ANNUAL REPORT

OF THE

MINISTER OF MINES

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE

YEAR ENDED 31ST DECEMBER

1944

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1945.

BRITISH COLUMBIA DEPARTMENT OF MINES.

VICTORIA, B.C.

Hon. E. C. CARSON, *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 1944 is herewith respectfully submitted.

ERNEST CRAWFORD CARSON,
Minister of Mines.

Minister of Mines' Office,
June, 1945.

Flying Officer James Roy Alexander Maconachie died in England on February 28th, 1945, and was buried with full military honours in Brookwood Regional Cemetery, Woking, England. He enlisted in the R.C.A.F. in 1942, and completed his training in navigation at Edmonton. In May, 1944, he went to England, where he was attached to an R.A.F. Mosquito Squadron. Flying Officer Maconachie was returning from his thirty-second operational flight over occupied Europe when his plane made a crash landing and he was killed.

He was born in Calgary, acquired his earlier education in Victoria and graduated from the University of British Columbia in Geological Engineering in 1934. In 1939 he returned to the University and obtained his M.A.Sc. in 1940.

He was on the engineering staff of the Premier Gold Mining Company in British Columbia for several years, and for a shorter period was with Boyles Brothers in Ontario. From March, 1938, until shortly before he enlisted in 1942, Maconachie was a member of the engineering staff of the British Columbia Department of Mines and was stationed at Nelson for most of this period.

Roy Maconachie's frankness, energy, ability, and pleasant manner won him many friends and inspired respect. His death is keenly regretted by the Department.

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THE MINING INDUSTRY IN BRITISH COLUMBIA.

The value of mineral production for 1944 was $54,923,802.* This amount is almost $11,000,000 less than the 1943 figure and is the lowest for any year since 1936. Compared with 1943, metal production was down almost $11,500,000 or 21 per cent. Non-metallic minerals, clay products, and other structural materials showed losses or gains which were not greater than 6 per cent. of the 1943 value. Coal production was some 112,000 tons more than 1943, an increase of $475,000 in value. Production of barite, sulphur, lime, and limestone also increased.

The decrease in the value of mineral production reflects the general shortage of labour. The reduction in value was greatest for the metals. For copper, lead, and zinc the reduction in quantity was even greater than the reduction in value as the prices used for 1944 are higher than those used for 1943. Production of placer gold, lode gold, silver, copper, lead, and zinc decreased 16 per cent. to 33 per cent. in quantity and 10 per cent. to 36 per cent. in value. The quantity of mercury was less than one-half that produced in 1943 and the value was little more than one-fourth of the 1943 value, reflecting a sharp decline in the price as well as the suspension of production. The value of antimony produced increased 48 per cent., while bismuth and cadmium were greatly reduced.

Five base-metal producers, including two mercury mines, were shut down during the year. Base Metals Mining Corporation, Limited, resumed milling in July, having been off production from January when the power plant was burned. Retallack Mines, Limited, began production at the old Whitewater mine. Hedley Mascot Gold Mines, Limited, resumed milling which had been suspended in September, 1943. Keen interest was shown in searching for lode deposits and exploratory work, done on several prospects and producing mines, gave encouraging results.

Production of coal was begun at the White Rapids mine adjoining the former Wellington-Extension Colliery in the Vancouver Island District and also at the Hasler Creek mine in the Peace River area. Production of coal decreased in the Vancouver Island and the Nicola-Princeton Districts and increased in the Northern and the East Kootenay Districts. Increased production from the open-cast mine at Corbin more than accounted for the increase for the East Kootenay District and for the Province.

The average number of employees in the industry (12,314) was slightly lower than the 1943 figure (12,448) and was the lowest for any year since 1933. Shortage of labour was general throughout the industry, and at the end of the year the total number employed was less than for the corresponding period in 1943. The average number employed in lode-mining underground decreased from 2,394 in 1943 to 1,896 in 1944, in other departments of lode-mining and of the mining industry losses or gains were much smaller. Some mines, notably gold-mines in the Hedley Camp, had more men working at the end of the year than they had at the same time in 1943, but others were still facing very serious labour shortage.

Dividends paid during 1944 amounted to $11,367,732, of which $413,595 was distribution of capital by a company not at present operating. Dividends in 1943 were $11,860,159, of which $399,101 was capital distribution. The dividends paid in 1939, when production had a value of $65,681,000, amounted to $11,865,000. Since 1939, taxes have increased greatly and the unit costs for labour and materials have also increased. It is apparent therefore that funds for maintenance, development, exploration, and reserves were very much less than available in 1939 for these purposes.

* Based on average prices for metals, *see* pages 11, 12, and 14, and on the price of $4.25 per long ton of coal.

It appears probable that demand for base metals will continue through 1945. Availability of labour therefore will have a very important bearing on production. The output of lode gold will probably be increased moderately, and production of silver, lead, and zinc may also increase, provided that the supply of labour is maintained. However, if the total number employed by the industry does not increase, improvement in one branch or department can only be at the expense of another; diversion of labour from base-metal mining might result in increased gold production at the expense of the output of base metal, or diversion of effort from production to exploration, development, or maintenance would result in a temporary decrease in output. Coal production is not expected to change greatly since even if more labour becomes available it will take time to put the mines in position to increase production materially. The open-cast coal mine at Corbin was shut down at the onset of winter, and should it not be operated in 1945 the total production of coal will probably be less than in 1944.

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 44.

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.) Gold-placer returns are received from operators giving production in crude ounces recovered. The fine-gold content is calculated and is then valued at the yearly average price of gold, which in 1944 was $38.50 per ounce. On this basis the average crude-gold value per ounce was $31.66 on Provincial placer-gold production.

(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.

Normally the prices used in valuing the different metals are: For gold, the average price for the year; for silver, the average New York metal-market price for the year; for lead, zinc, and copper the average London metal-market price for the year. Before 1932 copper was valued at the average New York price. The bulk of the lead and zinc production of the Province is sold on the basis of the London prices. The New York, St. Louis, and Montreal lead- and zinc-market prices differ materially from the London prices and therefore are not properly applicable in valuing British Columbia production of these metals. For some years British Columbia copper has been sold largely or entirely in the United States and the New York export price for copper rather than the London price is the basis for settlement. Any difference between the two prices introduces a variation in the gross value of copper production as calculated (*see* footnote, Table I.).

The following procedures are used to take care of the exchange fluctuations:—

(*a.*) Silver is valued at the average New York price, adjusted to Canadian funds at the average exchange rate.

(*b.*) Lead, zinc, and copper are valued at London prices, adjusted to Canadian funds at the average exchange rate.

Trading on the London Metal Exchange was suspended on the outbreak of war and since September 4th, 1939, prices in Great Britain have been controlled. The London market prices therefore could not serve as the basis for valuing mineral production. Since that time most of Canada's production of the principal base metals has been sold under contracts with the British and Canadian Governments and for the years 1940, 1941, and 1942 the prices used in valuing Canadian mineral production were those fixed by the contracts. British Columbia copper, however, continued to be sold in the United States and the price used for settlement was higher than the price as fixed in contracts with the British and Canadian Governments. Had the United States price been used in the calculation, the value of our copper production would have been materially greater (*see* note, Table I.).

For 1943 and 1944 production of copper, lead, zinc, and silver average prices were agreed upon with the Dominion Bureau of Statistics, in conjunction with the Dominion Metals Controller. These prices reflect the fact that several producers have been receiving higher prices than those fixed shortly after the outbreak of war.

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, 1943 and 1944.

	Quantity, 1943.	Quantity, 1944.	Value, 1943.	Value, 1944.	Per Cent. Increase (+) or Decrease (—). Quantity.	Value.
Metallics.			$	$		$
Antimony			189,408	281,000		+ 48.3
Bismuth			562,484	154,844		— 72.5
Cadmium			705,780	401,623		— 43.1
Copper* lb.	*42,307,510*	*36,300,589*	*4,971,132*	*4,356,070*	— 14.2	— 12.4
Gold, lode† fine, oz.	224,403	186,632	8,639,516	7,185,332	— 16.8	— 16.8
Gold, placer† crude, oz.	14,600	11,433	462,270	361,977	— 21.7	— 21.7
Lead lb.	405,285,476	294,797,469	15,214,417	13,265,886	— 27.3	— 12.8
Mercury lb.	1,690,240	755,908	4,559,200	1,210,375	— 55.3	— 73.5
Silver oz.	8,526,310	5,705,334	3,858,496	2,453,293	— 33.1	— 36.4
Tungsten concentrates			702,385	236,788		— 66.3
Zinc lb.	*335,137,014*	*280,356,477*	*13,405,481*	*12,055,328*	— 16.3	— 10.1
Other precious metals			270			
Other metals			478,344	299,643		— 37.4
Totals			*53,749,183*	*42,262,159*		— 21.4
Fuel.						
Coal (2,240 lb.) tons	1,821,654	1,932,639	7,742,030	8,217,966	+ 6.1	+ 6.1
Non-metallics.						
Barytes, diatomite, fluorspar, and mica			19,207	63,579		+231.0
Fluxes—limestone, quartz tons	78,713	63,443	140,299	100,283	— 19.4	— 28.5
Granules—slate and rock, talc tons	664	949	11,711	17,903	+ 42.9	+ 52.9
Gypsum products, gypsite			142,176	103,927		— 26.9
Iron oxides			4,836	8,200		+ 69.6
Sodium carbonate, magnesium sulphate tons	427	43	4,697	473	— 89.9	— 89.9
Sulphur‡ tons	104,599	113,374	1,039,108	1,123,868	+ 8.4	+ 8.3
Totals			1,362,034	1,418,233		+ 4.1
Clay Products and Other Structural Materials.						
Clay Products.						
Brick—						
Common No.	2,736,792	2,038,193	55,508	40,936	— 25.5	— 26.3
Face, paving, sewer brick No.	695,064	1,182,784	21,825	41,495	+ 70.2	+ 90.1
Firebricks, blocks			227,594	181,199		— 20.4
Fireclay tons	706	3,706	9,706	17,283	+425.0	+ 78.1
Structural tile-hollow blocks			27,617	26,527		— 3.9
Drain-tile, sewer-pipe No.	1,204,508	1,733,114	153,153	165,905	+ 43.9	+ 8.3
Pottery—glazed or unglazed			2,917			
Other clay products; bentonite			5,485	3,444		— 37.2
Totals			503,805	476,789		— 5.4
Other Structural Materials.						
Cement			1,146,865	1,085,918		— 5.3
Lime and limestone ton	128,469	147,444	340,988	421,648	+ 14.8	+ 23.7
Sand and gravel			890,058	935,370		+ 5.1
Stone tons	3,084	1,075	56,436	64,794	— 34.9	+ 14.8
Rubble, riprap, crushed rock tons	108,122	44,423	100,996	40,926	— 58.9	— 59.5
Totals			2,535,343	2,548,656		+ 0.5
Total value in Canadian funds			65,892,395	54,923,803		— 16.6

* Dominion production of copper is evaluated at the average price on the London market, and in order that the Dominion and Provincial compilations shall agree the same prices are used in calculating the value of British Columbia copper production shown in the above table. However, British Columbia copper production is sold in *the United States and had the value been calculated, using the United States export price converted into* Canadian funds, an additional gross amount of about $473,845 could be added to the above value for 1943 and $315,815 for 1944. For 1944 production of copper, lead, zinc, and silver, the Dominion Bureau of Statistics, in conjunction with the Dominion Metals Controller, realizing several of the producers were getting higher prices than those fixed shortly after the outbreak of war, agreed on what would be more adequate average prices, and the production values in Table I. reflect that trend. British Columbia lead, zinc, and silver, in addition to being exported to the United Kingdom under war-time contracts, are disposed of in considerable volume in Eastern Canada and the United States.

† 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 ,,	13.33 ,,	5.16 ,,	4.86 ,,
1923	.....	61.63 ,,	14.42 ,,	6.54 ,,	5.62 ,,
1924	.....	63.442 ,,	13.02 ,,	7.287 ,,	5.39 ,,
1925	.....	69.066 ,,	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	36.141	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 ,,	*3.764 ,,	*4.00 ,,
1944	**38.50**	***43.000** ,,	***12.000** ,,	***4.500** ,,	***4.300** ,,
Average, 1940–44 (inclusive)	38.50	41.186 ,,	10.801 ,,	3.668 ,,	3.706 ,,

* Refer to foot-note on Table I. regarding average prices of copper, silver, lead, and zinc for 1944.

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 1944.

Gold, placer	$91,899,360*
Gold, lode	326,156,278*
Silver	157,453,774
Copper	335,000,889
Lead	340,362,773
Zinc	221,831,454
Coal and coke	423,304,535
Structural materials	93,361,649
Miscellaneous metals, minerals, and materials	44,749,983
Total	$2,034,120,695

* Canadian funds.

TABLE IV.—PRODUCTION FOR EACH YEAR FROM 1852 TO 1944 (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		
1920	35,543,084	Total	$2,034,120,695

* Canadian funds.

TABLE V.—Quantities and Values of Mine Products for 1941, 1942, 1943, and 1944.

Description.	1941.		1942.		1943.		1944.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer* ....crude, oz.	43,775	$1,385,962	32,904	$1,041,772	14,600	$462,270	11,433	$361,977
Gold, lode* ....fine, oz.	571,026	21,984,501	444,518	17,113,943	224,403	8,639,516	186,632	7,185,332
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
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
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
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
Coal .....long tons	1,802,353	7,660,000	1,938,158	8,237,172	1,821,654	7,742,030	1,933,639	8,217,966
Structural materials	.....	2,845,262	.....	3,143,382	.....	3,039,148	.....	3,025,445
Miscellaneous metals and minerals	.....	4,372,476	.....	7,769,288	.....	8,559,905	.....	4,002,506
Totals	.....	$78,479,719	.....	$75,551,093	.....	$65,892,395	.....	$54,923,803

* Canadian funds.

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

Year.	GOLD.		SILVER.		COPPER.		LEAD.		ZINC.		Total Value.
	Oz.	Value.	Oz.	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	2,175,932	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	56,737,651	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	96,668,152	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	131,763,147	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	77,930,223	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	4,680,775	59,097,716	5,952,856	463,269,005	15,575,104	396,857,260	13,536,301	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
Totals	12,059,190	326,156,278	301,083,027	157,453,774	2,381,497,927	335,000,889	8,317,640,995	340,362,773	5,413,989,798	221,831,454	1,380,805,168

* Canadian funds.

TABLE VII.—VALUE OF GOLD PRODUCTION TO DATE.

Year.	Placer Gold.		Lode Gold.		Total.
	Crude, Oz.	Value.	Fine, Oz.	Value.	
1858–1862	493,582	$9,871,634	———	———	$9,871,634
1863–1867	814,180	16,283,592	———	———	16,283,592
1868–1872	494,766	9,895,318	———	———	9,895,318
1873–1877	450,960	9,019,201	———	———	9,019,201
1878 1882	278,996	5,579,911	———	———	5,579,911
1883–1887	192,076	3,841,515	———	———	3,841,515
1888–1892	126,271	2,525,426	———	———	2,525,426
1893	17,806	356,131	1,170	$23,404	379,535
1894	20,276	405,516	6,252	125,014	530,530
1895	24,084	481,683	39,270	785,400	1,267,083
1896	27,201	544,026	62,259	1,244,180	1,788,206
1897	25,676	513,520	106,141	2,122,820	2,636,340
1898	32,167	643,346	110,061	2,201,217	2,844,563
1899	67,245	1,344,900	138,315	2,857,573	4,202,473
1900	63,936	1,278,724	167,153	3,453,381	4,732,105
1901	48,505	970,100	210,384	4,348,605	5,318,703
1902	53,657	1,073,140	236,491	4,888,269	5,961,409
1903	53,021	1,060,420	232,831	4,812,616	5,873,036
1904	55,765	1,115,300	222,042	4,589,608	5,704,908
1905	48,465	969,300	238,660	4,933,102	5,902,402
1906	47,420	948,400	224,027	4,630,639	5,579,039
1907	41,400	828,000	196,179	4,055,020	4,883,020
1908	32,350	647,000	255,582	5,282,880	5,929,880
1909	23,850	477,000	238,224	4,924,090	5,401,090
1910	27,000	540,000	267,701	5,533,380	6,073,380
1911	21,300	426,000	228,617	4,725,513	5,151,513
1912	27,775	555,500	257,496	5,322,442	5,877,942
1913	25,000	510,000	272,254	5,627,490	6,137,490
1914	28,500	565,000	247,170	5,109,004	5,674,004
1915	38,500	770,000	250,021	5,167,934	5,937,934
1916	29,025	580,500	221,932	4,587,334	5,167,834
1917	24,800	496,000	114,523	2,367,190	2,863,190
1918	16,000	320,000	164,674	3,403,812	3,723,812
1919	14,325	286,500	152,426	3,150,645	3,437,145
1920	11,080	221,600	120,048	2,481,392	2,702,992
1921	11,660	233,200	135,663	2,804,154	3,037,354
1922	18,240	368,800	197,856	4,089,684	4,458,484
1923	20,320	420,000	179,245	3,704,994	4,124,994
1924	21,037	420,750	247,716	5,120,535	5,541,285
1925	16,476	230,092	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	404,472	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	32,904	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*
Totals	4,403,598	$91,899,360	12,059,190	$326,156,278	$418,055,636

* Canadian funds.

TABLE VIII.—VALUE OF MINE PRODUCTION BY DIVISIONS, 1941, 1942, 1943, AND 1944.

Mining Division.	1941.	1942.	1943.	1944.
Atlin	$1,449,341	$1,401,357	$314,005	$255,539
Portland Canal	2,262,577	1,796,684	1,100,439	732,087
Skeena	640,785	430,090	58,309	32,211
Stikine	32,991	16,211	2,311	1,520
Cariboo	3,157,927	2,465,413	1,161,053	979,399
Omineca	1,547,379	3,273,590	5,357,775	1,409,984
Peace River	2,459	13,910	59,354	58,251
Quesnel	170,457	77,082	20,360	13,804
Kamloops	183,054	183,406	161,820	124,130
Nicola	107,525	122,930	155,606	83,032
Vernon	34,657	10,409	2,177	3,225
Greenwood	740,814	511,553	361,396	275,571
Osoyoos	2,223,666	2,429,785	1,490,228	1,837,959
Similkameen	4,786,602	4,111,591	3,497,570	3,242,076
Ainsworth	44,408	25,270	49,405	277,435
Arrow Lake	127	.....	.....	.....
Fort Steele	35,417,691	35,427,802	34,397,668	30,532,861
Golden	721,155	528,800	438,726	324,525
Lardeau	11,823	1,031	95	1,288
Nelson	3,748,001	2,682,612	892,159	544,663
Revelstoke	19,443	30,997	29,031	19,664
Slocan	625,979	884,623	1,089,433	1,193,092
Trail Creek	3,095,444	4,154,407	3,282,427	2,246,794
Windermere	95	.....	.....	.....
Alberni	44,257	34,696	527,401	9,725
Ashcroft	9,963	59,598	9,964	14,809
Clayoquot	2,429,603	1,612,444	.....	.....
Clinton	13,688	8,602	5,679	1,803
Lillooet	5,991,503	5,093,991	3,312,574	3,072,599
Nanaimo	3,034,831	3,418,984	3,436,235	3,353,930
New Westminster	679,169	654,719	607,133	597,569
Quatsino	16,347	.....	.....	.....
Vancouver	4,024,175	2,596,739	2,607,391	2,233,911
Victoria	1,211,793	1,491,767	1,465,011	1,450,347
Totals	$78,479,719	$75,551,093	$65,892,395	$54,923,803

TABLE IX.A (1943 AND 1944).—PRODUCTION IN DETAIL OF PLACER GOLD, LODE GOLD, AND SILVER.

Divisions.	Year.	Tons.	GOLD—PLACER.		GOLD—LODE.		SILVER.	
			Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
				$		$		$
Atlin	1943		9,814	310,734				
	1944	**50**	**7,826**	**247,777**	**141**	**5,428**	**87**	**37**
Portland Canal	1943	93,003			22,157	853,045	335,600	151,872
	1944	**68,496**			**15,289**	**588,627**	**109,630**	**47,141**
Skeena	1943		31	982				
	1944		**19**	**601**				
Stikine	1943		73	2,311				
	1944		**48**	**1,520**				
Cariboo	1943	60,884	2,751	87,103	26,397	1,016,285	2,905	1,315
	1944	**54,227**	**1,895**	**59,997**	**23,030**	**886,655**	**2,189**	**941**
Omineca	1943		1,004	31,789				
	1944		**952**	**30,141**				
Peace River	1943							
	1944							
Quesnel	1943		639	20,232				
	1944		**430**	**13,614**				
Kamloops	1943		49	1,551				
	1944	**1**	**16**	**507**	**13**	**500**		
Nicola	1943							
	1944	**6**			**10**	**385**	**370**	**159**
Vernon	1943	38	14	443	10	385	7	3
	1944	**32**			**10**	**385**	**31**	**13**
Greenwood	1943	3,909			814	31,339	381,255	172,533
	1944	**2,056**			**575**	**22,138**	**337,555**	**145,149**
Osoyoos	1943	115,488			36,466	1,403,941	5,141	2,327
	1944	**130,776**			**45,960**	**1,769,460**	**5,831**	**2,507**
Similkameen	1943	1,363,346	18	570	6,464	248,864	156,507	70,826
	1944	**1,383,286**	**4**	**127**	**5,603**	**215,716**	**147,895**	**63,509**
Ainsworth	1943	13,126					7,984	3,613
	1944	**49,971**			**10**	**385**	**28,603**	**12,299**
Fort Steele	1943	2,500,714	68	2,153			7,007,800	3,171,310
	1944	**2,141,397**	**40**	**1,266**			**4,535,800**	**1,950,394**
Golden	1943	61,770					19,133	8,658
	1944	**24,995**					**10,408**	**4,476**
Lardeau	1943		3	95				
	1944	**27**			**3**	**115**	**547**	**235**
Nelson	1943	51,504	2	63	21,497	827,635	11,244	5,088
	1944	**16,267**	**6**	**190**	**6,979**	**268,692**	**5,374**	**2,311**
Revelstoke	1943		8	253				
	1944		**43**	**1,361**				
Slocan	1943	137,645			141	5,428	420,396	190,246
	1944	**140,886**			**88**	**3,388**	**427,358**	**183,764**
Trail Creek	1943	2,428			417	16,054	63,353	28,670
	1944	**121**			**356**	**13,706**	**153**	**66**
Alberni	1943	14,106			13,485	519,173	5,352	2,422
	1944	**54**			**145**	**5,582**	**114**	**49**
Ashcroft	1943		27	855				
	1944		**38**	**1,203**				
Clinton	1943		31	982				
	1944		**42**	**1,330**				
Lillooet	1943	144,897	56	1,773	85,078	3,275,503	21,247	9,615
	1944	**126,616**	**45**	**1,425**	**79,462**	**3,059,287**	**18,281**	**7,861**
Nanaimo	1943							
	1944		**6**	**190**				
New Westminster	1943		12	380				
	1944		**23**	**728**				
Vancouver	1943	849,147			10,922	420,497	73,645	33,327
	1944	**606,717**			**8,287**	**319,049**	**59,370**	**25,529**
Victoria	1943				555	21,367	14,741	6,671
	1944	**17,341**			**671**	**25,834**	**15,938**	**6,853**
Totals	1943	5,429,557	14,600	462,270	224,403	8,639,516	8,526,310	3,858,496
	1944	**4,763,332**	**11,433**	**361,977**	**186,632**	**7,185,332**	**5,705,334**	**2,453,293**

TABLE IXB (1943 AND 1944).—PRODUCTION IN DETAIL OF COPPER, LEAD, AND ZINC.

Divisions.	Year.	Copper.		Lead.		Zinc.	
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
			$		$		$
Atlin	1943						
	1944						
Portland Canal	1943	113,208	13,302	1,899,457	71,306		
	1944	120,061	14,407	1,620,265	81,912		
Skeena	1943						
	1944						
Stikine	1943						
	1944						
Cariboo	1943						
	1944						
Omineca	1943						
	1944						
Peace River	1943						
	1944						
Quesnel	1943						
	1944						
Kamloops	1943						
	1944						
Nicola	1943						
	1944			4,221	190	597	26
Vernon	1943						
	1944						
Greenwood	1943			230,406	8,650	296,564	11,863
	1944			174,010	7,830	201,076	8,646
Osoyoos	1943	68,679	8,069				
	1944	182,594	21,911				
Similkameen	1943	22,892,724	2,689,895				
	1944	22,248,642	2,669,837				
Ainsworth	1943			458,629	17,217	615,620	24,625
	1944			1,327,067	59,718	4,657,568	200,276
Fort Steele	1943			396,153,000	14,871,584	307,084,000	12,283,360
	1944			287,831,000	12,952,395	247,563,000	10,645,209
Golden	1943			3,731,081	140,065	6,350,377	254,015
	1944			880,720	39,632	5,184,654	222,940
Lardeau	1943						
	1944			12,578	566	8,661	372
Nelson	1943			71,320	2,677	61,396	2,456
	1944			60,438	2,720	62,863	2,703
Revelstoke	1943						
	1944						
Slocan	1943			2,223,448	83,468	20,257,281	810,291
	1944			2,550,361	114,766	20,724,981	891,174
Trail Creek*	1943	2,585,886	303,783	399,925	15,013		
	1944						
Alberni	1943						
	1944						
Ashcroft	1943						
	1944						
Clinton	1943						
	1944						
Lillooet	1943						
	1944						
Nanaimo	1943						
	1944						
New Westminster	1943						
	1944						
Vancouver	1943	16,436,868	1,931,332	73,075	2,743		
	1944	13,435,660	1,612,279	52,656	2,370		
Victoria	1943	210,645	24,751	45,185	1,694	471,776	18,871
	1944	313,632	37,636	84,153	3,787	1,953,077	83,932
Totals	1943	42,307,510	4,971,132	405,285,476	15,214,417	335,137,014	13,405,481
	1944	36,300,589	4,356,070	294,797,469	13,265,886	280,356,477	12,055,328

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

TABLE IX.C.—PRODUCTION VALUE OF PLACER GOLD, LODE GOLD, SILVER, COPPER, LEAD, AND ZINC IN 1940, 1941, 1942, 1943, AND 1944.

Divisions.	1940.	1941.	1942.	1943.	1944.
	$	$	$	$	$
Atlin	1,245,709	1,445,031	1,393,567	310,734	253,242
Portland Canal	2,211,087	2,253,299	1,796,684	1,089,525	732,087
Skeena	591,021	547,908	354,617	982	601
Stikine	67,154	32,991	16,211	2,311	1,520
Cariboo	2,774,971	3,077,675	2,415,991	1,104,703	947,593
Omineca	201,473	170,039	62,897	31,789	30,141
Peace River	5,984	2,438	760	.....	.....
Quesnel	223,183	167,297	74,625	20,232	13,614
Kamloops	36,809	8,073	5,713	1,552	1,007
Nicola	30,424	9,436	.....	.....	760
Vernon	17,536	30,122	7,473	831	398
Greenwood	727,331	711,981	458,573	224,385	183,763
Osoyoos	2,030,408	2,173,069	2,122,417	1,414,337	1,793,878
Similkameen	4,564,452	4,351,322	3,621,198	3,010,155	2,949,189
Ainsworth	24,862	34,308	3,870	45,455	272,678
Fort Steele	29,147,985	31,013,289	30,921,250	30,328,407	25,549,264
Golden	1,021,881	700,911	497,178	402,738	267,048
Lardeau	13,433	11,823	.....	95	1,288
Nelson	4,057,804	3,686,326	2,633,021	837,919	276,616
Revelstoke	2,976	2,596	1,108	253	1,361
Slocan	138,730	626,106	884,623	1,089,433	1,193,092
Trail Creek	564,603	322,166	178,645	363,520	13,772
Alberni	2,905,014	2,450,639	1,610,534	521,595	5,631
Ashcroft	17,382	1,362	7,535	855	1,203
Clinton	69,996	11,420	6,554	982	1,330
Lillooet	5,607,347	5,982,811	5,075,552	3,286,891	3,068,573
Nanaimo	39,258	1,379	1,102	.....	190
New Westminster	20,598	32,095	3,758	380	728
Vancouver	4,833,476	3,742,673	2,245,915	2,387,899	1,959,227
Victoria	4,180	1,456	380	73,354	158,092
Totals	63,197,067	63,601,981	56,401,251	46,551,312	39,677,886

TABLE IX.D.—Production of Placer Gold, Lode Gold, and Silver, 1900–1944.

Divisions.	Gold—Placer.		Gold—Lode.		Silver.	
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
		$		$		$
Atlin*	619,937	14,548,917	107,245	3,731,522	56,939	34,072
Portland Canal	201	4,260	1,816,119	47,257,050	48,985,016	27,234,054
Skeena	3,898	86,068	414,794	9,379,046	265,198	182,759
Stikine	29,169	761,329	114	4,120	20	8
Cariboo†	1,910,604	38,971,325	514,582	18,917,706	56,692	24,729
Omineca	46,236	1,214,702	8,638	197,545	2,350,470	1,454,199
Peace River	4,057	93,217	.....	.....	.....	.....
Quesnel‡	621,002	12,906,751	198	7,156	271	110
Kamloops	3,300	82,454	39,376	1,318,141	281,229	167,209
Nicola	230	4,652	8,520	234,747	266,829	126,121
Vernon	2,082	54,650	5,212	175,639	7,674	3,793
Greenwood	4,038	95,634	1,084,742	23,364,526	22,513,766	11,252,031
Osoyoos	188	4,079	1,097,098	30,683,318	508,374	323,021
Similkameen	7,049	159,477	95,990	3,204,890	4,480,917	1,053,598
Ainsworth	213	5,690	3,865	112,829	6,532,603	3,934,487
Fort Steele	17,078	395,083	2,532	56,964	141,307,456	66,931,196
Golden	466	11,203	70	1,447	1,319,909	790,067
Lardeau	1,755	37,886	24,889	652,366	2,085,116	1,119,850
Nelson	3,173	79,594	1,227,528	37,242,768	4,161,119	2,240,645
Revelstoke	4,040	87,520	12	335	56,097	31,309
Slocan	150	3,596	6,351	155,734	40,325,739	24,356,939
Trail Creek	848	24,176	2,604,254	55,569,591	3,306,125	1,843,618
Alberni	1,579	32,094	271,732	10,235,406	147,158	67,003
Ashcroft	10,980	252,823	8,476	289,680	16,804	9,513
Clinton	9,977	237,522	23,391	827,260	31,564	14,214
Lillooet§	90,494	1,853,470	1,736,183	602,287,217	460,512	205,414
Nanaimo	578	13,411	67,890	1,426,275	518,645	298,523
New Westminster	10,250	233,900	4,311	233,172	13,373	5,960
Vancouver	182	5,306	297,210	8,954,225	3,612,081	1,939,873
Victoria	612	15,223	36,574	777,845	765,054	412,656
Provincial totals	3,404,354	72,276,126	11,509,896	316,775,645	282,260,139	146,056,921

* 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.

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

TABLE IX.E.—PRODUCTION OF COPPER, LEAD, AND ZINC, 1900–1944.

Divisions.	Copper.		Lead.		Zinc.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
		$		$		$
Atlin	83,161	11,949	109,945	7,036	.....	.....
Portland Canal	649,583,558	96,784,583	29,918,485	1,254,149	.....	.....
Skeena	7,671,642	1,216,080	88,539	1,287	15,277	490
Stikine	.....	.....	.....	.....	.....	.....
Cariboo	.....	.....	656	30	492	16
Omineca	6,126,209	1,345,688	6,239,613	345,809	3,960,018	248,654
Peace River	.....	.....	.....	.....	.....	.....
Quesnel	.....	.....	.....	.....	.....	.....
Kamloops	5,767,133	1,021,694	368,662	20,737	409,170	26,063
Nicola	536,304	103,443	2,223,285	88,851	319,990	10,510
Vernon	614	89	6,374	293	2,820	149
Greenwood	441,171,575	70,493,191	9,266,504	367,947	9,252,635	310,173
Osoyoos	1,962,403	218,490	252,418	7,475	5,209	163
Similkameen	321,935,811	38,031,401	238,577	9,006	64,377	2,616
Ainsworth	10,175	1,201	123,873,333	6,042,190	39,200,116	1,240,474
Fort Steele	28,592	6,193	7,521,518,404	305,829,828	4,808,871,816	193,865,097
Golden	57,378	10,590	95,516,371	3,497,083	105,760,010	3,632,564
Lardeau	5,594	785	9,569,432	382,498	447,139	20,393
Nelson	5,685,261	889,008	53,532,567	2,340,547	24,695,688	1,464,396
Revelstoke	683	124	939,741	55,885	8,903	469
Slocan	219,318	42,287	297,398,760	14,213,235	240,773,132	13,939,310
Trail Creek*	116,850,749	17,374,402	16,970,979	689,209	157,917,364	5,292,401
Alberni	2,225,948	333,373	108,328	3,679	.....	.....
Ashcroft	633,775	155,721	99	4	.....	.....
Clinton	57,548	5,905	193	7	.....	.....
Lillooet	400	41	62,463	2,542	.....	.....
Nanaimo	20,223,405	3,201,703	.....	.....	.....	.....
New Westminster	26,489	6,379	28,144	1,081	12,163	415
Vancouver	722,684,844	97,925,010	7,884,077	275,172	17,981,772	563,988
Victoria	21,034,675	3,112,698	129,288	5,481	2,424,853	102,853
Provincial totals	3,324,583,244	332,292,028	8,175,196,237	335,441,061	5,413,989,798	220,831,449

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

TABLE IX.F.—PRODUCTION VALUE OF PLACER GOLD, LODE GOLD, SILVER, COPPER, LEAD, AND ZINC, BY MINING DIVISIONS, 1900–1944.

Divisions.	Mining Division Total.
Atlin*	$18,333,496
Portland Canal	172,644,350
Skeena	11,465,834
Stikine	765,457
Cariboo†	57,913,806
Omineca	4,806,597
Peace River	93,217
Quesnel‡	12,914,017
Kamloops	2,636,298
Nicola	568,315
Vernon	234,613
Greenwood	105,883,502
Osoyoos	31,236,546
Similkameen	42,460,988
Ainsworth	11,336,871
Fort Steele	567,084,361
Golden	7,942,904
Lardeau	2,213,788
Nelson	45,256,958
Revelstoke	175,642
Slocan	52,711,101
Trail Creek	80,793,397
Alberni	10,671,555
Ashcroft	707,741
Clinton	1,084,908
Lillooet§	62,348,684
Nanaimo	4,939,912
New Westminster	358,042
Vancouver	109,663,574
Victoria	4,426,756
Provincial totals	$1,423,673,230

* 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.
§ Lillooet totals include estimated placer gold production from and including 1874.

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

Divisions.	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	.....	.....	.....	430	1,867	.....	.....	.....	.....	.....	.....	.....	.....	2,297
Portland Canal and Skeena	.....	18,724	.....	118	12,768	.....	.....	.....	.....	.....	.....	.....	.....	31,610
Cariboo and Quesnel	.....	.....	.....	74	31,536	.....	.....	.....	.....	.....	.....	.....	.....	31,610
Omineca and Peace River	.....	.....	.....	.....	67,838	.....	.....	.....	.....	.....	.....	.....	.....	67,838
Nicola, Vernon, and Kamloops	.....	.....	1,500	640	19,785	.....	.....	1,011	.....	316	.....	.....	.....	23,252
Greenwood, Osoyoos, and Similkameen	.....	.....	.....	8,049	37,907	.....	.....	.....	.....	.....	.....	.....	1,504	47,460
Fort Steele and Golden	.....	.....	.....	3,010	227,231	.....	.....	.....	.....	.....	.....	.....	.....	230,241
Ainsworth, Slocan, and Nelson	.....	.....	7,394	1,459	25,256	.....	.....	.....	.....	.....	.....	.....	.....	34,109
Trail Creek and Revelstoke	.....	.....	400	9,748	21,594	.....	.....	.....	.....	.....	.....	.....	.....	31,742
Alberni, Nanaimo, and Victoria	1,085,918	398,552	.....	1,296	172,220	13,115	.....	.....	.....	8,891	6,239	.....	.....	1,686,231
Ashcroft, Lillooet, and Clinton	.....	.....	.....	332	14,886	.....	.....	.....	.....	.....	.....	.....	.....	15,218
Vancouver and New Westminster	.....	4,372	55,500	15,770	302,482	27,821	41,495	180,188	17,283	17,320	159,666	.....	1,940	823,837
Totals	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

TABLE XI.—Production in Detail of Miscellaneous Metals, Minerals, and Materials, 1944.

Division.	Antimony.	Bismuth.	Cadmium.	Diatomite, Mica.	Flux (Limestone and Quartz).	Gypsum Products.	Iron Oxides, Barite.	Mercury.	Slate and Rock Granules.	Sodium Carbonate.	Sulphur.	Tungsten Concentrates.	Others.	Division Totals.
	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Skeena														
Cariboo and Omineca								1,210,375						1,210,375
Peace River and Quesnel				190										190
Kamloops and Greenwood					84,173	103,927								188,100
Osoyoos and Similkameen				15,382	1,440									16,822
Fort Steele, Golden, and Lardeau														
Ainsworth, Nelson, and Revelstoke			1,907									236,788		238,695
Trail Creek	281,000	154,844	399,716								1,084,380		299,643	2,219,583
Ashcroft and Clinton										473				473
Lillooet and Nanaimo					14,340									14,340
Vancouver and Victoria					330		8,200		17,903		39,488			65,921
Totals	281,000	154,844	401,623	15,572	100,283	103,927	8,200	1,210,375	17,903	473	1,123,868	236,788	299,643	3,954,499

751 Dunsmuir Street * Vancouver 1, B. C.

TABLE XII.—British Columbia Mine Production, 1895–1944.

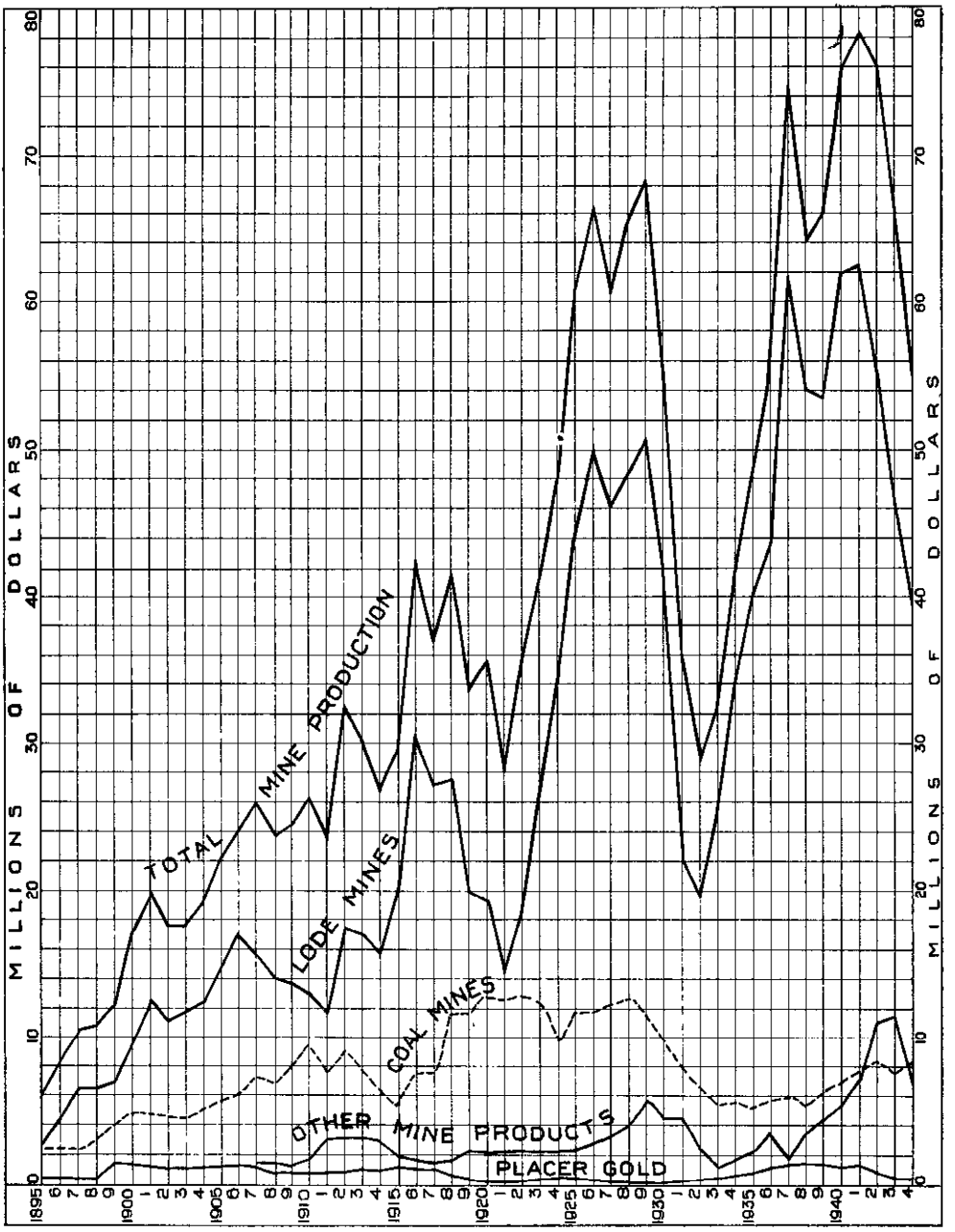


TABLE XIII.—Production of Lode Mines in British Columbia, 1913–1944.

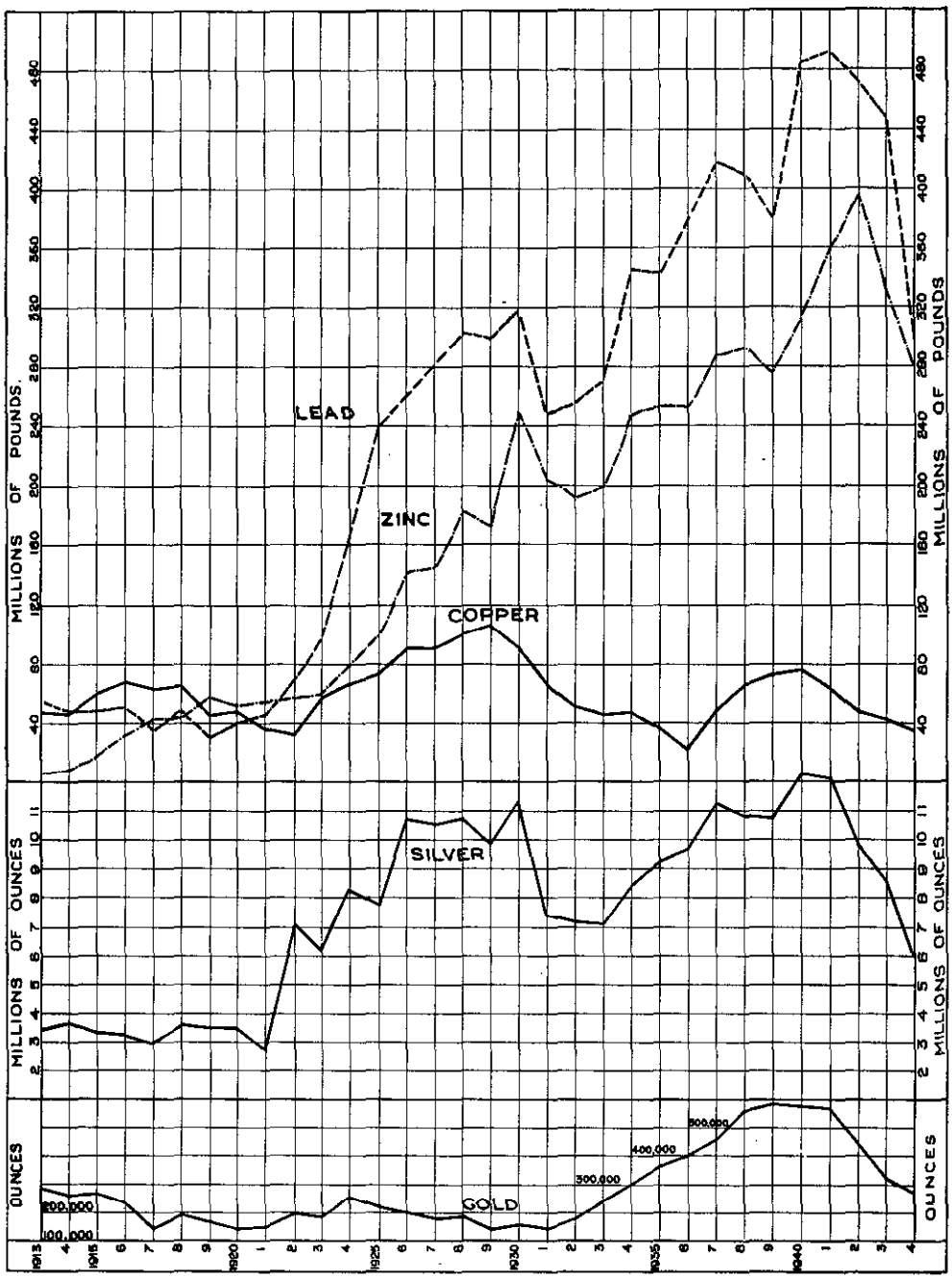


TABLE XIV.—Coal Production per Year to Date.*

	Tons. (2,240 lb.)	Value.		Tons. (2,240 lb.)	Value.
1836–1885	3,029,011	$9,468,557	1916	2,084,093	$7,294,325
1886	326,636	979,908	1917	2,149,975	7,524,913
1887	413,360	1,240,080	1918	2,302,245	11,511,225
1888	489,301	1,467,903	1919	2,267,541	11,337,705
1889	579,830	1,739,490	1920	2,595,125	12,975,625
1890	678,140	2,034,420	1921	2,483,995	12,419,975
1891	1,029,097	3,087,291	1922	2,511,843	12,559,215
1892	826,335	2,479,005	1923	2,453,223	12,266,115
1893	978,294	2,934,882	1924	1,939,526	9,697,630
1894	1,012,953	3,038,859	1925	2,328,522	11,642,610
1895	939,654	2,818,962	1926	2,330,036	11,650,180
1896	896,222	2,688,666	1927	2,453,827	12,269,135
1897	882,854	2,648,562	1928	2,526,702	12,633,510
1898	1,135,865	3,407,595	1929	2,251,252	11,256,260
1899	1,306,324	3,918,972	1930	1,887,130	9,435,650
1900	1,439,595	4,318,785	1931	1,707,590	7,684,155
1901	1,460,331	4,380,993	1932	1,534,975	6,523,644
1902	1,397,394	4,192,182	1933	1,264,746	5,375,171
1903	1,168,194	3,504,582	1934	1,347,090	5,725,133
1904	1,253,628	3,760,884	1935	1,187,968	5,048,864
1905	1,384,312	4,152,936	1936	1,346,471	5,722,502
1906	1,517,303	4,551,909	1937	1,444,687	6,139,920
1907	1,800,067	6,300,235	1938	1,309,428	5,566,069
1908	1,677,849	5,872,472	1939	1,477,872	6,280,956
1909	2,006,476	7,022,666	1940	1,667,827	7,088,265
1910	2,800,046	9,800,161	1941	1,802,353	7,660,000
1911	2,193,062	7,675,717	1942	1,938,158	8,237,172
1912	2,628,804	9,200,814	1943	1,821,654	7,742,030
1913	2,137,483	7,481,190	1944	1,933,639	8,217,966
1914	1,810,967	6,338,385			
1915	1,611,129	5,638,952	Totals	99,160,009	$397,630,935

* 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	4,393,255	$25,673,600
1912	264,333	1,585,998			

TABLE XVI.—Coke and By-products Production of British Columbia, 1943 and 1944.

Description.	1943.		1944.	
	Quantity.	Value.	Quantity.	Value.
Coal used in making coke, long tons	232,441	$983,910	190,074	$1,439,891
Coke made in bee-hive ovens, long tons	38,184	$291,843	33,005	$391,201
Coke made in by-product ovens, long tons	39,192	274,402	42,322	347,245
Coke made in gas plants, long tons	83,673	647,482	78,955	565,393
Total coke made, long tons	161,049	$1,213,727	154,282	$1,213,839
Gas sold and used		2,453,592		2,562,610
Tar produced		96,249		56,476
Other by-products		18,321		19,046
Total production value of coke industry		$3,781,889		$3,851,971

TABLE XVII.—Dividends paid by Mining Companies, 1897–1944.

*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	12,958,550
Belmont-Surf Inlet	Princess Royal Island	Gold	1,437,500
Cariboo Gold Quartz Mines, 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	1,034,945
I.X.L.	Rossland	Gold	134,025
Jewel-Denero	Greenwood	Gold	11,751
Kelowna Exploration, Ltd. (Nickel Plate)	Hedley	Gold	1,350,000
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	†290,000
Reno Gold Mines, Ltd.	Sheep Creek	Gold	†1,433,640
Sheep Creek Gold Mines, Ltd.	Sheep Creek	Gold	2,362,500
Silbak Premier Mines, Ltd.	Premier	Gold	‡2,250,000
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			$67,984,059

* 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, 1897–1944—*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	*126,455,483
Couverapee	Field	Silver-lead-zinc	5,203
Duthie Mines, Ltd.	Smithers	Silver-lead-zinc	50,000
Florence Silver	Ainsworth	Silver-lead-zinc	35,393
Goodenough	Cody	Silver-lead-zinc	45,668
H.B. Mining Co.	Hall Creek	Silver-lead-zinc	8,904
Highland Lass, Ltd.	Beaverdell	Silver-lead-zinc	132,464
Highland Bell, Ltd.	Beaverdell	Silver-lead-zinc	633,256
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	131,824
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			$137,691,507

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

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

TABLE XVII.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1944—*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	26,568,261
Marble Bay	Texada Island	Copper	175,000
Hall Mines	Nelson	Copper	233,280
Miscellaneous mines		Copper	261,470
Total, copper mines			$39,373,359

* 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, cannot be credited to British Columbia. Dividends in the above table for *Britannia* have been paid by that company, none being paid subsequent to 1930, until 1939. In making comparison with yearly totals the amounts shown as paid by the Howe Sound Company have been deducted for the years shown, so the total in the annual report concerned will show the higher figure.

† 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, Copper Mountain, and a coal mine near Princeton.

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	13,240,726
Total	$29,240,726

Miscellaneous, Structural, and Placer Gold.

Various	$2,758,104

Aggregate of all Classes.

Lode-gold mining	$67,984,059
Silver-lead-zinc mining and smelting	137,691,507
Copper-mining	39,373,359
Coal-mining	29,240,726
Miscellaneous, structural, and placer gold	2,758,104
Total	$277,047,755

TABLE XVII.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1944—*Continued.*

Dividends paid Yearly, 1917–1944, inclusive.

Year.	Amount paid.	Year.	Amount paid.
1917	$3,269,494	1932	$2,786,958
1918	2,704,469	1933	2,471,735
1919	2,494,283	1934	4,745,905
1920	1,870,296	1935	7,386,070
1921	736,629	1936	10,513,705
1922	3,174,756	1937	15,085,293
1923	2,983,570	1938	12,068,875
1924	2,977,276	1939	11,865,698
1925	5,853,419	1940	14,595,530
1926	8,011,137	1941	16,598,110
1927	8,816,681	1942	13,627,104
1928	9,572,536	1943	11,860,159
1929	11,263,118	1944	11,367,732
1930	10,543,500		
1931	4,650,857	Total	$213,894,895

Dividends paid during 1943 and 1944.

	1943.	1944.
Beaver Silver Mines, Ltd.	*$48,000	----
Bralorne Mines, Ltd.	1,496,400	$1,496,400
Britannia Mining and Smelting Co., Ltd.	----	183,932
Cariboo Gold Quartz Mines, Ltd.	53,332	----
The Consolidated Mining and Smelting Co. of Canada, Ltd.	8,189,569	8,189,604
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.	202,605	135,070
Hedley Mascot Gold Mines, Ltd.	135,848	----
Highland Bell, Ltd.	39,476	13,159
Island Mountain Mines, Ltd.	78,804	52,536
Kelowna Exploration, Ltd. (Nickel Plate)	90,000	150,000
Privateer Mine, Ltd.	171,786	49,082
Relief Arlington Mines, Ltd.	†45,000	----
Reno Gold Mines, Ltd.	†131,600	----
Sheep Creek Gold Mines, Ltd.	262,500	225,000
Silbak Premier Mines, Ltd.	325,000	125,000
Ymir Yankee Girl, Ltd.	†222,501	----
Others	181,384	148,000
Totals	$11,860,159	$11,367,732

* Liquidating dividend. † Distribution of capital.

TABLE XVIII.—CAPITAL EMPLOYED, SALARIES AND WAGES, FUEL AND ELECTRICITY, AND PROCESS SUPPLIES, 1944.

Class.	Capital employed.	Salaries and Wages.	Fuel and Electricity.	Process Supplies.
Lode-mining	.....	$15,086,582	$4,628,285	$3,196,706
Placer-mining	.....	118,936	9,024	7,305
Coal-mining	.....	5,326,999	310,610	1,022,233
Miscellaneous metals, minerals, and materials	.....	1,749,383	566,594	1,886,601
Structural materials industry	.....	849,974	274,158	31,239
Totals, 1944	†	**$23,131,874**	**$5,788,671**	**$6,138,084**
Grand totals, 1943	$140,782,366	$26,051,467	$7,482,585	$6,572,317
Grand totals, 1942	140,377,568	26,913,160	7,066,109	6,863,398
Grand totals, 1941	141,454,342	26,050,491	3,776,747	7,260,441
Grand totals, 1940	139,694,733	23,391,330	3,474,721	6,962,162
Grand totals, 1939	135,473,482	22,357,035	*3,266,000	6,714,347
Grand totals, 1938	153,012,848	22,765,711	3,396,106	6,544,500
Grand totals, 1937	145,520,641	21,349,690	3,066,311	6,845,330
Grand totals, 1936	142,663,065	17,887,619	2,724,144	4,434,501
Grand totals, 1935	143,239,953	16,753,367	2,619,639	4,552,730
Grand totals, 1935–44	.....	226,651,744	*42,611,033	62,887,810

* Estimated. † Not available for 1944.

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

Capital employed includes: Present cash value of the land (excluding minerals); present value of buildings, fixtures, machinery, tools, and other equipment; inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand; inventory value of finished products on hand; operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).

TABLE XIX.—Tonnage, Number of Mines, Net and Gross Value of Lode Minerals, 1901–1944.

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	.....	.....	15,980,164
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	.....	.....	14,728,781
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	.....	.....	19,444,365
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**

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, 1901–1944.

Year.	Placer-mining.	Lode-mining.			In Concentrators.	In Smelters.	Coal-mining.			Structural Materials.		Miscellaneous.	Total.
		Under.	Above.	Total.			Under.	Above.	Total.	Quarries and Pits.	Plants.		
1901	.....	2,736	1,212	3,948	.....	.....	3,041	931	3,974	.....	.....	.....	7,922
1902	.....	2,219	1,126	3,345	.....	.....	3,101	910	4,011	.....	.....	.....	7,356
1903	.....	1,662	1,088	2,750	.....	.....	3,137	1,127	4,264	.....	.....	.....	7,014
1904	.....	2,143	1,163	3,306	.....	.....	3,278	1,175	4,453	.....	.....	.....	7,759
1905	.....	2,470	1,240	3,710	.....	.....	3,127	1,280	4,407	.....	.....	.....	8,117
1906	.....	2,680	1,303	3,988	.....	.....	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	860	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	869	16,021
1939	1,252	3,905	2,050	5,955	998	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***

* 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 1944.*

Mine or Group.	Location of Mine.	Mining Division.	Owner or Agent.	Process.	Character of Ore.
Engineer	Atlin	Atlin	Forbes, Kirkwood, and Brandes, leasers, Atlin		Gold.
Silbak Premier	Stewart	Portland Canal	Silbak Premier Mines, Ltd., Premier	Flotation	Gold, silver, lead.
Cariboo Gold	Wells	Cariboo	Cariboo Gold Quartz Mining Co., Ltd., Vancouver	Cyanidation	Gold, silver.
Island Mountain	Wells	Cariboo	Island Mountain Mines, Ltd., Wells	Cyanidation	Gold, silver.
Windpass	Dunn Lake	Kamloops	Scott and Ingram, Vancouver		Gold, silver.
Consolidated Nicola	Stump Lake	Nicola	Cons. Nicola Goldfields, Ltd., Vancouver		Gold, silver, lead, zinc.
Kalamalka	Lavington	Vernon	A. S. Penny and M. Penny, Rossland		Gold, silver.
Cariboo	Camp McKinney	Greenwood	E. A. Wanke and O. Johnson, Greenwood		Gold, silver, lead, zinc.
Gold Finch	Greenwood	Greenwood	W. E. McArthur, Jr., Greenwood		Gold, silver, lead, zinc.
Highland Bell	Greenwood	Greenwood	Highland Bell, Ltd., Creston		Silver, gold, lead, zinc.
Providence	Greenwood	Greenwood	W. E. McArthur, Greenwood		Gold, silver, zinc.
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. and Power Co., Vancouver	Flotation	Copper, silver, gold.
Ainsmore	Ainsworth	Ainsworth	Ainsmore Mines, Ltd., Ainsworth		Silver, lead.
Kootenay Florence	Ainsworth	Ainsworth	Wartime Metals Corp., Montreal	Flotation	Silver, lead, zinc.
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.*
True Fissure	Ferguson	Lardeau	Codan Lead and Zinc Co., Ferguson		Gold, silver, lead, zinc.
Arlington	Erie Creek	Nelson	Messrs. Golac and Shrieves, Erie		Gold, silver.
Centre Star	Ymir	Nelson	O. Anderson and Associates, Ymir		Gold, silver.
Gold Belt	Sheep Creek	Nelson	Gold Belt Mining Co., Ltd., Vancouver	Cyanidation	Gold, silver.
Good Hope	Bird Creek	Nelson	S. Terzian, Nelson		Gold, silver.
Granite Poorman	Taghum	Nelson	Leasers—Blewett		Gold, silver.
Kootenay Belle	Sheep Creek	Nelson	Kootenay Belle Gold Mines, Ltd., Vancouver	Cyanidation	Gold, silver.
Miracle	Blewett	Nelson	F. Soloveoff, Blewett		Gold, silver.
Nugget and Reno	*Salmo*	Nelson	Messrs. Endersby, Jr. and Sr., Fruitvale		Gold, silver.
Protection	Ymir	Nelson	A. Fata, 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 Mines, Ltd., Vancouver	Cyanidation	Gold, silver.
Yankee Girl	Ymir	Nelson	L. Madden and E. Emilson, Ymir		Gold, silver, lead, zinc.
Ymir	Ymir	Nelson	E. Haukedahl and S. D. Lundgren, Ymir		Gold, silver.
McAllister	New Denver	Slocan	Allen Nelson Mining and Leasing Co., Nelson		Silver, gold, lead.
New Springfield	Sandon	Slocan	E. H. Petersen and H. Ekellad, Sandon		Silver, zinc, lead.
Ottawa	Springer Creek	Slocan	Leasers—Messrs. Huks, Graham, Berquest, and Olsen, Slocan		Silver.

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

Reco	Sandon	Slocan	Reco Mountain Base Metals Mines, Ltd., Nelson		Silver, lead, zinc.
Standard and Mammoth	Silverton	Slocan	Western Exploration Co., Ltd., Silverton	Table concentration; flotation	Silver, zinc, lead.
Victor	Sandon	Slocan	Leased by E. Doney and Sons, Sandon		Silver, lead, zinc.
Zincton (Lucky Jim)	Zincton	Slocan	Zincton Mines, Ltd., Vancouver	Flotation	Zinc.
Holoboff	Rossland	Trail Creek	P. Radich and Atone Radich, Rossland		Gold, silver.
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.
Silverine	Rossland	Trail Creek	A. J. Ruelle, Rossland		Gold, silver.
Mount Zeballos	Zeballos	Alberni	Leasers—B. C. Beale and O. Torgusson, Zeballos		Gold, silver.
Privateer	Zeballos	Alberni	Privateer Mine, Ltd., Vancouver	Amalgamation; cyanidation	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.
Twin "J"	Mount Sicker	Victoria	The Twin "J" Mines, Ltd., Duncan	Flotation	Copper, gold, silver.

TABLE XXII.—Mining Companies employing an average of Ten or more Men during 1944.

Shipping Mines.

Name of Mine or Company.	Days operating.		Tonnage.		Average Number of Men.	
	Mine.	Mill.	Mined.	Milled.	Mine.	Mill.
Silbak Premier Mines, Ltd.	310	310	68,496	68,496	175	14
Cariboo Gold Quartz Mining Co., Ltd.	366	366	32,833	33,041	161	14
Island Mountain Mines Co., Ltd.	366	366	21,186	21,186	60	8
Bralorne (Takla Lake)	256	258	10,807	10,807	46	4
Cons. M. & S. Co. (Pinchi Lake)	188	188	95,620	95,620	171	17
Highland Bell, Ltd.	304	.....	1,373	1,373	30	.....
Hedley Mascot Gold Mines, Ltd.	312	249	40,171	42,285	102	22
Kelowna Exploration Co., Ltd.	366	366	88,491	88,491	135	58
Copper Mountain (Granby Cons. M.S. & P. Co., Ltd.)	322	325	1,378,541	1,383,296	289	162
Wartime Metals Corporation (Kootenay Florence)	126	134	10,431	10,431	32	3
Retallack Mines, Ltd. (Whitewater)	280	220	39,515	39,515	58	8
Sullivan (Cons. M. & S. Co.)	308	299	2,143,945	2,141,397	1,309	309
Monarch and Kicking Horse (Base Metals, Ltd.)	272	175	24,866	24,995	50	6
Sheep Creek Gold Mines, Ltd.	317	127	13,092	13,092	42	6
Standard and Mammoth (Western Exploration Co., Ltd.)	365	365	38,479	.....	99	29
Zincton Mines, Ltd. (Lucky Jim)	366	312	100,588	100,588	55	18
Bralorne Mines, Ltd.	366	366	115,391	109,751	204	18
Pioneer Gold Mines of B.C., Ltd.	308	312	16,989	16,865	107	8
Britannia Mining and Smelting Co., Ltd.	305	305	606,717	606,717	415	116
Twin "J" Mines, Ltd.	138	138	17,341	17,341	37	4

Non-shipping Mines.

Privateer Mine, Ltd. (employed at several other properties under development)	.....	.....	.....	.....	34	.....

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 situate. 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 45 and 46.

Copies of the various Acts, upon payment of the prices listed on page 196, 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 Filing System.

A new card-index system put into operation on January 1st, 1945, provides a uniform system of entering and filing records at the offices of the Gold Commissioners and Mining Recorders. Each Mining Recorder has been supplied with a small cabinet designed to house cards which will provide a complete history of every mineral claim and placer-mining lease in good standing in his mining division at September 1st, 1944, and subsequently Mining Recorders will check their records each month and transfer from the active file to an inactive file the cards of those claims and leases which have forfeited; in this way, maintaining a constantly active file. The cards will be typed in duplicate and the originals forwarded semi-monthly to the Central Records Office, *305 Federal Building, Vancouver, B.C.*

In addition to the obvious benefits to the Department the new system will place Gold Commissioners and Mining Recorders in a position to give immediate replies to inquiries regarding the status and ownership (as represented by documents recorded and filed), etc., of any properties in their mining division. Information will be readily available whether the inquiry is by way of the owner's name, claim name, placer-mining lease number, or metal identification tag number.

Central Records Office.

The Central Records 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.

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
Totals	10,194	$294,644	.....

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.
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			J. R. MacDonald.
Sub-office	Pouce Coupe			M. S. Morrell.
Stikine	Telegraph Creek	A. E. Roddis	A. E. Roddis	
Sub-office	Burns Lake			John Brown.
Sub-office	Fort St. John			Mrs. M. B. McLeod.
Sub-office	Dease Lake Townsite			R. A. Farrell.
Sub-office	Lower Post			J. W. Stewart.
Sub-office	Pouce Coupe			M. S. Morrell.
Skeena	Prince Rupert	N. A. Watt	N. A. Watt	
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			C. H. Hill.
Sub-office	Bella Coola			W. F. C. Trant.
Sub-office	Queen Charlotte			Dr. D. McColl.
Portland Canal	Stewart	N. A. Watt (at Prince Rupert)	A. Fisher	
Sub-office	Alice Arm			Mrs. M. V. Leake.
Omineca	Smithers	H. A. Bryant	H. A. Bryant	D. H. Bruce.
Sub-office	Bella Coola			W. F. C. Trant.
Sub-office	Finlay Forks			Mrs. M. McDougal.
Sub-office	Fort St. James			Norman Henry.
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			Mrs. M. B. McLeod.
Sub-office	Terrace			T. C. Brunton.
Sub-office	Fort Fraser			Norman 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			Wm. R. Henry.
Sub-office	Doreen			W. E. Horwill.
Sub-office	Copper River			L. G. Skinner.
Peace River	Pouce Coupe	M. S. Morrell	M. S. Morrell	
Sub-office	Fort St. John			Mrs. M. B. McLeod.
Sub-office	Prince George			G. Milburn.
Sub-office	Finlay Forks			Mrs. M. McDougal.
Cariboo	Barkerville	W. E. McLean		Mrs. T. B. McLean.
Sub-office	Quesnel			E. C. Lunn.
Sub-office	Prince George			Geo. Milburn.
Sub-office	McBride			J. Blezard.
Sub-office	Fort McLeod			J. E. McIntyre.
Quesnel	Williams Lake	Miss J. Foster (Deputy)	Miss J. Foster (Deputy)	
Sub-office	Quesnel			E. C. Lunn.
Sub-office	Likely			H. W. Speed.
Sub-office	Barkerville			W. E. McLean.
Sub-office	Horsefly			A. B. Campbell.
Sub-office	Keithley Creek			W. Rae.
Clinton	Clinton	R. J. A. Dorrell	R. J. A. Dorrell	
Sub-office	Williams Lake			Miss J. Foster.
Sub-office	Haylmore			W. Haylmore.
Kamloops	Kamloops	D. Dalgleish	D. Dalgleish	
Sub-office	Chu Chua			G. M. Fennell.
Sub-office	Vavenby			H. Finley.
Sub-office	Salmon Arm			A. P. Suckling.

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.
Ashcroft	Ashcroft	D. Dalgleish (Kamloops)	W. F. Knowlton	
Sub-office	Lytton			J. Blakiston-Gray.
Nicola	Merritt	D. Dalgleish (Kamloops)	R. G. Couper	
Similkameen	Princeton	Chas. Nichols	Chas. Nichols	
Vernon	Vernon	E. F. Little	E. F. Little	
Sub-office	Kelowna			C. W. Dickson.
Greenwood	Greenwood	L. A. Dodd	L. A. Dodd	
Sub-office	Beaverdell			Mrs. J. J. Clarke.
Sub-office	Oliver			W. H. Laird.
Sub-office	Grand Forks			E. Harrison.
Osoyoos	Penticton	W. R. Dewdney	W. R. Dewdney	
Sub-office	Keremeos			L. S. Coleman.
Sub-office	Oliver			W. H. Laird.
Golden	Golden	A. W. Anderson	A. W. Anderson	C. J. Dainard.
Sub-office	Windermere			A. M. Chisholm.
Fort Steele	Cranbrook	W. G. Taylor	W. G. Taylor	
Sub-office	Fernie			K. D. McRae.
Ainsworth	Kaslo	C. MacDonald	W. M. H. Dunn	
Sub-office	Poplar			A. Robb.
Slocan	New Denver	C. MacDonald (Kaslo)	F. Broughton	
Sub-office	Slocan			W. E. Graham.
Nelson	Nelson	S. Hamilton	S. Hamilton	J. A. Stewart.
Sub-office	Creston			J. S. Clark.
Sub-office	Salmo			M. C. Donaldson.
Revelstoke	Revelstoke	W. G. Fleming	W. G. Fleming	
Lardeau	Beaton	W. G. Fleming (Revelstoke)	C. A. McElroy	
Trail Creek	Rossland	E. L. Hedley	E. L. Hedley	
Nanaimo	Nanaimo	W. H. Cochrane	W. H. Cochrane	
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	Quatsino			E. Evenson.
Alberni	Alberni	J. H. Byrne	J. H. Byrne	
Sub-office	Tofino			W. Armitage.
Sub-office	Zeballos			G. Nicholson.
Sub-office	Nanaimo			W. H. Cochrane.
Victoria	Victoria	P. J. Mulcahy	R. H. McCrimmon (Deputy)	Miss G. Wrigley.
New Westminster	New Westminster	A. B. Gray	J. F. Macdonald	
Sub-office	Chilliwack			C. N. Tingle.
Sub-office	Lytton			J. Blakiston-Gray.
Sub-office	Hope			A. J. Sutherland.
Vancouver	Vancouver	J. Egdell (Deputy)	Miss J. Burnett (Deputy)	
Sub-office	Alert Bay			W. H. Davidson.
Sub-office	Powell River			J. P. Scarlett.
Lillooet	Lillooet	G. H. Beley	G. H. Beley	
Sub-office	Haylmore			W. Haylmore.

Gold Commissioners' and Mining Recorders' Office Statistics, 1944.

Mining 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	212	6	.	..	47	21	....	. . .	5	16	26	15	22	$1,368.50	$5,041.00	$6,409.50
Portland Canal	70	1	.....	..	73	75	117	16	... ..	.....	.....	.... .	.....	437.50	727.75	1,165.25
Skeena	132		4	.....	18	22	64	.....	10	1	... .	.....	.....	641.00	730.75	1,371.75
Stikine	65	...		1	22	28	47	. ....	... .			4	32	319.55	943.75	1,263.30
Cariboo	217	12	....	4	130	144	9	3	9	13	63	27	16	2,025.50	10,919.50	12,945.00
Omineca	227	4	1	1	449	295	100	17	9	15	13	10	32	1,630.75	4,470.05	6,100.80
Peace River	63	.....	....	.... ..	22	.... ..	8	....	.....	.....	.....	.....	.....	293.50	92.50	386.00
Quesnel	132	6	. .....	8	78	44	7	.....	.....	5	46	40	20	1,073.25	4,216.75	5,290.00
Kamloops	145	.....	....	12	71	46	8	1	9	8	2	.....	3	646.25	1,151.75	1,798.00
Nicola	14	1	.....	.....	14	.....	2	2	.....	.....	.....	.....	.....	115.50	404.50	520.00
Vernon	69	1	2	5	18	9	.....	.....	.....	1	3	2	4	397.75	477.25	875.00
Greenwood	99	1	1	.... ..	58	59	5	4	9	1	5	.....	3	564.00	986.50	1,550.50
Osoyoos	110	2	1	3	235	97	16	.....	6	.....	.....	.....	.....	642.25	1,190.00	1,832.25
Similkameen	106	1	2	2	54	43	27	.....	2	2	12	.....	29	595.00	883.50	1,478.50
Ainsworth	60	3	2	2	43	83	1	1	19	1	.... ..	.....	. .....	617.00	1,069.25	1,686.25
Fort Steele	124	1	..... .	8	45	30	.....	.....	1	3	2	6	.....	614.25	1,594.50	2,208.75
Golden	36	2	1	1	16	61	2	.....	.....	.....	.....	1	.....	380.25	228.00	608.25
Lardeau	20	..... .	.....	1	27	25	.... .	.....	.....	1	..... .	... ..	.....	97.25	286.50	383.75
Nelson	160	7	.....	11	121	168	14	1	11	19	....	.. ....	.....	1,873.25	2,021.25	3,894.50
Revelstoke	33	.....	1	..... .	27	13	.....	.....	10	....	5	.....	5	173.25	1,147.50	1,320.75
Slocan	51	1	.. .	.....	20	4	19	.....	.	.....	..	. .....	5	339.00	248.00	587.00
Trail Creek	89	1	1	6	15	17	7	.....	3	. ....	.	..... .	...	527.50	178.00	705.50
Alberni	118	9	1	.....	105	119	29	7	.. ..	.....	6	1	. .	1,305.25	2,017.75	3,323.00
Ashcroft	39	.....	.....	.... ..	78	16	20	. .	. ....	1	.....	.....	4	163.25	435.00	598.25
Clinton	27	. .....	.... .	2	139	46	26	.....	. .	2	...	..... .	8	125.50	582.00	707.50
Lillooet	188	7	2	5	391	253	17	.....	6	1	6	8	4	1,511.25	2,634.35	4,145.60
Nanaimo	104	1	.....	3	126	85	86	.....	9	.....	....	.....	2	558.00	1,141.25	1,699.25
New Westminster	135	1	1	18	133	149	14	..	4	1	4	8	.....	972.25	2,408.25	3,380.50
Vancouver	833	51	7	39	43	38	74	.....	17	.... ..	...	.....	.... ..	7,915.50	1,238.74	9,154.24
Victoria	161	9	.. ..	10	8	15	1	.... ..	5	.....	3	.....	.... .	1,288.00	1,694.25	2,982.25
Totals	3,839	128	27	142	2,626	2,005	720	52	144	91	196	122	189	$29,211.05	$51,160.14	$80,371.19

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 five 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 the year 1944 the chemical laboratory in Victoria issued reports on 1,868 samples and specimens. A laboratory examination of a sample generally consists of the following: (1) A mineralogical determination, by a mineralogist, 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 base metals shown to be present in interesting percentages by the spectrographic analysis. The laboratory reports were distributed in the following manner amongst *bona-fide* prospectors, *bona-fide* prospectors who are 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	982	584	707	1,551
Bona-fide prospectors (grantees)	606	591	558	1,025
Departmental Engineers	274	10	41	996
Sampling plant	6	6	4	2
Totals	1,868	1,191	1,310	3,574

The laboratory instituted four new aids to the *bona-fide* prospector. Serially numbered sample or specimen tags are now issued, stapled together in booklets of ten sheets with a printed cover giving directions for their use. Each sheet is printed on special strong water-proof paper. The Department now supplies shipping-tags, with the proper address printed on them, for shipping samples or specimens to the laboratory. *Bona-fide* prospectors may obtain these booklets and shipping-tags free of charge from any Gold Commissioner, Mining Recorder, or Sub-mining Recorder. Also, on request made to this laboratory, a limited number of sample sacks will be loaned free of charge. These services proved very popular and will be continued. Finally, the laboratory collaborated with other officers of the Department in presenting Bulletin No. 18. The laboratory contribution to this bulletin consisted of an illustrated section describing, in a non-technical manner, how samples are assayed here.

Proximate analyses and heat value determinations were made on twenty-one coal samples. Of these, seven were for the Department of Mines and fourteen were for the Department of Public Works.

For the Attorney-General's Department thirty-five cases of a chemico-legal nature were undertaken, involving in all a study of 175 exhibits. The volume of work done is more than twice that done in 1943 and there are indications that it will grow to a still larger proportion in 1945. The analyses and examinations were of a very diversified and time-consuming nature. They included toxicological analyses of pathological specimens, and of foods suspected of being contaminated with poison; examination of fibres in a breaking and entering case; analyses of powder residues left after explosions; analyses of powder and of dynamite; analysis of putty in a breaking and entering case; comparisons of safe-packing, soap, and solder in a breaking and entering case; identification of several unknown liquids and powders; determination of per cent. grain alcohol in liquids and wines; comparison of shell wadding and fired lead pellets with wadding and pellets in unfired shells; and extensive analyses of sea water. Quantitative spectrographic analyses for traces of metals have played an important part in several of the investigations.

Twelve analyses of soils and other raw materials for the Department of Agriculture and two analyses for the mineral content of water submitted by the Provincial Board of Health completed the analytical work of the laboratory for the year.

Forty-one lots of placer gold amounting to 259.278 oz., representing purchases from individual placer-miners, were received from Gold Commissioners.

Provincial Government examinations for certificates of competency and licence to practise assaying in British Columbia were held in May and December. One candidate sat in May and was granted a supplemental examination, which he passed in December. He has been granted a licence to practise. One other candidate sat for the examination in December but failed.

Prince Rupert Sampling Plant and Assay Office.*

During 1944 shipments to the sampling plant continued at about the same rate as in 1943, but a very considerable increase in the number of small samples for assay was noted. All assaying for tonnage lots, test lots, and assay samples was carried out in the properly equipped laboratory now operated in conjunction with the sampling plant. In addition, a considerable amount of assaying was done for the Victoria laboratory, to help relieve the congestion of work there.

Many prospectors were interviewed and prospectors' identification cards issued to a number of applicants.

In 1944 expenditure on account of ore purchased was $853.34; no ore was sold to smelters. At the end of the year ore on hand, including carry-over from 1943, had an estimated value of $1,381.64. Since the sampling plant commenced operations in August, 1937, a total of 769 lots have been handled through the plant and a total of $50,996.21 has been paid out to the various shippers. From the ore purchased the sampling plant has realized $50,049.81, which, with the estimated value of ore on hand, $1,381.64, amounts to $51,431.45. This total, compared with $50,996.21 paid to the producers of the ore, indicates the care exercised in sampling the ore, thus giving correct guidance to the small operators shipping to the sampling plant.

The principal statistics for tonnage lots, test lots, and samples for assay for each year beginning with 1938, and the details for tonnage and test lots received in 1944, are shown in the following tables:—

Prince Rupert Sampling Plant and Assay Office.

Year.	Ore Receipts.						
	No. of Tonnage Lots.	No. of Properties.	Bulk Test Lots.	No. of Properties.	Assay Lots.	No. of Properties.	Weights of Shipments.
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

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

Sampling Plant.

Details of Tonnage Lots received, 1944.

Lot No.	Property.	Shipper.	Locality.	Dry Tons.	Au.	Ag.	Cu.	Pb.	Zn.	WO_3.
					Oz. per Ton.	Oz. per Ton.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
748	Tide Lake Gold	Phillips, Al	Stewart	0.5555	10.68	22.6	*Nil*	.....	19.5	.....
767	Tide Lake Gold	Phillips, Al	Stewart	1.6040	9.59	41.1	*Nil*	.....	22.8	.....

SAMPLING PLANT—*Continued.*

Test Lots.

Lot No.	Property.	Shipper.	Locality.	Dry Tons.	Au.	Ag.	Cu.	Pb.	Zn.	WO_3.
					Oz. per Ton.	Oz. per Ton.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
697-T	Troy Group	McDonald, Neil	Stewart	0.1440	0.02	8.9	.....	.....	.....	1.91
765-T	Nicholson Creek Mining Corporation	W. D. Galbraith	Usk	1.0520	1.40	26.6	13.9	.....	.....	.....
768-T	.....	Davis, G.	McDame Creek	0.0228	3.63	0.6	.....	.....	.....	.....
769-T	.....	Davis, G.	McDame Creek	0.1180	1.01	0.3	.....	.....	.....	.....

INSPECTION BRANCH.

The full reports of the Chief Inspector and of the Inspectors of Mines, dealing with the coal-mining industry, inspection of coal mines, and inspection of metalliferous mines, begin on page 85. The information in the Progress Notes regarding metalliferous, industrial mineral, etc., deposits is largely supplied by the Inspection Branch.

MINERALOGICAL BRANCH.

Joseph T. Mandy, stationed in Vancouver, was occupied principally in attending to requests for information, at the Vancouver Office.

B. T. O'Grady was occupied largely in organizing and directing the grub-stake programme, and in dealing with applications for assistance *re* mining roads and trails; he continues to assist the Superintendent of Brokers in administering the "Securities Act."

M. S. Hedley made a detailed geological study of the Lucky Jim and Whitewater properties and of the intervening ground in the Slocan-Ainsworth area.

J. S. Stevenson completed a detailed examination of the Mount Sicker copper-zinc property, made a detailed study of the Little Billie and adjoining ground in the copper-gold area on Texada Island, and resumed detailed mapping in the Zeballos area.

S. S. Holland was occupied largely in supervising prospectors in receipt of assistance under the "Prospectors' Grub-stake Act." He also made preliminary studies in the Cariboo lode-gold area and in the Whitesail Lake area.

K. DeP. Watson was occupied throughout the field season supervising prospectors receiving assistance under the "Prospectors' Grub-stake Act."

W. H. Mathews spent the early part of the season studying limestone deposits on Texada Island, and the latter part studying coal occurrences on Carbon Creek in the Peace River area.

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 181.

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 and for each of the 1944 and 1945 seasons appropriations of $50,000 were made. Expenditures for the 1943 season were approximately $18,500 and for the 1944 season $27,215.

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 the precious or base metals which are the principal products of the metal-mining industry of the Province. In addition to deposits of the more usual type, deposits of scheelite and other strategic minerals were found, but by the end of the field season it was apparent that the war demand for such minerals would be met from properties already in production or fully developed. Gold-bearing deposits on two properties staked by prospectors grub-staked in 1943 have already been found to be of more than usual interest. Gold ore will probably be mined in 1945 from the Good Hope property, near Hedley. The Harrison property, in Tweedsmuir Park (Whitesail Lake area), staked to cover a scheelite-bearing zone, has been found to contain gold-bearing veins. This discovery attracted much attention to that area in 1944.

In 1944, 105 grub-stakes were granted; of these, thirteen were reduced or cancelled. Attention was directed principally to the search for lode-gold deposits. It is reported that several claims staked by grub-staked prospectors in 1944 have been optioned and that some of the discoveries appear promising, but it is still too early to say more definitely what merit they possess.

In 1943 the prospectors grub-staked sent 773 samples and specimens to the Department's laboratories. In 1944 the number sent in was 606. The samples and specimens are examined by an engineer, following which most of them are the subject of further work involving one or more of the following: mineralogical determination, spectrographic analysis, assaying.

In 1943 prospectors in receipt of grub-stakes recorded eighty-seven mineral claims. In 1944, 135 mineral claims were recorded.

Organizing work in the grub-stake programme has been in the hands of B. T. O'Grady. In 1943 he was assisted by several Gold Commissioners and Mining Recorders, who acted as grantors, and by the Inspectors of Mines stationed at Prince Rupert, Lillooet, Princeton, and Nelson, who, in addition to acting as grantors, visited the prospectors in the field, so far as possible. In 1944 the four Inspectors assisted Mr. O'Grady as grantors, J. T. Mandy interviewed applicants in Vancouver, and several Gold Commissioners and Mining Recorders interviewed applicants at other points. Two engineers on the permanent staff of the Mineralogical Branch, and a third engineer engaged for the summer months, devoted their time for the field season to visiting grub-staked prospectors in the field to see what was being attempted, the progress being made, and to give information and advice to the prospectors.

The grub-stake programme has two principal objectives; one is to assist in the discovery of mineral deposits, the other is to assist in the rehabilitation of men released from the armed services. To date the first objective alone has been possible and the results obtained have been satisfactory in that two gold deposits of some promise can be credited to the programme. The usefulness of the programme in providing a healthful invigorating activity and thereby assisting in rehabilitation of men released from the armed services has yet to be tested, as so far industry has absorbed the physically able men who have been released.

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 page 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 page 182.

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.

A. M. Floyd commenced topographical mapping of the Bennett area; longitude 134°–136°; latitude 59°–60°. Ground photography combined with the trimetrogon aerial photography.

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

J. E. Armstrong completed the geological mapping of the Takla area; longitude 125°–126°; latitude 55°–56°.

J. E. Armstrong and J. B. Thurber completed the geological mapping of the Manson Creek area; longitude 124°–125°; latitude 55°–56°.

H. M. A. Rice completed the geological mapping of the Princeton area; longitude 120°–121°; latitude 49°–50°.

A. F. Buckham continued a study of the coal-bearing rocks in the Nanaimo and Cumberland areas, Vancouver Island.

W. E. Cockfield conducted several brief geological investigations in south-western British Columbia, in connection with engineering projects and deposits of strategic minerals.

F. H. McLearn made investigations of early Mesozoic stratigraphy in the Peace River district.

PROGRESS NOTES.

The Progress Notes on metal-mining, quarrying, etc., are compiled from information supplied by the Inspectors of Mines and the Bureau of Economics and Statistics, through the courtesy of the property-owners and from information obtained by the officers of the Mineralogical Branch in the course of their field-work. The Registrar of Companies and Superintendent of Brokers have also supplied information through their respective offices.

The Notes are grouped in types of mineral deposits (Lode Gold, Limestone, etc.) in named areas. The numbers in parentheses following the name of a property refer to the latitude and longitude of the south-eastern corner of the one-degree quadrilateral in which the property is situated and the letters refer to the particular quarter of the quadrilateral.

LODE-GOLD DEPOSITS.

PORTLAND CANAL AREA.

SALMON RIVER.

Silbak Premier Mines, Ltd. (56° 130° S.E.) D. L. Coulter, General Manager; J. G. Pearcey, Mine 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.

The mine was worked 310 days and produced 68,496 tons of ore. The production has been greatly reduced because of shortage of labour, only 189 men being employed. Operations have been confined mainly to 9A and 9B stopes between No. 4 and No. 6 levels. Some ore from these stopes is from Premier Border.

TIDE LAKE.

East Group. (56° 130° S.E.) Formerly owned by the late Mrs. Campbell, Hyder, Alaska. The group comprises eight claims which lie about 5 miles north of the *Salmon Gold* group, on Summit Lake. A. Phillip and two other men started sinking a small shaft on a high-grade vein from ½ inch to 8 inches wide and were down about 30 feet when work was abandoned for the winter.

C. E. Barker prospected on the east side of Summit Lake, opposite *Salmon Gold*. He did some open-cutting and got gold and silver values.

H. Melville and E. G. Langille, of Premier, prospected on some claims they staked north of *Salmon Gold*. They did about 80 feet of open-cutting and located two veins.

STIKINE MINING DIVISION.

MCDAME CREEK.

Norah Claim. (59° 129° S.W.) Davies and Hope have five claims on McDame Creek. A vein from 20 to 30 inches wide has been traced for 200 feet on the *Norah* claim. Some cutting was done on the vein and 10 tons of ore, taken out and put through a small amalgamation plant, yielded 25 oz. of gold.

CARIBOO AREA.

WELLS.

Cariboo Gold Quartz Mining Co., Ltd.

(53° 121° S.W.) Capital: 2,000,000 shares, $1 par; issued, 1,333,309. Because of the shortage of labour, particularly of miners, the output was reduced and the company operated at a loss during 1944. The labour situation was at its worst in July when there were only about seventy men employed underground. By January, 1945, this number had increased to 116. The surface crew remained more or less constant and numbered about seventy, inclusive of staff. The average number of men employed during 1944 was 175.

Development-work was again restricted to that necessary for ventilation, and consisted of 14 feet of drifting, 11 feet of crosscutting, and 376 feet of raising. No diamond-drilling has been done since July, 1942. It is estimated that stoping operations produced 32,359 dry tons of ore and 4,449 dry tons of waste. The tonnage milled was 33,041 or slightly more than that broken. This yielded 13,589 oz. of gold and 1,057 oz. of silver. Again the broken ore came from all parts of the mine, with the exception of the Butts and B.C. zones.

Because of the difficulty in obtaining adequate supplies of wood for the heating plant, coal-grates were installed and a coal-bunker of about 120 tons capacity was built. It has proved, however, to be just about as difficult to obtain sufficient coal of a satisfactory grade, at a reasonable price, as it was to get wood.

Island Mountain Mines Co., Ltd.

(53° 121° S.W.) Capital: 1,100,000 shares, 50 cents par; issued, 1,050,716. The prolonged shortage of experienced machine-men and timbermen is now affecting the condition of this company's mine at Wells. Rotting of timber is proceeding apace and the ore is not coming from the stopes as fast as it should, with the result that more timber replacement is required than would normally be the case. Considering the size of the present crew a comparatively large amount of maintenance and repair work was accomplished, but much still remains to be done and the men to do it are not available.

Also because of the shortage of labour, development was again curtailed drastically, there being only 350 feet of drifting and crosscutting and 197 feet of raising, all necessary for the proper carrying-out of the stoping operations. A well-planned diamond-drilling programme involved 4,776 feet of drilling from which several interesting intersections in replacement ore were obtained. This development-work was distributed throughout the mine.

Work done in mining ore-bodies has revealed the presence of ore about equal in quantity to that mined. At the end of 1944 ore reserves are about the same as a year ago, and are estimated by the company at 68,700 tons. Ore mined and milled totalled 21,186 tons, or an average of 57.89 tons per day. This yielded 9,441 oz. of gold and 1,132 oz. of silver. The crew averaged sixty-eight for the entire operation. Corresponding averages for 1943 are 62 tons per day and sixty-two employees.

There were no additions or alterations to the plant.

BRIDGE RIVER AREA.

Pioneer Gold Mines of B.C., Ltd.

(50° 122° N.W.) Capital: 2,500,000 shares, $1 par; issued, 1,751,750. Development during 1944 has added materially to the unbroken reserves of this mine. This development-work consisted of 2,106 feet of drifting, 122 feet of crosscutting, 194 feet of raising, and 3,016 feet of diamond-drilling. The greater part of this work was done on the "27" vein as follows: On the 1,900 level, 362 feet; on the 2,000 level, 295 feet; on the 2,100 level, 263 feet; on the 2,500 level, 922 feet.

The mine produced 19,989 tons, 5,935 of which came from development ore. A total of 16,865 tons of ore was milled, yielding 9,112 oz. of gold and 1,527 oz. of silver. The total crew increased from eighty-four on January 1st, 1943, to 104 on January 1st, 1945. The respective underground figures were thirty-four and forty-three. The average number of men employed was 115.

Because of the enforced inactivity brought about in certain parts of the mine by the labour shortage, timber decay was very marked, and a comparatively large percentage of the small crew was required for maintenance and repair work underground. On the surface a new treated wooden head-frame was erected at No. 3 Shaft collar during the summer.

Some work was also done at the old Taylor tunnel on the Eagle fraction. This was cleaned out and is now being retimbered.

Bralorne Mines, Ltd. (50° 122° N.W.) Capital: 1,250,000 shares, no par value; issued, 1,247,000. M. M. O'Brien was appointed Managing Director during 1944. Development footage showed a slight increase over the 1943 total. The figures for 1944 are: Drifts and crosscuts (5 by 7 feet), 5,435 feet; raises, 939 feet; diamond-drilling, 4,862 feet.

Drilling on the 1,400 level for the "E" block disclosed a 14-foot vein of very good ore. Later development of this ore-shoot verified the drill results. Drifting on the "C" block on the foot-wall of the "53" vein opened up a very good shoot of ore. Development of the western end of the "51" vein on the 1,500 level gave promise of good ore-shoots in this vicinity at depth. Drifting on the "77B" vein on both 1,800 and 1,900 levels developed some very good ore-bodies. No work was done in either the King or Coronation mines.

A total of 109,751 tons of ore was milled during 1944, making an average of 300 tons per day. This ore yielded 70,350 oz. of gold and 16,754 oz. of silver. The underground crew, excluding absentees, averaged 116 men daily; the total number of men employed averaged 222. Ninety per cent. of the milled tonnage was obtained from shrinkage stopes in the Crown and Empire mines, 2 per cent. was obtained from horizontal cut-and-fill stopes, 2 per cent. from rill stopes, 5 per cent. from stope sills, and 1 per cent. from development-work. At the mill, an all-time record of 97.7 per cent. recovery was made in August; otherwise, milling operations were normal for 1944.

New surface construction during 1944 consisted of a one-room school to take care of increased attendance which had overcrowded the regular school. The foundations of several of the company's houses were replaced. The primary ore-bin was hopper-bottomed and braced.

Bridge River Consolidated Mines, Ltd. (50° 122° N.W.) Capital: 4,500,000 shares, $1 par; issued, 2,461,131. This company owns the mine of the same name on the east bank of the Hurley River, a short distance above its confluence with the Bridge River. E. M. Thompson and associates obtained an option on this property during 1944 and immediately started to explore its possibilities. A pilot road, approximately 3,000 feet long, was built by hand from the B.R.X. mill-site to the Forty Thieves vein on the *Ural* claim. Diamond-drilling began about October 1st on the *Ural* claim, and three holes totalling 1,944 feet were completed by the end of 1944. This drilling was done by Boyles Brothers. H. Hill, the engineer in charge, has established a mine office at Goldbridge.

B.R.X. Mines, Ltd. (50° 122° N.W.) Capital: 5,000,000 shares, 50 cents par; issued, 3,850,000. The B.R.X. mine is on the east bank of the Hurley River, immediately above its confluence with the Bridge River. Under the direction of E. R. Shepherd, a diamond-drilling programme was started June 1st with funds raised from the selling of treasury stock. The first two holes, totalling 1,600 feet, were drilled from the end of the main crosscut at the lower camp

and were directed towards an albitite body lying to the east of the California vein. The third hole was collared in the end of the north drift off this crosscut and was drilled 800 feet in a northerly direction towards the Golden Gate workings. It was stopped after it intersected a fault, because exploration beyond the fault could be done at less expense and faster from the Golden Gate tunnel. A fourth hole was then drilled 1,100 feet in a south-westerly direction from the main crosscut to intersect the Berta vein system. Several mineralized intersections were made in these holes, but none was of commercial grade.

It is proposed to drill the fifth hole from the far end of the easterly crosscut on the 300-adit level. It will be directed steeply downward to intersect the California vein about 300 feet below the bottom of the present California incline. At the end of 1944 the 300-level adit was being cleaned out and retimbered to give access to this location.

The diamond-drilling is being done by Boyles Brothers and the other work by the B.R.X. Mines, Limited.

Minto Gold Mines, Ltd. (50° 122° N.W.) Capital: 3,000,000 shares, no par value; issued, 3,000,000. Under the direction of H. Hill, consulting engineer on the property from August 1st to December 1st, the company made a series of open-cuts, seeking the northern extension of the main Minto vein. As some encouragement was obtained from this work and as deep overburden made trenching difficult, a diamond-drilling programme was started in September. The Highway Construction Company, 612 Hall Building, Vancouver, obtained the contract and by the end of November, when operations ceased because of approaching cold weather, seven shallow holes totalling 1,687 feet had been drilled.

Success Group. (50° 122° N.W.) This group of three claims lies on the northern boundary of the Bralorne property. Two men, working for two months, freshened up some old outcrops and put in a number of open-cuts and trenches, one of the latter being about 100 feet in length. It is understood that this work was done for Ventures, Limited.

Pacific Eastern Golds, Ltd. (50° 122° N.W.) Capital: 5,000,000 shares; issued, 3,377,987. This company entered into an agreement with the Quebec Gold Mining Corporation whereby the latter is carrying out exploratory work on the P.E. property adjoining Pioneer on the south-east. Because of restrictions on labour and because of the nature of the overburden, the work to date has been limited to a preliminary study of the geology and other features of the property.

TASEKO LAKE AREA.

Hi Do Group. (51° 123° S.W.) This group, located about 5 miles south-westerly from the south end of Taseko Lake, is owned by A. Pelletier, A. J. Allaire, and associates. It was optioned during 1944 to the Quebec Gold Mining Corporation after being examined by the Corporation's engineers.

STUMP LAKE AREA.

Consolidated Nicola Goldfields, Ltd. (50° 120° S.E.) Capital: 6,500,000 shares, $1 par; issued, 4,537,623. This mine is at Stump Lake, 2 miles west of the Kamloops–Merritt Highway and 30 miles from Merritt. Mining operations were suspended on December 9th, 1942, and were not resumed during 1944, but about 5 tons of lead concentrates went to Trail during the year. A caretaker resides at the property and a mechanic makes occasional visits to do the necessary pumping of water from the mine.

SIMILKAMEEN RIVER AREA.

HEDLEY.

Hedley Mascot Gold Mines, Ltd.

Company office, 908 Royal Bank Building, Vancouver, B.C.; mine office, Hedley, B.C.; Vice-President, R. G. McCuish; V. J. Creeden, Secretary; W. S. Charlton, Treasurer; C. W. S. Tremaine, General Superintendent; J. C. 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 some development-work on the *Good Hope* mineral claim, 4 miles south-east of Hedley.

Hedley Mascot Mine.—(49° 120° S.E.) The concentrator and mine offices are on the east bank of Hedley Creek and the mine camp is on the side of Nickel Plate Mountain. The ore is transported down the side of the mountain by an aerial tramway, 5,600 feet long, from the 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 in length, and generally known as the 4,800-foot level; this is the main haulage-level. All the ore is passed by haulage and transfer chutes to the 4,800-foot level, the ore is then taken out of the mine in cars hauled by battery-type electric locomotives. The 4,300-foot level is the lowest operating level, and ore from this level is taken to the outside and hoisted up the No. 2 tramway to the 4,800-foot level. Underground transportation is served by two 3½-ton Atlas battery locomotives and one Mancha trammer.

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 of a joint ventilation system. During months when natural ventilation is found to be inadequate a 4-foot Jeffrey propeller-type fan in the 4,800-foot level is used to assist the natural air-current.

The main development during 1944 was concentrated on the new level known as the 3,700-foot level. At the end of the year the level had been driven approximately 600 feet. For the new development a surface tramway, 2,000 feet long, known as the No. 4 tramway, and having a 38-degree slope, was built from an opening off the 4,800-foot level. A 35-horse-power electric hoist installed during August is used for the hoisting and lowering of men and equipment.

The mill resumed operations in March after having been closed since September, 1943, because of man-power shortage. A total of 42,285 dry tons of ore was milled during 1944, yielding 13,434 oz. of gold, 3,561 oz. of silver, and a quantity of copper and arsenic.

A safety committee, elected by the miners' union, makes an inspection of the mine twice a month, after which a safety-first meeting is held. The accident frequency rate for the company's operations during 1944, including all accidents involving the loss of one shift or more, was 0.96 per thousand shifts, this being a commendable improvement over the 1943 rating of 1.51. The labour situation improved and at the end of 1944 fifty-six men were employed underground and seventy-nine on the surface. The average number of men employed during 1944 was 124. In December provision had been made for aluminium-dust therapy at the mine for underground workmen; however, because of delay in securing aluminium-dust, the introduction of the treatment was postponed until early in 1945.

Good Hope Mineral Claim.—(49° 120° S.E.) This claim is situated about 4 miles south-east of Hedley and was staked in 1943 by W. R. Wheeler. In the showing, gold associated with bismuth telluride occurs in skarn. In many places the skarn is a coarse-grained, pyroxene-rich variety containing much "watery" appearing quartz. The property was operated under option by the Hedley Mascot Gold Mines, Limited,

who employed a small crew on exploratory work for several months. The ore produced from this open-cut work was stock-piled at the property and a road was built to the old Canty ore-bin, above the Mascot mine. It is proposed to transport the broken ore over the new road early in 1945 to the ore-bin for subsequent treatment at the Mascot mill.

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, Treasurer; R. Emmel, Secretary; W. C. Douglass, General Manager; F. A. McGonigle, Manager; E. E. Mason, Mine Superintendent; Alex. Shaak, Mine Foreman. This is a private company operating the Nickel Plate mine at Hedley. The mill, machine-shops, and general offices are at Hedley. The mine is at an elevation of 5,600 feet, approximately 4,000 feet above and 4 miles north of Hedley.

The transportation system up the side of Nickel Plate Mountain is in two sections; a 10,000-foot gravity 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; an electric trolley system hauls the ore from the mine to this terminal.

The Nickel Plate is connected underground at several points with the Hedley Mascot, 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 great magnitude which should provide adequate natural ventilation. However, it is found that in the winter months the air becomes stagnant in the large open stopes of the upper workings. A ventilation survey was under way at the end of 1944 and it is believed that if the potential natural power available were fully utilized, adequate natural ventilation could be provided. If such planning is not successful it will become necessary to introduce mechanical ventilation.

Development during 1944 consisted of 5,110 feet of drifting, crosscutting, and raising; 8,094 feet of exploratory diamond-drilling, and 213 feet of diamond-drilling for blasting. Development in the newly completed Morning incline workings was continued and advance was made on the four levels now established. In addition to the shaft openings, connecting raises were completed from the lower to the upper levels.

At the mill a fine-ore screening and conveying belt was installed and one 6-cell No. 15 Denver flotation unit was added. A new tailings pond was built near the Similkameen River, approximately ¾ mile below the mill.

Regular inspections of the surface and underground are made by the safety first committee composed of representatives of the miners' union and the management. The accident rate for the entire operations during 1944, including all accidents involving the loss of one shift and over, was 0.75 per thousand shifts, this being a very slight improvement over the 1943 rating. Aluminium-dust therapy was initiated during 1944 being made available to both underground and surface employees. The labour situation showed some improvement and at the end of 1944 eighty-five men were employed underground and 105 on the surface. The average number of men employed was 193.

A total of 88,491 tons of ore was mined and milled during 1944, yielding 32,526 oz. of gold, 2,270 oz. of silver, 90,593 lb. of copper, and some arsenic.

SOUTHERN OKANAGAN.

FAIRVIEW.

Fairview Amalgamated Mine.—(49° 119° S.W.) This mine, previously operated by the Fairview Amalgamated Gold Mines, Limited, was optioned by the Kelowna Exploration Company, Limited, and three men were employed for about six months in exploration-work and in cleaning up some of the old workings.

BEAVERDELL AREA.

Gold Nugget. (49° 119° S.E.) This property, on Cranberry Creek, about 10 miles south of Beaverdell, is owned by Tom Henderson and Milton Thompson, of Beaverdell. The showings consist of a series of flat-lying narrow quartz veins in diorite, carrying, in places, substantial values in gold. The owners, under financial arrangements with the Highland Bell, Limited, did a limited amount of surface and underground work with hand-steel.

CAMP McKINNEY AREA.

Cariboo-Amelia. (49° 119° S.E.) This property, at Camp McKinney, was operated under lease by E. Wanke and O. Johnson, of Greenwood, for the greater part of 1944. The property is equipped with a small complete mining plant. Ore was recovered from stope remnants and surface pillars above the old water level. A total of 178 tons was mined and shipped to Trail. This yielded 69 oz. of gold, 111 oz. of silver, and 1,512 lb. of lead.

GREENWOOD-GRAND FORKS AREA.

Mabel Jenny Claims. (49° 118° S.W.) This property is in an area known as the West Copper Camp, about 8 miles west of Greenwood. The showings consist of a number of well mineralized but very narrow quartz veins. A small amount of stripping and surface trenching by hand methods was done by the owner, C. Kerry, of Vancouver, but no ore was shipped.

CASTLEGAR AREA.

Gibson Creek Group. (49° 117° S.W.) This property, on the summit of the ridge between Pass Creek and the Kootenay River, and about 4 miles from Castlegar, is owned by John Sawchenko, of Trail. Three large pegmatite dykes cutting granitic rock of the same type as the Nelson batholith can be traced along the summit of the ridge for several hundred feet and are opened up in numerous places by shallow cuts and trenches. It is reported that assays in gold and tungsten have been obtained from some samples from the property, but several selected samples taken by the Inspector failed to disclose anything of interest. Two men were employed.

ROSSLAND AREA.

MOUNT ROBERTS.

Midnight. (49° 117° S.W.) This property, on Mount Roberts, is owned and operated by B. A. Lins and associates, of Rossland. Two men were engaged in the work when other employment was not available. The property is equipped with a small complete mining plant.

I.X.L. (49° 117° S.W.) This property adjoins the Midnight. It was operated continuously throughout 1944 by C. Jorgenson and associates, of Rossland, under lease. The property is equipped with a small complete mining plant. The average number of men employed was four. A total of 366 feet of diamond-drilling was done. Ore amounting to 46 tons was mined and shipped to Trail and yielded 145 oz. of gold and 75 oz. of silver.

O.K. (49° 117° S.W.) This property, adjoining the I.X.L., was operated for a short time by lessees using hand-steel. A small amount of work was done, efforts being directed to reconditioning some of the old workings near the surface.

NELSON AREA.

TOAD MOUNTAIN.

California. (49° 117° S.E.) This property, on Toad Mountain, was purchased by Sheep Creek Gold Mines, Limited; company office, 316 Stock Exchange Building, Vancouver, B.C. During 1944 work was confined to surveying underground and on the surface.

EAGLE CREEK.

Granite-Poorman, Livingstone Mining Co. (49° 117° S.E.) Company office, 521 Central Building, Seattle, Washington; H. R. Smith, of Blewett, B.C., President and Manager. Capital: 10,000 shares, no par value; issued, 7,915. This company owns and operates the Granite-Poorman mine on Eagle Creek. The property is equipped with a complete mining plant and mill, but the latter was not operated during 1944. No development-work was done. Two men, on the average, were employed. In addition, two lessees with hand-steel worked on the upper parts of the Poorman vein. Ore was recovered from pillars and stope remnants from the Poorman and Hardscrabble veins. A total of 152 tons was mined and shipped to Trail. This yielded 105 oz. of gold and 183 oz. of silver.

Venango. (49° 117° S.E.) This property, adjoining the Granite-Poorman, is controlled by A. Norcross and associates, of Nelson. The mine is equipped with a small complete mining plant. During 1944 all work was done under lease by Albert and Dave Norcross. Efforts were directed to development on a new vein about 140 feet west of the original Venango vein. About 100 feet of drifting on this vein opened up a shoot of commercial ore about 50 feet long and 14 inches wide. A second adit, 70 feet lower, measured on the dip of the vein, was driven on a vein averaging about 1 foot in width, for 95 feet. At that point it was 45 feet short of reaching the projection of the ore-shoot in the upper level. No ore was shipped during 1944.

FORTY-NINE CREEK.

Miracle Group. (49° 117° S.E.) This property was located by George Gormley and Fred Solveoff, of Nelson. About 30 feet of drifting was done on a showing just above the Forty-nine Creek road and 25 tons of ore, shipped to Trail, yielded 10 oz. of gold and 24 oz. of silver. Later in 1944 a lease and bond was taken on the property by the Consolidated Mining and Smelting Company of Canada, Limited. A diamond-drilling programme was started and some six holes were planned. Three of these holes were completed by the end of 1944 and work will be continued if road and weather conditions permit. The option is being retained for the present.

ROVER CREEK.

Rover Creek Mining Co., Ltd. (49° 117° S.E.) Company office, Room 11, K.W.C. Block, Nelson; L. D. Clark, Manager and Secretary. This company, a subsidiary of the Alpine Gold, Limited, continued to prospect a group of claims on Whitewater Creek where there is a large amount of quartz float carrying good gold values. During the summer of 1944 a total of 7,600 feet of diamond-drilling was done in nineteen holes. Although results were not very encouraging the option is still being held.

YMIR.

Goodenough. (49° 117° S.E.) This property, on Elise Mountain, about 5 miles from Ymir, is now owned by L. S. Davidson, 850 Hastings Street West, Vancouver. It was leased during 1944 by A. Lata, G. Turk, and

F. Padulo, of Ymir and Nelson. Hand-steel only was used and ore was recovered by mining pillars and stope remnants underground above the No. 1 level and by sorting old surface dumps near the portal of the No. 3 level.

Ymir Mine. (49° 117° S.E.) This old property, adjoining the Goodenough, was operated under lease by E. P. Haukedahl and S. Lundgren, of Ymir. Hand-steel was used to recover ore from pillars and stope remnants near the old No. 8 level. A total of 196 tons shipped to Trail yielded 55 oz. of gold, 166 oz. of silver, and 3,885 lb. of lead.

Ymir Good-Hope Mining Co. (49° 117° S.E.) Head office, 503 Westlake North, Seattle, Washington; local office, Medical Arts Building, Nelson; 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 operates the *X-ray* group of claims on Huckleberry Creek, about 6 miles from Ymir. An active development campaign was undertaken during 1944. With the assistance of a Government grant, three-quarters of a mile of road up Huckleberry Creek from the old Ymir mill and 1,400 feet of trail to connect the end of this road to the showings were built. A compressor-house was built at the end of the road and a small blacksmith-shop was built near the portal of the tunnel. A Gardner-Denver type XH 7- by 6-inch two-cylinder single-stage compressor, belt-driven by a 36- to 42-horse-power Petter engine, was installed. Development-work included about 500 feet of surface stripping and trenching and 400 feet of crosscutting. Three veins were encountered in the crosscut: an 8-inch vein at 70 feet, a 2-foot vein at 302 feet, and a 4-inch vein, which may be the downward extension of the surface showing on which the stripping was done, at about 400 feet. A crew of seven men was employed. No ore was shipped.

Ymir-Yankee Girl Gold Mines, Ltd. (49° 117° S.E.) Company office, 525 Seymour Street, Vancouver, B.C.; E. P. Crawford, President; W. A. Sutton, Secretary-Treasurer. Capital: 3,000,000 shares, no par value; issued 2,225,005. This property was operated under lease by Leo Madden, Ed. Emilson, and Oscar and Clarence Anderson, of Ymir. A small remnant of good ore was discovered on the 11 level. This was mined out partly by hand-steel and partly by compressed air from a small semi-portable plant installed by the lessees. Operations were terminated when this shoot was exhausted. A total of 202 tons was mined and shipped to Trail. This yielded 201 oz. of gold and 1,080 oz. of silver.

Oxide Group. (49° 117° S.E.) This property is on the ridge between Oscar (Bear) Creek and Porcupine Creek, near Ymir. It was discovered in 1943 by Ed. Haukedahl, of Ymir. The showings consist of an impressive area of gossan, parts of which showed values in lead and zinc. In 1944 an option was taken on this property by the Leta Exploration Company, 678 Howe Street, Vancouver. A diamond-drilling programme under the direction of D. F. Kidd was undertaken and two holes aggregating some 600 feet in length were drilled through the oxidized material. Results were inconclusive and the option was retained.

Wesko (Ymir Centre Star). (49° 117° S.E.) This property, about 3 miles from Ymir, was leased during 1944 by Ed. Emilson and Oscar Johnson, of Ymir. Hand-steel was used to recover ore from pillars and stope remnants. A total of 30 tons was shipped to Trail, yielding 27 oz. of gold, 104 oz. of silver, and some lead and zinc.

Maple Leaf Gold Mining Co., Inc. (49° 117° S.E.) Capital: 2,000,000 shares, 1 cent par; issued, 439,555. This is a Spokane syndicate which has under option the *Porcupine* group of claims on Porcupine Creek, about 4 miles from Ymir. During 1944 approximately 125 feet of drifting by hand under the direction of Ed. Haukedahl, of Ymir, followed a large lamprophyre dyke showing slight mineralization on one wall for the entire distance. Five men were employed.

Barrett Creek.

Spotted Horse. (49° 117° S.E.) This property, on Barrett Creek, about 6 miles from the main highway, is controlled by E. C. Wragge, of Nelson. An option was taken by the Consolidated Mining and Smelting Company of Canada, Limited, who made eight trenches, removing 3,500 cubic feet of overburden. Results were unsatisfactory and the option was dropped. Four men were employed.

Erie Creek.

Arlington. (49° 117° S.E.) This property, on Keystone Mountain, about 3½ miles from Erie, has been optioned from Relief Arlington Mines, Limited, by B. and K. Golac and A. Shrieves, Box 223, Nelson. It was operated continuously throughout 1944, two to three men being employed. Ore was recovered from underground workings and by sorting the extensive surface dump. Hand-steel only was used. A total of 437 tons was shipped to Trail and yielded 282 oz. of gold, 744 oz. of silver, and 10,168 lb. of lead.

Second Relief. (49° 117° S.E.) This property, on Erie Creek, about 13 miles from Erie, is owned by a syndicate consisting of A. Burgess, M. Burgess, C. M. Esche, and M. Towriss, of Salmo. This is an old mine with extensive underground workings. From No. 5, the lowest adit level, to No. 11 level the workings are served by a shaft and are flooded. The owners have installed a small mining plant consisting of an International Diesel engine belt-connected to a single-stage single-cylinder Jenks compressor and a Sullivan steel sharpener. The property was worked continuously throughout 1944 by the four partners. Ore was recovered from surface pillars, stope remnants, dumps, and clean-up around the mill. A total of 640 tons was shipped to Trail, which yielded 815 oz. of gold and 403 oz. of silver. The average number of men employed was five.

Sheep Creek.

Kootenay Belle Mine. (49° 117° S.E.) This property, on Sheep Creek, about 10 miles from Salmo, has been leased from the Kootenay Belle Gold Mines, Limited, by Russell Thompson, of Sheep Creek. Much of the surface and milling equipment and some of the buildings, including the dry-house, bunk-house, cook-house, office, and some of the residences have been dismantled and moved to the Kootenay Belle's operation at Retallack. During 1944, 250 tons was recovered from mill clean-up, broken ore, stope remnants, and pillars. This was shipped to Trail and yielded 107 oz. of gold and 114 oz. of silver.

Queen, 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 1944. The mill was operated for only two periods during 1944, from January 1st to February 29th and from April 10th to June 18th. The reason for this was lack of sufficient men to keep development-work ahead of mill requirements. The maximum crew employed during 1944 was sixty-one in April; this was reduced to less than thirty near the end of the year. The average number of men employed was forty-eight. This mine normally has a crew of from 100 to 110. Development-work included 491 feet of drifting, 19 feet of crosscutting, 83 feet of raising, and 936 feet of diamond-drilling. During the periods in which the mill operated a total of 13,092 tons was treated. This yielded 4,781 oz. of gold and 1,322 oz. of silver.

Nugget. (49° 117° S.E.) This property, adjoining the Motherlode and Reno, is owned by A. Endersby, Jr., of Fruitvale. It is equipped with a water-driven compressor which supplies air to both the new workings accessible from the 4,900 tunnel and the old workings in the Fawn basin. During the early part of 1944 ore was recovered from pillars and stope remnants in the area above the 4,900 level. Later, when road conditions permitted, mining was done in stopes above the 3 level in the Fawn basin. Thirty feet of crosscutting, 30 feet of drifting, and 150 feet of raising were done. From four to five men were employed. A total of 1,072 tons was mined and shipped to Trail. This yielded 379 oz. of gold and 447 oz. of silver.

SILVER-GOLD DEPOSITS.

BEAR RIVER AREA.

Mountain Boy Mining Co., Ltd. (56° 129° S.W.) Capital: 6,000,000 shares, no par value; issued, 4,326,847. J. O. LeFrancois, P.O. Box 1240, Place D'Armes, Montreal, Que., Engineer. The property is located on American Creek, a tributary of Bear River. A prospect adit, located about 300 feet south of the old camp at about 2,470 feet in elevation, has been driven 286 feet. Some open-cutting was also done during 1944.

GREENWOOD AREA.

Elkhorn. (49° 118° S.W.) This property, about 1½ miles north of Greenwood, was operated for several months during the summer under lease and bond by W. E. McArthur, of Greenwood. It is an old property with fairly extensive underground workings, largely served by a shaft about 150 feet deep. The deposit consists of a narrow quartz vein, much the same as the Providence, carrying good values in gold and silver. The vein is badly faulted and the early operators were unable to work out the faulting system and find additional blocks of ore. The present operator unwatered the shaft and about 300 feet of workings from it and did some 700 feet of diamond-drilling. This work was unsuccessful and the option was dropped. A small gasoline-driven portable compressor provided air for pumping and diamond-drilling.

Providence. (49° 118° S.W.) This property adjoins the Elkhorn. It was operated continuously throughout 1944 under lease by W. E. McArthur, of Greenwood, seven men being employed. The property is equipped with a small complete electrically-operated mining plant. During 1944 development-work included 150 feet of drifting, 45 feet of crosscutting, 60 feet of raising, and 350 feet of diamond-drilling. Ore was recovered from several small faulted blocks lying near the surface between the collars of the two shafts. Practically all of the known ore in the area has now been mined. A total of 433 tons was shipped to Trail. This yielded 344 oz. of gold, 43,535 oz. of silver, and some lead and zinc.

Gold Finch. (49° 118° S.W.) This property, just south-east of Greenwood, was operated for a short time during the early part of 1944 under lease by W. E. McArthur, of Greenwood. Development-work included one surface cut 80 feet long and from 5 to 12 feet deep, in solid rock, and 180 feet of raising. A small portable gasoline-driven compressor was used for this work. A total of 72 tons of siliceous ore was mined and shipped to Trail. This yielded 64 oz. of gold and 663 oz.

of silver. The development programme failed to disclose any further ore or possibilities and the property was abandoned. Three men were employed.

COPPER DEPOSITS.

SIMILKAMEEN RIVER AREA.

PRINCETON.

Copper Mountain, Granby Consolidated M., S. and P. Co., Ltd.

(49° 120° S.W.) Julian B. Beaty, President, New York, N.Y., and at Copper Mountain, B.C.; A. S. Baillie, Vice-President and General Manager; W. I. Nelson, Assistant General Manager; Robt. S. Douglas, Mine Superintendent; Ed. Foy, Mine Foreman. Capital: 600,000 shares, $5 par; issued, 450,260.65. The Copper Mountain mine and the concentrator at Allenby have been in continuous operation since work was resumed early in 1937, following several years of inactivity. The mine is located at Copper Mountain, at an elevation of 4,000 feet, and is 12 miles south of Princeton. A branch line of the Kettle Valley Railway from Princeton connects the mine, concentrator, and power plant.

The main development of the mine is by two adit haulage-levels, known as No. 2 and No. 6 levels, and two vertical shafts. The No. 1, or main shaft, handling all men and all supplies for the upper portion of the mine, extends from the surface to the 6th, or main haulage, level. The shaft is timbered throughout with 10- by 10-inch British Columbia fir. It is closed to the levels by panel doors beyond the shaft stations to assist in controlling ventilation. No. 2 shaft is used principally as an ore-hoisting shaft and, until the 7th and 8th level service raise is completed, it will continue in use for all men and supplies for these lower levels. All the ore is passed by haulage and transfer chutes to No. 6 level, on which the main transportation system of the mine is situated. The ore is taken out of the mine 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 on the railway to the concentrator at Allenby, 8 miles distant. The more recently opened levels, No. 7 and No. 8, received no development during 1944. The only work done on these lower levels was the drawing of ore mined in some of the upper workings.

Mining methods at Copper Mountain have gradually changed from the shrinkage methods of earlier years to the spiral method, which later was modified and improved. Long-slope stoping combined with long-hole drilling was proved to have a decided advantage over previous mining systems. Ore left in pillars was found to be most advantageously mined by the use of diamond-drill holes, which are now used for all stoping. Percussion drills have been retained for development-work. Development during 1944 consisted of 1,845 feet of drifting and crosscutting, 4,507 feet of raising, and 139,552 feet of diamond-drilling. Six new chutes were built during 1944 and twenty new grizzlies were made. Diamond-drill mining at the Princess May workings was completed during 1944. A new method of transferring ore was introduced when a "slushing drift" was completed on No. 6 level during the later part of the year. The slusher scraper-hoist is powered by a 50-horse-power electric motor. There were no major additions to surface plant equipment. Compressed air is developed by three various sized Ingersoll-Rand compressors and one Sullivan compressor, these four units being capable of a total delivery of 8,600 cubic feet a minute.

Underground ventilation generally is well maintained and the natural ventilation is supplemented by five fans. Fresh air enters the mine through the old glory-holes and ventilation raises, from which the fans force it to the 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, except on the 6th level. The potential capacity of the five fans in use on the different levels is 204,000 cubic feet a minute.

The company employs a Safety Inspector and the Copper Mountain Miners' Safety Committee holds meetings every two weeks. 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 competent nurse and an industrial first-aid man are on hand at all times. In 1944 the overall accident frequency rate for all accidents involving the loss of one shift or more was 0.62 per thousand shifts, as compared with the frequency rate of 0.76 for 1943. This was a noteworthy improvement which placed Copper Mountain among the few mines reporting a reduced accident rate. At the end of 1944 provision had been made for aluminium-dust therapy for the prevention of silicosis.

Labour turnover was less than in the two previous years. The average number of men employed was 451. Exclusive of townsite and staff employees, 224 men were employed at the end of 1944. Of these, 141 men were employed underground.

By December, 1944, diamond-drills had completely replaced percussion rock-drills in drilling blast holes in mining ore. The fourteen men required for diamond-drilling were in the employ of T. Connors, Diamond Drilling Company, Limited, and are not included in the figures given for company employees. It is reported that the amount of ore broken per man shift by the diamond-drilling method is about double that broken by the percussion-drill method. A total of 117,360 feet of diamond-drilling was done in 1944, compared with 7,255 feet in 1943.

A total of 1,383,296 tons of ore was milled, yielding 22,248,642 lb. of copper, 147,695 oz. of silver, and 5,603 oz. of gold.

VANCOUVER AREA.

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; and G. C. Lipsey, Superintendent. Capital: 100,000 shares, $25 par; issued, 91,966. This company operates the Britannia Mines at Britannia Beach, Howe Sound. The mines being operated are the Victoria, No. 5, Fairview, Bluff, and the 4,100-tunnel district, which includes No. 8 shaft. Despite the labour shortage a fair amount of development-work was carried out and regular stoping operations were carried on.

Preliminary development-work in the No. 8 shaft area has been done. The necessary equipment for hoisting has been installed. Dumping arrangement transfer raises between the 4,100 and 4,500 levels, and the loading-pockets at the 4,600 level have been completed. No. 8 hoist is a modern hoist manufactured by the Canadian Ingersoll-Rand Company. It is a type "P.E.I." 21,000 lb. rope pull, having two steel plate parallel drums (96 inches diameter by 60 inches wide), spiral grooved for 1¼-inch diameter rope, single reduction double helical cut steel gears, gravity air-post brakes, and each drum fitted with an air-operated internal expanding jaw-type clutch. Two Model "D" Lilly controllers and enclosed platform desk control on which two 20-inch diameter dial-type depth indicators with station tabs are included. The hoist is driven by a 450-horse-power, 600-r.p.m., 2,200-volt, 3-phase, 60-cycle, A.C., 40-degree C. rise,

continuous rated, wound rotor, hoist type induction motor, suitable for plugging duty, with full magnetic control apparatus.

An auxiliary air-compressor unit was installed. It is a Canadian Ingersoll-Rand type 30, 2-stage air compressor, powered with a 10-horse-power, 440-volt, 60-cycle, 3-phase, A.C. motor and V-belt drive with automatic start and stop control, air-filter and air-cooled after cooler.

Development-work at these mines in 1944 totalled 7,053 feet or 1.34 miles, made up as follows: Drifts, 2,907 feet; crosscuts, 1,250 feet; raises, 2,896 feet; powder-blast workings, 1,902 feet; winzes, 9 feet. A total of 4,807 feet of diamond-drilling was also done. The average number of men employed was 531. The total number of men employed at the end of 1944 for all operations underground, on the surface, and at the mill was 569. The total production of all mines amounted to 606,717 tons as compared with 864,357 tons in 1943.

The total metals produced, including copper from the copper precipitation plant, was 13,435,660 lb. of copper, 8,287 oz. of gold, 59,370 oz. of silver, and 17,053 dry tons of pyrite.

Ventilation and dust-control received great attention throughout 1944. The greatest advance in the year was the introduction of aluminium-powder therapy for the prevention of silicosis. All the active dry-rooms were equipped with aluminium-dispersal units, and each man receives a treatment before going on shift. A satisfactory dustless Leyner machine was developed and put in use at the property during 1944, and is giving good results. The dust concentration in headings using this machine is below the dangerous limit. The machine was equipped with standard tappet chuck fronthead and a New York backhead. A large water-needle is used with a small clearance in the tappet and hammer to prevent any air from passing into the drill steel with the water. The New York type backhead prevents any dry-drilling as the air cannot be turned on without the water being turned on automatically. The average dust-counts all over the Britannia mines was lower in 1944 than in any other year.

COPPER-GOLD DEPOSITS.

TEXADA ISLAND.

Little Billie, Industrial Metals Mining Co., Ltd.

(49° 124° N.W.) Company office, 626 Pender Street West, Vancouver, B.C.; L. Prosser, President; W. J. Grieve and J. Bray in charge of operations during 1944. The Little Billie mine is near Vananda, on Texada Island. The Little Billie shaft is 280 feet deep with four levels—the 40-foot, 80-foot, 180-foot, and 280-foot. During 1944 some prospecting and development work was done on three levels as follows: On the 80-foot level, 275 feet of drifting, 25 feet of crosscutting, 50 feet of raising, and 561 feet of diamond-drilling; on the 180 level, 386 feet of drifting and 3,178 feet of diamond-drilling; and on the 280-foot level, 58 feet of drifting and 6,059 feet of diamond-drilling. Siliceous flux, amounting to about 355 tons, was shipped to Tacoma. The Copper Queen mine, also owned by this company and close to the Little Billie, was unwatered to the 500-foot level and then allowed to fill up again. Towards the end of 1944 only ten men were employed at the Little Billie.

In January, 1945, ownership of the property was transferred from Industrial Metals Mining Company, Limited, to the Vananda Mining Company, Limited (N.P.L.), 607 Rogers Building, Vancouver, B.C.; H. T. James, President and Managing Director. This company proposes to initiate further work on the property by deepening the Little Billie shaft an additional 200 feet. (*See* page 162 for detailed report.)

COPPER-ZINC DEPOSITS.

VANCOUVER ISLAND.

DUNCAN.

Mount Sicker. (48° 125° N.W.) Twin "J" Mines, Limited. Head office, Vancouver, B.C.; Col. E. M. Thompson, President; C. Rutherford, General Manager, Vancouver, B.C.; R. B. Gayer, Mine Manager; mine office address, Duncan, B.C. Capital: 3,000,000 shares, $1 par; issued, 3,000,000. This mine was worked under a contract with Wartime Metals Corporation from the beginning of 1944 until May 19th when all underground operations were suspended because of cancellation of the contract. All machinery and other equipment were left intact at the mine in readiness for operations being resumed at short notice. J. W. Brickley is in residence at the camp as caretaker.

During the above working period an average crew of seventy-five men was employed, forty-one of these being employed underground. The following development-work was completed during 1944: Drifting and crosscutting, 110 feet; raising, 441 feet; reopening and repairing old workings, 1,260 feet; and diamond-drilling, 1,786 feet. Production amounted to 17,341 tons of ore, estimated to yield 17,341 lb. of copper and 1,493,604 lb. of zinc. This estimate was made by the management at the time the mine was closed as accurate smelter returns were not available.

The mine represents an amalgamation of the old Lenora, Tyee, and Richard III. mines which together produced 253,000 tons of copper-gold ore between 1898 and 1909. During the more recent period of production from these properties, July, 1943, to May, 1944, the present owners, Twin "J" Mines, Limited, milled 34,893 tons of ore with an average grade of: gold, 0.075 oz. per ton; silver, 2.05 oz. per ton; copper, 1.32 per cent.; lead, 0.6 per cent.; and zinc, 6.12 per cent.

The ore occurs as two separate, easterly-trending bodies about 150 feet apart, known as the North ore-body and the South ore-body. Most of the ore in the early days came from the South ore-body in all three mines, but most of that mined by Twin "J" came from the North ore-body and mainly from the old Lenora mine, with a little from the Tyee mine.

The two ore-bodies are parallel and lie along two main drag-folds in a narrow band of sediments. The ore is a fine-grained replacement of tuffs and graphitic schists. Mineralogically two types of ore are found, one is a "barite ore" consisting of a fine-grained mixture of pyrite, chalcopyrite, sphalerite, and a little galena in a gangue of barite, quartz, and calcite; a second type is a "quartz ore" consisting mainly of quartz with small amounts of chalcopyrite. The "quartz ore" is found as long, lenticular masses replacing both "barite ore" and the enclosing schists along the drag-fold.

Although most of the North ore-body appears to have been mined, the South ore-body still has some possibilities and extensions of it, probably down-faulted, could be explored by cleaning out some old workings in the vicinity of the Richard III., and, if need be, doing some diamond-drilling from these workings.

SILVER-LEAD-ZINC DEPOSITS.

BEAVERDELL AREA.

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. This property was operated continuously throughout 1944 on a somewhat reduced scale. The difficulty of obtaining a satisfactory crew was largely responsible for the reduction, the crew having decreased from about thirty men in the early part of 1944 to less than twenty at the end. The chief development-work was the completing and equipping of the raise from the 8 to the 4 level. This working is now being used to handle all ore and supplies. The old cook-house and bunk-house have been retained as it was not found practical to close them and find satisfactory accommodation for the fluctuating crew in the town of Beaverdell. The installations in the new power-house and blacksmith-shop were completed during 1944. This included satisfactory guards around all moving parts and a substantial addition to the concrete base of the large Rushton-Hornsby Diesel engine. This addition was necessary because the original base, built in two sections, proved to be inadequate. Development during 1944 included: shafts, 150 feet; crosscuts, 600 feet; drifts, 300 feet; winzes, 100 feet; and diamond-drilling, 200 feet. A total of 1,373 tons was mined and shipped to Trail. This yielded 98 oz. of gold, 293,246 oz. of silver, and 148,893 lb. of lead.

AINSWORTH MINING DIVISION.

Spokane Group, Ainsmore Mines, Ltd.

(49° 116° N.W.) Company office, Ainsworth, B.C.; M. Mohr, Manager. This company operates the *Spokane* group of claims on Munn Creek, about 3 miles from Ainsworth. The property was operated continuously throughout 1944, an average of four men being employed. It is equipped with a complete small mining plant which is electrically driven. Power for this is obtained from the Corporation of the City of Nelson. Development-work during 1944 included 150 feet of raise from the upper adit-level to the surface. An estimated total of 25 tons of high-grade hand-sorted crude lead ore was shipped to the Kellogg smelter, Idaho, under a contract with the Metals Reserve Corporation of Washington, D.C. In addition, a small tonnage of milling grade lead-zinc ore was accumulated for a possible future milling operation.

Kootenay Florence.

(49° 116° N.W.) This property was operated continuously until May 16th, 1944, when it was closed down on an order from the Wartime Metals Corporation. Until that time it had been mining and milling about 90 tons of ore per day. During the early part of 1944 a small part of this ore was obtained from tailings dredged from Kootenay Lake, but this part of the undertaking was stopped in January. When the property closed, about 1,000 tons of broken ore remained in the main stope below the No. 9 level. Faces of low-grade ore were left in the small stope from the 9 level and in the raise from the 8 level near the main raise. Two diamond-drill holes from the 7 level intersected the vein and showed some ore which was never developed. Practically no development-work was done during 1944. An average crew of about seventy-five men was employed up to the time the property was closed. The underground workings were cleaned up and put in good condition and all the surface plant and equipment were left on the property in charge of a watchman. A total of 10,431 tons was milled, the concentrates from which, shipped under a Metals Reserve Corporation contract, yielded 12,346 oz. of silver, 967,202 lb. of lead, 571,618 lb. of zinc, and some cadmium.

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. 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.

This company took over all holdings of Whitewater Mines, Limited, and for the majority interest Kootenay Belle Gold Mines, Limited, agreed to pay off all indebtedness and to supply all necessary equipment and operating capital, the outlay to be repayable from earnings. In December, 1943, a contract for sale of zinc concentrates was made with U.S. Commercial Company and in April, 1944, a further contract for sale of lead and zinc was arranged with American Smelting and Refining Company.

The old 125-ton mill was brought up to a capacity of 300 tons per day with the installation of a bank of ten M.S. flotation cells, providing a total of thirty cells, and the setting-up of the Kootenay Belle ball-mill and classifier. Diesel power was installed in a newly constructed power-house early in 1944 and late in the year two additional Diesels were installed to replace the old hydro-electric plant during the low-water months. The total power plant capacity is 900 horse-power. Renovation of the old camp and erection of new buildings, many of which were brought up from the Kootenay Belle camp, was completed early in 1944. In August a small bin, crusher, and sampling arrangement were installed just above the coarse-ore bin to facilitate the handling of customs ore.

A diamond-drilling campaign, begun in 1943, was completed early in 1944, before production started. This work blocked out remnants and continuations of formerly explored ore-bodies below No. 11 level, which extend in a downward raking arc from below the western end of No. 11 level to nearly 100 feet below the south-eastern face of No. 14 level. These ore-bodies are replacements of limestone by sphalerite and smaller amounts of galena closely associated with siderite (spathic iron). One ore-body between Nos. 12 and 1,472 levels west of the main raise is a replacement of a lamprophyre dyke within the limestone; the gangue in this ore-body consists largely of magnetite and pyrrhotite.

These ore-bodies are all replacements within the Whitewater limestone and are dominantly zinc bearing. They are below and completely separate from the silver-lead ore-bodies of the old upper mine, which are dominantly fissure fillings in slates. Complex folding of the limestone has resulted in irregular, curving structures which are in places difficult to follow but are of great importance to the localization of ore.

Milling commenced on March 14th at a rate of 100 tons a day and was later increased to about 200 tons a day. Work was first concentrated on a large ore-body lying between the south-eastern ends of Nos. 14 and 1,472 levels and, when this was nearly exhausted, on ore-bodies between Nos. 12 and 13 levels. The 1,472 level was advanced westerly with a view to getting beneath this latter ore and bringing it out through No. 1,472 level to avoid the necessity of tramming on the upper, crooked levels. Mining was done also on scattered remnants in other parts of the general ore-zone. Some ore was recovered from the old upper mine dumps and was trucked to the mill.

The average number of men employed during 1944 was sixty-six. Development-work included 650 feet of drifting, 50 feet of crosscutting, 200 feet of raising, 2,200 feet of diamond-drilling, and the reconditioning of 500 feet of old workings. Tonnage milled amounted to 39,515 tons, including 1,915 tons recovered from the upper dumps and 421 tons from two customs sources, the Bell and Jackson mines. At the end of 1944 broken reserve in the mine was estimated at 4,000 tons. The 39,515 tons milled yielded 15,154 oz. of silver, 359,309 lb. of lead, and 4,085,950 lb. of zinc.

Bell. (50° 117° S.E.) This property, in the Jackson Basin, about 7 miles from Retallack, was operated under lease and bond by Joe Gallo and associates, of Nelson. During the winter about 85 feet of development-work was done from the low-level tunnel in an attempt to intersect the Sunshine vein on an adjoining claim. Early in the summer the road was repaired with the assistance of a Government grant. A total of about 390 tons of high-grade zinc ore was recovered from sorting surface dumps and from mining pillars and stope remnants underground by hand-steel. This ore was hauled to Retallack and treated in the Whitewater mill, the concentrates being included in the Whitewater shipments. Four men were employed. The operators plan to continue throughout the coming winter.

Jackson. (50° 117° S.E.) This property, in the Jackson Basin, about 6 miles from Retallack, was operated under lease and bond for a short time during the summer. Some 30 tons of material containing values in zinc was hauled from an old tailing dump and treated in the Whitewater mill at Retallack.

SLOCAN MINING DIVISION.

Lucky Jim, Zincton Mines, Ltd. (50° 117° S.E.) Mine office, Zincton, B.C.; F. R. Thompson, Manager. This company, a subsidiary of Sheep Creek Gold Mines, Limited, owns and operates the Zincton (Lucky Jim) Mine at Zincton, B.C. The ore-bodies on this property all lie within a single band of limestone. This band, known as the Lucky Jim limestone, is from 20 to 50 feet thick and is strongly brecciated in most parts of the mine. There is more limestone in the banded argillites above and below the main band, but in thicknesses that rarely exceed 5 feet. The series is strongly deformed, and the Lucky Jim limestone is warped and folded; great differences in horizontal width on some levels have been brought about by folding and by squeezing (flowage) of the limestone. The average dip is about 45 degrees to the south-west from the surface down to No. 9, the lowest adit-level, where a flattening occurs. The flat section has not been fully explored, nor has an expected steepening farther down the dip. The structure plunges westward at an angle of about 20 degrees.

The ore is a replacement of limestone by sphalerite and pyrite. It occurs in relatively large and irregular ore-bodies as much as 25 feet thick. Former operations in upper parts of the mine were concentrated for the most part on ore that was localized by cross-fractures within the limestone and contained locally a high proportion of galena. In the present workings there is virtually no galena and for the most part the ore is not controlled by the existence of cross-fractures; instead, the ore-bodies follow mainly the plunge of the general structure and tend to be localized along troughs.

Ore mined in 1944 all came from above No. 9 level, and some from above No. 8 level, 250 feet vertically above No. 9. Exploration by diamond-drilling encountered new ore between recognized ore-bodies, as well as extensions of others already mined. A winze was sunk 220 feet at 20 degrees, from No. 9 level, in 1943, in a promisingly mineralized section, but shortage of labour prevented further development during 1944.

Some exploration was done by diamond-drilling on the upper surface, in ground not reached by underground workings, but failure of the water-supply in midsummer put a stop to this work for the rest of the year.

Operations were carried on continuously throughout the year, producing an average of about 320 tons a day while the mill was operating, the usual practice being to run the mill 6 days a week. Taking the yearly operation as a whole there was a marked falling off in the labour available. At the first of the year a crew of about ninety men was employed but this was reduced to less than seventy before the year ended. The average number of men employed was seventy-three. Development included 347 feet of drifting, 203 feet of crosscutting, 387 feet of raising, and 11,769 feet of diamond-drilling. On the surface a new dry, a small building for accommodating staff and visi-

tors, and a larger building to be used either as a bunk-house or a recreation hall were completed. All these buildings were of the locstave construction. The old dry was used to house a steam-heating plant to serve the new dry, mill, assay office, office, and staff house. A total of 100,588 tons was mined and milled during 1944, from which 15,350,781 lb. of zinc was recovered. The concentrates were shipped to the Anaconda smelter, near Butte, Montana, under a contract with the Metals Reserve Corporation. No lead was recovered and no payment was made for silver.

McAllister. (50° 117° S.E.) This property, on London Ridge, about 3 miles from Three Forks, was operated for a short time during the summer by the Allan Nelson Mining Company, Limited, Box 46, Nelson; Paul Lincoln, Manager. During the summer a truck-road was built, with the assistance of a Government grant, from the lower tram terminal to the mine. This road is slightly over a mile in length. A Diesel compressor plant, consisting of a 70-horse-power Petter 2-cylinder 2-cycle Diesel engine, belt connected to an ER-2 14- by 9- by 12-inch 2-stage Ingersoll-Rand compressor was taken to the mine and some preliminary preparations were made to install it. Work was confined to sorting and shipping ore from an old dump near the portal of the No. 3 level. The material from the dump was hauled underground and dropped through ore passes to the No. 6 level, from which it was trammed to the upper tram terminal. A total of 309 tons was handled in this manner and shipped to Trail. This yielded 4,384 oz. of silver. Five men were employed and all work was done by hand methods. The company plans, after the installation of the mechanical equipment, to mine a substantial tonnage of low-grade siliceous ore and ship it to Trail. Values are chiefly in silver. The operation was closed for the winter.

Victor. (49° 117° N.E.) This property, 3 miles from Sandon, is owned by Mrs. D. Petty, of Nelson, and was operated continuously during 1944 under lease by E. Doney, of Sandon. A total of 34 tons of ore was mined by hand-steel and shipped to Trail. This yielded 5,550 oz. of silver and 29,241 lb. of lead.

Noble Five Mine, Reco Mountain Base Metal Mines, Ltd. (49° 117° N.E.) Mine office, Sandon, B.C.; A. H. Honsberger, Manager. Capital: 3,000,000 shares, 50 cents par; issued, 2,000,000; 127,500 debentures, issued 127,500. This company controls and operates the Noble Five mine, about 2½ miles from Sandon. The mill was operated during January at about 80 tons a day, after which it was closed for alterations and repairs. About fifty-six men were employed while the mill was in operation. After that time a rather extensive diamond-drilling programme was undertaken to explore the vein between the 1,800 and 800 levels. This programme was in progress until April 16th, when the mill, power plant, office, warehouse, and lower tram terminal and all supplies and equipment contained therein were completely destroyed by fire. At the time a water-driven generator was being operated for lighting and charging storage-batteries in the mill and a stove was burning in the power plant, which was in the lower part of the mill building. Either of these may have caused the fire as both had given trouble previously. The buildings and equipment were covered by insurance. No attempt was made to replace the equipment or rebuild any of the structures and later in 1944 much of the heavy material was sold for scrap. Concentrates produced while the mill was operating were shipped to the United States under a Metals Reserve Corporation contract.

Enterprise. (49° 117° N.E.) This property, on Enterprise Creek, about 5 miles from the main Slocan Highway, was purchased by the Western Exploration Company. No work, other than an examination, was undertaken. Practically all the material from the recently erected mill was removed and either salvaged or sold for scrap. The Western Exploration Company anticipates carrying on an active programme on this property in 1945.

Ottawa. (49° 117° N.E.) This property, on Springer Creek, about 5 miles from Slocan City, was operated intermittently during 1944 by two lessees with hand-steel. During the early part of 1944 about 150 feet of drifting was done on the east vein on the No. 8 level without much encouragement. A total of 9 tons was mined from the 8 level stopes, shipped to Trail, and yielded 2,040 oz. of silver. This property has received considerable revenue from the British Columbia Security Commission in rentals from the mill building, near Slocan City, and the Diesel electric power plant and is now practically free of indebtedness.

Standard and Mammoth, Western Exploration Co. (49° 117° N.E.) Company office, Silverton, B.C. Capital: 2,000,000 shares, 50 cents par; issued, 1,514,482. General Manager, A. M. Ham; Mine Superintendent, R. A. Avison. This company operates the Standard mine on Emily Creek, about 3 miles from Silverton, and the Mammoth mine on Avison Creek, about 4½ miles from Silverton. Both these properties were worked continuously during 1944. At the Standard mine a minimum of fifty and a maximum of sixty men were employed during 1944. Ore was recovered from pillars and stope remnants above the No. 6 level. At the end of 1944 practically all the ore between the 6 and 5 levels was exhausted and stoping was being carried on above the 5 level. Development-work included 1,617 feet of drifts and crosscuts, 165 feet of raises, and 7,984 feet of diamond-drilling.

At the Mammoth mine a minimum of forty-three and a maximum of sixty men were employed during 1944. The stopes between the 7 and 6 levels and 6 and 5 levels, which comprised the largest part of the ore-body, were completely mined out. Some small areas above the 4 and 5 levels are still producing ore. Development-work at this property included 263 feet of drifts and crosscuts, 899 feet of raises, and 8,530 feet of diamond-drilling. A substantial part of the diamond-drilling was done below the 7 level to explore the downward extension of the main part of the ore-body, but no decision has been reached as to whether this area will be opened up in the near future. Diamond-drilling from the surface to the west of the present workings disclosed commercial values and widths and a crosscut is being driven to open up this new area.

A total of 38,749 tons of ore was treated in the Standard mill at Silverton from December 1st, 1943, to November 30th, 1944. This included 22,293 tons from the Mammoth, 16,405 tons from the Standard, and 51 tons purchased from the Enterprise mine in 1943. The 1,808.54 tons of lead concentrates and 5,141.62 tons of zinc concentrates produced were shipped to Kellogg, Idaho, under a contract with the Metals Reserve Corporation of Washington, D.C.

At the mill and power plant a crew of from thirty to forty men was employed in addition to those at the Standard and Mammoth mines. The average number of men employed in the entire operation was 128. During the summer a large part of the road between Silverton and the Standard mine was relocated and constructed and several of the steeper parts eliminated. The ore from the Standard mine was all hauled by truck. No other changes or additions of importance were made during 1944.

CRANBROOK AREA.

Sullivan Mine, 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.; S. G. Blaylock, Trail, President; R. E. Stavert, Montreal, Vice-President; J. E. Riley, Montreal, Secretary; H. B. Fuller, Trail, Comptroller; James Buchanan, Trail, General Manager. Sullivan mine office: Kimberley, B.C.; William Lindsay, General Superintendent; 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, some 3 miles away. During 1944 the output decreased to some extent from that attained in 1943, because of the increased amount of preparation required to extract ore from the lower levels and the necessity of limiting the production above the 3,900 level because of the back-filling programme. Lack of an adequate labour supply was also in some measure responsible.

In spite of determined efforts on the part of the management, the accident rate has not shown marked improvement during 1944. This has resulted from the increased activity in an attempt to maintain production and the fact that it was impossible to maintain the same careful selection of men as was formerly exercised.

Ventilation of the underground workings was not materially changed during 1944. The two large surface fans exhaust a total of 158,000 cubic feet of air a minute. Seventeen auxiliary units varying in capacity from 2,200 to 45,000 cubic feet a minute are in use underground and, in general, provide adequate distribution of air to the more remote parts of the mine. Five spare fans are kept on hand to take care of any emergency which may arise. A new ventilation raise in the extreme north section of the mine is planned. This raise will be 1,340 feet long and will have an average cross-section of 10 by 16 feet. It is proposed to pass some 200,000 cubic feet of air a minute through this raise by the installation of a new surface unit.

Development-work done in 1944 included 2,524 feet of drifting, 966 feet of cross-cutting, 9,050 feet of sub-level drifts and crosscuts, 20,634 feet of raising, and 903 feet of sinking. In addition, 19,176 feet of core diamond-drilling was done. All the sinking was done from the surface, this work comprising the sinking of shafts through unconsolidated material and rock for back-filling.

The installation of the belt conveyer from the 3,350 level to the 3,900 level was completed and this piece of equipment was put in operation near the end of 1944. This installation consists of a 36-inch conveyer belt built in six sections with a total length of 2,538 feet and a total vertical lift of 680 feet. It is designed to deliver 400 tons per hour from the 3,350 level to an 8,000-ton ore-pocket just above the 3,900 level at the south end. This installation is equipped with a 3-foot service track with skips and hoists for its entire length. It is electrically driven throughout and each section is automatically linked up with all others in such a manner that failure in any part of the system will result in the stopping of the entire belt so that a minimum of damage and spilling will occur. All material, before being handled on the belt, is crushed to 8 inches. At the end of each section a sloping grizzly allows the finer materials to fall on the belt first and provide a cushion for the larger pieces. Operation of this conveyer should materially reduce the strain put on the hoisting capacity in the 3,901 shaft.

In the methods of mining followed there was a very marked increase in the footage drilled with diamond-drills over that drilled with conventional steel and detachable bits as compared with 1943. There was also a marked increase in the use of detachable bits not only in drilling which was done for breaking ore, but also in that which was done for development-work. A total of 1,652,629 feet of holes was drilled in preparing the ground for blasting in stoping and development-work. A total of 876,445 feet of this was for stoping and 776,184 feet for development. In the drilling for stoping 273,405 feet was done by diamond-drills, 565,020 feet by detachable bits, and 38,020 feet by conventional type bits. This means that approximately 31 per cent. of the total drilling done for stoping purposes was done by diamond-drills. The diamond-drilling for stoping purposes yielded 2.77 tons per foot of hole while the drilling by detachable bits and conventional steel for stoping purposes yielded 2.53 tons per foot of hole. Of a total of 776,184 feet of hole drilled on development-work, 584,288 feet was drilled with detachable bits and the remainder with conventional steel. Of the total amount drilled for both stoping and development purposes about 16 per cent. was drilled by diamond-drills as compared with 5.2 per cent. in 1943.

Back-filling the large open stopes above the 3,900 level was actively carried on during 1944 and, in addition, many concrete bulkheads were placed in strategic localities underground to prepare for next season's work. In all, a total of 1,723,530 cubic yards of material was placed underground. This included 1,612,450 cubic yards placed by trucks, shovel, and bulldozers, 96,880 cubic yards by caving brought about by the drawing of pillars in the upper levels, and 14,200 cubic yards of development waste. The following additions were made to the back-filling equipment: Five 13-cubic-yard Euclid Diesel trucks, one power-grader for the roads, and one RD-8 tractor.

To provide water for back-filling operations, a pump, capacity 200 gallons a minute, was installed underground to pump mine water to a new 50,000-gallon wood-stave tank erected on the hill. The pump is equipped with a 150-horse-power motor and works against 1,500 feet of a vertical lift. The water is pumped through 500 feet of 4-inch cased diamond-drill holes and then through surface-lines to the tank. A carefully predetermined amount of water is dumped with each load of back-fill material from the Euclid trucks. This amount is varied with the clay content of the material and with the distance which the material has to run in the stopes. This back-filling method promises to be successful. The excess water drains off rapidly through an opening left in the back-fill bulkheads and through the rock itself and in a short time material placed underground in a semi-fluid condition is hard enough to walk on.

On the surface an extension was made to the mine office building and dry. This was of brick construction and provided room to accommodate 350 new lockers as well as 2,688 square feet of additional office space. On the hill and in connection with the back-filling operation a frame garage was built for repairing trucks. A brick warehouse and gasoline-station was constructed on the townsite for trucks and tractors. Twenty-four new houses were built in Happy Valley and on the lower Blarchmont townsite to accommodate northern employees.

At the beginning of 1944 there were about 1,600 employees on the pay-roll. Of these about 800 worked underground, 400 in various other capacities on the surface, and about 400 at the concentrator. At the end of 1944 there were about 200 less on the pay-roll because of military call-ups and employees leaving for various other reasons.

A total of 2,156,639 tons of ore was mined during 1944. Of this, 109,640 tons was from development, 93,597 tons from surface dumps, 1,213,454 tons from above the 3,900 level, and 739,948 tons from below the 3,900 level. The proportion of the total which will be taken from below the 3,900 level is expected to increase in the future.

WINDERMERE AREA.

Parridice Mine, Sheep Creek Gold Mines, Ltd.

(50° 116° S.E.) This property, 18 miles from Invermere, is owned by the Sheep Creek Gold Mines, Limited. During August and September some exploratory work was done underground. This included unwatering a winze on the 7,800-foot level and 373 feet of diamond-drilling. In addition to this, some of the old equipment was salvaged. A crew of eight men was employed under the direction of J. S. McIntosh.

GOLDEN AREA.

Monarch and Kicking Horse Mines, Base Metals Mining Corporation, 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; Alexander G. Ballachey, Manager; H. D. Forman, 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. On

January 2nd, 1944, the power-house of this company was completely destroyed by fire and considerable damage done to the Diesel, electrical, and compressor equipment therein. The mill was of necessity closed after having milled only 96 tons in January. The company purchased two new Ingersoll-Rand, type 40K series, semi-portable compressor outfits of about 500 cubic feet capacity each, and, with these, carried on an active development programme in the Kicking Horse mine while the power-house was being rebuilt and the equipment repaired. The mill, which had also undergone some repairs and alterations during the shut-down, was started on June 12th and was operated continuously from then to the end of 1944. The development-work indicated a substantial tonnage of good grade zinc ore on the extension of the No. 4 ore-body in the Kicking Horse workings and this provided ore for the remainder of the year's operation. A total of 24,995 tons was mined and treated, including a small tonnage from the Monarch mine, where mining operations at the rate of about 35 tons per day were started in November. Development done included 534 feet of drifting and cross-cutting, 115 feet of raising, and 1,174 feet of diamond-drilling. All raising was confined to cutting box-holes in preparation for stoping operations. An average of fifty men was employed while development and repairs were being carried out. This number was increased to about an average of sixty-five men after the mill was put in operation. All concentrates were shipped to the United States, under a contract with the Metals Reserve Corporation, and yielded 10,408 oz. of silver, 880,720 lb. of lead, and 5,184,654 lb. of zinc.

MERCURY DEPOSITS.

FORT ST. JAMES AREA.

PINCHI LAKE.

Pinchi Lake Mercury Mine, Consolidated Mining and Smelting Co. of Canada, Ltd.—(54° 124° N.E.) Operations were suspended at this property in July.

TAKLA LAKE AREA.

SILVER CREEK.

Snell Property.—(55° 125° N.E.) The Consolidated Mining and Smelting Company of Canada, Limited, did some prospecting on this property on Silver Creek.

Takla Mercury Mine, Bralorne Mines, Ltd.—(55° 125° N.E.) Operations were suspended at this property in September.

PLACER-GOLD DEPOSITS.

ATLIN AREA.

Production from this area was reduced further during 1944. The large surface operations were idle. The shovel operation of Spruce Creek Placers, Limited, was started but because of trouble with the drainage flume and with some slides from the bench very little was done during the season.

Dream, Shamrock, and New Year Leases, Columbia Development, Ltd.—(59° 133° N.W.) J. H. Eastman, Manager. Capital: 50,000 shares, $1 par; issued, 50,000. This is an

underground operation on Spruce Creek, working on the *Dream*, *New Year*, and *Shamrock* leases on a lay from J. W. Noland.

The actual mining operations at present are on the *Shamrock* lease. There has been no change in the methods of mining as outlined in previous reports. These have been working out very satisfactorily.

A small Mancha trammer, a 40-cell Edison storage-battery locomotive with a 5-horse-power motor, has been installed on B level for haulage.

Because of shortage of labour only one shift worked during 1944 and even that was not at full strength. Twenty-nine men were employed. General conditions were satisfactory.

Dream Lease. (59° 133° N.W.) J. W. Noland, Operator. Only a few men were employed and at irregular intervals on the *Dream* lease. Mr. Noland has purchased the holdings of the Spruce Creek Mining Company and is now proposing to open up a drain from the *Dorothy* lease, No. 5 shaft, up through Nos. 4, 2, and 1 shafts to the *Dream* shaft. Nothing has been done yet on this work.

Several small lay operations employing from one to four men carried on during 1944.

OMINECA MINING DIVISION.

Manson and Germansen Creeks.

None of the large operations was worked during 1944. Some prospecting and sniping were carried on by individuals.

STIKINE MINING DIVISION.

There was no activity, other than some prospecting, during 1944 in this area.

CARIBOO AREA.

Willow River Watershed.

Lowhee Mining Co., Ltd. (53° 121° S.W.) The dam at the head of this company's pit was removed at the beginning of 1944. This slowed down the operation somewhat, making it necessary to do more sledging of boulders so that the water available from Ella and Groundhog Lakes would carry them through the long 4-foot-wide flume. Only during August and September, in which months the rainfall was very heavy, was there enough water to handle the boulders. The face of the pit was advanced about 200 feet during the season and will probably connect with the Stouts Gulch pit in 1945. The bottom of the channel widened considerably making it necessary to install two flumes in the form of a "V" to carry away the washed gravels. The deep portion of the channel appears to be swinging towards the east side of the pit. This, together with the difference in the bed-rock elevations in the Lowhee pit and Stouts Gulch pit, suggests a possibility that the upper part of the latter pit is on the flank of the deep channel. More will be known about this in 1945 when the top ends of the two pits will be connected. Estimated yardage from the pit washed during the season was about 150,000 cubic yards. The crew consisted of twelve men and a cook.

Rouchon Creek Placers.—(53° 121° S.W.) Work was curtailed considerably in 1944 and the recovery was very low.

Lease of C. Risberg.—(53° 121° S.W.) C. Risberg continued to sluice at his small pit in Beaver Pass and made a small recovery of gold from the 2,700 cubic yards of gravel which he estimates he washed.

Lease of Dr. Hougen.—(53° 121° S.W.) P. McColm, who is working this ground alone on a lay, is reported to have had a very successful season. The ground he is working is very shallow but is apparently quite rich.

J. Powell Estate Lease.—(53° 121° S.W.) J. Chouse, with Izydor Andracki as a new partner, continued to operate this lease on Coulter Creek which he is purchasing on a time basis from the J. Powell estate. They removed a bulge of ground left previously because of buildings on it and obtained exceptionally good returns for about four months of piping. The remainder of 1944 was spent in building a new cabin, cutting blocks, and clearing ground. It is understood that a shortage of lumber for sluice-boxes made it necessary to stop piping.

Lease of H. C. and H. L. Ailport.—(53° 121° S.W.) This lease lies at the bottom of Nelson Creek close to the old Sangdang operation of Wm. Hong and associates. Gravel from odd patches totalling about 1,000 cubic yards was washed.

Red Gulch Placers.—(53° 121° S.W.) J. J. Gunn, layman, reports that he worked alone all season and was accordingly much handicapped. Despite this he was able to pipe off some 6,000 cubic yards at a new set-up, which gave him a better chance to dispose of his tailings.

Lease of E. Rask.—*(53° 121° S.W.) It is reported that E. Rask piped all season at* his small pit on Devil's Canyon Creek, about 5 miles west of Wells.

Langford Placers.—(53° 121° S.W.) At this operation, 7 miles north of the Wells highway at Beaver Pass, Mr. Langford spent most of his time driving a tunnel at the confluence of Aura Fina Creek with Tregillus Creek. He was searching for a channel which he believed existed behind a rim of rock north-westerly across Tregillus Creek from his previous operations.

WILLIAMS CREEK WATERSHED.

Stouts Gulch.—(53° 121° S.W.) J. Marok obtained permission from the Lowhee Mining Company to work out remnants of the old pay-gravels which had been left by previous operators. He had a small hydraulic plant.

Mink Gulch.—(53° 121° S.W.) R. Sehl, who previously worked Stouts Gulch, went into partnership with G. Simmons to work the lease of W. H. Savery on a percentage basis. Because of trouble over water rights, Sehl withdrew from the partnership. Simmons continued to operate for a while but with mediocre results.

Walker Gulch.—(53° 121° S.W.) B. Stoyva obtained a lay on the J. J. Gunn lease on this gulch, and with three others, working on a partnership basis, started work but soon stopped, apparently because of unsatisfactory returns.

McArthur Gulch.—(53° 121° S.W.) K. Johannson continued piping but spent most of his time prospecting for pay-gravel. His returns were low.

Little Valley Creek.—(53° 121° S.E.) G. Halvoresen, lessee, hydraulicked about 800 cubic yards for a small recovery of gold.

J. T. A. Fleury reported sluicing about 2,000 cubic yards of gravel, averaging about 40 cents per yard.

J. J. Curtis Operation.—(53° 121° S.W.) J. J. Curtis, financed by Van Bibber interests, continued to work on the east side of Williams Creek, below the town of Barkerville. Col. J. E. Hamming took charge later in the season and was apparently successful in making an agreement with the Mink Gulch interests concerning water rights.

ANTLER CREEK WATERSHED.

Waverly Placers.—(53° 121° S.E.) W. Moore continued to pipe shallow ground but it was reported that it was not as good as that worked in 1943.

Nugget Gulch Placers.—(53° 121° N.E.) At the time of inspection, N. M. Hansen and one other man were opening up a new pit. It is understood that the clean-up *proved disappointing. For a while it was thought that the continuation of the old* rich channel had been located.

Eight-mile Lake.—(53° 121° S.W.) M. A. Anderson, lessee, continued working at Eight-mile Lake but nothing is known regarding the outcome of the year's operations.

Pinus Creek.—(53° 122° N.E.) J. Doody, lessee, continued to pipe and ground-sluice on this creek and put about 1,600 cubic yards through his boxes. He also did some road-work to facilitate moving supplies to the operation.

Lease of A. Holm.—(53° 121° S.E.) Holm and one other man sluiced about 2,000 cubic yards for one of the better gold recoveries of the season.

Lease of C. Bindschedlar.—(53° 121° S.E.) Bindschedlar spent a short time by himself ground-sluicing.

Lease of J. A. Sauve.—(52° 121° N.E.) Sauve and partner opened up a small pit near the junction of Nugget Gulch and Antler Creek. The work to date can all be classed as prospecting.

Lease of E. S. Dowsett.—(53° 121° S.E.) Dowsett estimates that he moved about 1,000 cubic yards of dirt in opening up his ground. Some gold was recovered.

Guyet Placers, Ltd.—(53° 121° S.E.) New interests have obtained this ground, which is situated on the slopes of Guyet Mountain, about 6 miles south-east of Barkerville. Considerable repair-work was done to the entire plant. This consisted of cleaning out the pit and ditches, changing the pipe-line, and rebuilding bridges for flumes.

Cunningham Creek.

Lease of Wm. Beamish.—(52° 121° N.E.) Beamish purchased and installed a small monitor and pipe-line in 1944.

Lease of D. Jorgeson.—(52° 121° N.E.) It appears that very little work was done on this ground in 1944.

Lightning Creek Watershed.

B. and K. Placers.—(53° 121° S.W.) This company again restricted its activities to the Dunbar Flats ground. Only two men were obtainable for this operation. After the channel pinched out and a new pit failed to find further pay-gravels, the operation was closed for the season.

Lease of I. I. Felker.—(53° 121° S.W.) At this lease on Butchers Bench, about opposite the confluence of Amador Creek with Lightning Creek, I. I. Felker piped all season. He handled about 5,000 cubic yards of gravel according to his estimation.

Ennerdale Placers.—(53° 121° S.W.) Hind and Freeman estimate that they piped about 2,000 cubic yards of pay-gravels from their pit at Grub Gulch. A well-mineralized shear, which was exposed by this work, failed to carry gold values.

Slade Placers, Ltd.—(53° 121° S.W.) This company's operation on Mostique Creek continued to be worked under the supervision of Mrs. M. Caldwell. With two men she was piping out the last shallow gravels on the north-west corner of the property. It is estimated that 25,000 cubic yards was removed but the gold recovery was very low and it is doubtful if the operation will continue. It is impossible to open up new ground with the present available crew.

Houseman Creek.—(53° 121° S.W.) Mr. and Mrs. L. Biggs continued to develop their property on Houseman Creek. This was previously referred to as the lease of G. Murphy.

Lease of Magnus Sundburg.—(53° 121° S.W.) This property had not been worked for several years; in 1944 Sundburg took one man in as a partner and began ground-sluicing on a small scale.

Cottonwood River Watershed.

Lease of M. Murlock.—(53° 122° S.E.) The gravels on this ground are getting deeper and consequently require a stronger flow of water. Murlock accordingly spent his time making a dam so that he might procure the necessary flow of water.

Lease of H. D. Wagner.—(53° 121° N.W.) Because he did not realize that he had to apply for exemption each year under the provisions of the "Free Miners' Exemption Act," Wagner allowed his ground to lapse after doing a considerable amount of preparatory work on it. It is now held in reserve.

Sovereign Creek, Reddish River, and Little Swift River. (52° 121° N.W., 52° 122° N.E.) The St. Eugene Mining Corporation, Limited, has optioned and staked placer-ground along these watercourses and proposes to do considerable testing. A trail has been made to above Eskridge Creek and a cabin built at the end of it. Several cross-sections of test shafts have been collared-in pending the arrival of pumping equipment to permit testing below ground-water level. A survey of the valley flats and low benches has also been started to aid in placing the test-work.

QUESNEL RIVER WATERSHED.

Spanish Creek, North Fork of the Quesnel River. St. Eugene Mining Corporation, Limited. (52° 121° N.E.) In addition to the Sovereign Creek ground mentioned above, this corporation has procured the old Ruby Pit at the mouth of Spanish Creek and the holdings of Ashby and Speers a short distance below Spanish Creek on the North Fork of the Quesnel River.

A remnant of the Ruby Pit channel was hydraulicked practically up to the pipeline. As further work could not be done without disturbing the pipe-line and as it appeared that there was not much of the channel left before it again entered the main river, this work was discontinued.

On the Ashby and Speers ground an old Northwestern shovel was used to dig test-pits along the benches up-stream from the pit and camp. It is understood that later in the season the pipe-line was rearranged to give a better head than Ashby had, and some piping was done at the old pit.

Some drilling was also done and it is understood that another channel has been located by this work.

Lease of J. Hasbrouck. (52° 121° N.E.) With H. Asserlind as partner this year, J. Hasbrouck continued piping at his operation on Barr Creek, about 12 miles north of Keithley. When he ran out of pay-dirt he dropped back to the bottom end of the pit and began to pipe out what appeared to be a spillover into the pit from the south bank. It is understood that some good pay-gravel was found here but that it was again cut through.

McGregor and Tait.—(52° 121° N.E.) It is reported that McGregor and Tait continued to develop their ground at Keithley Falls by use of boom-gates.

Lease of Adolph Anderson.—(52° 121° N.E.) This lease is on the north shore of the North Fork of Quesnel River, about opposite Murderer's Gulch. Anderson estimated that he washed 3,000 cubic yards of gravel, working all summer with a wheelbarrow. An old 90-foot shaft in the gravels near-by indicates the presence of a deep channel.

LILLOOET AREA.

BRIDGE RIVER WATERSHED.

Principia Placers, Ltd.—(50° 122° N.E.) At this company's property on the west bank of the Bridge River, about 20 miles from Lillooet, work was done by local labour whenever it was available. The crew varied from two to four men who were employed in piping out a small test-pit.

Lease of Wm. Haylmore.—(50° 122° N.E.) The long cut that Mr. Haylmore has been driving into the gravel bank at the mouth of the Hurley River was advanced about 50 feet during 1944. This cut is about 12 feet wide and 12 feet deep. It is walled with the large wash and double track is laid on the floor. Two end-dump 1-ton cars are used to carry the fines to the sluice-boxes at the end of the cut.

Lease of C. Wihksne.—(50° 122° N.E.) Mr. Wihksne reports that he advanced his gravel cut about 40 feet.

FRASER RIVER.

Lease of L. D. Leonard.—(50° 121° N.W.) This lease is situated at the mouth of Sallus Creek, about 14 miles up the Fraser River from Lillooet. During the early spring Mr. Leonard made a road from the highway to the property and repaired an old cabin to serve as his living-quarters. In the late fall and winter he spent some time advancing the lower of two exploratory adits a distance of 50 feet from the adit at the edge of the Fraser River. The floor-level, which was controlled by the level of the water in the Fraser River, was some 6 feet above the bottom of the channel. The gravel is shovelled directly into the sluice-box from the face. A grizzly is used to separate the coarse wash from the fine wash. The former is trammed out of the working while the latter is sluiced out. Water from Sallus Creek is carried by flume to two storage-tanks outside the adit then to the head end of the sluice-box at the face. This exploratory work can be done only when the Fraser River is low. Some coarse gold has been obtained.

Leases of G. A. Carter.—(50° 121° N.W.) These leases are located on the east bank of the Fraser River, about 10 miles south of Lillooet. An old road leading to a cabin on the property was cleaned out and some testing of the gravels was done at various points. Most of the work was done at the foot of a big bluff on its up-stream side where some gold was found. Very heavy wash was also present at this point and hindered the test-work considerably. This was not a suitable location for testing but there are some sections of the property that might be tested to advantage.

PRINCETON AREA.

No activity in placer-gold deposits during 1944 was reported.

BARITE.

GOLDEN AREA.

Summit Lime Works.

(51° 116° S.W.) Capital: 1,000 shares, $100 par; issued, 500. This property, about 6 miles from Parson on the Kootenay Central Railroad, is owned by the Summit Lime Works, of Lethbridge, Alta. The deposit consists of a vein of high-grade barite from 5 to 20 feet wide which can be traced on the surface for more than 1,000 feet. This deposit has supplied about 1,000 tons a year, the material being shipped to Lethbridge. Investigation has shown that barite is an excellent material for permanent ballast in the 10,000-ton freight ships now being built in coast shipyards. The Northern Construction Company and J. W. Stewart, Limited, have a contract to supply some 45,000 long tons of barite for this purpose and have taken over the operation of this property. The preliminary work was started in June. The road from Parson to the mine was repaired. A camp to provide accommodation for about twenty men, consisting of bunk-house, cook-house, dry, warehouse, etc., was built at the property. The material was mined by quarrying and loaded into trucks with a small gasoline-operated shovel. Other mechanical equipment comprised two small portable gasoline-driven compressors, providing compressed air for drilling, seven standard 3-ton trucks, and a tractor provided with a bulldozer blade. A total crew of twenty men was employed under the direction of J. T. MacNeill. A total of 14,334 tons was mined during 1944. Of this 2,426 tons

has been stock-piled and the remainder shipped to the coast. In addition to this tonnage, seven 50-ton cars have been loaded for the Summit Lime Works' operation at Lethbridge, as the Northern Construction Company's contract called for the filling of the requirements of this company.

CLAY AND SHALE.

NEW WESTMINSTER AREA.

Clayburn Co., Ltd. (49° 121° S.W.) 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, about 50 miles east of Vancouver. The mines are operated on the room-and-pillar system. The fireclay from the Kilgard mine is hauled by storage-battery electric locomotive to the plant, and from 4B and No. 9 mine by truck. About thirteen men are steadily employed underground. The production for 1944 amounted to: Fireclay from Kilgard, 15,479 tons; No. 4B, 1,695 tons; No. 9 mine, 2,295 tons; and shale from quarry, 2,170 tons; total production, 21,639 tons.

Richmix Clay Co.—(49° 121° S.W.) 2891 Twelfth Avenue East, Vancouver, B.C.; Geo. Richmond, Manager. A small mine has been opened up by this company near the eastern boundary of the Clayburn company. A slope has been driven down about 200 feet and two men are employed. Production for 1944 was 5,189 tons of fireclay.

GABRIOLA ISLAND.

Gabriola Shale Products Quarry.—(49° 123° S.W.) Evans, Coleman and Evans, Operators, Vancouver, B.C.; F. A. Higgs, Manager, Gabriola Island, B.C. This quarry was idle in 1943 but resumed operations on May 15th, 1944. With a crew of six men employed at the quarry and five men around the surface plant, work was carried on for the rest of the year.

GYPSUM.

FALKLAND AREA.

Gypsum, Lime and Alabastine, Canada, Ltd. (50° 119° N.W.) Head office, Paris, Ontario; British Columbia office, 509 Richards Street, Vancouver, B.C.; British Columbia Manager, Norman Jessiman, Vancouver, B.C.; Quarry Superintendent, Alex. Jessiman, Falkland, B.C. Capital: 500,000 shares, no par value; issued, 440,043. This company again confined its Falkland operation to the No. 2 and No. 5 quarries, 40 miles south of Kamloops, near the Vernon–Kamloops Highway. Shipping facilities are provided by the Canadian National Railways at Falkland, over which normally the gypsum is shipped to the calcining and board mill at Port Mann, B.C. However, because of the destruction of this mill by fire early in July, most of the subsequent output was shipped to the Calgary mill, which in turn supplied part of the west coast requirements of processed gypsum. Shipments were also made to the Canada Cement Company at Exshaw, Alta., and the Pacific Coast Cement Company at Bamberton, B.C.

The gypsum is mined in open quarries. The overburden is thin and with the quarrying advancing into the hillside the walls rise to a considerable height above the quarry-floors. This makes it necessary to keep the walls at a safe angle of inclination, and well barred down, for the safety of workmen. Drilling is done by compressed-air operated jack-hammers. In addition to the actual quarrying a drag-line scraper was used to remove overburden above the No. 5 quarry during the summer. The quarries are 500 to 600 feet higher than the railway-bunkers, to which the gypsum is transported by trucks.

A crew of eleven men was employed and 26,000 tons of gypsum was produced. This is a reduction of approximately 7,000 tons below the 1943 output. The destruction of the Port Mann mill was chiefly responsible for the decreased output.

LIMESTONE.

KOEYE RIVER AREA.

Koeye Limestone Co.—(51° 127° N.W.) P. Christensen, Manager. The quarry is on Koeye River, about 7 miles south of Namu. It was worked for 321 days and produced 13,374 tons of limestone. The entire output was taken by Pacific Mills at Ocean Falls.

GRAND FORKS AREA.

Fife Limestone Quarry, Consolidated Mining and Smelting Company of Canada, Ltd.—(49° 118° S.E.) This company owns and operates the Fife Limestone Quarry, near Christina Lake. A crew of nine men was employed during the summer under the direction of G. E. Clayton, of Trail. No development-work was done during 1944, all the material mined being taken from the glory-hole which was opened up in 1943. This working is practically exhausted and it is planned to mine by open-cut and gas-shovels in the future. A total of 15,700 tons of limestone was mined and shipped to Trail during the season. This material is used chiefly for fluxing purposes in the smelter.

TEXADA ISLAND.

Pacific Lime Co.—(49° 124° N.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 only operation carried on at present by this company at Blubber Bay. Six kilns are working, producing quicklime and hydrated lime. In addition, other limestone products are marketed. More than 40,000 tons of limestone is quarried per year. Thirty-four men are employed in the quarry. This plant has been worked continuously throughout 1944, and if more men had been available it could have had a higher production.

Texada Quarry, B.C. Cement Co.—(49° 124° N.W.) The company operated a limestone quarry on the opposite shore of Blubber Bay from the Pacific Lime Company. A new 36- by 48-inch Dominion jaw-crusher driven by a 160-horse-power motor has been installed. This will allow increased production. The limestone is shipped to the company's cement plant at Bamberton. R. Hamilton is in charge of operations. Nineteen men are employed.

Vananda Quarries.—(49° 124° N.W.) Operated by Beale Quarries, Limited. This quarry is situated a short distance from Vananda. An agricultural lime plant capable of producing 60 tons per day is being operated. Limestone is shipped to various pulp-mills and crushed limestone is produced for various purposes, including limestone-dust

for the coal mines, stucco dash, explosives, etc. Twenty men are employed under the supervision of W. D. Webster.

VANCOUVER ISLAND.

Bamberton, B.C. Cement Co.—(48° 123° N.W.) Company office, corner of Fort and Wharf Streets, Victoria, B.C. Capital: 15,995 "A" preferred, $100 par; 15,995 "B" preferred, $100 par; 10 common, $100 par; issued, 32,000. This company operates quarries at Bamberton and Texada Island and a cement plant at Bamberton. At Bamberton the total crew employed in the cement plant and quarry averages 120 men. A shortage of labour hindered production during 1944.

SILICA.

GRAND FORKS AREA.

Bailey Silica, Consolidated M. and S. Co. of Canada, Ltd.

(49° 118° S.E.) This property, 3 miles south of Grand Forks, is owned by the Consolidated Mining and Smelting Company of Canada, Limited. A crew of nine men was employed during the summer under the direction of G. E. Clayton, of Trail. Mining was carried on in the same manner as in 1943; that is, by loading into trucks with a small gasoline-shovel. A new siding on the Great Northern Railway, about ¼ mile from the quarry, greatly facilitated the handling of the material and did away with the necessity of the 3-mile haul into Grand Forks. A total of 24,000 tons of high-grade silica was mined and shipped to Trail to be used as a flux in smelting operations. At the end of the season's operation the property was closed and the shovel, Diesel plant, and all other equipment were removed.

STONE, SAND, AND GRAVEL.

VANCOUVER AREA.

NORTH VANCOUVER.

Deeks Sand and Gravel Co., Ltd.—(49° 123° S.E.) Company office, 101 First Avenue, Vancouver, B.C.; T. O. Burgess, Superintendent. Seven men are employed.

Highland Sand and Gravel Co.—(49° 123° S.E.) North Vancouver. About nine men are employed.

Road Materials, Ltd.—(49° 123° S.E.) North Vancouver. Seven men are employed.

NEW WESTMINSTER AREA.

Gilley Bros. Quarry.—(49° 122° S.W.) A granite quarry and crushing plant is operated at Silver Valley, Pitt River. The stone is used for construction-work. About twenty men are employed.

Maryhill Sand and Gravel Co.—(49° 122° S.W.) This quarry and screening plant is operated by Gilley Brothers on the Fraser River bank, about 3 miles from Coquitlam. More than twenty men are employed regularly.

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. About ten men are employed when it is operating.

VANCOUVER ISLAND.

Cassidy Gravel-pit.—(49° 123° S.W.) A. Galloway, Foreman. This quarry is in the Cassidy district, convenient to the main Island Highway, and is operated by the Public Works Department to supply gravel and other supplies when required for highway construction and repairs. A crew of four men was employed during 1944 as occasion demanded. No explosives were necessary in this operation. The various benches in the quarry proper have been kept fairly well trimmed and working conditions were found satisfactory.

COAL MINES.

BY

JAMES DICKSON.

The Province is divided into six Inspection Districts, as follows:—

Inspection District.	Mining Divisions in Districts.
Coast	Alberni, Nanaimo, Victoria, Vancouver, and New Westminster.
Northern Interior	Lillooet, Ashcroft, Clinton, Quesnel, Cariboo, and Peace River.
Interior	Similkameen, Osoyoos, Nicola, Vernon, and Kamloops.
East Kootenay and Boundary	Greenwood, Trail Creek, Nelson, Slocan, Ainsworth, Lardeau, Revelstoke, Fort Steele, and Golden.
Northern	Atlin, Stikine, Portland Canal, Skeena, and Omineca.

The Inspectors inspect the coal mines, metalliferous mines, and quarries in their respective districts.

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.

The District Inspectors of Mines have their headquarters in the different mining areas as follows: John MacDonald, Nanaimo; James Strang, Victoria; Robert B. Bonar, Cumberland; James A. Mitchell, Lillooet; E. R. Hughes, Princeton; Hamilton C. Hughes, Nelson; H. E. Miard, Fernie; and Charles Graham, Prince Rupert.

PRODUCTION.

The total tonnage produced by the coal mines of the Province for the year 1944 was 1,933,639 tons, being an increase of 111,985 tons or 6.1 per cent. over 1943.

The Coast District, which includes Vancouver Island, Nicola-Princeton, and Northern Districts, produced 812,394 tons, a decrease of 81,778 tons from 1943.

Vancouver Island Collieries produced 689,714 tons, a decrease of 40,275 tons or 5.5 per cent. from 1943.

The Northern District produced 38,233 tons, an increase of 20,109 tons or 110.4 per cent. over 1943.

The Nicola-Princeton District produced 85,027 tons, a decrease of 61,032 tons or 41.1 per cent. from 1943.

The East Kootenay District produced 1,120,665 tons, an increase of 193,183 tons or 20.8 per cent. over 1943.

The following table shows the output and *per capita* production daily and for the year 1944 at the various mines:—

OUTPUT AND PER CAPITA PRODUCTION, 1944.

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)	132,378	275	321	1.50	412	239	2.01	554
Comox Colliery (No. 8 mine)	209,396	276	400	1.89	523	312	2.43	671
South Wellington (No. 10 mine)	259,308	274	313	3.02	828	276	3.46	939
Wellington mine	71,362	170	107	3.92	667	91	4.61	784
Prospect mine	3,786	281	7	1.92	541	6	2.24	631
White Rapids mine	2,540	100	27	0.94	94	25	1.02	102
Chambers' mine	2,714	225	7	1.28	388	5	2.41	543
Loudon mine	838	234	3	1.19	279	3	1.19	279
Cassidy mine	1,296	254	5	1.02	259	4	1.27	324
Lewis' mine	671	254	2	1.31	335	2	1.31	335
Deer Home mine	2,798	233	6	2.00	466	5	2.40	559
Lake Road mine	403	264	4	0.37	100	4	0.37	100
Wellington No. 9	555	289	2	0.95	277	2	0.95	277
Pacific mine	590	263	2	1.12	295	2	1.12	295
Stronach mine	1,079	255	5	0.84	216	4	1.13	270
Middlesboro Colliery	10,240	77	82	1.62	125	55	2.48	191
Merritt coal mines	8,529	228	26	1.43	328	16	2.33	533
Princeton Tulameen Coal Co.	18,038	96	77	2.43	234	59	3.19	306
Tulameen mine	47,687	279	73	2.34	653	62	2.75	769
Jackson mine (British Lands)	233	91	4	0.63	58	3	0.84	78
Coldwater (Merritt)	300	133	4	0.56	75	4	0.56	75
Bulkley Valley Colliery	12,802	285	38	1.14	337	28	1.60	457
Telkoal Colliery	20,006	280	48	1.49	417	32	2.23	625
Coldspring mine (Cariboo)	46	10	2	2.30	23	1	4.60	46
Hat Creek Colliery	568	64	6	1.47	94	4	2.22	142
Packwood mine (Peace River)	2,700	145	20	0.93	135	11	1.70	245
Gething mine (Peace River)	566	75	9	0.84	63	8	1.02	77
Hasler Creek mine (Peace River)	777	95	13	0.60	59	8	1.02	97
Peace River mine (Peace River)	768	63	42	0.30	18	19	2.10	40
Elk River Colliery	304,421	295	367	2.84	840	276	3.70	1,103
Michel Colliery	650,594	295	698	3.16	932	582	3.80	1,118
Corbin Colliery (open cast)	165,650	197	114	7.37	1,453	.....	.....	.....

COLLIERIES OF VANCOUVER ISLAND INSPECTION DISTRICT.

The output of Vancouver Island Collieries was 689,714 tons. Of this amount 124,358 tons or 18 per cent. was lost in preparation for the market; 4,629 tons or 0.6 per cent. was consumed by operating companies as fuel; 565,077 tons was sold in the competitive market; 4,350 tons of this was taken from stock. Of the amount sold in the competitive market 510,880 tons or 90.4 per cent. was sold in Canada and 54,197 tons or 9.6 per cent. was sold in the United States.

COLLIERIES OF THE NICOLA-PRINCETON DISTRICT.

Of the gross output of 85,027 tons produced by the collieries of the Nicola-Princeton District, 2,831 tons or 3.3 per cent. was consumed by the producing companies as fuel, 26 tons was added to stock, and 82,170 tons was sold in the competitive market in Canada.

Collieries of the Northern District.

Out of a total of 38,233 tons produced, 1,234 tons was used by the operating companies as fuel, 220 tons was added to stock, 36,779 tons was sold in Canada, and 18 tons in the United States.

Collieries of the East Kootenay District.

The output of the collieries in the East Kootenay District was 1,120,665 tons. Of this amount 62,868 tons or 5.6 per cent. was lost in preparation for the market; 17,757 tons or 1.6 per cent. was consumed by producing companies as fuel; 113,056 tons or 10 per cent. was used in making coke; 901, 422 tons was sold in the competitive market; and 21,458 tons was added to stock. Of the amount sold in the competitive market, 745,197 tons or 82.6 per cent. was sold in Canada and 156,225 tons or 17.4 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 1940 are shown in previous Annual Reports.

Output and Per Capita Production in Various Districts.

Year.	District.	Total Coal mined during Year, Tons.	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.
1940	East Kootenay District	776,518	731	1,062	550	1,412
	Coast District	891,309	2,143	462	1,625	548
	Whole Province	1,667,827	2,874	580	2,175	766
1941	East Kootenay District	1,026,053	921	1,114	753	1,682
	Coast District	776,300	1,802	431	1,476	526
	Whole Province	802,358	2,723	662	2,229	808
1942	East Kootenay District	1,047,718	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

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, 1944.

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 1944.
	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)	101,504	13,030		114,534	17,127		1,456	18,583	2,007	1,268		739	132,378
Comox Colliery (No. 8 mine)	156,778	20,124		176,902	31,558		2,248	33,806	1,452	140		1,312	209,396
South Wellington (No. 10 mine)	175,105	20,312		195,417	64,486		700	65,186	3,499	2,204		1,295	259,808
Wellington mine	61,857			61,857	10,289		220	10,509	1,004			1,004	71,362
Prospect mine	3,106			3,106	679		1	680					3,786
White Rapids mine	1,586	731		2,317	219		4	223					2,540
Chambers' mine	2,714			2,714									2,714
Loudon mine	838			838									838
Cassidy mine	1,296			1,296									1,296
Lewis' mine	671			671									671
Deer Home mine	2,798			2,798									2,798
Lake Road mine	403			403									403
Wellington No. 9	555			555									555
Pacific mine	590			590									590
Stronach mine	1,079			1,079									1,079
Totals, Vancouver Island District	510,880	54,197		565,077	124,358		4,629	128,987	7,962	3,612		4,350	689,714
Nicola-Princeton District.													
Middlesboro Colliery	8,603			8,603			1,637	1,637					10,240
Merritt Coal Mines, Ltd.	8,256			8,256			273	273					8,529
Granby Cons. M.S. & P. Co., Ltd.													
Princeton Tulameen Coal Co.	18,038			18,038									18,038
Tulameen mine	46,766			46,766			921	921					47,687
Jackson's mine (British Lands, Ltd.)	207			207						26	26		233
Coldwater (Merritt)	300			300									300
Totals, Nicola-Princeton District	82,170			82,170			2,831	2,831		26	26		85,027
Northern District.													
Bulkley Valley Colliery	12,707			12,707			121	121	151	125		26	12,802
Telkoal Colliery	18,658	18		18,676			1,093	1,093	58	295	237		20,006
Coldspring mine (Cariboo)	46			46									46
Hat Creek Colliery	559			559					390	399	9		568
Packwood mine (Peace River)	2,700			2,700									2,700
Gething mine (Peace River)	566			566									566
Hasler Creek mine (Peace River)	777			777									777
Peace River mine (Peace River)	748			748			20	20					768
Totals, Northern District	36,761	18		36,779			1,234	1,234	599	819	246	26	38,233
East Kootenay District.													
Crow's Nest Pass Coal Co., Ltd.—													
Elk River Colliery	206,866	71,175		278,041	22,140		4,439	26,579	277	78		199	304,421
Michel Colliery	403,624	82,732		486,356	37,864	113,056	13,318	164,238					650,594
Corbin Colliery (Cons. M. & S. Co., Ltd.)	134,707	2,318		137,025	2,864			2,864	4,935	30,696	25,761		165,650
Totals, East Kootenay District	745,197	156,225		901,422	62,868	113,056	17,757	193,681	5,212	30,774	25,761	199	1,120,665
Coal.													
Grand Totals for Province	1,375,008	210,440		1,585,448	187,226	113,056	26,451	326,733	13,773	35,231	26,033	4,575	1,933,639
Coke.													
Crow's Nest Pass Coal Co., Ltd.— Michel Colliery	38,702	35,334		74,036					2,256	3,537	1,281		75,317

COLLIERIES OF BRITISH COLUMBIA—MEN EMPLOYED, 1944.

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)	13	5	18	114		114				11	17	28	95	42	137	6	3	9											15	15	239	82	321
Comox Colliery (No. 8 mine)	16	5	21	189		189				19	21	40	75	40	115	13	7	20											15	15	312	88	400
South Wellington (No. 10 mine)	10	4	14	148		148				99	20	119	18	10	28	1	3	4													276	37	313
Wellington mine	6		6	53		53				24	9	33	8	7	15																91	16	107
Prospect mine	1		1	5		5								1	1																6	1	7
White Rapids mine	3		3	8		8				3		3	11	2	13																25	2	27
Chambers' mine		1	1	5		5																							1	1	5	2	7
Loudon mine				3		3																									3		3
Cassidy mine	1	1	2	3		3																									4	1	5
Lewis' 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	4		4																									4	1	5
Totals, Vancouver Island District	51	17	68	545		545	1		1	156	68	224	207	102	309	20	13	33											31	31	980	231	1211
Nicola-Princeton District.																																	
Middlesboro Colliery	2	3	5	28		28	25		25		10	10		11	11		3	3													55	27	82
Merritt Coal Mines, Ltd.		1	1	12		12	2		2		9	9	2		2																16	10	26
Granby Cons. M.S. & P. Co., Ltd.		1	1								1	1	2	1	3																2	3	5
Princeton Tulameen Coal Co.	5	2	7	36		36				18	10	28		6	6																59	18	77
Tulameen mine	1	2	3	46		46	7		7	5	2	7	3	6	9														1	1	62	11	73
Jackson's mine (British Lands, Ltd.)	1		1	2		2					1	1																			3	1	4
Coldwater mine (Merritt)	1		1	3		3																									4		4
Totals, Nicola-Princeton District	10	9	19	127		127	34		34	23	33	56	7	24	31		3	3											1	1	201	70	271
Northern District.																																	
Bulkley Valley Colliery	3	2	5	18		18	7		7		1	1		6	6					1	1										28	10	38
Telkoal Colliery	3	2	5	22		22	5		5	1	5	6	1	9	10																32	16	48
Coldspring mine (Cariboo)				1		1					1	1																			1	1	2
Hat Creek Colliery	1	2	3	2		2	1		1																						4	2	6
Packwood mine (Peace River)	1	2	3	10		10					5	5		2	2																11	9	20
Gething mine (Peace River)				5		5	2		2	1	1	2																			8	1	9
Hasler Creek mine (Peace River)		1	1	6		6				2	2	4		2	2																8	5	13
Peace River mine (Peace River)	3	3	6	10		10	6		6		15	15		5	5																19	23	42
Totals, Northern District	11	12	23	74		74	21		21	4	30	34	1	24	25					1	1										111	67	178
East Kootenay District.																																	
Crow's Nest Pass Coal Co., Ltd.—																																	
Elk River Colliery	11	16	27	146		146				74	40	114	45	29	74		6	6													276	91	367
Michel Colliery	22	27	49	300		300				173	48	221	81	37	118	6	4	10													582	116	698
Corbin Colliery (Cons. M. & S. Co., Ltd.)		8	8					57	57		36	36		11	11		2	2														114	114
Totals, East Kootenay District	33	51	84	446		446		57	57	247	124	371	126	77	203	6	12	18													858	321	1179
Grand totals for Province	105	89	194	1192		1192	56	57	113	430	255	685	341	227	568	26	28	54		1	1								32	32	2150	689	2839

NOTE.—U=Underground; A=Above ground; T=Total.

LABOUR AND EMPLOYMENT.

During 1944, 2,839 persons were employed in and about the coal mines of the Province, a decrease of twelve from 1943. Taking the average of the principal mines in the Vancouver Island District, about 9 per cent. of the working-days were lost, principally through Saturday afternoon crews not working. In the Nicola-Princeton District about 15 per cent. of the working-days were lost. In the East Kootenay District the mines worked about 98 per cent. of the working-days.

COMPETITION OF COAL PRODUCED OUTSIDE BRITISH COLUMBIA.

During 1944 the shipment of Alberta coal to British Columbia totalled 678,960 tons (short). Coke shipped was 67,770 tons and briquettes 39,009 tons. The following table shows the amount of Alberta coal brought into British Columbia during past years:—

Year.	Short Tons.	Year.	Short Tons.
1935	221,748	1940	311,232
1936	244,928	1941	304,928
1937	269,023	1942	652,222
1938	238,435	1943	963,000
1939	239,227	1944	678,960

Of the 1,585,448 tons of British Columbia coal marketed 138,705 tons was sold for domestic and industrial uses in the Provinces of Alberta, Saskatchewan, and Manitoba; 221,771 tons was sold for railroad use in the Provinces; 13,324 tons was sold for railroad use in the United States and 188,165 tons was sold for railroad use in British Columbia; 207,116 tons was exported to the United States and 62,018 tons was sold for ships' bunkers. The tonnage of British Columbia coal used for domestic and industrial purposes in the Province was 754,349 tons.

ACCIDENTS IN AND AROUND COAL MINES.

During 1944, 2,839 persons were employed in and around coal mines. Three fatal accidents occurred during the year as compared with eight during 1943. The ratio of fatal accidents per 1,000 persons employed was 1.06 as compared with 2.80 for 1943.

In 1942 the ratio was 4.23; in 1941, 1.47; in 1940, 2.08; in 1939, 0.67; in 1938, 3.37; in 1937, 3.17; in 1936, 2.84; and in 1935, 1.67. The average for the ten-year period was 2.31.

The number of fatal accidents per 1,000,000 tons produced during 1944 was 1.55; during 1943 the figure was 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; in 1936, 5.94; and in 1935, 4.21. The average for the ten-year period was 4.14 per 1,000,000 tons raised.

The following table shows the collieries at which the fatal accidents occurred during 1944 and comparative figures for 1943:—

Name of Company.	Name of Colliery.	1944.	1943.
Canadian Collieries (D.), Ltd.	No. 10 mine, South Wellington	1	1
Granby Consolidated M.S. & P. Co., Ltd.	Granby No. 1	—	1
Crow's Nest Pass Coal Co., Ltd.	Coal Creek	—	5
Crow's Nest Pass Coal Co., Ltd.	Michel	—	1
Crow's Nest Pass Coal Co., Ltd.	Elk River	2	—
Totals		3	8

The following table shows the various causes of fatal accidents in 1944 and their percentages of the whole and comparative figures for 1943:—

Cause.	1944.		1943.	
	No.	Per Cent.	No.	Per Cent.
By falls of roof and coal	1	33.33	3	37.50
By mine-cars and haulage	1	33.33	1	12.50
By bumps	....	.....	4	50.00
Miscellaneous (surface)	1	33.33	....	.....
Totals	3	100.00	8	100.00

The following table shows the number of tons of coal mined for each fatal accident in their respective classes in the years 1944 and 1943:—

Cause.	1944.		1943.	
	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	1	1,933,639	3	607,218
By mine-cars and haulage	1	1,933,639	1	1,821,654
By bumps	....	.....	4	455,413
Miscellaneous (surface)	1	1,933,639	....	.....
Totals	3	644,546	8	227,707

The number of tons of coal mined per fatal accident during 1944 was 644,546 tons, compared with 227,707 tons in 1943. The average for the ten-year period was 241,867 tons.

The following table shows the fatalities from various causes in coal mines during the year 1944 compared with 1943, according to Inspection Districts.

District.	Number of Deaths from Accidents.				Totals.	
	Falls of Roof and Coal.	Mine-cars and Haulage.	Bumps.	Miscellaneous (Surface).	1944.	1943.
Vancouver Island	1	....	....	....	1	1
Nicola-Princeton	....	....	....	....	....	1
East Kootenay	....	1	....	1	2	6
Northern	....	....	....	....	....	....
Province, 1944	1	1	....	1	3	....
Province, 1943	3	1	4	....	....	8

Ratio of Accidents.

District.	Accident Death-rate.			
	Per 1,000 Persons employed.		Per 1,000,000 Tons of Coal mined.	
	1944.	1943.	1944.	1943.
Vancouver Island	0.82	0.79	1.44	1.37
Nicola-Princeton	....	2.88	.....	6.84
East Kootenay	1.69	5.19	1.78	6.46
Northern	....	.....	.....	.....
Totals, 1944	1.06	.....	1.55	.....
Totals, 1943	.....	2.80	.....	4.33

The details regarding the occurrences of fatal accidents in coal mines during 1944 are as follows:—

The fatal accident which occurred to William J. Moore, miner, No. 10 mine, Canadian Collieries (D.), Limited, on February 23rd resulted from deceased falling about 8 feet from a plank scaffold from which he was loading a shot-hole. Some coal fell from the face and broke the planks on which he was standing. He suffered injuries to the bladder from which he died two days later.

The fatal accident which occurred to James Galloway, steam-locomotive driver, Elk River Colliery, Crow's Nest Pass Coal Company, Limited, on May 26 resulted from his head being crushed between the side of his locomotive and a timber support of an overhead snow-shed when he was leaning out from the window of the locomotive cab. Swelling ground had thrown the track out of alignment and tilted that side of the locomotive towards the timber which normally gave sufficient clearance.

The fatal accident which occurred to Thomas Millar, driver, No. 1 East mine, Elk River Colliery, Crow's Nest Pass Coal Company, Limited, on December 6th resulted from deceased being crushed between the front of a loaded car on which he was riding and a dislodged roof-timber on a level road near a working-face in pillar-extraction work. Some coal had fallen from above the timbers at this point and deceased had one of the miners remove this coal, but the work was not completed when deceased came out with a loaded car. The miner signalled Millar to stop, but apparently the latter did not understand the signal or was unable to stop his horse, which mounted the small pile of coal on the floor and displaced a roof-timber with its collar and deceased was crushed between this timber and the loaded car. He died from his injuries the following day. Deceased was on special furlough from the army to assist in coal production.

EXPLOSIVES.

The following table shows the quantity of explosives used in coal mines during 1944, 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)	30,431	132,378	30,431	4.35	1.00
Comox Colliery (No. 8 mine)	67,550	209,396	67,550	3.10	1.00
South Wellington (No. 10 mine)	71,600	259,308	68,400	3.63	1.04
Wellington mine	15,175	71,362	25,450	4.70	0.59
Prospect mine	1,800	3,786	4,200	2.10	0.43
White Rapids mine	15,825	2,540	14,550	0.16	1.08
Chambers' mine	2,100	2,714	3,300	1.28	0.37
Loudon mine	900	838	1,450	0.93	0.62
Cassidy mine	700	1,296	1,150	1.85	0.61
Lewis' mine	850	671	1,250	0.79	0.69
Deer Home mine	2,240	2,798	3,250	1.25	0.69
Lake Road mine	350	403	432	1.23	0.81
Wellington No. 9	750	555	1,169	0.74	0.64
Pacific mine	350	590	845	1.70	0.41
Stronach mine	1,550	1,079	1,450	0.70	1.07
Totals for district	212,171	689,714	224,877	3.25	0.94

NICOLA-PRINCETON DISTRICT.

Middlesboro Colliery	4,320	10,240	5,760	2.37	0.75
Merritt Coal Mines, Ltd.	5,250	8,529	5,000	1.62	1.05
Princeton Tulameen Coal Co.	3,600	18,038	6,000	5.00	0.60
Tulameen mine	12,800	47,687	20,500	3.72	0.62
Jackson mine (British Lands)	325	233	550	0.71	0.59
Coldwater (Merritt)	300	300	400	1.00	0.75
Totals for district	26,595	85,027	38,210	3.19	0.69

NORTHERN DISTRICT.

Bulkley Valley Colliery	2,400	12,802	5,000	5.33	0.48
Telkoal Colliery	6,287	20,006	7,710	3.18	0.81
Coldspring mine (Cariboo)	.....	46	.....	.....	.....
Hat Creek Colliery	2,000	568	1,500	0.28	1.33
Packwood mine (Peace)	1,200	2,700	2,000	2.25	0.60
Gething mine (Peace)	600	566	900	0.94	0.66
Hasler Creek mine (Peace)	650	777	1,200	1.19	0.54
Peace River mine (Peace)	650	768	1,200	1.18	0.54
Totals for district	13,787	38,233	19,510	2.77	0.70

EAST KOOTENAY DISTRICT.

Elk River Colliery	36,640	304,421	45,000	8.31	0.81
Michel Colliery	45,000	650,594	50,284	14.45	0.89
Corbin Colliery (open cast)	2,900	165,650	1,683	57.12	1.72
Totals for district	84,540	1,120,665	96,967	13.25	0.87
Totals for Province	337,093	1,933,639	379,564	5.91	0.86

QUANTITY OF DIFFERENT EXPLOSIVES USED.

	Lb.
Monobel of different grades	309,370
Permissible rock-powder	25,123
Stumping-powder (on surface)	2,600
Total	337,093

MACHINE-MINED COAL.

During the year 1944, mining-machines produced approximately 1,195,415 tons or 62 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	...	15	...	15
East Kootenay	...	63	9	54
Northern	...	5	...	5
Totals	...	110	30	80

In addition to the above, 125 air-picks are used in the mines of the Crow's Nest Pass Coal Company.

BRITISH COLUMBIA & YUKON CHAMBER OF MINES
651 Dunsmuir Street - Vancouver 1, B. C.

SAFETY-LAMPS.

There were 2,773 safety-lamps in use in the coal mines of the Province. Of this number 244 were flame safety-lamps of the Wolf type and 2,529 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)	61	226	37	250
Comox Colliery (No. 8 mine)	76	338	33	381
South Wellington (No. 10 mine)	15	290	15	290
Wellington mine	12	154	8	158
Prospect mine	2	22	2	22
White Rapids mine	3	27	3	27
Chambers' mine	1	10	1	10
Loudon mine	2	5	2	5
Cassidy mine	2	.....	2	.....
Lewis' mine	1	2	1	2
Deer Home mine	3	18	3	18
Lake Road mine	2	6	2	6
Wellington No. 9 mine	2	2	2	2
Pacific mine	1	2	1	2
Stronach mine	5	7	2	10
Totals for district	188	1,109	114	1,183

Nicola-Princeton District.

Middlesboro Colliery	7	60	7	60
Merritt Coal Mines, Ltd.	2	22	2	22
Princeton Tulameen Coal Co.	74	.....	4	70
Tulameen mine	86	.....	5	81
Jackson's mine (British Lands)	2	.....	2	.....
Coldwater (Merritt)	2	12	2	12
Totals for district	173	94	22	245

Northern District.

Bulkley Valley mine	34	.....	4	30
Telkoal Colliery	39	.....	4	35
Cold Spring mine (Cariboo)	.....	.....	.....	.....
Hat Creek Colliery	1	.....	1	.....
Packwood mine (Peace)	12	.....	1	11
Gething mine (Peace)	20	.....	1	19
Hasler Creek (Peace)	7	.....	1	6
Peace River mine (Peace)	21	.....	1	20
Totals for district	134	.....	13	121

East Kootenay District.

Elk River Colliery	360	.....	30	330
Michel Colliery	715	.....	65	650
Corbin Colliery (open cast)	.....	.....	.....	.....
Totals for district	1,075	.....	95	980
Totals for Province	1,570	1,203	244	2,529

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 eleven mines and underground at four.

The purposes 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	2,077
Ventilation	1,838
Haulage	1,920
Coal-washing	2,600
Miscellaneous	4,601
Total horse-power	13,036
Underground—	
Haulage	1,352
Pumping	1,080
Coal-cutting	.....
Miscellaneous	43
Total horse-power	2,475
Total horse-power above and below ground	15,511

Of the above practically all the current was 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 the year.

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 prohit 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 the year 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 the year 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 the year 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 form a valuable record and offer a means of checking the accuracy of the other means of methane testing. During the year 191 samples were taken.

INSPECTION COMMITTEES.

At all the larger mines the miners fully observed the requirements of General Rule 37 of the "Coal-mines Regulation Act" by appointing and maintaining Inspection Committees which inspect the mines on behalf of the workmen every month. These committees generally display an efficient interest in their work and as the personnel is changed at three- or six-month intervals a large number of the miners have, in the course of years, been brought directly into this work, which should provide an added safety factor.

A report of each monthly inspection is sent to the District Inspector of Mines.

COAL-DUST.

During the year the sampling and analyses of coal-dust was well maintained, 2,479 samples were 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 January 5th an outburst of gas immediately followed the firing of a shot in a place in No. 1 Diagonal slope, No. 10 mine, South Wellington, and necessitated the withdrawal of all the men in this section. The gas was cleared out by the following day.

On January 26th an outburst of gas occurred in No. 10 mine, South Wellington, in the same location as the above and about one minute after the firing of a shot in the place. All the men were withdrawn at once, the gas was removed, and work was resumed on the following shift.

On February 16th an outburst of gas occurred in No. 10 mine, South Wellington, in No. 1 Diagonal slope, following the firing of a second shot of a round. Three sets of timber were displaced and a considerable tonnage of coal was loosened.

On March 4th, at No. 9 mine, Elk River Colliery, a coal-car broke away from a trip at the upper landing of the main surface incline, which is 1,500 feet long, and was derailed and smashed at the bottom of the incline near the transfer-house of the retarding conveyer. No person was injured and safety-ropes are used on all trips since this occurrence.

On March 8th a small fire occurred on the first landing of the mainway in the Main shaft No. 8 mine, Comox Colliery. This shaft is also the main intake of the mine. A cutting-torch had been used in repairing the shaft-gates at the upper landing and apparently a piece of hot metal had fallen down the shaft to the landing and started the fire, which was discovered and extinguished before any material damage was done.

On March 10th an outburst of gas occurred in a place in No. 1 Diagonal, No. 10 mine, South Wellington, immediately following the firing of the second shot of a round. The gas was cleared out and work was resumed on the following day.

On March 16th an outburst of gas and coal occurred in the same place as the outburst of March 10th, immediately after the firing of two shots simultaneously. This

outburst was accompanied by a loud rumbling noise. All men were withdrawn from the district, the gas was cleared off, and work was resumed on the following shift. This outburst was quite severe as the roadway was filled completely with the blown-out coal for a distance of 40 feet from the original position of the face at the time of firing the shots.

On April 11th an outburst of gas and coal occurred in a place in No. 1 Diagonal, No. 10 mine, South Wellington, immediately following the firing of two shots simultaneously. All men were withdrawn and the gas was cleared sufficiently to permit resumption of work on the following shift.

On April 20th an outburst of gas immediately following the firing of two shots simultaneously in No. 5 Dip section, No. 1 Diagonal, at 1.30 a.m. All men were withdrawn. Work resumed at 3 p.m.

On April 26th a small outburst of gas occurred in No. 1 Diagonal, No. 10 mine, South Wellington, at 1.30 a.m. Work was resumed at 9 a.m. on the same day.

On May 11th a bump occurred in No. 1 East mine, Coal Creek, affecting the main entry and travelling-road between No. 12 and No. 14 entries. No serious personal injuries resulted.

On August 28th in No. 8 shaft, Comox Colliery, a descending cage was jammed in the shaft because failure of lag-screws at a joint in the guides allowed the guides to get out of alignment and stop the cage. There were no persons on the cage at this time.

On September 25th at No. 8 mine, Comox Colliery, one of the two friction-drives on the right-hand drum of the hoist fractured across its full cross-section and caused this compartment of the shaft to remain inactive until repairs were made. No person was injured.

On October 2nd in the No. 1 Diagonal Slope district, No. 5 Dip section, a fairly heavy outburst of gas occurred after the firing of one shot, at 8.45 p.m. Gas cleared away and work resumed at 7 a.m., October 3rd.

On November 13th at No. 8 mine, Comox Colliery, two new hoisting-ropes were being installed and while the ropes were being adjusted to their proper hoisting-length a man who was riding on the top of a cage to supervise part of the work and prevent kinking of the rope was hoisted into the head-frame and injured. The hoisting engineer had overlooked the fact that the indicator did not at this time indicate the exact position of the cage.

On November 30th at No. 8 mine, Comox Colliery, the right-hand cage was jammed while descending, due to the guides being out of alignment from failure of lag-screws. Five lengths of guides were damaged and a new cage was placed in service. Following this occurrence the lag-screws were replaced by bolts.

On December 7th a slight local bump occurred in No. 1 East mine, Coal Creek, in the No. 8 East section. No one was injured.

Bumps.

On May 11th a bump occurred in No. 1 East mine, Elk River Colliery, and did considerable damage in the No. 12 and No. 14 East sections. Part of the damage consisted of the serious heaving of some 300 feet of main roadways and the displacement of timber. The shock was felt on the surface at a distance of 1 mile but was not noticed by some men underground at a lesser distance. There were no serious personal injuries resulting from this bump.

On December 7th, in No. 1 East mine, Elk River Colliery, a slight local bump occurred in No. 8 East section and displaced some timber and threw some coal from the sides of pillars. There were no persons injured.

Outbursts of Gas and Bumps.

During 1944 a number of outbursts of gas, sometimes accompanied by the projection of coal, were experienced in the No. 1 Diagonal section of No. 10 mine, Canadian Collieries (D.), Limited, at South Wellington. These outbursts all occurred in the part of the mine which has gained the greatest depth of cover and is at approximately the same depth at which outbursts of gas and coal were experienced in the Cassidy mine to the south and the Reserve mine to the north.

As present and previous experiences with outbursts of gas and coal showed that most of the outbursts either accompanied or immediately followed, within a margin of a few minutes, the firing of a shot in the place, and to eliminate the possibility of an outburst coinciding with the firing of a second shot of a round with the possible ignition of the released gas, the following regulation applicable to the affected area was introduced and was still in force at the end of 1944:—

" 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 on 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."

The above regulation has worked satisfactorily and it was intended to increase the number of shots that may be fired simultaneously, but the above occurrences, together with a marked inferiority of the seam in this direction, has caused the mining company to abandon further advance in this area.

PROSECUTIONS.

During 1944 there were three prosecutions for infractions of the " Coal-mines Regulation Act," as follows:—

Date.	Colliery.	Occupation of Defendant.	Offence charged.	Judgment.
Feb. 22	Michel	Miner	Riding on a trip without permission	Fined $5 and costs.
April 27	Comox	Fireboss	Unlawfully charging a second shot in a place before the first shot was fired and the place examined	Fined $25 and costs.
Aug. 2	Michel	Miner	Had a cigarette in his possession underground	Fined $10 and costs.

GOVERNMENT MINE-RESCUE STATIONS.

The Department of Mines maintains four fully-equipped mine-rescue stations in charge of trained instructors. These are located in the chief mining centres of Nanaimo, Cumberland, Princeton, and Fernie. Those at Nanaimo and Cumberland are for the service of the coal-mining industry in the respective areas, while the stations at Fernie and Princeton serve both coal and metalliferous mining.

The above rescue-stations provide a full course in mine-rescue work without charge to any men who are physically fit and who volunteer for this work and a number of men outside the mining industry have taken this training; these latter include members of fire brigades and others.

Since the inception of the war there has been a scarcity of the younger men from the mines who formerly took up this work and maintained a regular training, and it is difficult to interest the older men who may be still physically fit to undergo the arduous training schedule which consists of a minimum of twelve two-hour training periods in the actual use of the self-contained oxygen apparatus and Burrell all-service gas-masks in an irrespirable atmosphere.

All of the above rescue-stations are also centres for the instruction of first aid under the St. John Ambulance Association and are, at present, centres for air-raid precaution work and serve as casualty stations.

During the year, in addition to the regular teams in training, twenty-three new men took the full training and were granted certificates of competency:—

Cert. No.	Name.	Where trained.	Cert. No.	Name.	Where trained.
1182	William Joseph Clarke	Cumberland.	1194	Leonard Empey	Copper Mountain.
1183	Walker Addison	Cumberland.	1195	David Ogren	Copper Mountain.
1184	Arthur Brignal Mawhinney	Cumberland.	1196	Nels Hendrickson	Copper Mountain.
1185	Joseph Shepard	Cumberland.	1197	Hugh Kirkpatrick	Nanaimo.
1186	Orville Albert Batchelor	Cumberland.	1198	James H. Patterson	Nanaimo.
1187	James Carrol Sockett	Cumberland.	1199	James Scott	Fernie.
1188	Leonard Ridley	Cumberland.	1200	Archibald R. Gee	Fernie.
1189	Robert Mitchell	Princeton.	1201	John Cairns	Coal Creek.
1190	Joseph R. Langman	Princeton.	1202	Fred Simister	Michel.
1191	George S. Bosnich	Princeton.	1203	George F. Sutton	Michel.
1192	Daniel Kreator	Princeton.	1204	Thomas F. Krall	Natal.
1193	James Brennan	Copper Mountain.			

SUPERVISION OF COAL MINES.

During the year twenty-six companies operated thirty-two mines employing 2,150 men underground. In the supervision of underground employees there were eleven managers, sixteen overmen, and ninety-three firebosses and shotlighters; or one official for every eighteen 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 to 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 1944, the first on May 17th, 18th, and 19th, and the second on November 22nd, 23rd, and 24th. The total number of candidates at the examinations were as follows: For First-class Certificates, 3 (1 passed and 2 failed); for Second-class Certificates, 6 (3 passed and 3 failed); for Third-class Certificates, 15 (9 passed and 6 failed); and for Mine Surveyor, 1 (1 passed).

The following is a list of the candidates who successfully passed in the various classes:—

First-class Certificate.—Archibald R. Gee.

Second-class Certificates.—William Dinsdale, Stephen Lazaruk, and Richard B. Wilson.

Third-class Certificates.—Hugh Kirkpatrick, Joseph Frew, Fred Simister, Daniel B. Bobchak, Thomas S. Dunlop, Quentin F. Gething, Harry Batchelor, Martin Frobisher, and James C. Sockett.

Mine Surveyor's Certificate.—Alexander F. Buckham.

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 1944 there were 127 candidates for coal-miners' certificates; of these 123 passed and 4 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.

REGISTERED LIST OF HOLDERS OF CERTIFICATES OF COMPETENCY AS COAL-MINE OFFICIALS.

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

Name.	Date.	Name.	Date.
Horrobin, William	May 1, 1882	Browitt, Benjamin	Aug. 3, 1901
Chandler, William	Dec. 21, 1883	Wilson, A. R.	Oct. 17, 1902
Priest, Elijah	Dec. 21, 1883	Budge, Thomas	Oct. 17, 1902
Randle, Joseph	Jan. 18, 1888	Richards, James A.	Oct. 17, 1902
Matthews, John	Jan. 8, 1889	Wright, H. B.	Jan. 21, 1904
Norton, Richard Henry	Aug. 26, 1889	Coulthard, R. W.	Jan. 21, 1904
Hardy, Joseph	Dec. 17, 1896	Roaf, J. Richardson	Jan. 21, 1904
Simpson, William G.	June 12, 1899	Manley, H. L.	Jan. 21, 1904
Cunliffe, John	Aug. 3, 1901		

FIRST-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT," 1904–1911–1919.

Name.	Date.	Name.	Date.
Baird, Harold	Sept. 26, 1939	Howells, Nathaniel	Oct. 28, 1911
Baxter, Andrew	June 10, 1911	Hughes, Edward R.	Dec. 29, 1936
Bennett, John	Dec. 30, 1926	Hughes, John C.	May 17, 1917
Biggs, J. G.	July 22, 1908	Humphries, Clifford	June 10, 1911
Bonar, Robert	Oct. 28, 1911	Hunter, Alex. B.	July 8, 1916
Bonar, Robert (Jr.)	Dec. 15, 1932	Huntrods, Eustace S. F.	May 19, 1922
Brace, Tom	May 13, 1915	Jackson, Thos. R.	Nov. 9, 1907
Bridge, Edward	July 22, 1908	Johnston, John	June 30, 1928
Brown, Robert Joyce	May 13, 1915	Lawrence, Stanley J.	Jan. 4, 1943
Caufield, Bernard	May 1, 1909	Leighton, Henry	May 9, 1912
Chapman, William	Dec. 20, 1938	Littler, James	Dec. 2, 1929
Church, James A. H.	June 10, 1911	Mackinnon, Hugh G.	May 19, 1922
Clark, Henry Wilton	Oct. 9, 1943	Macauley, D. A.	June 10, 1911
Cox, Richard	May 13, 1915	McCulloch, James	Sept. 10, 1910
Cumberford, James	Oct. 7, 1938	McDonald, John	Oct. 3, 1919
Cunningham, John Howard	May 9, 1912	McGuckie, Thomas	July 22, 1908
Davies, David	June 10, 1911	McKay, Walter	Jan. 20, 1944
Davies, Stephen	Nov. 15, 1917	McLean, Michael D.	June 16, 1925
Davies, Thos. Owen	May 21, 1914	McVicar, Samuel	May 1, 1909
de Hart, J. B.	May 17, 1917	Mazey, William John	Oct. 31, 1912
Devlin, E. H.	Dec. 30, 1926	Miard, Henry Ernest	May 9, 1912
Dickson, James	Oct. 31, 1912	Millar, John K.	Nov. 22, 1906
Elliott, John B.	June 30, 1928	Miller, Andrew Anderson	Oct. 31, 1912
Emmerson, Joseph	Nov. 9, 1907	Montgomery, John W.	May 1, 1909
Ewart, William	May 19, 1922	Mordy, Thomas	Sept. 10, 1910
Fairfoull, Robert	June 10, 1911	Morgan, Evan H.	June 21, 1944
Foster, William R.	Dec. 31, 1925	Murray, George	June 21, 1921
France, Thos.	Nov. 22, 1906	Newbury, Arthur	June 21, 1920
Fraser, Norman	March 4, 1905	Ovington, John	May 27, 1913
Freeman, H. N.	May 1, 1909	Peacock, Frank David	Oct. 28, 1911
Frew, Wm. B.	July 6, 1932	Penman, Hugh	May 21, 1914
Galloway, C. F. J.	July 22, 1908	Pettigrew, Robert	June 1, 1933
Gascoyne, Rowland B.	May 21, 1914	Phelan, Arthur	May 27, 1913
Gee, Archibald R.	Jan. 20, 1944	Powell, J. W.	June 10, 1911
Gillham, John	Jan. 5, 1925	Quinn, James A.	Dec. 2, 1929
Glover, Francis	Oct. 31, 1912	Quinn, John Graham	July 8, 1916
Graham, Charles	Nov. 14, 1905	Ramsay, Peter Millar	May 16, 1918
Hanson, Wm. B.	Dec. 9, 1930	Reger, Frederick W.	July 6, 1932
Henderson, Robert	Nov. 27, 1909	Rolfe, Emrys	Dec. 15, 1932
Hewlett, Howe	May 27, 1913	Roper, William	May 13, 1915
Higgins, Alexander	Dec. 19, 1918	Russell, John	May 21, 1914
Hodge, William K.	June 16, 1925	Shanks, John	May 1, 1909
Howden, Archibald	May 27, 1913	Shenton, T. J.	Sept. 10, 1910

FIRST-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT," 1904–1911–1919—*Continued.*

Name.	Date.	Name.	Date.
Smith, A. E.	Oct. 28, 1911	Wesnedge, William	Dec. 19, 1918
Smith, Joseph	July 22, 1908	Whittaker, John	Dec. 19, 1918
Smith, Thos. Edwin	Dec. 19, 1918	Whittaker, William C.	April 6, 1938
Spicer, J. E.	Oct. 28, 1911	Williams, John Samuel	Dec. 19, 1918
Stevens, L. C.	Nov. 27, 1909	Williams, Thos. B.	May 17, 1917
Stewart, R. T.	Sept. 10, 1910	Williams, Thos. H.	Nov. 22, 1906
Strang, James	June 10, 1911	Wilson, Ridgeway R.	Nov. 15, 1917
Stubbs, Clement	July 21, 1929	Wilson, Thos. M.	Dec. 23, 1927
Taylor, James	May 16, 1918	Wilson, William	May 16, 1918
Touhey, James	May 21, 1914	Wylie, John	July 20, 1908
Vincent, Thomas C.	June 24, 1924	Yates, Frank	Dec. 31, 1925
Walker, William	May 16, 1918	Young, David B.	Dec. 6, 1943
Wallbank, J.	Sept. 10, 1910		

SECOND-CLASS CERTIFICATES OF SERVICE.

Name.	Date.	No.	Name.	Date.	No.
Millar, J. K.	March 4, 1905	B 10	Powell, William Baden	March 4, 1905	B 16
Hunt, John	March 4, 1905	B 13			

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

Name.	Date.	No.	Name.	Date.	No.
Adams, Wm. Henry	June 24, 1935	B 286	Christie, John	July 18, 1938	B 290
Allan, Alex. McDiarmid	May 27, 1913	B 167	Churchill, James	July 22, 1908	B 65
Almond, Walter	Nov. 15, 1917	B 213	Clark, Robt.	June 21, 1921	B 242
Alstead, Robert	June 24, 1924	B 257	Clarkstone, Wm. W.	May 21, 1914	B 180
Archibald, William	Nov. 22, 1922	B 250	Cochrane, James	July 22, 1942	B 298
Barlow, Benjamin Robt.	Dec. 19, 1918	B 229	Cochrane, Thomas	Jan. 16, 1941	B 297
Bastion, Albert	Nov. 21, 1923	B 256	Commons, Wm.	Sept. 10, 1910	B 115
Bell, John	May 17, 1917	B 212	Corbett, Garner S.	June 30, 1928	B 272
Beveridge, William	June 21, 1920	B 233	Coupland, George	May 16, 1918	B 217
Bevis, Nathaniel	Sept. 10, 1910	B 123	Courtney, A. W.	Oct. 28, 1911	B 138
Biggs, John G.	Nov. 2, 1907	B 40	Cox, Richard	May 9, 1912	B 143
Bonar, Robt. B.	June 30, 1928	B 270	Crawford, David	May 1, 1909	B 88
Brace, Tom	Nov. 27, 1909	B 96	Cunliffe, Thomas	May 1, 1909	B 78
Bridge, Edward	Oct. 23, 1906	B 33	Dando, John	May 27, 1913	B 164
Brown, George	Dec. 19, 1918	B 225	Davidson, Hugh	May 27, 1913	B 165
Brown, James L.	Oct. 28, 1911	B 136	Davies, J. C. H.	June 15, 1934	B 285
Brown, John C.	Oct. 23, 1906	B 39	Davies, Stephen	Sept. 10, 1910	B 113
Brown, John Todd	May 9, 1912	B 150	Dennis, Fred. W.	May 21, 1914	B 174
Brown, R. J.	Oct. 28, 1911	B 134	Devlin, Ernest H.	May 21, 1914	B 179
Brown, Robert	May 21, 1914	B 183	Dewar, Alexander	Oct. 31, 1912	B 162
Brown, Robert Sneddon	May 13, 1915	B 196	Dickenson, Clifford	May 13, 1915	B 189
Brown, William Gold	Dec. 19, 1918	B 228	Dinsdale, William	June 26, 1944	B 301
Brownrigg, John H.	May 17, 1917	B 124	Dockrill, Arthur H.	Jan. 16, 1941	B 296
Bushell, J. P.	May 1, 1909	B 81	Dunn, Jas. W.	July 5, 1932	B 282
Carroll, Henry	July 22, 1908	B 62	Dunsmuir, John	Nov. 14, 1905	B 26
Caufield, Bernard	Oct. 23, 1906	B 30	Dykes, J. W.	May 1, 1909	B 77
Caufield, John	July 8, 1916	B 199	Eccleston, Thomas (Jr.)	June 24, 1940	B 294
Cawthorne, L.	May 1, 1909	B 93	Eccleston, Wm.	May 1, 1909	B 87
Challinor, Jno. Thomas	May 27, 1913	B 169	Fairfoull, James	May 21, 1914	B 186
Challoner, Jno. Arthur	May 21, 1914	B 178	Fairfoull, R.	May 1, 1909	B 83
Chapman, Wm.	June 10, 1927	B 268	Finlayson, James	July 29, 1905	B 21
Chester, Daniel	July 24, 1943	B 299	Ford, Allan	May 27, 1913	B 171

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

Name.	Date.	No.	Name.	Date.	No.
Foster, W. R.	Nov. 27, 1909	B 102	Middleton, Robert	July 22, 1908	B 72
France, Thos.	May 14, 1905	B 27	Mitchell, Henry	July 8, 1916	B 201
Francis, David M.	May 21, 1914	B 182	Morgan, Daniel	Nov. 21, 1923	B 254
Francis, Enoch	May 1, 1909	B 86	Morgan, Irvine	July 18, 1938	B 291
Francis, James	July 22, 1908	B 63	Morgan, John	Nov. 2, 1907	B 43
Frater, George	July 8, 1916	B 204	Morgan, William	Dec. 19, 1918	B 224
Freeman, Henry N.	Nov. 2, 1907	B 45	Morton, Robert W.	July 22, 1908	B 59
Frew, Wm. M.	June 10, 1927	B 269	Murray, George	Oct. 3, 1919	B 232
Garbett, Richard	Oct. 31, 1912	B 161	Musgrave, J.	May 1, 1909	B 90
Gibson, Munro M.	June 15, 1934	B 284	Myers, Peter	May 9, 1912	B 149
Gilham, John	June 21, 1920	B 237	MacKinnon, Hugh G.	Dec. 22, 1921	B 243
Gillespie, Hugh	July 29, 1905	B 24	McDonald, J. A.	Oct. 28, 1911	B 133
Gould, Alfred	May 13, 1915	B 190	McDonald, John	May 27, 1913	B 172
Gourlay, Robert	*Dec. 19, 1918*	B 227	*McFegan, W.*	*Nov. 31, 1909*	B 106
Graham, Chas.	March 4, 1905	B 1	McGarry, Martin	Oct. 31, 1912	B 156
Gray, David	May 1, 1909	B 76	McGuckie, Thomas M.	Oct. 23, 1906	B 35
Gray, George	July 8, 1916	B 207	McKay, Walter	June 30, 1926	B 262
Greenwell, Archibald	May 16, 1918	B 220	McLaughlin, Alex.	May 13, 1915	B 191
Gregory, Wm.	June 16, 1931	B 278	McLean, Michael D.	June 21, 1920	B 234
Hamilton, Robert N.	May 21, 1914	B 175	McMillan, D.	June 10, 1911	B 125
Hastings, Andrew P.	Dec. 19, 1918	B 223	McNay, Carmichael	May 9, 1912	B 151
Hayes, Thomas O.	July 24, 1943	B 300	McPherson, James E.	July 22, 1908	B 73
Heathcote, Joseph	July 21, 1929	B 273	Newbury, Arthur	May 21, 1914	B 184
Henderson, Robert	July 22, 1908	B 60	Newton, Wm.	Sept. 10, 1910	B 116
Hodge, William K.	Jan. 5, 1925	B 259	Nicholl, Joseph O.	Dec. 31, 1925	B 261
Holliday, William	Dec. 19, 1918	B 230	Osborne, Hugh	Dec. 14, 1920	B 239
Hopkins, Harry	June 16, 1930	B 276	Ovington, John	Nov. 2, 1907	B 52
Horrocks, Abner G.	June 10, 1911	B 130	Park, William	June 21, 1920	B 238
Howells, Nathaniel	Nov. 27, 1909	B 97	Parkinson, T.	May 1, 1909	B 80
*Hughes, Edward R.	Sept. 28, 1931	B 280	Parnham, Charles	Nov. 2, 1907	B 49
Hughes, John C.	Sept. 10, 1910	B 109	Pettigrew, Robt.	Dec. 15, 1931	B 281
Hutton, Isaac	May 21, 1914	B 185	Quinn, James	May 21, 1914	B 181
Hutton, John	May 9, 1912	B 154	Quinn, John	May 9, 1912	B 146
Hynds, John	May 18, 1922	B 247	Ramsay, Peter Millar	May 17, 1917	B 209
Hynds, William	Dec. 14, 1920	B 240	Rankin, Geo.	Nov. 27, 1909	B 103
Jackson, Thos. R.	March 4, 1905	B 5	Raynes, M. T.	Oct. 28, 1911	B 139
James, David	Nov. 2, 1907	B 58	Rear, Albert E.	June 15, 1934	B 283
Jarrett, Fred	May 1, 1909	B 84	Reid, Wm.	Oct. 28, 1911	B 132
John, Francis	*July 8, 1916*	B 200	*Renny, James*	Oct. *28, 1911*	B 140
John, Howell	Sept. 10, 1910	B 122	Richards, Samuel	May 9, 1912	B 152
Johnston, John	June 10, 1927	B 267	Richards, Thomas	Nov. 2, 1907	B 57
Jones, Samuel	May 16, 1918	B 221	Rigby, John	July 29, 1905	B 29
Jones, William T.	July 22, 1908	B 66	Roberts, Ebenezer	Sept. 10, 1910	B 117
Jordon, Thos.	Nov. 27, 1909	B 104	Robinson, William	July 22, 1908	B 69
Kirkwood, John R.	Oct. 31, 1912	B 160	Rogers, George	May 1, 1909	B 79
Knowles, James E.	Oct. 28, 1911	B 137	Roper, William	May 9, 1912	B 141
Lancaster, Peter	Dec. 20, 1938	B 292	Rowbottom, Thomas	May 16, 1918	B 222
Lander, Frank	May 13, 1915	B 195	Russell, John	Nov. 2, 1907	B 47
Lawrence, Stanley J.	Dec. 9, 1940	B 295	Scarpino, Francis	Dec. 19, 1918	B 226
Lazeruk, Stephen	July 20, 1944	B 302	Shanks, David	Oct. 31, 1912	B 159
Lee, Robert John	Sept. 10, 1910	B 110	Shaw, Thomas John	May 27, 1913	B 166
Littler, Jas.	June 10, 1927	B 266	Smith, John	Oct. 3, 1919	B 231
Littler, Matthew	Oct. 31, 1912	B 157	Smart, Robert K.	Nov. 22, 1922	B 248
Luck, George	June 10, 1911	B 128	Stafford, Matthew	June 10, 1911	B 131
Manifold, Albert	May 9, 1912	B 145	Stewart, John	July 21, 1929	B 274
Mason, Joseph	May 13, 1915	B 193	Stewart, J. M.	May 1, 1909	B 95
Massey, H.	Nov. 27, 1909	B 99	Stobbart, Jacob	May 9, 1912	B 153
Mather, Thomas	June 10, 1911	B 127	Stockwell, William	Nov. 2, 1907	B 56
Matusky, A.	May 1, 1909	B 91	Strang, Thomas	Oct. 31, 1912	B 158
Mayer, Ralph Waldo	May 9, 1912	B 144	Stubbs, Clement	May 18, 1922	B 245
Mazay, W. J.	Nov. 27, 1909	B 101	Sutherland, John	May 16, 1918	B 218
Menzies, Fred	Dec. 22, 1921	B 244	Taylor, James	May 13, 1915	B 194
Miard, Hy. E.	Sept. 10, 1910	B 107	Taylor, Robt.	Dec. 30, 1926	B 265

* Substituted for B 279, June 16, 1931.

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

Name.	Date.	No.	Name.	Date.	No.
Taylor, Thomas	July 8, 1916	B 203	Webster, James S.	June 24, 1924	B 258
Thomas, Daniel W.	Nov. 22, 1922	B 249	Wesnedge, William	Nov. 27, 1909	B 98
Thompson, Joseph	Sept. 10, 1910	B 114	Williams, John Samuel	Nov. 15, 1917	B 215
Tonge, Thomas	July 22, 1908	B 71	Williams, Watkin	Sept. 10, 1910	B 118
Touhey, James	May 9, 1912	B 147	Wilson, Joseph	June 30, 1928	B 271
Touhey, William	July 8, 1916	B 205	Wilson, Richard B.	Jan. 16, 1945	B 303
Tully, Thomas	Nov. 15, 1917	B 214	Wilson, Robinson	May 21, 1914	B 177
Vaughan, John Henry	July 12, 1939	B 293	Wilson, Thomas	July 22, 1908	B 74
Virgo, John	May 1, 1909	B 89	Wilson, William	July 22, 1908	B 70
Waddington, Daniel M.	June 16, 1931	B 277	Wood, Thos. James	May 21, 1914	B 176
Walker, William	May 13, 1915	B 192	Worthington, Joseph	May 1, 1909	B 85
Watson, Arthur W.	May 17, 1917	B 211	Yates, Frank	Nov. 22, 1922	B 251

COAL-MINE OFFICIALS.

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

Name.	Date.	No.	Name.	Date.	No.
Ashman, Jabez	Feb. 5, 1907	C 131	Lander, Frank	Jan. 9, 1905	C 61
Auchinvole, Alex	March 29, 1905	C 89	Miard, Harry E.	March 3, 1905	C 76
Barclay, Andrew	April 27, 1904	C 19	Middleton, Robt.	Feb. 11, 1905	C 71
Barclay, James	April 27, 1904	C 20	Miller, Thos. K.	Feb. 21, 1905	C 74
Barclay, John	April 17, 1905	C 111	McKinnon, Arch'd	April 3, 1905	C 102
Bowie, James	May 13, 1905	C 116	Myles, Walter	April 3, 1905	C 100
Briscoe, Edward	Oct. 10, 1906	C 129	Nash, Isaac	June 1, 1904	C 120
Campbell, Dan	March 29, 1905	C 93	Neave, Wm.	Oct. 12, 1904	C 43
Carroll, Harry	March 29, 1905	C 98	Nelson, James	April 27, 1904	C 16
Clarkson, Alexander	April 27, 1904	C 18	Nimmo, Richard E.	April 18, 1911	C 133
Collishaw, John	Feb. 7, 1905	C 68	Power, John	Sept. 8, 1920	C 142
Courtney, A. W.	Nov. 2, 1904	C 45	Price, Jas.	Nov. 8, 1904	C 50
Crawford, Frank	April 6, 1904	C 7	Rafter, Wm.	March 29, 1905	C 95
Davidson, David	April 3, 1905	C 106	*Roughead, George	Jan. 30, 1907	C 810
Dobbie, John	Nov. 27, 1905	C 126	Ryan, John	Dec. 28, 1904	C 59
Dudley, James	March 22, 1905	C 114	Shenton, Thos. J.	July 25, 1904	C 30
Duncan, Thomas	Aug. 29, 1906	C 128	Shepherd, Henry	June 13, 1904	C 26
Dunsmuir, John	*March 29, 1905*	C 90	*Smith, Geo.*	*March 29, 1905*	C 84
Eccleston, Wm.	March 15, 1905	C 80	Stauss, Chas. F.	Feb. 9, 1905	C 69
Fagan, Daniel	April 6, 1905	C 109	Steele, John	June 4, 1913	C 137
Farquharson, John	April 27, 1904	C 17	Stewart, Daniel W.	May 16, 1904	C 23
Findlayson, James	June 6, 1904	C 25	Stewart, Duncan H.	March 28, 1904	C 4
Gibson, Edward	May 30, 1905	C 118	Stewart, John	April 3, 1904	C 104
Gould, Alfred	April 17, 1906	C 112	Stobbart, Jacob	Feb. 21, 1905	C 73
Green, Francis	Oct. 11, 1904	C 38	Sullivan, John	July 4, 1916	C 139
Handlen, Jas.	June 16, 1904	C 122	Summers, Joseph	May 17, 1920	C 141
Hescott, John	Jan. 16, 1905	C 62	Thomas, John	March 29, 1905	C 97
John, David	Nov. 8, 1904	C 49	Vater, Charles	April 6, 1904	C 6
Johnson, Geo.	May 9, 1904	C 124	Wilson, Austin	Feb. 7, 1905	C 67
Johnson, Wm. R.	March 1, 1905	C 75			

* Issued in lieu of No. C 130, destroyed by fire.

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

Name.	Date.	No.	Name.	Date.	No.
Adams, Wm. H.	Dec. 9, 1930	C 845	Brown, Robert D.	June 10, 1911	C 423
Adamson, Wm.	Dec. 22, 1921	C 721	Brown, Robert S.	June 10, 1911	C 408
Ainsworth, Edward	May 16, 1918	C 674	Brown, William Gold	July 8, 1916	C 629
Allan, Alexander	Oct. 28, 1911	C 430	Bryden, Thomas	June 16, 1930	C 842
Almond, Walter	July 22, 1908	C 286	Bullen, Thomas	Sept. 10, 1910	C 379
Alstead, Robt.	June 21, 1921	C 719	Bushell, Jas. P.	Oct. 1, 1907	C 264
Ambrosi, Antonio	June 16, 1930	C 843	Cairns, Andrew	June 10, 1911	C 420
Anderson, John	Oct. 28, 1911	C 437	Cairns, Robert	May 27, 1913	C 539
Anderson, John E.	June 24, 1940	C 919	Caldwell, Peter	June 21, 1921	C 715
Anderson, Robt.	Oct. 14, 1914	C 599	Calverly, Joseph	Sept. 10, 1910	C 375
Angell, William	May 21, 1914	C 591	Camamile, Hollis	Oct. 28, 1911	C 443
Arbuckle, John	May 13, 1915	C 622	Campbell, Andrew	Nov. 27, 1917	C 651
Archibald, Geo.	May 21, 1914	C 569	Campbell, Samuel	Nov. 15, 1917	C 662
Archibald, Thomas	Oct. 28, 1911	C 454	Carroll, George	Nov. 21, 1922	C 746
Ball, Alfred	May 17, 1917	C 635	Carruthers, Robert	Dec. 22, 1933	C 859
Bann, Thomas	Oct. 31, 1912	C 494	Carson, George	March 17, 1917	C 663
Baggaley, J.	July 22, 1908	C 300	Cass, Wm.	Dec. 30, 1926	C 800
Baguley, James	Dec. 2, 1929	C 829	Catchpole, Charles	July 29, 1905	C 227
Bain, James	May 27, 1913	C 546	Caufield, Edward	May 16, 1918	C 670
Bainbridge, James	Nov. 21, 1922	C 744	Caufield, John	May 1, 1909	C 321
Barber, Walter H.	Jan. 20, 1944	C 943	Challoner, Arthur	Oct. 28, 1911	C 433
Barker, Robert	June 10, 1911	C 415	Chambers, Ralph H.	Dec. 14, 1920	C 709
Barlow, B. R.	May 1, 1909	C 337	Chapman, John	May 30, 1923	C 753
Barr, Samuel	June 10, 1927	C 809	Chapman, Wm.	Dec. 22, 1921	C 720
Barrass, Robt.	June 30, 1926	C 795	Cheetham, Ben	July 22, 1908	C 311
Bastion, Albert	May 30, 1923	C 750	Chester, Daniel	Dec. 20, 1939	C 912
Batchelor, Harry	Jan. 20, 1944	C 945	Chester, John	Oct. 28, 1911	C 440
Bate, Horace	Dec. 30, 1926	C 802	Christie, John	Dec. 20, 1928	C 820
Bateman, Joseph William	Oct. 28, 1913	C 551	Cimolini, Primo	June 24, 1940	C 915
Beard, Henry C.	May 30, 1923	C 751	Cimolini, Romeo	Jan. 4, 1943	C 929
Beeton, D. H.	May 1, 1909	C 338	Cimolini, Sero J.	Jan. 4, 1943	C 928
Bell, Fred	May 27, 1913	C 514	Clark, Walter Pattison	May 9, 1912	C 480
Bell, John	May 9, 1912	C 477	Clarkson, Hugh G.	May 17, 1922	C 736
Bennett, Andrew M.	Nov. 15, 1917	C 661	Clarkson, Robert	June 21, 1920	C 696
Bennett, John	Oct. 14, 1914	C 597	Clarkstone, Wm. W.	Oct. 28, 1911	C 431
Bennie, William W.	July 18, 1938	C 895	Cleaves, Walter	May 9, 1912	C 475
Beveridge, Wm.	June 10, 1911	C 396	Clifford, William	July 22, 1908	C 313
Biggs, James	June 1, 1933	C 858	Cloke, Chas. E.	June 16, 1925	C 782
Biggs, Thomas	Oct. 28, 1911	C 449	Coates, Frank	June 16, 1925	C 789
Birchell, Richard	Oct. 1, 1907	C 266	Cochrane, James	June 24, 1940	C 914
Blakemore, Roydon E.	Dec. 27, 1934	C 869	Coldgrove, Charles Henry	Dec. 19, 1918	C 679
Blas, Emil	June 24, 1924	C 774	Coldwell, Daniel	May 17, 1917	C 639
Blewett, Ernest	July 22, 1908	C 298	Commons, William	July 22, 1908	C 304
Blinkhorn, Thomas	Dec. 19, 1918	C 681	Cooper, John Andrew	Dec. 19, 1918	C 689
Bobchak, Daniel	Jan. 26, 1944	C 946	Cooper, Leonard	Dec. 16, 1937	C 887
Bond, Frank	June 30, 1926	C 797	Cope, Frank	Oct. 28, 1913	C 549
Bowie, James I.	May 6, 1936	C 873	Corbett, Garnet S.	Dec. 23, 1927	C 812
Bradley, William	July 22, 1908	C 291	Corrigan, Harry	July 18, 1938	C 901
Bradley, Wilfred	May 17, 1922	C 733	Corrigan, James P.	Jan. 10, 1944	C 940
Bridge, Edward	July 29, 1905	C 223	Coulthard, James	June 10, 1911	C 407
Briscoe, F.	July 22, 1908	C 309	Coupland, David	June 21, 1921	C 713
*Briscoe, Fred S.	July 7, 1937	C 878	Crawford, David	March 4, 1905	C 208
Broderick, Matthew	Jan. 21, 1913	C 525	Cullen, Alex.	July 21, 1929	C 824
Brown, Arthur A.	Oct. 14, 1914	C 596	Cunliffe, Thos.	Oct. 1, 1907	C 265
Brown, George	July 8, 1916	C 626	Cunliffe, Thos. H.	Dec. 20, 1938	C 903
Brown, George A.	Dec. 14, 1920	C 706	Cunningham, G. F.	Nov. 11, 1905	C 229
Brown, James	Sept. 10, 1910	C 364	Cuthell, George W.	Dec. 2, 1929	C 832
Brown, James	June 10, 1911	C 412	Dabb, Owen	May 21, 1914	C 578
Brown, James	July 8, 1916	C 625	Dando, John	May 9, 1912	C 465
Brown, James M.	Jan. 4, 1943	C 930	Davey, George	June 21, 1921	C 718
Brown, Jas. Miller	May 13, 1915	C 615	Davidson, Hugh	May 9, 1919	C 464
Brown, John	Sept. 10, 1910	C 392	Davies, Evan Thomas	May 9, 1912	C 463
Brown, Matthew	July 5, 1932	C 854	Davies, John H. C.	May 17, 1922	C 729
Brown, Robert	Oct. 28, 1911	C 451	Davis, John David	May 16, 1918	C 669

* Substituted for C 309, July 20, 1908.

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

Name.	Date.	No.	Name.	Date.	No.
Davis, William	May 1, 1909	C 339	Gabriel, Ernest P.	May 17, 1922	C 739
Dean, Alexander	June 10, 1944	C 931	Gall, Louis	Jan. 20, 1944	C 942
Dean, Andrew	Dec. 19, 1918	C 688	Garbett, Richard	Sept. 10, 1910	C 377
*Dean, John	Jan. 31, 1944	C 952	Gascoyne, Rowland B.	Jan. 21, 1913	C 513
Dean, Joseph	May 13, 1915	C 611	Geater, Jas. Gordon	May 21, 1914	C 573
Delprato, Joseph	June 16, 1930	C 837	Gee, Archibald R.	Jan. 10, 1944	C 939
Derbyshire, A.	June 10, 1911	C 401	Gibson, Munro M.	Dec. 27, 1931	C 850
Dewar, Alex.	Sept. 10, 1910	C 369	Gilham, John	May 13, 1915	C 623
Devlin, Edward	Oct. 23, 1906	C 241	Gillies, William	May 16, 1918	C 668
Devlin, Ernest Henry	May 27, 1913	C 538	Gilmour, Hugh M.	July 18, 1938	C 896
Devlin, John	Oct. 3, 1919	C 693	Glen, James	Oct. 28, 1911	C 435
Devoy, William	May 17, 1917	C 638	Gordon, Davis John	May 9, 1912	C 474
Dickenson, Clifford	May 27, 1917	C 532	Gray, George	May 9, 1912	C 467
Dickie, Leslie	Nov. 20, 1923	C 762	Greenhorn, John	May 21, 1914	C 575
Dingsdale, Geo.	Oct. 28, 1911	C 459	Gregory, William	May 30, 1923	C 756
Dinsdale, William	Dec. 27, 1934	C 868	Gregson, John B.	Dec. 31, 1925	C 790
Dockrill, Arthur H.	Dec. 20, 1938	C 904	Griffiths, Edward	Oct. 31, 1914	C 508
Dockrill, Frank M.	June 15, 1934	C 865	Groat, Ed. Murray	Nov. 20, 1923	C 764
Doherty, J. S.	May 1, 1909	C 340	Gunnell, James	Oct. 31, 1912	C 505
Doney, John	March 4, 1905	C 211	Gunniss, Matthew	May 9, 1912	C 460
Donnachie, John	June 10, 1911	C 425	Guy, George	June 16, 1931	C 848
Dorrance, Orlin William	Jan. 21, 1913	C 517	Haile, Joseph G.	May 17, 1922	C 731
Douglas, D. B.	Oct. 23, 1906	C 235	Hall, James	May 17, 1922	C 742
Dow, And. Y.	May 21, 1914	C 587	Halsall, J.	July 22, 1908	C 307
Drybrough, Robert	June 21, 1920	C 701	Hamer, Joseph	Dec. 9, 1930	C 846
Dunlop, Thomas S.	June 26, 1944	C 948	Hamilton, Robert Nesbitt	Oct. 28, 1913	C 550
Dunn, Andrew	Jan. 7, 1936	C 871	Hampton, Abel E.	Jan. 7, 1936	C 872
Dunn, James	July 21, 1929	C 821	Hampton, Samuel	Nov. 15, 1917	C 650
Dunnigan, Richard	June 21, 1921	C 716	Hancock, Arthur	Nov. 15, 1917	C 656
Dunsmore, Alexander	Dec. 9, 1930	C 847	Hannah, Archibald	Dec. 2, 1929	C 834
Dykes, Joseph W.	Oct. 1, 1907	C 248	Hanson, T. H.	July 8, 1908	C 280
Easton, Andrew B.	July 18, 1938	C 893	Hardy, Edward	June 21, 1920	C 694
Ebert, Henry R.	Jan. 16, 1941	C 926	Hart, Daniel M.	May 17, 1922	C 730
Eccleston, John J.	May 30, 1923	C 757	Hartley, Thomas	Oct. 31, 1912	C 510
Eccleston, Thomas	May 17, 1917	C 482	Harvey, Thomas	May 9, 1912	C 466
Eccleston, Thomas	June 16, 1930	C 841	Harvie, George	Sept. 10, 1910	C 378
Eckersley, John	June 15, 1934	C 866	Harwood, Fred	Sept. 10, 1910	C 384
Edwards, John	May 27, 1913	C 542	Hayes, Ernest	Dec. 2, 1929	C 830
Elliott, John	May 27, 1913	C 541	Heaps, Robert	Sept. 10, 1910	C 373
Elliott, John B.	Dec. 23, 1927	C 811	Hemer, Herbert	Oct. 14, 1914	C 595
Elmes, Levi	July 5, 1932	C 856	Hendry, James	May 9, 1912	C 471
Evans, D.	July 22, 1908	C 284	Herd, William	Dec. 19, 1918	C 682
Ewing, Robert	May 13, 1915	C 608	Hetherington, Geo.	July 21, 1929	C 825
Fairfoull, James	Oct. 28, 1911	C 453	Heycock, James E.	July 5, 1932	C 852
Fairley, James	Jan. 24, 1940	C 916	Heycock, William J.	Dec. 29, 1936	C 876
Farrow, John William	Dec. 19, 1918	C 683	Heyes, Edward	May 1, 1909	C 320
Ferryman, Henry	June 21, 1920	C 697	Heyes, Thos. O.	Jan. 7, 1936	C 870
Fitzpatrick, T. J.	Oct. 2, 1911	C 452	Hilton, Arthur	Dec. 2, 1929	C 831
Flockart, David	Jan. 21, 1913	C 531	Hilton, Mathias	Dec. 19, 1918	C 825
Ford, Allen	Oct. 28, 1911	C 445	Hilton, R. G.	Sept. 10, 1910	C 376
Forsyth, William	June 16, 1930	C 836	Hindmarsh, John G.	June 30, 1926	C 799
Fowler, Robert	Oct. 31, 1912	C 495	Hindmarsh, Peter	May 30, 1923	C 755
Fowler, Samuel	July 7, 1941	C 921	Hodge, William K.	Nov. 20, 1923	C 761
Frame, Muir	July 12, 1939	C 906	Hodson, R. H.	March 4, 1905	C 216
Francis, David Morgan	Oct. 28, 1913	C 558	Holdsworth, William	May 16, 1918	C 671
Francis, James	Oct. 1, 1907	C 250	Holley, Thomas W.	July 2, 1943	C 932
Frater, George	May 13, 1915	C 616	Holliday, William	July 8, 1916	C 634
Frater, Joseph	July 21, 1929	C 828	Hopkins, Harry	Dec. 31, 1925	C 791
Freeman, H. N.	Nov. 14, 1905	C 230	Horbury, Joseph W.	June 10, 1911	C 406
Frew, Joseph	June 26, 1944	C 947	Horrocks, A. G.	May 1, 1909	C 324
Frew, William M.	May 30, 1923	C 752	Howells, Nathaniel	May 1, 1909	C 316
Frobisher, Martin	Jan. 16, 1945	C 950	Hughes, Edward R.	Dec. 9, 1930	C 844
Frodsham, Vincent	July 22, 1908	C 282	Hughes, Isaac R.	June 18, 1936	C 874
Furbow, John	Jan. 21, 1913	C 528	Hughes, Sydney S.	July 2, 1943	C 938

* Substituted for C 617, June 2, 1915.

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

Name.	Date.	No.	Name.	Date.	No.
Hunchuk, William	July 12, 1939	C 907	Luck, George	May 1, 1909	C 318
Hunt, Sydney (Jr.)	July 24, 1940	C 913	Lynch, Stewart	Oct. 28, 1911	C 432
Hunter, Peter M.	June 30, 1926	C 798	Mackie, John	June 10, 1911	C 421
Hunter, Thomas	June 16, 1925	C 786	Magielka, John	June 24, 1940	C 918
Hutchinson, Lawrence	July 2, 1943	C 937	Maki, Hannes	July 7, 1941	C 922
Hutchison, Ben	Nov. 14, 1905	C 232	Makin, J. Wm.	Sept. 10, 1910	C 385
Hutchison, Fred	Nov. 27, 1909	C 358	Malone, John	May 21, 1914	C 585
Hynd, John	Dec. 14, 1920	C 707	Manifold, A.	May 1, 1909	C 336
Hynds, William	July 8, 1916	C 632	Marrs, John	May 17, 1917	C 640
Ireson, John	Oct. 31, 1912	C 507	Marsh, Daniel Parks	May 27, 1913	C 543
Irvine, David	June 10, 1911	C 413	Martin, James	June 10, 1911	C 398
Jack, John	May 21, 1914	C 582	Mason, Joseph	July 22, 1908	C 297
Jackson, Harry	June 24, 1924	C 776	Massey, Henry	May 1, 1909	C 317
James, Thos.	May 21, 1914	C 588	Mather, Thomas	July 22, 1908	C 293
Jardine, Geo. Edward	Jan. 21, 1913	C 521	Matusky, Andrew	Oct. 1, 1907	C 259
Jarrett, Fred. J.	Oct. 1, 1907	C 256	Mawson, J. T.	Nov. 27, 1909	C 359
Jenkins, John	Sept. 10, 1910	C 390	Maxwell, Alfred W.	July 7, 1937	C 881
Jenkinson, Jonathan	Dec. 23, 1927	C 813	Maxwell, Geo.	May 21, 1914	C 571
John, Howell	July 22, 1908	C 305	McAlpine, John	March 4, 1905	C 217
Johnston, Fred	Dec. 30, 1926	C 803	McArthur, John Malcolm	May 17, 1917	C 648
Johnston, Robert	May 9, 1912	C 479	McArthur, Robert	Dec. 22, 1921	C 723
Johnstone, William W.	July 18, 1938	C 894	McCann, Thomas	July 12, 1939	C 910
Jones, Alf. Geo.	May 21, 1914	C 584	McCourt, John	Oct. 14, 1914	C 605
Jones, Douglas M.	June 15, 1934	C 861	McCourt, Thos.	Dec. 30, 1926	C 805
Jones, Samuel	March 4, 1905	C 544	McCulloch, James	May 1, 1909	C 315
Jones, Samuel	May 27, 1913	C 518	McDonald, Allen	June 30, 1928	C 817
Jones, William E.	Jan. 21, 1913	C 556	McDonald, John	Oct. 28, 1911	C 448
Jones, William T.	Oct. 28, 1913	C 221	McFagen, Alexander	May 9, 1912	C 490
Joyce, Walter	Nov. 27, 1909	C 361	McFegan, W.	May 1, 1909	C 319
Judge, Peter	Sept. 10, 1910	C 391	McGarry, Martin	May 1, 1909	C 326
Karner, Joseph	Dec. 29, 1936	C 877	McGrath, James	July 8, 1916	C 630
Keenan, Wm. James	June 10, 1911	C 426	McGregor, Gregor	Jan. 20, 1944	C 941
Kelly, Ernest	May 17, 1917	C 646	McGuckie, Thomas	July 29, 1905	C 226
Kelly, Francis	June 16, 1930	C 839	McGuire, Thomas	Oct. 28, 1913	C 553
Kemp, Wm.	Oct. 14, 1914	C 594	McInnis, John C.	July 7, 1937	C 885
Kirkeberg, H. S.	Nov. 27, 1909	C 350	McIntyre, Neil	May 21, 1914	C 574
Kirkham, Alfred	Oct. 28, 1913	C 559	McKay, Walter	Nov. 20, 1923	C 763
Kirkpatrick, Hugh	June 26, 1944	C 944	McKenzie, Peter	June 10, 1911	C 427
Klejko, Steve	Dec. 14, 1920	C 703	McKibben, Matthew	May 21, 1914	C 580
Krall, Thomas F.	July 2, 1943	C 936	McKinley, John	Oct. 28, 1914	C 442
Kraus, Joseph	July 2, 1943	C 934	McLachlan, Alex.	June 10, 1912	C 419
Lancaster, Peter	Dec. 16, 1937	C 888	McLaren, John	May 30, 1923	C 754
Larner, Ralph	July 7, 1941	C 924	McLaughlin, James	May 9, 1912	C 485
Lazaruk, Steve	June 30, 1928	C 815	McLean, M. D.	Sept. 10, 1910	C 389
Leeman, T.	May 1, 1909	C 345	McLellan, William	March 4, 1905	C 219
Leonard, Leon D.	Jan. 16, 1941	C 925	McLeod, James	July 22, 1908	C 296
Lester, Frank	May 17, 1922	C 734	McLeod, John	May 13, 1915	C 609
Lewis, Benj. J.	Sept. 10, 1910	C 386	McMeakin, James	May 13, 1915	C 612
Lewis, Glyn	July 12, 1939	C 909	McMillan, D.	Sept. 10, 1910	C 363
Leyward, Paul	May 17, 1917	C 637	McMillan, Edward	Oct. 31, 1912	C 493
Lindsay, William	May 17, 1917	C 642	McMillan, Neil	Nov. 15, 1917	C 654
Linn, George Y.	May 17, 1922	C 737	McNay, Carmichael	July 22, 1908	C 306
Litherland, David	June 30, 1928	C 816	McNeill, Adam L.	July 22, 1908	C 281
Littler, Albert	July 2, 1943	C 933	McNeill, Robert	Sept. 10, 1910	C 387
Littler, James	June 30, 1926	C 792	McVeigh, Francis	July 5, 1932	C 855
Little, John	June 10, 1911	C 410	McWhirter, Archibald	June 30, 1926	C 794
Littler, Matthew	June 10, 1911	C 417	Meek, Matthew	May 9, 1912	C 484
Littler, Robert	June 10, 1911	C 418	Menzies, Frederick	Dec. 14, 1920	C 704
Littler, Robert (Jr.)	July 18, 1938	C 898	Merrifield, George	Oct. 23, 1906	C 239
Livingstone, Alex.	Oct. 28, 1911	C 436	Miles, John	June 10, 1911	C 414
Lloyd, Thomas	May 17, 1922	C 740	Miller, Frederick	July 21, 1929	C 823
Louden, William D.	July 7, 1941	C 923	Mills, Christopher	July 18, 1938	C 893
Loxton, George	June 10, 1911	C 428	Mitchell, Charles	May 1, 1909	C 322
Loxton, John	June 10, 1911	C 416	Mitchell, Henry	Sept. 10, 1910	C 366

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

Name.	Date.	No.	Name.	Date.	No.
Moore, George	Oct. 23, 1906	C 242	Reid, Wm.	June 10, 1911	C 403
Moore, John	May 1, 1909	C 335	Reilly, Thomas	July 22, 1908	C 303
Moreland, Thomas	July 22, 1908	C 299	Renney, Jas.	Nov. 27, 1909	C 354
Morgan, Cornelius	Dec. 22, 1921	C 725	Richards, James	Nov. 1, 1907	C 249
Morgan, Irving	July 7, 1937	C 885	Richards, Samuel	Oct. 23, 1906	C 244
Morgan, John	June 24, 1924	C 773	Richardson, J. H.	Oct. 28, 1911	C 458
Morgan, William	May 17, 1917	C 636	Rigby, John	July 29, 1905	C 225
Morris, David	May 9, 1912	C 472	Roberts, Arthur	June 24, 1924	C 772
Murdoch, Jno. Y.	May 21, 1914	C 564	Roberts, Ebenezer	May 1, 1909	C 327
Murray, Robt.	June 30, 1926	C 796	Robertson, Thomas H.	July 7, 1937	C 883
Myers, Peter	Oct. 28, 1911	C 446	Robinson, Asa	June 16, 1925	C 787
Nash, George F.	Dec. 22, 1921	C 727	Robinson, Michael	May 1, 1909	C 332
Nash, George William	May 17, 1917	C 565	Robson, James	June 16, 1925	C 788
Nee, Wm. R.	Dec. 22, 1921	C 724	Robson, Thomas	May 21, 1914	C 566
Neen, John R.	Dec. 16, 1937	C 889	Roper, William	July 22, 1908	C 274
Neilson, William	May 9, 1912	C 481	Rowbottom, Thomas	Oct. 31, 1914	C 492
Nelson, Horatio	Oct. 1, 1907	C 263	Royle, Edward	Oct. 31, 1912	C 506
Nicholson, James	May 9, 1912	C 469	Russell, Robert	Nov. 27, 1909	C 351
Nimmo, James	May 9, 1912	C 461	Sanders, Henry	June 15, 1934	C 863
Norris, Joshua	Oct. 28, 1913	C 557	Saunders, Eustace L.	Jan. 21, 1913	C 520
Nuttall, Wm.	June 16, 1925	C 780	Scales, Joseph	May 17, 1922	C 738
Oakes, Robert	Oct. 31, 1912	C 498	Scarpino, Francis	May 17, 1917	C 649
O'Brien, Reginald	June 26, 1940	C 917	Scott, Henry	July 22, 1908	C 294
Odgers, Eli	Jan. 21, 1913	C 523	Seddon, James	Oct. 3, 1919	C 824
Osborne, Hugh	Oct. 28, 1913	C 555	Shanks, David	Sept. 10, 1910	C 372
Oswald, Geo. L.	Sept. 10, 1910	C 370	Sharp, James	May 1, 1909	C 325
*Owen, Thomas	May 1, 1909	C 347	Sharpe, Henry	June 16, 1925	C 783
Park, William	Dec. 19, 1918	C 684	Shaw, Robert	June 1, 1933	C 857
Parker, John H.	June 15, 1934	C 864	Shea, Thomas J.	Dec. 22, 1921	C 722
Parker, L.	May 1, 1909	C 341	Shields, Thomas	May 16, 1918	C 667
Parkinson, James Wm.	Nov. 15, 1917	C 655	Shipley, John W.	Oct. 28, 1911	C 456
Parkinson, T.	July 22, 1908	C 289	Shooter, Joseph	Oct. 1, 1907	C 261
Parkinson, Thomas	June 24, 1924	C 769	Shortman, J.	May 1, 1909	C 331
Parks, Alexander	Jan. 21, 1913	C 519	Sim, James	Dec. 14, 1920	C 711
Parrott, Jas. E.	May 21, 1914	C 590	Simister, Frederick	June 26, 1944	C 949
Parson, Herbert	May 13, 1915	C 621	Simister, J. H.	Nov. 27, 1909	C 353
Parsons, Albert	June 10, 1927	C 808	Simister, W.	May 1, 1909	C 334
Pasiaud, Roger A.	July 18, 1938	C 897	Simms, Hubert Allan	Jan. 21, 1913	C 526
Patrick, Andrew	June 16, 1931	C 849	Sinclair, William	Jan. 21, 1913	C 527
Pearson, Jonathan	May 9, 1912	C 473	Slee, Thomas	June 30, 1926	C 793
Penman, Hugh	Oct. 28, 1913	C 552	Smellie, John	May 29, 1923	C 758
Perry, Lorne B.	July 12, 1939	C 911	Smith, A. E.	Sept. 10, 1910	C 367
Phillips, James	Nov. 21, 1922	C 749	Smith, John Watterson	May 16, 1918	C 665
Phillips, Richard S.	May 17, 1917	C 620	Smith, Joseph	March 4, 1905	C 207
Pickup, A.	July 22, 1908	C 310	Smith, Richard Beveridge	Oct. 28, 1913	C 561
Picton, W.	May 1, 1909	C 333	Smith, Thos. J.	Oct. 1, 1907	C 271
Plant, Samuel	Nov. 14, 1905	C 233	Smith, Thomas	May 9, 1912	C 486
Pollock, John	May 30, 1923	C 760	Smith, Thomas	Dec. 14, 1920	C 705
Poole, Samuel	May 27, 1913	C 536	Sockett, James C.	Jan. 16, 1945	C 951
Price, Walter	Sept. 10, 1910	C 371	Somerville, Alexander	July 7, 1937	C 884
Quayle, Alex. B.	Jan. 5, 1925	C 778	Sopwith, Reginald Scott	Jan. 21, 1913	C 512
Queen, John	July 12, 1939	C 908	†Sparks, Edward	Oct. 1, 1907	C 314
Queen, Peter	Jan. 16, 1941	C 927	Spencer, G.	May 1, 1909	C 329
Quinn, James	Oct. 28, 1911	C 441	Stafford, M.	Sept. 10, 1910	C 382
Quinn, John	Oct. 28, 1911	C 429	Starr, Wallace	May 9, 1912	C 488
Radford, Albert	May 21, 1914	C 579	Staton, Edward	May 21, 1914	C 581
Rallison, James	May 30, 1923	C 759	Steele, Walter	Oct. 28, 1911	C 439
Rallison, R.	July 22, 1908	C 279	Stewart, George	May 27, 1913	C 534
Rankin, George	July 22, 1908	C 275	Stewart, James B.	June 16, 1925	C 785
Rankin, Wm. Shaw	May 9, 1912	C 489	Stewart, James M.	Oct. 23, 1906	C 240
Raynor, Fred	Oct. 1, 1907	C 257	Stewart, John	Dec. 30, 1926	C 801
Rear, Albert E.	June 10, 1927	C 807	Stobbart, David	June 16, 1925	C 781
Reid, Thos.	May 21, 1914	C 592	Stockwell, William	Oct. 23, 1906	C 238

* Issued as substitute for No. C 342.

† Issued in lieu of No. C 255, destroyed by fire.

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

Name.	Date.	No.	Name.	Date.	No.
Stone, Wm. C.	June 21, 1921	C 714	Wallace, Fred	Oct. 1, 1907	C 260
Strachan, John	Oct. 14, 1914	C 604	Waller, Wm. E.	July 5, 1932	C 851
Strang, James	May 13, 1915	C 614	Walls, John	Dec. 14, 1920	C 710
Strang, Thomas	June 10, 1911	C 400	Ward, Ernest Hedley	May 17, 1917	C 641
Strang Wm.	June 10, 1911	C 395	Wardrop, James	Oct. 31, 1912	C 504
Surtees, Edward	June 16, 1930	C 835	Watson, Arthur W.	May 27, 1913	C 535
Sutherland, John	May 27, 1913	C 545	Watson, George	July 22, 1908	C 288
Sweeney, John	May 17, 1922	C 735	Watson, John	May 17, 1922	C 743
Taylor, Charles M.	March 4, 1905	C 213	Watson, Joseph	Jan. 21, 1913	C 515
Taylor, Henry	Dec. 20, 1928	C 818	Watson, William	Oct. 22, 1906	C 246
Taylor, Hugh	Jan. 21, 1913	C 530	Watson, William	May 17, 1917	C 645
Taylor, James	May 21, 1914	C 567	Weaver, William	Nov. 17, 1922	C 748
Taylor, Jonathan	Dec. 19, 1918	C 680	Webb, Herbert	Oct. 28, 1911	C 457
Taylor, J. T.	Oct. 28, 1911	C 447	Webster, James Stewart	Dec. 19, 1918	C 685
Taylor, Leroy	Sept. 10, 1910	C 381	Weir, James	July 7, 1937	C 880
Taylor, Reginald T.	June 18, 1936	C 875	West, James Gloag	May 16, 1918	C 676
Taylor, Robert	June 21, 1920	C 695	Whalley, William	Dec. 19, 1918	C 686
Taylor, Thomas	May 21, 1914	C 577	Whittaker, John (Jr.)	July 18, 1938	C 891
Taylor, Thomas	July 7, 1937	C 882	Wicks, Roy	July 21, 1929	C 827
Tennant, Joseph	June 24, 1924	C 770	Wilkinson, Edward	Oct. 28, 1911	C 438
Thacker, Geo.	May 27, 1913	C 537	Williams, Arthur	Dec. 20, 1938	C 905
Thewlis, David	July 2, 1943	C 935	Williams, Cadwaladr	June 16, 1930	C 838
Thomas, John B.	Nov. 14, 1905	C 231	Williams, John Sam.	June 10, 1911	C 404
Thomas, Thomas	Sept. 10, 1910	C 365	Williams, Watkin	June 22, 1908	C 301
Thomason, Charles	Nov. 15, 1917	C 657	Wilson, John M.	Dec. 16, 1937	C 890
Thompson, John	Oct. 31, 1912	C 509	Wilson, Joseph	June 24, 1924	C 767
Thompson, Joseph	Oct. 1, 1907	C 269	Wilson, Joseph	June 30, 1928	C 814
Thompson, Thomas	Oct. 1, 1917	C 267	Wilson, Joseph R.	July 18, 1938	C 902
Thomson, Charles	June 24, 1924	C 765	Wilson, Robinson	June 10, 1911	C 397
Tiberghien, Alphonse	June 15, 1934	C 867	Wilson, Thomas M.	Oct. 1, 1907	C 272
Tolley, John	Dec. 19, 1918	C 678	Wilson, William	Oct. 1, 1907	C 262
Touhey, William	May 27, 1913	C 547	Wilson, William	May 17, 1917	C 647
Travis, Joseph	June 21, 1920	C 699	Winstanley, H.	July 22, 1908	C 283
Tully, Thomas	May 9, 1912	C 468	Winstanley, Robert	Nov. 21, 1922	C 747
Tune, Elijah	May 9, 1912	C 476	Wintho, Thomas A.	July 29, 1905	C 222
Unsworth, John	June 16, 1925	C 784	Witherington, George	Oct.. 28, 1913	C 554
Uphill, Vernon R.	June 15, 1934	C 862	Wood, Francis E.	Dec. 16, 1937	C 886
Valentine, Wilfrid	July 21, 1929	C 826	Wood, Thos. James	Oct. 31, 1912	C 491
Vardy, Robt.	May 21, 1914	C 570	Worthington, J.	July 22, 1908	C 295
Vaton, Harry	July 5, 1932	C 853	Wright, John	May 21, 1914	C 593
Vaughan, John Henry	Oct. 28, 1913	C 560	Wright, Robert	May 21, 1914	C 589
Vincent, Thomas C.	Nov. 21, 1922	C 745	Wright, William	Jan. 21, 1913	C 522
Waddington, D. M.	June 10, 1927	C 806	Wynne, Thomas M.	Dec. 9, 1940	C 920
Walker, George	July 8, 1916	C 633	Yates, Frank	May 17, 1922	C 732
Walker, Jas. Alexander	Oct. 31, 1912	C 496	Yates, John	June 16, 1930	C 840
Walker, Robert C.	May 17, 1922	C 728	Yeowart, Hudson	June 24, 1924	C 771
Walker, Wm.	May 21, 1914	C 586	Young, Alexander	May 16, 1918	C 666

MINE SURVEYOR CERTIFICATES ISSUED UNDER THE "COAL-MINES REGULATION ACT AMENDMENT ACT, 1919."

Name.	Date.	No.	Name.	Date.	No.
Andersen, Thormod	Jan. 10, 1944	85	Lauderbach, Wilfrid P.	June 16, 1925	63
Anderson, Harry C.	May 19, 1922	59	Lawrence, Stanley J.	Dec. 20, 1939	82
Baile, Wynne Jeffreys	Oct. 3, 1919	16	Lindoe, Luke	June 21, 1921	41
Bapty, Harry	Dec. 16, 1942	83	MacDonald, John	May 19, 1922	46
Bonar, Robert B.	Dec. 30, 1926	64	McKenzie, Frank	June 10, 1927	66
Bowerman, Everard S.	Dec. 14, 1920	39	Miard, Harry Ernest	Oct. 3, 1919	2
Brehaut, Cecil H.	Dec. 16, 1937	80	Munro, David L.	Dec. 16, 1939	79
Buckham, Alexander F.	June 26, 1944	86	Owen, Wm. Arthur	Oct. 3, 1919	10
Caufield, Bernard	May 19, 1922	54	Pettigrew, Robt.	Dec. 9, 1930	75
Corbett, Garnett S.	May 19, 1922	49	Priest, Elijah	May 19, 1922	53
Cox, Richard	May 19, 1922	57	Rafter, Wm.	May 19, 1922	51
Crosscombe, James S.	May 31, 1923	60	Reger, Frederick Wm.	Oct. 3, 1919	7
Daniell, Geo. W. B.	Oct. 3, 1919	29	Richards, Chas. Clifton	Oct. 3, 1919	19
Davis, Gerald D.	Oct. 3, 1919	28	Richards, James A.	Oct. 3, 1919	15
Delaney, James	Oct. 3, 1919	21	Richmond, Alexander M.	Jan. 25, 1943	84
Dickson, James	Oct. 3, 1919	3	Ridley, James	Oct. 3, 1919	18
Drewry, Wm. Stewart	May 19, 1922	56	Roaf, Jos. R.	Oct. 3, 1919	14
Edwards, Jas.	June 10, 1927	65	Rutherford, John A.	Dec. 2, 1929	70
Freeman, Harry N.	May 19, 1922	47	Sandland, Joseph	May 31, 1923	61
Gardner, Harold H.	June 16, 1930	72	Schjelderup, Vilhelm	July 21, 1929	69
George, Frank J.	May 19, 1922	48	Stewart, R. T.	Nov. 17, 1923	62
Gibson, Munro M.	Dec. 15, 1931	77	Strachan, Robert	June 21, 1920	36
Graham, Charles	May 19, 1922	50	Stropkay, John	June 16, 1931	76
Graham, Morton H.	Dec. 20, 1938	81	Townsend, Neville F.	Nov. 17, 1919	31
Gregory, P. W.	Nov. 17, 1919	32	Vallance, Wm. Dixon	Oct. 3, 1919	8
Hargreaves, James	Nov. 29, 1920	33	Verkirk, Lucas	June 21, 1921	42
Heaney, Chas. J.	June 16, 1930	73	Waddington, Geo. W.	June 21, 1920	35
Hepburn, James T.	Dec. 14, 1920	37	White, Harold	Oct. 3, 1919	25
Holdsworth, William	Oct. 3, 1919	9	Wilkie, Octavius B. N.	Oct. 3, 1919	26
Holmes, Terence C.	June 16, 1930	74	Williams, John S.	Dec. 15, 1932	78
Howden, Archibald	May 19, 1922	55	Williams, Paul E. R.	Dec. 2, 1929	71
Hughes, Edward	Dec. 14, 1920	38	Wilson, Arthur Rupert	Oct. 3, 1919	13
Hunter, George	Oct. 3, 1919	30	Wilson, Chas. James	Oct. 3, 1919	22
Jackson, Thos. R.	May 19, 1922	43	Wilson, Hartley Paul	Oct. 3, 1919	24
King, Alfred Geo.	Oct. 3, 1919	27	Wilson, R. Robinson	Oct. 3, 1919	12
Kneen, Percy	Dec. 20, 1928	67	Wilton, Douglas D.	May 19, 1922	59
Lancaster, Peter	Oct. 3, 1919	23	Wright, Austin	Dec. 14, 1920	40

INSPECTION OF 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.; H. Baird, Superintendent, Cumberland, B.C.; R. K. Smart, Assistant Superintendent, Nanaimo, B.C.

No. 10 Mine, South Wellington.—(49° 123° S.W.) W. Frew, Manager; Joseph Wilson, Overman; A. Hannah, T. Jordan, F. Bell, J. McArthur, W. Roper, D. McMillan, E. Heyes, F. Johnstone, and T. McCann, Firebosses. This mine, in the Cranberry district, about half a mile south of the old No. 5 mine, is in the Douglas seam. It has maintained its record of having the largest output in the district, with a total of 259,290 long tons over a working period of 274.5 days, with an average crew of 230 men employed underground and thirty-five on the surface. The bulk of this tonnage came from pillar-extraction while the balance was obtained from the driving of roadways necessary for these operations. New development-work during 1944 included 7,000 feet of drivage in the Left side district of No. 2 Diagonal slope and 2,000 feet in 7 Right section in the No. 1 Diagonal Slope district. From the main boundary pillar separating this mine from the old Granby No. 1 mine abandoned workings, the pillars have been drawn back for a distance of 2,000 feet in the Main slope district, 950 feet in the No. 2 Diagonal Slope district, and 450 feet in the 7 Right section in No. 1 Diagonal Slope district. The splendid recovery reported from pillar-extraction in 1943 has been upheld during 1944 and the maintenance of this creditable record must prove highly gratifying to all officials and workmen engaged in these operations. First-aid requirements have been kept up to the usual standard, nine emergency stations being maintained in addition to the main station in the lamp-cabin, where a large stock of first-aid equipment is always kept on hand. All emergency stations are examined at least twice in each month by a competent first-aid attendant whose duty it is to replenish supplies as required. Thirty of the employees at this mine are qualified to render first aid in cases of injury.

Nine dangerous occurrences were reported in connection with outbursts of gas at the face, all of these liberating gas in sufficient quantity to necessitate the withdrawal of all men from the sections directly affected. Two mine-rescue teams of six men each have kept up regular training of one two-hour period monthly, when the teams assemble the apparatus and carry out a certain amount of practical work in the experimental mine adjacent to the mine-rescue station at Nanaimo. General working conditions have been found usually satisfactory in the course of inspection, excepting on occasion when abnormal emissions of methane made it necessary to restrict blasting in the affected areas pending the removal of all visible gas-caps from the general body of the air.

The ventilation in general has been kept at a fairly high standard of efficiency, measurements taken at the last inspection in December showed 102,310 cubic feet of air a minute passing in the Main returns for the use of ninety men. Twenty-eight samples of air were collected in the Main return airways, the methane content of these varying from 0.12 per cent. in the main West return to 0.77 per cent. in the main East return. One hundred and forty-one samples of dust were gathered from the various

roadways, all of these being well above the minimum standard of incombustible content as set by the Coal-dust Regulations. Lime-rock dust, amounting to 110 tons, was used in treating 25,000 feet of roadways, while a total of 20 tons of this material was used for tamping in blasting operations. One hundred and twelve accidents were reported during 1944; one of these was fatal, two were serious, and the others were classed as minor, although many of these involved the loss of considerable working-time.

Wellington Mine.—(49° 124° S.E.) A. Newbury, Manager; J. Sutherland, Overman; A. Bennett, J. Brown, J. Marrs, T. McCourt, A. Kirkham, J. Wilson, and J. Unsworth, Firebosses. This mine was situated in the Timberlands district, a distance of 14 miles from the washery and cleaning plant at Nanaimo, to which point the coal was hauled in a fleet of trucks operated by F. W. Beban Company under contract with the coal company. This mine was originally opened in May, 1926, and worked to October, 1928, when operations were suspended indefinitely on account of depression in trade. In May, 1941, the present management of the company decided to unwater the workings for the purpose of examination with a view to reopening the mine. A favourable decision being reached, plans were made for the erection of a new tipple and power-house and the installation of coal-cutting machines and face conveyers to mine the seam by the long-wall method. Production was resumed on September 24th, 1941, and continued steadily to August 10th, 1944, at which date all available coal that could be extracted with safety had been mined out. Immediately following the cessation of production, all material was withdrawn from the mine and the various openings permanently closed off, this operation being completed as at August 16th. During the above stated period this mine produced a grand total of 373,309 long tons, with an average crew of 140 men employed underground and eleven men on the surface. During 1944 this mine operated 170 days from the beginning of January to August 10th, inclusive, and produced 71,362 long tons. Toward the end of this operating period the regular working crew was greatly reduced as the retreating long-walls converged on the bottom of the Main slope. Apart from the occasional breaking and weighting of the roof on the walls, working conditions were found satisfactory in the course of inspection. The ventilation was always very good throughout the workings, the quantity passing in the Main return at the July inspection measured 45,000 cubic feet of air a minute for the use of forty men and four horses. Six samples of air were collected at the testing station in the Main return, none of which showed more than a slight trace of methane. Although practically all of the roadways were naturally wet throughout, forty-two samples of dust were collected in the vicinity of the main loading stations on the levels, the resultant analyses showing these to be well above the minimum standard of incombustible content as set by the Coal-dust Regulations. A total of 5,000 lb. of lime-rock dust was used to combat the coal-dust hazard in the above-mentioned localities. Forty-one accidents were reported and investigated; of these, two were in the serious class while the remainder were recorded as being of a minor nature.

White Rapids Mine.—(49° 123° S.W.) A. Newbury, Manager, J. Sutherland, Overman; A. Bennett, J. Brown, and J. Marrs, Firebosses. This is a new mine in process of development and is situated approximately 9 miles south-west of Nanaimo, with the workings located in Sections 3 and 4, Range 1, in the Cranberry district. Following a fairly extensive diamond-drilling programme, suitable locations for the tipple, surface plant, and main haulage slope were chosen, the driving of the latter roadway commencing on February 10th and being completed on August 20th; this roadway is 7 by 10 feet in the clear and is driven on a 30-per-cent. grade in solid conglomerate, tapping the seam at a distance of 604 feet from the surface. From the foot of the Main slope a roadway was turned off to the left and driven a distance of 710 feet to connect with an old air-shaft located on the bluff near Nanaimo River; this roadway

will serve as a main return airway and second outlet. When the above connection was made, a main siding was turned off to the right of the Main slope and a development dip started from the inby end of this siding; this dip had been driven a distance of 380 feet at the end of December. A main development heading and counter were turned off from the main return airway and have been driven 375 feet and 275 feet respectively; two main levels have been started off these headings to act as loading-roads for the long-wall faces in this area. The seam varies from 30 to 36 inches in height and will be mined by means of Anderson-Boyes coal-cutting machines while Meco shaking conveyers will be used to transport the coal along the walls to the loading-stations on the various levels. The roof consists of shale of varying thickness, between the seam and the main conglomerate body, and probably will require careful attention by workmen and officials to timbering and strapping on the faces. The mine-cars are handled on the tipple by a rotary gravity dump which deposits the coal on a "Hendrick" patented lip-screen, the lump passing by a travelling picking-table and loading-boom to the railway cars. Power for underground operations is provided by one Canadian Ingersoll-Rand 23- by 14½- by 12-inch XVHE-2 air-compressor having a capacity of 1,500 cubic feet of air a minute, and one Ingersoll-Rand 16- by 10- by 14-inch belt-driven air-compressor with a capacity of 700 cubic feet of air a minute. Haulage on the Main slope will be taken care of by an Ingersoll-Rand S.E. geared electric hoist driven by a 150-h.p. 2,200-volt motor. The ventilating unit is installed at the top of the old air-shaft mentioned above; this is a single-inlet Keith fan, powered by a 30-h.p. 440-volt motor. When operating at a speed of 150 r.p.m., this unit has an estimated capacity of 40,000 cubic feet of air a minute under a water-gauge of 3 inches. Fire protection and fresh water supplies are fully provided for by a Fairbanks-Morse 200-gallons-a-minute pump; this is driven by a 20-h.p. 440-volt G.E. induction motor. The manager's office, firebosses' cabin, warehouse, and lamp-cabin are all under one roof, the building being convenient to the slope entrance and tipple. The workings have not yet been developed to the point where regular air sampling and the collection of dust samples is necessary, but this will be inaugurated early in 1945 when the long-wall faces are producing. Actual production was begun in September with 293 long tons hoisted; the total tonnage to the end of December amounted to 2,541 long tons, all of which was mined in the driving of airways and development roadways. Three serious accidents and eight of a minor nature were reported and investigated. At the present rate of development, it is anticipated that at least two long-wall faces will be in production in the latter part of February, 1945.

Prospect Mine, Extension. (49° 123° S.W.) M. Broderick, Fireboss. This mine is at Extension, on the southern end of the Harewood ridge, and is in the Wellington seam. Production for 1944 amounted to 3,795 long tons over a working period of 281 days, with an average crew of six men employed. No new development-work of any consequence was done during 1944 and operations have been principally confined to the extraction of pillars. General working conditions have usually been found fairly satisfactory in the course of inspection; at the last inspection in December the quantity of air passing in the Main return measured 2,400 cubic feet a minute for the use of six men. Two minor accidents 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 is in an area of outcrop coal which was left in this locality when Extension No. 1 mine was abandoned. Production in 1944 amounted to 2,136 long tons over a working period of 266 days, with a crew of four men employed. General working conditions have been found satisfactory in the course of inspection; no accidents were reported during 1944.

Chambers' No. 3 Mine.

(49° 123° S.W.) R. H. Chambers, Operator and Fireboss. This mine is situated in the Extension district on a portion of the Wellington seam which had been left in this area when Extension No. 3 mine was abandoned. Production for 1944 amounted to 2,694 long tons over a working period of 225 days with an average crew of six men employed, the whole of this output coming from pillar-extraction. Because of the broken nature of the ground, all development-work in the general direction of the old No. 3 mine was abandoned and retreating with the pillars was started, this being completed toward the end of 1944 and the opening to the Main slope closed off. A new haulage roadway is now being driven from the surface to the right of the above old workings to reach a few pillars presumably left intact in this same area when Extension No. 1 mine was abandoned. Considering existing circumstances, working conditions were found fairly good in the course of inspection. One minor accident was reported and investigated.

Deer Home No. 2 Mine.

(49° 123° S.W.) Robert Hamilton and Associates, Operators; Robert Hamilton, Overman. This mine is situated roughly 1,500 feet in a south-easterly direction from the old Vancouver slope and is operating in some outcrop coal left intact in this area when Extension No. 3 mine was abandoned. It was anticipated that several pillars had been left intact below the main outcrop barrier pillar in the old mine, but exploratory roadways driven through the old gobs have so far failed to locate these and the assumption is that this area had been pretty well robbed before it was abandoned. Production for 1944 amounted to 2,798 long tons over a working period of 223 days, with a crew of six men employed. Working conditions have generally been found satisfactory in the course of inspection. One minor accident was reported and investigated.

Lewis' No. 3 Mine.

(49° 123° S.W.) Thomas and G. Lewis, Operators; G. Lewis, Fireboss. This mine is situated in the Harewood district and is operating in a portion of the outcrop barrier of the Wellington seam which was left in this area when Harewood mine was abandoned. Production in 1944 amounted to 671 long tons over a working period of 254 days, with a crew of two men employed. Working conditions have usually been found satisfactory in the course of inspection. No accidents were reported during 1944.

No. 5 Mine, Cassidy.

(49° 123° S.W.) J. McKellar and Associates, Operators; J. Unsworth, 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 during 1944 amounted to 1,300 long tons over a working period of 254 days, with an average crew of four men employed. As a rule, working conditions have been found fairly good in the course of inspection. No accidents were reported from this mine during 1944.

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 developing a portion of the upper Wellington seam which was untouched in this area when the old No. 9 mine was abandoned. The upper Wellington seam in this area is reached by a short slope from the surface, 50 feet in length, and the main roadway is being driven to make contact with the face of old No. 9 Main slope. Production for 1944 amounted to 865 long tons over a working period of 234 days, with a crew of four men employed. Working conditions have been found fairly satisfactory in the course of inspection. No accidents were reported during 1944.

Carruthers and Wakelam No. 3 Mine.

(49° 124° S.E.) R. B. Carruthers and W. Wakelam, Operators; R. B. Carruthers, Fireboss. This mine is also situated on the opposite side of the ridge from old No. 9 mine in the Wellington district and is operating in a portion of the upper Wellington seam. The main roadway

is being driven in the general direction of the old No. 9 workings and will eventually reach those workings on the left of the old Main slope. A barrier pillar approximately 35 feet in thickness separates this mine from the Loudon No. 5 mine Main level. Production for 1944 amounted to 547 long tons over a working period of 289 days, with a crew of two men employed. General working conditions have been found satisfactory in the course of inspection. No accidents were reported during 1944.

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 on a portion of the lower Wellington seam lying close to the outcrop which had been left in to protect the original Wellington slope. Production during 1944 amounted to 580 long tons over a working period of 263 days, with a crew of two men employed. Working conditions have been found fairly good in the course of inspection. No accidents were reported from this mine during 1944.

Stronach No. 2 Mine. (49° 124° S.E.) C. Stronach, Operator; L. Dickie, Fireboss. This mine is situated in the Wellington district on a portion of the upper Wellington seam adjacent to the old No. 9 mine abandoned workings. Contact with these old workings has been made at three different points by levels driven from the Stronach Main slope. Production for 1944 amounted to 1,110 long tons over a working period of 255 days, with a crew of five men employed. As a result of the connections made with the old No. 9 mine, there has been a good current of natural ventilation passing through the workings and general working conditions have always been found satisfactory in the course of inspection. No accidents were reported from this mine during 1944.

Rowburn Mine. (49° 123° S.W.) This mine, formerly known as "Richardson's" Big Flame mine, is being cleaned up and repaired by the Rowburn Coal Company, of which William Burnip, of Port Alberni, is president and A. Speller, of Nanaimo, is secretary, with A. Kirkham as fireboss in charge of operations at the mine. A beginning was made in October at cleaning up the surface and repairing the entrances to the Main intake and Main return airway, which had caved to some extent during the period the mine was closed. This mine is approximately 1½ miles in a south-easterly direction from the main Extension-Chase River highway and lies on the opposite side of the ridge from the old Fiddick mine. The seam in this area, resembling the Douglas in many respects, is very irregular and a number of barren patches were encountered in the original working. The Rowburn Company has reached an agreement with the Richardson Estate to prospect the property generally and, in addition to any new work undertaken, hopes to recover some pillar coal presumably left unworked when the Pacific Coast Coal Company abandoned this area. At the moment of writing, a crew of two men is employed in repairing the main tunnel and relaying the track in this roadway.

At the larger mines in the district regular inspections were made by inspection committees appointed by the workmen, copies of these reports being forwarded regularly to our office through the courtesy of the various committees. All report-books required to be kept at the mines have been periodically examined and found in order.

COMOX.

BY

R. B. BONAR.

No. 8 Mine, Comox Colliery. (49° 125° N.E.) James A. Quinn, Manager; Arthur W. Watson, Overman; Daniel Morgan and William Johnstone, Shiftbosses; John Anderson, William Bennie, Frank Coates, Alexander Dean, Muir Frame, George Harvie, Alfred Maxwell, John Queen, Thomas Shields, John W. Smith, James Weir, Daniel Waddington, and Frank Woods, 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, although the lower or No. 4 seam workings are being kept unwatered with a view to future development. In the No. 2 seam, before opening out on the long-wall advance system of work, a circular shaft pillar 1,000 feet in diameter was left and only narrow roadways 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, three in the main South level district, three in the No. 1 Incline district, and one in the No. 2 Slope district. On the north side of the shaft there are three active walls, two advancing up the pitch and one along the strike. Altogether there are ten long-walls in operation, one tandem unit and nine single units, their total length aggregating 3,000 feet. The seam thickness runs from 3 to 4 feet, including rock-bands or bony coal. Although most of the walls in this mine are operated on the advance system along the strike, several have been worked advancing up the pitch and this method has proved to be more advantageous, both in roof-control and continuance of operations.

The main North level has advanced to a point 1,100 feet from the shaft, and the face of the North slope is now 600 feet down from the North level. In this North district an overcast across the North slope and an undercast across the main South level were completed and coupled to the main North return airway. This arrangement allowed the district to be ventilated by three splits which made considerable improvement in the ventilation. The No. 2 Slope right return airway which will connect with No. 1 Right off No. 1 Slope was driven up 400 feet.

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. Shaker 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, the varying thickness of cap-rock, and to the slow advance of the walls, the roof conditions are not of the best and require the closest supervision and care. The average daily output of coal during the month of December was 713 long tons, with 273 men employed underground and thirty-six on the surface. A 7-stage centrifugal pump directly connected to a 150-h.p. electric motor and housed in the fire-proof pump-room near the main shaft bottom handles the mine water.

The haulage in the main South level district is handled 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 223,800 cubic feet of air a minute against a 7-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. Thirty 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 South return airways on December 13th showed a methane content of 0.57 per cent. in the No. 1 main South return airway, 0.37 per cent. in the No. 2 main South return airway, and 0.43 per cent. in the North side return.

A total of 320,000 lb. of limestone dust was used underground during the past twelve months, approximately 107,000 lb. being used in tamping shots and 213,000 lb. 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 1944 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 a 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.

No. 5 Mine, Comox Colliery.

(49° 125° N.E.) John S. Williams, Manager; John Christie, Overman; Alex. Somerville and Thomas Eccleston, Shiftbosses; William Herd, Alf. G. Jones, J. H. Vaughan, C. Williams, L. Cooper, J. Cochrane, R. Littler, R. O'Brien, L. Hutchinson, and M. Brown, 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 with the exception of No. 6 Right tandem wall which is being worked on the retreating system. At the end of 1944 there were four active long-walls, one tandem unit 500 feet long and two single units each 300 feet long, their total length aggregating 1,100 feet, with an average seam thickness of 3 feet 6 inches plus 10 inches of rock. The average daily output of coal during the month of December was 421 long tons, with 215 men employed underground and twenty-nine 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 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 1944 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 61,200 cubic feet of air a 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 107,000 cubic feet of air a minute against a 4.4-inch water-gauge. The methane content in the No. 1 fan return airway was 0.29 per cent. and 1.2 per cent. in the No. 2 fan return at the time of the above inspection.

A total of 279,000 lb. of limestone-dust was used underground during 1944 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 seventy-four samples of mine-dust were collected and analysed during 1944 to determine the percentage of incombustible matter and moisture in the dust on the roof, floor, and sides of the mine roadways.

No. "A" East level has been started near the top of the upper Main slope to develop the thin coal to the right of the slope.

A man-trip is run up the upper Main slope and, as a safeguard, the hoist is equipped with an automatic cut-off which cuts off the power and applies the brake if anything should happen to the hoistman; it 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 end of the trip.

The compressed air for the underground machinery is supplied by three electrically driven compressors, situated at the top of No. 3 intake air-drift, which have a rated capacity of 4,950 cubic feet of air a minute. The bath-house at the mine is equipped with 512 lockers and has sixty sprays. All the report-books required to be kept at the mine were examined regularly and found to be in order.

NICOLA-PRINCETON INSPECTION DISTRICT.

BY

E. R. HUGHES.

During 1944 two of the most important collieries in the district were closed. The Middlesboro Colliery, at Merritt, closed on March 31st after being in operation for thirty-seven years and producing slightly more than 2,000,000 tons of coal. The Princeton Tulameen Colliery, at Princeton, ceased production on April 29th after being in operation for eight years and producing approximately 180,000 tons of coal. Only repair-work was done at the Granby Colliery, which stopped producing on December 4th, 1943. It should be noted that a considerable tonnage of coal remains unmined in each of these collieries.

The mines operating at the end of the year were as follows: The No. 3 mine of the Tulameen Collieries, Limited, at Princeton; the Jackson mine of the British Lands, Limited, at Princeton; the Diamond Vale No. 4 mine of the Merritt Coal Mines, Limited, at Merritt; the Coldwater coal mines at Merritt; and the Hat Creek coal mine at Upper Hat Creek, near Ashcroft. Messrs. J. Delprato and E. Hayes continued intermittent prospecting on their property near Coalmont.

Accidents.—There were no fatal accidents in the coal-mines of the district during 1944, nor were there any accidents that could be classed as serious. Twenty-four compensable accidents were reported, most of these being of a trivial nature.

Dangerous Occurrences and Prosecutions.—There were no dangerous occurrences or prosecutions to report.

Output.—The closing of the Princeton Tulameen and Middlesboro collieries during the early part of 1944 adversely affected the annual output, which amounted to 94,773 tons, approximately two-thirds of the 1943 output.

Mine-rescue and First Aid.—The Similkameen Valley Mine Safety Association held its annual field-day competition on the Allison Flats, Princeton, on Saturday, June 24th. Although, because of lessened mining activity, entries in mine-rescue and first-aid were fewer than in some former years, the standard of work was excellent. The Copper Mountain team, under Captain E. Tregunna, won the mine-rescue event with an efficiency rating of 85 per cent. and the Tulameen Colliery team, captained by the veteran mine-rescue man, Arthur Hilton, with a team of newly trained men, was placed second with an 81-per-cent. rating.

The Granby Consolidated Mining, Smelting, and Power Co., Ltd.—Julian B. Beaty, President, New York; A. S. Baillie, Vice-President and General Manager, Copper Mountain, B.C.; W. I. Nelson, General Superintendent and Assistant General Manager, Copper Mountain, B.C.

Granby Colliery, No. 1 Mine.—(49° 120° S.W.) Mine Manager, Thos. M. Wilson. This mine is situated about 6 miles west of Princeton, near the Hope–Princeton High-

way. Because of high operating costs and labour troubles the mine ceased operations on December 4th, 1943, after producing 464,368 tons of coal during the last seven years. Almost all the output from the mine was used at the company's steam electric power plant near Princeton, which supplies the power requirements at the Copper Mountain copper-mining operation and the concentrator at Allenby. Coal for the operation of the power plant is now being purchased from other mines and some coal is being recovered from the old dump at Coalmont.

The No. 1 mine was developed from two diagonal slopes, the North diagonal and the South diagonal; this system providing for the development of a large triangular area of unworked coal between the slopes. Although the mine is now being allowed to fill with water, the water is rising very slowly and as yet most of the triangular area between the slopes is available for extraction at short notice if the coal were required. The only work done at the mine during 1944 was in the nature of repairs and the withdrawal of material.

Granby Colliery No. 2 Mine.—(49° 120° S.W.) This development mine remained closed throughout 1944, except for a small amount of repair-work.

Princeton Tulameen Coal Co., Ltd.

(49° 120° S.W.) Guy F. Atkinson, President, San Francisco, California; George H. Atkinson, Vice-President, San Francisco, California; W. D. Seaman, Secretary-Treasurer, Princeton, B.C.; James Taylor, Manager, Princeton, B.C. This mine is situated about 1 mile west of Princeton and has been operated by this company for eight years, during which time approximately 180,000 tons of coal was produced. The mine ceased production on April 29th. As the mine went to depth trouble was experienced from squeezing. This movement, starting in the Nos. 13, 14, and 15 Right levels, later extended downward and included the Nos. 16, 17, and 18 Right levels. The progression of squeeze exceeded the speed of rehabilitation to the extent that the lower roadways soon became impassable and had to be abandoned. Thus the whole of the lower workings were lost to production during the latter part of 1943. As the abandoned workings could not be adequately ventilated it became necessary to isolate the area; this was done by the erection of 15-inch wood-block stoppings in each level. The stoppings were later reinforced by 10 to 30 feet of rock and clay stowage and a new return airway was driven. With the loss of the lower workings, and in an effort to maintain production, the management resorted to withdrawing surface pillars on both sides of the Main slope. Rehabilitation of the lower Main slope had been completed and new development was under way by the driving of new lower workings and extending the slope when it was decided to close the mine.

A representative seam section measured near the face of the Main slope showed 114½ inches of coal together with five thin clay partings, three of which were ¼ inch in thickness and two were ½-inch bands. All material was withdrawn from the mine and sold. The mine entrances were sealed, but caving, due to the extraction of surface pillars, permitted air to circulate in the partly extracted area and spontaneous combustion occurred near the seam outcrop. The mine was rapidly filling with water which may eventually rise sufficiently to extinguish the fire.

Tulameen Collieries, Ltd.

(49° 120° S.W.) Head office, 716 Hall Building, Vancouver, B.C.; Manager, Thos. M. Wilson; Overman, Thos. Cunliffe; Firebosses, Thos. Bryden, Arthur Hilton, and F. Bond. This company operates the Tulameen No. 3 mine, which 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 underground workings are connected to the formerly abandoned workings of the old Tulameen No. 2 mine. Most of the old workings have now been rehabilitated and are being extended toward the workings of the old No. 1 mine.

This is the only part of the mine where further extension is possible, and even it is very limited. The workings extend west to a major fault near the outcrop, beyond which the coal was overlain by gravel and was of an inferior nature. The southern boundary of the workings is also an inferior outcrop coal. Pillars are being extracted and all available coal may be taken out in about a year.

This mine is now the chief source of coal for the Granby Company's steam electric power plant near Princeton; power from this plant is now also supplied to the Tulameen colliery and replaces the small steam plant previously in use.

Mine ventilation is provided by an electrically driven Sheldon fan and the air measurement taken in December showed 17,500 cubic feet of air a minute to be passing for the use of thirty-eight men. Psychrometer readings indicated a wet bulb of 42 degrees and dry bulb of 47 degrees, the relative humidity being 65 per cent. A sample of the return air gave an analysis of 0.02 per cent. methane and 1.6 per cent. black-damp.

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 regularly examined and found to be in order. Working conditions in general were found to be satisfactory during 1944. Coal production for 1944 was 53,388 tons.

British Lands, Ltd.

(49° 120° S.W.) *Jackson No. 1 Mine.*—Agent, C. H. Jackson, Kelowna, B.C.; Manager, James Taylor, Princeton, B.C. This small mine is situated about 6 miles south-west of Princeton and about one-half mile north of the Black mine. The Main tunnel, after being driven through 119 feet of surface gravel, sandstone, and shale, encountered a 4½-foot seam of coal containing a 1½-inch shale-band and a 7½-inch bentonite seam. After driving 30 feet along the strike of the seam a surface connection was made for ventilation after which the cross-measure Main tunnel was extended for exploratory purposes. Forty-seven feet beyond the first seam a superior seam, called the "seven-foot" seam, was found. At the face it was 86 inches thick, including a 1-inch clay parting, a 1-inch shale parting, a 2-inch shale parting, and a 14-inch mixture of coal and shale. To the left, on the strike of the second seam, a fault having a 14-foot displacement was found. This was penetrated and the left level was continued to a point 110 feet in from the Main level. At the end of 1944 a raise was started in the second seam to make another surface ventilation connection.

Development underground during 1944 was restricted chiefly because of lack of trade. During the winter months only two men were needed to produce sufficient coal to meet the local sales. The small amount of coal produced, 233 tons, was all mined during the last five months of 1944. Ventilation by natural means was found to be satisfactory. An analysis of mine-air taken in December showed 0.02 per cent. methane in the return airway.

Black Coal Mine.

(49° 120° S.W.) This small mine, situated in the Finlay Creek district, 6 miles south-west of Princeton and about one-half mile south of the Jackson mine, did not produce any coal during 1944. During the early part of January five men were employed preparing for the erection of a new tipple, but after only a few days' work operations were suspended and were not resumed during 1944.

Delprato and Hayes Prospect.

(49° 120° S.W.) Fireboss, J. Delprato. Work on this small prospect started in 1943. The workings are situated between Blakeburn and Coalmont and are in the vicinity of the No. 7 tower on the abandoned aerial tramway formerly operated by the Coalmont Collieries, Limited. The work done consists of three short adits and four small open-cuts driven to prove the coal-measures in this area. The greatest distance from the surface reached by any

of the adits is approximately 30 feet. No persons other than the two owners were employed at the property.

Merritt Coal Mines, Ltd.

(50° 120° S.W.) *Diamond Vale Colliery.*—Geo. Murray, President; P. Malone, Vice-President; J. Sisco, Director; Geo. Murray, Colliery Manager; James Fairley, Fireboss. This company operates the Diamond Vale Colliery, near the city limits of Merritt.

No. 4 Mine.—(50° 120° S.W.) The mine is developed by a Main slope dipping 25 degrees in a south-westerly direction. Three levels have been turned off to the right (west) and two levels, with two counters, develop the left (east) side. The Main slope was advanced 50 feet during 1944 to a point approximately 350 feet from the surface. Further slope advance was prohibited in January because of the proximity of the overlying flooded workings of the abandoned No. 3 mine. This prohibition remained in force until late in November when the No. 3 mine had been unwatered sufficiently to allow the No. 4 mine Main slope to be extended 100 feet farther. No. 1 Right level was driven 280 feet from the slope and was there stopped because it was near the outcrop. No. 2 Right level was driven in 430 feet from the slope, at which point heavy feeders of surface water were encountered and the level was abandoned. No. 3 Right level reached a point 400 feet from the slope and, because of the inflow of water in the level above, it was decided not to advance any farther in this direction at the present elevation. No. 1 Left level was driven 680 feet from the slope and was stopped because both the level and the counter above had reached discoloured inferior outcrop coal. No. 2 Left level and its counter were driven approximately 650 feet from the slope to a point at which the seam became irregular and near which it was assumed to end. Apart from the Main slope, there was now no place where development could be continued and the management decided to proceed with pillar-extraction on the East side, above No. 2 Left level; this extraction was being commenced at the end of 1944.

During an inspection in February, safety-lamp tests indicated the presence of 3 per cent. of methane near the face of a development raise, off No. 2 Left level; shot-firing was prohibited in this area until further inspection and report. During a July inspection explosive gas was found 6 feet from the face of the last raise, off No. 2 Right level; this was receiving the attention of officials and the gas was diluted and removed later the same day. During July an Aerodyne-type fan, formerly in use at the Princeton Tulameen Colliery, was installed at the mouth of a new surface raise on the East side and anemometer readings taken at this time showed that 21,000 cubic feet of air a minute was passing through the fan-drift. An analysis of the mine-air showed 0.05 per cent. methane in the return air. A crew of twelve to fourteen men was employed underground. Coal production for 1944 amounted to 9,504 tons.

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. At the end of 1944 the water was down to a point approximately 370 feet down the slope from the portal, this being a short distance below the East level (where an explosion occurred in 1912). It was possible to explore this level to a point approximately 450 feet from the slope, where a cave prevented further exploration. It is intended to unwater this mine completely, in order that development may proceed in the underlying No. 4 mine.

Middlesboro Collieries, Ltd.

(50° 120° S.W.) E. W. Hamber, President, Vancouver, B.C.; Miss E. McDonald, Secretary, Vancouver, B.C.; Robert Fairfoull, Superintendent, Merritt, B.C. This colliery, situated on a branch of the Kettle Valley Railway, about 1 mile from Merritt, closed on March 31st after being in operation for thirty-seven years and producing slightly over 2,000,000 tons of coal. At the time of abandonment and for the previous twelve months the rate of

output was approximately 3,280 tons per month, which represents slightly higher production than the 1943 rate of 1.06 tons of coal mined per employee daily. On closing, all material was withdrawn from the three small mines: No. 2 South, No. 2 South Extension, and No. 5 Prospect. The mine plant and machinery were sold to the B.C. Equipment Company, the surface rights were disposed of to local farmers, and the coal rights were given to a group of former employees.

Coldwater Colliery.

(50° 120° S.W.) A. D. Allan and Partners, Operators; A. D. Allan, Overman. Following the closing of the Middlesboro Colliery, A. D. Allan and partners, old employees of the Middlesboro Company, were given the coal rights of the old colliery. During the month of July these men began to mine coal from a former prospect adit in the No. 3 seam, situated about one-half mile east of the Middlesboro Colliery office and 450 feet west of the old Middlesboro No. 2 mine portal. A small amount of work was done at this prospect by the Middlesboro Collieries, Limited, during the last few months of 1941, when a connection was driven through to the abandoned workings of the old No. 3 mine. The present operators intended to take out some coal remaining to the rise of the old workings, but the coal was found to be discoloured and not suitable for sale. Prospecting in this area resulted in the discovery of a new, hitherto unworked, seam of coal situated approximately 500 feet west of the No. 3 mine portal; this was named the No. 4 mine. A level was driven on the new seam for a distance of 80 feet from the surface but the coal continued to be discoloured; the seam was 2 feet 6 inches in thickness, including a 2-inch rock-band near the centre. It was also intended to take out a row of pillars said to remain to the rise of the old No. 2 mine Main level. For this purpose, a new opening was driven in 40 feet from the surface. The original No. 2 mine was abandoned in July, 1915.

Ventilation at this property by natural means was found to be sufficient. Where the old workings had been penetrated a good flow of air was encountered. An analysis of the return air from the abandoned workings of the old No. 2 and No. 3 mines showed 0.02 per cent. methane and 0.89 per cent. black-damp. Four men were employed and the tonnage of coal produced for the 133 days of operation was 352 tons.

Hat Creek Coal Mine.

(50° 121° S.W.) Owned by the Western City Company, Limited, Vancouver. The mine is situated at Upper Hat Creek, 30 miles from Ashcroft and 15 miles from Pavilion, a station on the Pacific Great Eastern Railway. The property is at an elevation of 2,700 feet above sea-level and has been developed by a Main level driven 280 feet in a westerly direction into a hill and crosscutting the almost vertical measures, which at this point consist of numerous lignite seams interlayered with clay and shale bands of varying thicknesses. Development during 1944 consisted of continuing the drivage in the first left side level to a point approximately 400 feet from the Main level. The Main level was also advanced about 50 feet for the purpose of further prospecting the cross-measures but no new workable seams were encountered. Ventilation was by natural means and was sufficient for the crew of three men. An analysis of the return air made in December showed 0.05 per cent. methane and 1.29 per cent. black-damp. Output for 1944 amounted to 584 tons.

The mine was operated during the earlier part of the year by M. McGeer and was later optioned to the St. Eugene Mining Corporation, Limited, which intends to investigate the possibility of developing the property into a large-scale stripping operation. While underground work continued on a limited scale, chiefly to supply fuel for local requirements, some surface-stripping was also done. When a sufficient area has been stripped it is intended to discontinue underground work. Mr. McGeer was the corporation's resident representative at the mine and William H. C. Brown, a miner, was granted a permit under the "War-time Coal-mine Employment Act" to act in the capacity of fireboss.

NORTHERN INSPECTION DISTRICT.

VICINITY OF QUESNEL.

BY

JAMES A. MITCHELL.

Donnelly Prospect. (53° 122° S.W.) J. Donnelly, Owner and Operator. Work during 1944 consisted of making 3 miles of road to the coal on the west bank of the Fraser River and about ¾ mile of road to the coal on the east bank of the river. The gravel cover was stripped off parts of the outcrops on both sides of the river. Some coal was mined from the surface on the east bank of the Fraser and was stored at Quesnel.

Coldspring Coal Mine. (53° 122° S.E.) *Cariboo Central Placers, Ltd.*—C. F. Mackenzie, Operator. This company has acquired the property previously known as the Coldspring Coal Mines, near Cottonwood. According to the management, it is intended to work the property as a stripping operation by the use of a Diesel caterpillar bulldozer with the possibility of later starting underground mining, but nothing had been done by the end of 1944.

TELKWA AREA.

BY

CHARLES GRAHAM.

Two properties are being operated in the district—namely, the Bulkley Valley Collieries, Limited, on Goat Creek, and the Telkoal Company, Limited, on Telkwa River.

Production during 1944 showed a very considerable increase over 1943, because of increased development in the mines and the continued heavy demand by Canadian and United States armed services. Production during 1944 was 33,308 tons, an increase of 19,356 tons over 1943.

Bulkley Valley Collieries, Ltd.—F. M. Dockrill, President; A. H. Dockrill, Overman; Wm. Dinsdale and Asa Robinson, Firebosses.

No. 1 Mine.—(54° 127° N.E.) Pillar-extraction was completed and the mine was abandoned in June.

No. 2 Mine.—(54° 127° N.E.) This mine was opened on an outcrop on the west bank of Goat Creek, about 268 feet vertically above river elevation and 1,100 feet east and 160 feet north of the south-west corner of Lot 401.

Two entries were driven in from the surface. The main entry struck a roll in the floor at about 85 feet and was stopped. No. 2 entry, which just missed the roll, was continued on down the dip as the main slope. A crosscut driven through the roll from No. 1 entry was continued as No. 1 South entry.

Only the main and counter slopes and the two south entries have been worked so far. All coal produced to date has been from development places.

The main slopes are now down more than 350 feet and preparations are being made to turn off another pair of entries parallel to No. 1 south. A small air-hoist was installed to hoist coal from the Main slope.

Coal is cut by puncher machine and loaded by hand. A Diesel-driven air-compressor, having a capacity of 350 cubic feet a minute, provides the power for cutting and hoisting. The steam plant from the old mine could not be used because of lack of water. A small fan, having a capacity of 5,000 cubic feet a minute, has been installed.

No gas was found in the mine during 1944 and general conditions were satisfactory.

Telkoal Co., Ltd.—A. M. Richmond, President and Managing Director; T. O. Davies, Mine Manager; J. M. Wilson and John Wiley, Firebosses.

Betty Mine.—(54° 127° N.E.) All the operations to date have been in the Betty seam which outcrops on the north bank of Telkwa River. The Main slope was driven down in the direction north 33 degrees east in good coal to just below No. 6 Left level, where a downthrow fault was met. The displacement was about equal to the height of the seam. The slope was driven through the fault. The pitch then changed and it appears that the axis of a syncline was reached.

No. 5 and No. 6 Left levels also swung around until they were parallel with the slope direction. These levels and No. 7 Left struck a well-defined fault, which appears to be an upthrow. All places driven from the bottom of the slope also struck faulting.

In No. 5 level several rooms, driven to the rise, have crossed a series of sharp rolls, rather than a fault, running parallel with the level. The rooms have been connected by crosscuts above the series of rolls.

To the right of the slope a barrier line was laid down parallel to the river, which limited the operations to the right of the slope. In driving No. 4 right to the barrier several small faults were met.

A place was turned off to the right, below No. 7 level, on what appeared to be the pitch of the seam. The place was driven through a small fault and was continued until it struck another. Nothing further has been done in this direction.

The mine is ventilated by a fan which has a diameter of 5 feet and a capacity of about 11,000 cubic feet a minute. At last inspection 9,450 cubic feet was passing through. The mine is worked by two shifts with about fifteen men employed underground on the morning shift. Twenty-seven men are employed underground and eighteen on the surface.

Small quantities of gas were noted on several occasions, usually in pot-holes in the roof. General conditions were satisfactory.

Peace River Area.

There are four small mines now being operated in the area—namely, Hasler Creek mine, on Hasler Creek; King Gething mine, on the east slope of Portage Mountain; Peace River Coal Mines, Limited, on the west slope of Portage Mountain, near the head of the Peace River Canyon; and Packwood mine, on the southern end of a spur of Butler Ridge.

The main problem common to all of these mines is transportation. The Hasler Creek mine is 94 miles by road from Dawson Creek. The King Gething, Peace River, and Packwood mines near Hudson Hope are 72, 80, and 83 miles respectively from Fort St. John. All coal has to be hauled to Dawson Creek or Fort St. John by truck.

The market at present for the Hudson Hope mines is provided mainly by the Canadian and United States army airports at Fort St. John and Fort Nelson. From the Hasler Creek mine, the Northern Alberta Railways take 30 tons per day. Some coal is also furnished from this mine to the camps at Dawson Creek. The local market at Fort St. John and Dawson Creek does not exceed 3,500 tons per year.

Hasler Creek Coal Co., Ltd. (55° 121° N.W.) J. Gordon Wilson, Managing Director; David Millar, Manager (under permit); James Carson, Fireboss (under permit). The property is located on Hasler Creek, about 8 miles south of its junction with Pine River and 94 miles west of Dawson Creek.

The mine was idle from early in March until December 27th. During this time a bridge was under construction across Pine River opposite Hasler Creek and some road improvement up Hasler Creek to the mine was being done. The winter crossing of the river at East Pine is on the ice. A ferry is in use during the summer.

The main and counter entries and the crosscut between are the only places being worked. The seam is about 8 feet 3 inches in thickness and pitches about 78 degrees. The main entry is now in about 280 feet and four crosscuts are through to the counter-

level. Two of these crosscuts were continued above the counter but ran into gravel about 30 feet above the counter. A flat section above the counter-level extends for about 500 feet before the ground starts to rise again. Only these three places will be available for production until the entries get under the rise of the hill sufficiently far to permit the working of a panel above the counter. It is estimated that there is about 700 feet of ground above the entries at about 2,000 feet in from the portal.

The property has no power plant except a small charging plant for the electric lamps.

The tipple has stationary bar-screens, 4 inches apart, and a stationary screen with 2-inch square perforations.

The coal is shipped to Dawson Creek, most of the output being taken by the Northern Alberta Railways. Tests conducted by the railway appear to have been satisfactory.

Gething Mine. (55° 122° N.E.) King Gething, Operator. T. Kaslowitz, Fireboss (under permit). The mine is located on the east slope of Portage Mountain, about 12 miles by road from Hudson Hope and 72 miles from Fort St. John.

The main entry had been permitted to stand idle for some considerable time. The rooms which had been turned off up the pitch all had run into surface gravel. It would appear that the creek had run along the face of the bluff at one time and had eroded a portion of the seam. The entry is being driven farther and is now in about 460 feet. When it has been driven far enough there should be ample room lengths as the coal-seam can be traced up the face of the bluff.

A peculiar feature of the seam is the occasional intrusion of an ironstone band into its upper part. The ironstone band does not replace any coal. Where the band, which varies in thickness to as much as 18 inches, is present, the coal does not change in thickness; the height of the seam is merely increased by the thickness of the ironstone band.

The face of the entry appears to be almost under the bluff. In the face of the entry the ironstone band is absent, the seam measures 4 feet 5 inches and its pitch has increased to 31 degrees.

The main entry and a crosscut near the face of the entry are being worked single shift. Five men are employed underground and two on the surface.

The mine was free from gas and in safe working condition generally.

Peace River Coal Mines, Ltd. *Canyon Mine.*—(55° 122° N.E.) Lloyd Gething, Managing Director; George Crawford, Overman (under permit); J. Haworth, Fireboss (under permit). The property is on the west slope of Portage Mountain, near Larry Creek. It has been leased from the Aylard Estate by the present operating company.

The slope is down about 140 feet and pitches at about 7 degrees. It runs almost parallel with the canyon-walls. Two places have been turned off the main slope to the right. One of these is through on the old prospect and a fan has been installed there. The second place will be driven through to the canyon and will give drainage for surface water. Two places have been turned off to the left. A new slope is to be started at about 120 feet from the present slope, which will be driven back up to the surface. The present slope location is not suitable for tipple facilities.

A section of the seam at the face of the slope is as follows: Roof, shale; shale-band, 3 inches, which parts readily from the main roof; coal, 2 feet 1 inch; clay ironstone band, 4½ inches; coal, 2 feet 3 inches; clay ironstone band, 6 inches; coal, 2 feet; floor, shale.

A 26-horse-power hoist, having a drum 6 inches in diameter and 30 inches in width, driven by a Buda gas-engine and using a ½-inch cable, is used to hoist from the slope

to the tipple. Only one car is hoisted at a time, because that is all that can be handled on the present tipple.

Ten men are employed underground. The mine was free from gas and generally in safe working condition.

Packwood Mine. (56° 122° S.E.) George Packwood, Operator; J. Reschke, Fireboss (under permit). This property is on a southern spur of Butler Ridge, about 83 miles from Fort St. John.

Difficulties have been encountered which may result in the abandonment of the present location.

No. 1 entry which is in 360 feet struck a fault and nothing further was done. No. 2 entry also struck what is probably the same fault which strikes across the face of the entry at about north 50 degrees east, the bearing of the entry being about north.

The entry was driven through this fault as the displacement was quite small and it encountered coal which was normal in thickness and quality. A room was turned up the pitch (54 degrees), but when it got up about 70 feet it ran into badly crushed coal and a soft cap-rock, from 6 to 8 inches in thickness, came in on top of the seam. The room was driven up 90 feet and was stopped as there was no improvement. Another room was turned off and went up about 30 feet where similar conditions were found. The entry also ran into the badly crushed coal and the soft cap-rock. The cap-rock came down with the coal in mining and broke up so finely that it could not be sorted out by hand. The coal in the face of the entry is normal in thickness, direction, and pitch, but it is so badly crushed and soft and so intermixed with the soft cap-rock in mining that probably only about 10 per cent. of it is marketable. At the face of the entry there are two small rolls in the roof of from 6 to 8 inches displacement which run parallel with the entry. The entry was driven a short distance farther and then abandoned.

The remaining coal is being removed and it is planned to open up a new section farther up the mountain where there appears to be some regular ground.

EAST KOOTENAY INSPECTION DISTRICT.

BY

H. E. MIARD.

In the Crow's Nest section of the district an appreciable increase in the production of coal was recorded in 1944, the total gross output having been exceeded only in 1910, 1912, and 1913, when four collieries were in constant operation. Scarcity of labour, aggravated by absenteeism, and other hindrances are only partly offset by more extensive use of machinery. Mine workings must expand constantly, causing ventilation and transportation problems to assume greater importance, while different geological conditions are met in new parts of the field.

Of the 1,102,919 long tons mined in the district, a total of 62,831 is to be deducted because of losses in washing and transportation, which will be considered in detail in the part of this report dealing with individual operations. The remaining 1,040,088 tons represent coal sold, used at the collieries for various purposes, including the manufacture of coke, and added to stock.

At the Michel colliery twenty Curran-Knowles by-products ovens (Plate VIII.) and 147 bee-hive ovens were in service throughout 1944. The total quantity of coal processed was 113,052 long tons, yielding 75,317 long tons of coke, or a yield of 66.6 per cent. Owing to the diminishing demand for coke, the Curran-Knowles ovens were operated at reduced capacity, and consequently at less than maximum efficiency, during that period. For the same reason, the number of bee-hive ovens fired has now been reduced to sixty-nine. The superiority of the retort type of oven is strikingly illustrated by the respec-

tive performances of the two plants, even though operations were not at maximum efficiency. The 56,342 long tons of coal treated in the bee-hive ovens yielded 33,003 tons of coke, while the 56,710 tons processed in the Curran-Knowles ovens yielded 42,314 tons. If operated at full capacity, on the mixture of "A" and "B" seams coal now used, the ultimate results would be about 1,680 lb. of coke, 9,500 cubic feet of gas, and 8.4 to 8.9 gallons of tar per long ton of raw coal processed.

The accident record for 1944 is not encouraging. There were two fatal occurrences, one of which took place on the surface and the other underground, both being incident to haulage operations. The investigations of 546 among the 573 accidents with ensuing loss of time, reported to this office, could be carried far enough to permit their accurate tabulation, but the remaining twenty-seven occurrences were not followed until the end of the resulting disability. Of the men involved in these twenty-seven accidents, nineteen left the district before they had been pronounced able to resume their ordinary employment, and the other eight had been employed in railway, sawmill, or timber-cutting operations. In addition, twenty men were still not working at the end of 1944 because of injuries sustained some time previously. In such cases the loss of time registered in the present statistics is only a part of that which will eventually have to be recorded.

All accidents are classified as "minor," "slight," "serious," or "major," according to the duration of the disability, all those in which this exceeds ninety days being ranked as "major." On this basis the 546 accidents tabulated included 75 minor, 320 slight, 122 serious, and 29 major. A total of 470 accidents took place underground and 76 on the surface (this including 13 serious and 5 major occurrences). The 35 mishaps reported from the Corbin operations of the Consolidated Mining and Smelting Company of Canada, Limited, are all classed as "surface," although the two most serious among them actually resulted from falls of coal in an open pit. Of the remainder, 187 were reported from the Elk River colliery and 351 from Michel, giving ratios of 0.614 and 0.539 per 1,000 tons mined respectively.

Miners, constituting nearly 59 per cent. of the underground working force, met with only a little more than 55 per cent. of the accidents, with a loss of time of 7,597 calendar days or 57 per cent. of the total. As immediate causes of these mishaps falls of coal and rock hold first place, having caused 159 separate occurrences, resulting in an aggregate loss of time of 5,250 days. Accidents caused by slipping and falling are mentioned in 111 instances and involve a loss of time of 3,239 days. The commonest injuries, bruises and contusions, are mentioned in 184 cases, with a loss of time amounting to 4,623 days or 29 per cent. of the whole.

The total of 15,879 days lost because of accident is equivalent to the time of 43 men for a full calendar year and of one man for half a year, or the loss of the full time of 40 men for each 1,000 employed. It is scarcely necessary to say that accidents causing such loss of time, particularly under present circumstances, are a most damaging waste of man-power.

Crow's Nest Pass Coal Co., Ltd. President, H. P. Wilson, Fernie, B.C.; Vice-President, Thos. Balmer, 305 G.N. Building, Seattle, Wash., U.S.A.; Secretary, Thos. G. Ewart, Fernie, B.C.; Treasurer, A. L. McPhee, Fernie, B.C.; General Manager, Thos. H. Wilson, Fernie, B.C.; General Superintendent, Wm. C. Whittaker, Fernie, B.C.; Chief Engineer, H. A. White, Fernie, B.C.; Mining Engineer, B. L. Montgomery, Fernie, B.C. Capital, $6,212,666.66. Value of plants, $8,138,981. This company operates the Elk River and Michel collieries.

Elk River Colliery.—(49° 114° S.W.) Manager, James Littler. The No. 1 East, No. 4, and No. 9 mines were operated throughout 1944. Some prospecting carried on in the summer located the outcrops of Nos. 3, 9, and 10 seams at various points on the

hillside. The outcrop of No. 3 appears promising and more work is to be done on it as soon as the weather becomes favourable.

No. 1 East Mine.—Overman, Carmichael McNay. This operation, the only part of the old Coal Creek colliery still active, continues to supply nearly half of the output of the colliery. As explained in the Annual Report for 1943, the inner, or South, section of the mine had to be abandoned in the early part of that year and after consideration of all the factors it was decided to re-enter an area nearer the portal, which had been untouched since 1916. This choice was based upon the expectation that stresses would have been relieved by the underlying workings of old No. 2 mine, in which a high percentage of the coal had been extracted prior to 1908. The lapse of thirty-five years was thought sufficient to permit the establishment of new equilibria, even though it might not have permitted definite fracturing of the overlying conglomerate beds. The original intention of transferring the site of operations to the No. 14 East district was rejected, after some preliminary work had been done. Instead, it was thought advisable to release the stresses thoroughly by completely extracting the part of the seam extending from this section to the surface, before making any attempt to resume work in territory which had not been influenced by a large expanse of underlying worked-out ground.

That the mountain is not yet entirely quiescent is proved by occasional earth tremors, but only two of those experienced in 1944 could be called "bumps." On May 11th one shock damaged both the main entry and the travelling-way over a distance of some 150 feet, between Nos. 12 and 14 East entries, and displaced some timber in a roadway then advancing towards the area affected. This shock was felt at the office of the colliery, fully a mile away, but not felt by men working 500 feet from the point at which damage was done. On December 7th another slight shock, entirely local, displaced some timber and threw some coal off a rib in an abandoned roadway of the No. 8 East district. No one was injured in either instance.

The rate at which roadways are advanced, when passing near or over large pillars in old No. 2 mine, has to be carefully regulated to provide ample opportunity for the gradual release of retained stresses.

No explosives are used underground. All coal is mined with the help of pneumatic picks, of which seventy-two are in service. It is hauled by horses, on the West side, or by a compressed-air hoist in the East section, to the main entry on which it is brought out of the mine to the foot of the surface incline by an endless rope. From there it is taken to the main preparation plant, 4,400 feet away, by a steam-locomotive.

Very little methane is given off but a large quantity of coal-dust is liberated. Both characteristics probably result from the expansion of the seam following release of pressure caused by the settlement of the intervening strata above the underlying old workings of No. 2 mine.

The ventilation is good. The total volume of air passed by the fan amounts to 87,000 cubic feet a minute, of which 58,000 are supplied to the active sections of the mine for a total working force of seventy-six men and fourteen horses, while 21,000 cubic feet a minute are circulating through the abandoned workings on the East side. The highest percentage of methane found in the mine-air, at the foot of the fan-shaft, was 0.37 and the lowest 0.21. The return air from the abandoned area carried as much as 1.19 per cent. of the gas in the early part of 1944, but this was lowered to 0.75 per cent. when the same current was joined by that passing through a small section of the East side workings, constituting a separate split, this meaning the addition of about 10,000 cubic feet a minute to the original volume.

No. 4 Mine.—Overman, John Caufield; Assistant Overman, D. Chester. In the latter half of 1944 operations were limited to the driving of four main roadways, which have now reached a distance of 2,600 feet from the portal. This will permit the devel-

opment of two panels, on the room-and-pillar system. Complete extraction is precluded by the risk of a disturbance of the measures extending to the surface below the No. 9 mine entrance. The coal is of good quality, but the erratic distribution of the ash and the occasional appearance of thin rock bands complicate the preparation of the output for the market. The lower roof is generally weak, particularly in the outer section of the mine.

The Crow's Nest field is a shallow syncline with sharply inclined limbs on the east and west sides of the trough. Although at the Elk River and at Michel the amount of folding and faulting does not approach the amount found in the Corbin area, small strike-faults have been encountered in both No. 4 and No. 9 mines. In addition, a series of undulations and some faulting, more or less parallel to the general dip of the measures, have been found. As can be expected, these disturbances have hampered the development of the two new mines to an appreciable extent.

The mine is ventilated by a 5-foot double-inlet Sirocco fan with steel housing, which passes 40,000 cubic feet of air a minute when exhausting. In the winter season, in order to prevent the formation of ice in the main entry, this fan is operated as a blower, with the sacrifice of some of its efficiency, and in December it was supplying 28,000 cubic feet of air a minute for the use of fourteen men and two horses. Beyond a fault intersected about 2,000 feet from the portal the coal began to give off methane in appreciable quantity.

The coal is mined either with pneumatic picks or with radial coal-cutting machines and is blasted afterwards, if necessary. It is brought to the main entry from the three places driven on the upper side of this roadway by trough-conveyers, and is then hauled to the surface by horses. This mode of transportation has now become inadequate and compressed-air locomotive haulage will have to be introduced before more extensive operation can be undertaken.

No. 9 Mine.—Overman, John Caufield; Assistant Overman, Daniel Chester. This will eventually become the most important section of the colliery and development has been planned to handle a large output. At the end of 1944 the main entries had reached 1,500 feet from the surface and preparations were being made to start two cross-measures inclines to give permanent connections between these workings and the overlying undeveloped area of No. 10 seam.

Only a few months will elapse before the Slope section, a small area of the seam between the present workings and those of the Coal Creek No. 2 mine, will have to be abandoned. There the thickness of solid measures separating No. 9 and 10 seams is not enough to allow complete extraction without the risk of causing fractures which might reach some of the No. 1 South abandoned workings.

The coal, of excellent quality, is mined entirely by machinery and is blasted where necessary. It is carried from the faces by conveyers delivering to a system of transporting belts on which it completes its journey to the surface. Preparations for the driving of a roadway, on a gradient low enough to permit haulage by compressed-air locomotives, have now been completed. At present, thirty-six pneumatic picks, twelve radial coal-cutters, and two short-wall coal-cutting machines are used at the faces, and two Goodman duckbill loaders, thirteen shaker-conveyers, and two scraper-conveyers, with one 36-inch and five 30-inch transporting belts, carry the output to the surface. The coal from the slope workings is brought to the retarding conveyer by a short transfer belt.

At Elk River and Michel problems have to be solved before the extensive programme of mechanization can be carried out fully. Uncertain behaviour of roofs, small but comparatively numerous dislocations of the strata, variable and occasionally steep gradients are factors which alter conditions from those under which the best results

have been obtained from the same machinery in other fields. A great deal of experimental work is being done, and more will be required to determine how the new equipment can be used most advantageously.

The coal is giving off very little methane and, until now, the gas has never been detected anywhere underground in proportions sufficient to cause a clearly discernible cap on the flame of a Wolf safety-lamp. The mine is ventilated by an 8- by 3½-foot Jeffrey fan, with steel casing and concrete housing and duct, driven at a speed of 150 revolutions a minute by a 100-horse-power A.C. motor. It passes 77,000 cubic feet of air a minute when operated as a blower, a procedure necessary in the winter months to avoid the formation of ice in the Slope workings. As some parts of the upper section are normally somewhat damp also, this difficulty is not entirely avoided, but is rendered less troublesome than it would be were the current travelling in the opposite direction. Sixty-eight men are employed underground on the morning shift.

The plant has been described in detail in the Annual Report for 1943 and no additions of importance have been made to it in 1944. Late in the fall a well was sunk to provide a constant and reliable supply of potable water, because surface streams had ceased to provide it regularly. The construction of a laboratory building was begun, but this work was interrupted by the arrival of winter. The two air-compressors formerly at Coal Creek (an I.R. high pressure and a 3,000 cubic feet Bellis and Morcom) were brought to the Elk River but have not yet been put in operation.

The gross output for 1944 amounted to 304,421 long tons and the loss incurred in cleaning it was 22,410 tons or 7.27 per cent. of the total. The explosives used included 36,500 lb. of Monobel and 140 lb. of CXL-ite, in 45,000 shots with no misfires reported. In the same period, 480,000 lb. of pulverized limestone were applied to underground roadways in order to neutralize the coal-dust.

Michel Colliery. (49° 114° N.W.) Manager, William Chapman. This is still the largest producer in the Crow's Nest field, the gross output for 1944 having been 650,594 long tons or nearly 59 per cent. of the total tonnage extracted in the district. The loss in cleaning is comparatively small, amounting to only 5.82 per cent. However, the production remained below that of 1943 by 38,927 tons, or 5.67 per cent., because of natural difficulties similar to those encountered at the Elk River colliery and to the insufficiency of the labour supply. In fact, parts of two sections of the workings on "A" seam had to be temporarily abandoned, so that the men employed there would be available for work in other districts.

No addition of any importance was made to the surface installations in 1944. The operation of the coking plant has already been discussed.

"A" Seam.—Overmen, Walter McKay and William Gregory. The workings of this seam are in three sections, East, West, and South, each constituting a separate split as far as the ventilation is concerned. The general method of working is long-wall retreating, with abandonment of narrow strips of the seam, at distances of about 80 feet, known as "sacrifice" pillars, the purpose being to afford a certain measure of control over the initial settlement of the roof. This is the practice followed in all parts of the colliery in which an approach to complete extraction can be attempted. Up to the present, two panels have been worked out in the East and West sides of the mine, but the active part of the latter and the South section were still in the development stage at the end of 1944. Only in a few of the main roadways is the coal loaded directly into cars at the working-face. Conveyers are used in advancing practically all the narrow workings, and in the more important districts conveyer-belts bring the coal to central loading-points. Compressed-air locomotives are in service on all the main haulage-roads.

The present East side workings are on the south-west flank of a small anticline, the axis of which forms an angle of approximately 15 degrees with the strike of the seam.

This results in a gradual narrowing of the territory available for development to the rise of the main entries. In both "A" and "B" seams the coal has been driven out of the apex and into the limbs of the anticline, this being accompanied by dislocations of the overlying strata. This disturbed zone not only restricts the workable area but also hinders plans for improving the ventilation in the East side workings of both seams. An integral part of all plans was the driving of roadways to the surface in order to provide new intakes.

The great extent of the workings, the weak nature of the roof, and the rapid destruction of timber by micro-organisms make maintenance of airways difficult, with the result that the adequate ventilation of the workings presents problems demanding constant attention. Methane is given off in appreciable volume in mining and it may accumulate in small quantity at any point that is not swept effectively by an air-current. However, little difficulty is experienced in this respect, although the method of working involves the use of long lines of bratticing in the single places forming the preparatory work for final extraction by the long-wall method.

In December an interesting although not entirely unknown phenomenon was observed in this section. A roadway driven to the outcrop reached the surface gravel in which an extinctive mixture of gases and an extraordinarily high temperature were met. Similar conditions had been encountered in two other instances previously and, so far, can be explained only by the assumption that a chemical reaction of some kind is occurring in place. In all three cases conditions were similar. A short distance from the outcrop of the seam, usually about 300 feet, the coal begins to give off hydrogen sulphide in perceptible quantities. As the outcrop is approached, the temperature increases. Coal dug out in the immediate vicinity of the gravel feels warm but cools down rapidly; the temperature met at first was 113 degrees Fahrenheit. A mixture of gases containing a high percentage of nitrogen and a considerable proportion of carbon dioxide issues from the gravel for several days, but the volume emitted decreases gradually and finally ceases. There is no evidence of weathering of the outcrop; the seam is cut off almost vertically and the impure and partly decomposed material known as "blossom" is lacking entirely. The surface covering is glacial drift.

Some old workings in No. 3 seam, 300 feet lower in the measures, were abandoned and sealed off some years ago because of a fire. The fire, however, is not known to have extended within 1,150 feet of the point under consideration, and the nearest workings of that abandoned area are 600 feet away. Therefore, it seems unlikely that heat and gases from that fire travelled under the mantle of gravel and soil covering the hillside.

Samples of the coal and of the mixture of gases found in the gravel were sent to the fuel laboratories of the Mines Branch of the Department of Mines and Resources for examination and analysis. The coal showed very little physical or chemical alteration, but it was oxidized to a certain extent, its heating value and coking properties were impaired very little. The composition of the mixture of gases varied slightly between the roof and the centre of the face and, contrary to expectation, the mixture was a trifle lighter than air (0.997). The proportions of oxygen were 15.92 and 14.13 per cent. respectively. This shows absorption of 5 cubic feet per 100 in the first case, and of 6.53 cubic feet in the second, and the percentage of this reappearing in the form of carbon dioxide is 58.2. In a test made at the Fernie office, a sample of the coal which had been lying in the place nearly four weeks, in pieces of about walnut size, absorbed more than its own volume of oxygen in a period of thirteen days.

In this part of the colliery "A" and "B" seams are separated by little more than 50 feet of solid measures and, consequently, any large blocks of coal abandoned in the goaves of the latter exert a detrimental effect upon underlying portions of "A" seam. Careful co-ordination of development and extraction is therefore essential to successful

operation. A rock tunnel connecting the East sections of both seams has been started to simplify the main haulage.

Experiments have been conducted, under the direction of an expert from the manufacturers, to investigate the feasibility of using Goodman duckbill loaders in pillar-extraction. It appears that satisfactory results can be obtained from machinery of this kind, if properly handled, in at least some parts of the field.

At the time of the last inspection 24,500 cubic feet of air a minute was supplied to this section for the use of sixty-four men and six horses. The return air-current carried 0.52 per cent. of methane.

The West section covers a large territory, part of which has already been worked out. In an important area now entering the final stage of development, however, regular extraction will soon be resumed. Further extension of the workings in another direction is in progress and new airways are being driven towards the South section. In the district now fully open, all coal is carried away from the faces by trough-conveyers and is delivered to a system of transporting belts taking it to a central loading-point from which it is taken in cars to the main haulage-road by a compressed-air hoist, over an incline with a moderate gradient.

The ventilation is good. In December, 26,500 cubic feet of air a minute was supplied to these workings for the use of forty-two men and four horses. The return air from both this and the South section, a total volume of 38,000 cubic feet a minute, carried 1.09 per cent. of methane.

The South section is on the west, or Sparwood, side of the Michel syncline, where steeper gradients are found than in the other workings of "A" seam. In the latter half of 1944 it was found advisable to abandon the greater part of the area already opened, owing to lack of men to prepare it for extraction. For the same reason operations were also suspended, at the same time, in the slope district of the West section.

The general method of development followed until now has been to drive main entries at an angle of about 30 degrees with the strike of the measures, off which level or moderately inclined roadways were started at intervals of 350 feet, measured on the full dip of the seam. Raises were then driven, from one of these to the other, the coal being handled in chutes from which it was drawn into cars and hauled away. In this area, the seam reaches a thickness of 20 feet or more and the lower bench is of very good quality. These conditions led to a method of working intended to permit the recovery of a fairly high percentage of the coal available. In this method a network of narrow roadways is driven in the lower bench and the small pillars thus formed are subsequently removed, with the result that the upper portions of the seam cave. The fallen coal is removed and transported to a chute by a duckbill loader and a conveyer. At the end of 1944 fourteen men had made considerable progress with the preparatory work in a small area. No other work was then in progress in the section.

In this section difficulties are experienced in maintaining roadways in "A" seam and, as a result, some of the development-work done in former years has been lost. Difficulties are particularly great in the case of parts of the airways. These are not in the best of condition, but are still meeting the now much reduced requirements of the section. In December the volume of air entering this area amounted to 13,000 cubic feet a minute for the use of fourteen men and one horse.

The fan ventilating all the workings of "A" seam passes 72,000 cubic feet of air a minute, against a water-gauge of 1.9 inches. The methane content of the return air was 0.83 per cent.

"B" Seam.—Overman, Irving Morgan. This is still the largest producing operation at the colliery, its average daily output amounting to 1,285 tons. The seam is comparatively thin, its height varying between 4½ and 6 feet; this means rapid deple-

tion of a district once extraction by the long-wall method has begun. Therefore, development-work must be kept sufficiently far in advance so that new faces may always be awaiting the coal-cutting machine.

The mine extends over the same territory as the workings of "A" seam, and all that has already been said concerning the difficulties caused by folding and faulting in the latter is applicable to this operation also. The ventilation presents some problems more difficult than those to be solved in the case of the underlying seam, as the comparatively small thickness of the coal exerts a restricting influence over the cross-sectional area of the airways. These airways are of considerable length, the distance the air travels between the Sparwood ridge intake and the fan, for instance, being more than 12,000 feet.

The present workings are grouped in two sections, East and South, the intervening West section having been worked out and abandoned. The Slope districts are still in the development stage. In final extraction, the method followed is long-wall retreating with abandonment of sacrifice pillars in the parts of the seam extending to the rise of the main entries.

The underground topography of the East section led to a general arrangement of the workings which is not entirely free from deficiencies. The custom is to drive a pair of inclines in the centre of each panel, turn roadways off them at intervals of 300 feet to the right and left, advance these in turn about 750 feet, the length of a conveyer-belt, and connect them by single places, known locally as "splits," driven 100 feet apart. Total extraction begins at both ends of the uppermost line of rectangular blocks thus formed and proceeds towards the incline, successive series being attacked in descending order. The result is that, in every instance, the incline pillars are finally left standing between two large expanses of worked-out ground. Their recovery is always difficult, but it must be completed to avoid damage to the workings of "A" seam which, unavoidably, lag behind.

The coal is mined with radial coal-cutters in narrow work and with chain machines at the long-wall faces. It is carried by trough-conveyers to transporting belts installed in the rooms which deliver it to main belts on the inclines. These take it to the haulage-road where it is loaded into cars and taken to the surface. In this case, the rolling-stock used for the transportation of coal never leaves the main entry.

In the slopes, the coal gives off methane much more freely than it does on the rise side of the section, and it is mined with radial coal-cutting machines and pneumatic picks, without any blasting. The development of the area intended to be opened by No. 1 Slope had been almost completed at the end of 1944.

The section has an independent air intake, but it is now some distance behind the active workings and an effort is being made to drive another opening to the surface. The geological conditions mentioned previously are met here also and add to other difficulties. Differences in elevation between intake and fan, coupled with the broad oscillations of the surface temperature common in these parts, bring about some fluctuations of the effective mine pressure acting advantageously in summer and detrimentally in winter.

High inclinations are characteristic of the South section and cause practically all the difficulties encountered there, although faults, usually of comparatively small displacement but distributed erratically, occasionally require that plans be changed. Here, the main artery is an incline, following the boundary of the abandoned West section at a prudent distance, on the left side of which roadways are turned off at intervals so chosen as to provide long-wall faces of the usual length between them, on the full dip of the seam which may be as much as 40 degrees. These secondary openings cannot follow the varying strike of the seam, but must be driven straight to

permit the installation of conveyer-belts. Their gradients are usually such as to make it necessary to handle supplies by small compressed-air hoists.

The present active area is delimited by an incline reaching the surface on the Sparwood ridge, which is used as an intake for the section in the summer. It is intended to develop the territory extending southward from this roadway to permit the installation of a system of conveyer-belts, operating on the principle of the switch-back railway and ascending on gradients not exceeding 16 degrees, about the maximum inclination on which coal can be satisfactorily handled in this manner underground. This would probably be the best solution of the problem presented by the transportation of the output to the main entry. Raising and lowering mine-cars on inclines by means of compressed-air hoists imposes strict limits on the production, once a distance of a couple of thousand feet has been reached.

The bulk of the output is obtained at present from long-wall faces and raises following the full dip of the seam. The coal is mined with radial coal-cutters in narrow work and with chain machines in long-wall work. It is taken away in chutes or runs along the face to points at which it is discharged on to a system of conveyer-belts which carry it to the loading-stations. Trough-conveyers are used for the same purpose in some of the development-work, done on moderate gradients, and at the foot of long-wall faces, to bridge the interval between these and the crosscuts leading to the belt road.

In No. 3 incline district, which forms the subject of the foregoing comments, the volume of methane given off is rather slight. Inflammable mixtures are met occasionally in very small quantities and only in places in which excessive lengths of bratticing are carried. The coal behaves somewhat differently in the Slope district and the air-current has to be managed carefully there, to avoid possible accumulation of the gas in places driven to the rise.

In December, 9,000 cubic feet of air a minute was supplied to the Slope district for the use of twelve men; and 24,000 cubic feet was passing through the No. 3 Incline workings for forty-one men and one horse. The return air carried 0.64 per cent. of methane in the first case and less than 0.5 per cent. in the other.

The fan passes 93,500 cubic feet of air a minute, against a water-gauge of 2.9 inches, but much of this volume represents leakage through old workings on several seams intersected by the main return airway.

No. 3 Mine.—The West section of this mine, which for many years produced most of the colliery's output, was finally abandoned at the end of December and is to be sealed off shortly. In the South section, penetrated recently, all work has been suspended temporarily, because of the scarcity of labour. An increase in the volume of air circulating will be necessary before this part of the field can be developed on a large scale.

No. 3 East Mine.—The underground fire, which caused part of the colliery to be sealed off some years ago, remained quiescent. Analyses of samples of the mixture of gases filling this area showed that the residual oxygen had been reduced to little more than 1 per cent. Some of the stoppings have developed flaws and will have to be faced again to stop a slight leakage outwards.

There are now in service underground four long-wall, two short-wall, and one arc-wall coal-cutting machines; thirty-six radial coal-cutters; ninety-nine pneumatic picks, and ten mechanical drills for boring holes in coal. The loading and transporting machinery comprises two Goodman duckbill loaders, sixty trough-conveyers, and twenty-one conveyer-belts.

During 1944, 40,000 lb. of Monobel and 5,000 lb. of CXL-ite were used in 50,284 shots, of which only three are reported to have misfired. In the same period, 521,500 lb. of pulverized limestone was applied to the workings to neutralize the coal-dust.

Consolidated M. & S. Co. of Canada, Ltd.

President and Chairman, S. G. Blaylock, Trail, B.C.; Executive Vice-President, R. E. Stavert, Montreal, P.Q.; Vice-President and General Manager, R. W. Diamond, Trail, B.C.; Secretary, J. E. Riley, Montreal, P.Q.; Comptroller, H. B. Fuller, Trail, B.C.; Superintendent of Coal-mining Operations, R. R. McNaughton, Trail, B.C. Value of plant and equipment at Corbin, $81,224.51.

Corbin Colliery.—(49° 114° N.W.) Acting-Manager, W. R. Almond. The entire production was obtained from the open pit known as No. 3 mine, on the western flank of Coal Mountain. In 1943 operations were resumed after having been suspended for eight years. The nature of the deposit, the method of quarrying followed, and the manner in which the output is handled have been described in detail in the Annual Report for 1943. A considerable amount of work was done to improve the roads leading to the mine and to the Canadian Pacific Railway station at McGillivray. Construction-work completed in the summer included two steam-heated bunk-houses, each providing comfortable living-quarters for about forty men, a staff house, a cook-house, and a small detached building well equipped as an ambulance-room. Water of good quality, obtained from a spring on the hillside above the village, was led to these buildings. A 10,000-gallon storage-tank assures constant supply and eliminates the inconvenience resulting from the poor condition of some parts of the original water system.

Operations were suspended on September 23rd, having then fulfilled their purpose of assuring a reserve coal-supply for the company's plants at Trail and Kimberley, and the working force was dispersed. Although the crew varied in number, about 100 persons were constantly on the contractor's pay-roll, covering mining, transportation, and catering. In May the total number employed reached 131, including three diamond-drillers and fourteen men employed in stripping operations, a part of the work which was allotted separately to the Mannix Contracting Company of Calgary. The company's local staff, also included in the total, consisted of the acting-manager, two clerks, and an electrician.

The mechanical equipment used in mining and transportation consisted of two power-shovels, one bulldozer, one road-grader (of the type known as "motor patrol"), portable electric lighting plants (both at the mine and at McGillivray), and fifty-six trucks. In midsummer a water-tank mounted on one of the trucks was used to sprinkle the road leading to the mine to lay the dust which had then become exceedingly troublesome. While the stripping operations were in progress, the Mannix Contracting Company had one shovel, one bulldozer, and two carry-alls in service.

The coal, brought from the open pit to the preparation plant, was screened, divided into three sizes—namely, lump, stoker, and slack—and transported to McGillivray, where it was either loaded in railway-cars or added to the stock piles. The total output for 1944 amounted to 147,904 long tons, accounted for as follows: 122,345 tons shipped, 23,002 tons (mostly lump) added to stock, and 2,557 tons (1.73 per cent) lost in transportation. Exploration of the deposit and its preparation for mining included 1,229 feet of diamond-drilling and the removal of 150,000 cubic yards of surface material in the course of stripping operations.

INSPECTION OF METALLIFEROUS MINES.

BY

JAMES DICKSON.

PRODUCTION.

The output of metalliferous mines for 1944 was 4,869,759 tons. This tonnage was produced from fifty-three mines of which thirty-three produced 100 tons or more.

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

There were four fatal accidents in and around metalliferous mines and concentrators in 1944, being a decrease of nine from 1943. There were no fatalities in the quarries in 1944. There were 3,721 persons under and above ground in the metalliferous mines and 849 persons in the concentrators in 1944. The ratio of fatal accidents per 1,000 persons employed was 0.87 compared with 2.60 in 1943.

The tonnage mined per fatal accident during 1944 was 1,217,439 tons compared with 417,658 tons in 1943. The tonnage mined per fatal accident during the last ten-year period was 485,574 tons.

The following table shows the mines at which fatal accidents occurred during 1944, and the comparative figures for 1943:—

Mining Division.	Mine.	No. of Fatal Accidents.	
		1944.	1943.
Vancouver	Britannia	....	3
Lillooet	Bralorne	2	....
Cariboo	Island Mountain	....	1
Osoyoos	Nickel Plate Mine	....	1
Fort Steele	Sullivan	....	3
Fort Steele	Sullivan (concentrator)	1	....
Omineca	Pinchi Lake	....	3
Portland Canal	Silbak Premier	1	2
Totals		4	13

Of the four fatalities which occurred in and around the metalliferous mines, three were underground and one at the boiler plant at a concentrator.

The fatal accident to George Corbett, motorman, Bralorne mine, occurred on January 6th while he was bringing two timber cars out on the 1,000-foot level with his motor. His head was caught between the lip of a chute and the top of the motor battery.

It is believed that he had looked back at the trucks, not realizing that he was close to a chute.

On January 16th Ignace Wekel, fireman's helper, employed at the Sullivan concentrator was fatally burned when removing ashes in the ash-pit at a battery of four boilers. The ashes are washed out of a tunnel by water and the fireman's helper usually completes this operation by going into the tunnel and clearing away any remaining ashes. Apparently some of the hot ashes had bridged over the water and collapsed as he approached, causing a cloud of steam from which he received severe burns.

On January 15th a fatal accident occurred to George Casper, nipper, at the Premier mine. He was assisting two timbermen to put a heavy timber on a truck near the top of a vertical ore raise. The timber slipped and Casper involuntarily stepping backward fell down the raise. The guard-rail had been removed to dump ore and had not been replaced.

On August 30th a fatal accident occurred to Stuart Hawley, stope cleaner, at Bralorne mine. Hawley was cleaning off the sill bulkheads between two chutes when a slab of rock fell from the hanging-wall, pinning him against the foot-wall. The rock fell from between two stulls.

DANGEROUS OCCURRENCES.

On January 2nd the power-house of the Base Metals Corporation, near Field, was completely destroyed by fire and substantial damage done to machinery and electrical equipment. It is believed a spark from the exhaust started the fire. No persons were injured.

On February 8th, at the Twin "J" mine, Mount Sicker, Vancouver Island, a miner fired two shots without having all approaches to the place properly guarded. One person suffered from shock due to concussion of the blast.

On March 19th, at Copper Mountain Mine, the hoistman while cleaning the No. 2 hoist, observed a crack 20 inches long in the end face of one of the drums. Hoisting of men was prohibited until necessary repairs were made. Hoisting was resumed on April 13th.

On April 17th the mill, office, warehouse, and lower tram terminal at the Noble Five mine were destroyed by fire. It is presumed fire started either from overheated bearing on generator set, or from faulty flue-pipe from heating stove in compressor-room. No persons were injured.

On August 28th, at No. 8 shaft, Britannia mine, before the commencement of the morning shift the South side cage fell to the bottom of the shaft, due to failure of the air-brake. The cam operating the poppet valves was under repair, but brake was set. When air was turned on at the beginning of the shift, due to air being out of top side of piston and poppet valves not operating, the brakes lifted and could not be set. The cage and cable fell to the bottom of the shaft. No persons were injured.

On September 22nd, at the Sullivan mine, a wooden bulkhead in a crosscut broke away, allowing the backfill material to run along two drifts for a distance of 800 feet. No persons were injured. In future these bulkheads will be made of concrete.

On October 1st, at 3901 shaft, Sullivan mine, the hoistman was lowering the empty skip, prior to lowering men and supplies, when the rear axle of the skip broke, causing some damage to guide timbers. No persons were injured.

On November 7th, at the Hedley Mascot mine, a rock-slide occurred in Climax Canyon, carrying out approximately 500 feet of the new No. 4 surface tramway. The slide occurred during the night and no persons were injured.

EXPLOSIVES USED IN MINES.

During 1944 the quantity of explosives used in metalliferous mines and quarries showed a further reduction due to loss of man-power. The high explosives amounted to 3,011,600 lb.; fuse detonators, 956,000; electric detonators, 28,500; delay electric detonators, 20,650; primacord, 22,000 feet; and safety-fuse, 7,868,000 feet. The above explosives are less than one-half of the normal amount used in British Columbia mines.

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

PROSECUTIONS (METALLIFEROUS).

Date.	Mine.	Occupation of Defendant.	Offence charged.	Judgment.
February 8	Twin "J" Mine	Miner	Failed to properly guard all approaches to blasting	Fined $10 and costs. Blasting certificate was suspended for three months.
April 21	Silbak Premier	Miner	Failed to properly guard all approaches to blasting	Fined $10 and costs. Blasting certificate was suspended for three months.

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 the 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.

Most of the mines are showing continued improvement in the control of dust, and fan ventilation is standard at all the larger mines. During 1944 aluminium powder therapy was introduced at many of the mines for the prevention of silicosis. The dry-houses are equipped with aluminium dispersal units and each man receives a treatment before going on shift.

A very satisfactory dustless Leyner machine has been introduced at some of the properties. The dust concentration in headings using this machine are well below the dangerous limit.

An improvement has been noticed in the ventilation of long single drifts and raises, more attention being given to the use of auxiliary fans.

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 1944.

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 is being realized beyond the immediate needs of the mines.

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

Because of the shortage of labour, and so many of the new men entering the mines being inexperienced, it has entailed greater responsibility on both management and experienced workmen to carry on safety education and to keep up the usually high percentage of trained first-aid men; but in spite of these difficulties very good progress has been made during the year.

GEOLOGY AND ORE DEPOSITS OF THE CHINA CREEK AREA, VANCOUVER ISLAND, BRITISH COLUMBIA.

(Latitude 49°, longitude 124° S.W.)

By John S. Stevenson.

CONTENTS.

ILLUSTRATIONS.

INTRODUCTION.

The China Creek area includes 52 square miles of territory east of Alberni Canal. The city of Port Alberni, a deep-sea port at the head of the canal, is the nearest railroad-station. Access to the area is by truck-road from Port Alberni up China Creek or by boat down the canal to Underwood Cove and up Franklin Creek by truck.

PHYSICAL FEATURES.

The area comprises the rugged, mountainous country around the headwaters of China, Franklin (Hiwatches), and Museum Creeks, and the West Fork of the Nitinat River (Plate I., A and B), with Mount McQuillan (Plate II., A), elevation 5,200 feet, and Mount Spencer, elevation 4,900 feet, the two highest peaks. The sides of the valleys are steep and the bottoms narrow. Long ridges are absent, the general erosion surface being characterized by disconnected major and minor peaks. Timber-line lies between 4,000 and 4,500 feet, and small areas of alpine country and continuous rock-outcrop occur above timber-line. The stands of timber are heavy and consist of a typical West Coast growth of hemlock, balsam, and Douglas fir. Much merchantable timber has been logged from the more open valley-bottoms. Although the hillsides are densely wooded, the steepness of the slopes results in numerous rock bluffs and outcrops.

Drainage of the area is westerly to Alberni Canal by China, Franklin, and Museum Creeks, and southerly by Nitinat River through Nitinat Lake into the ocean.

Lakes are few and small. They include an upland-valley lake, Lizard Lake, and three glacial cirque lakes; namely, Father and Son, Summit, and Black Lakes.

PREVIOUS GEOLOGIC WORK.

The earliest report on the China Creek area was by Herbert Carmichael and may be found on page 1080 of the Annual Report, Minister of Mines, British Columbia, for 1893. This report is confined to short descriptions of the veins known at the time and to an account of the current mining activity. In 1895 Wm. J. Sutton mapped about 165 square miles of territory east of Alberni Canal, which included the entire area covered by the present report. The map and an accompanying report on the salient geologic features of the area appeared in the Annual Report of the Minister of Mines for 1895, pages 648–654. The map is on a scale of 60 chains to 1 inch with topography shown by hachures and the geology by printed rock-type names. In 1896, Wm. A. Carlyle, Provincial Mineralogist, in Bulletin No. 1 of the Department of Mines, British Columbia, described the properties close to Alberni Canal, including those on China and Franklin Creeks. The Geological Survey of Canada, Memoir 13, 1912, by C. H. Clapp, describes the geology of Southern Vancouver Island south-easterly from Alberni Canal and includes a geologic map on a scale of 6 miles to 1 inch. This map shows the general geology on China and Franklin Creeks.

Short property reports and brief references to prospecting have been published in the Annual Reports, Minister of Mines, British Columbia, and mention is made of these in the list of references following each property description in this report.

FIELD-WORK AND ACKNOWLEDGMENTS.

The writer spent ten weeks in the field in 1941 in topographic and geologic mapping. The topography of the area south-westerly from Franklin Creek had been previously mapped by photo-topography by the Topographic Division of the Survey Branch of the Department of Lands, British Columbia, on a scale of ½ inch to 1 mile with 100-foot contours. The topography of the area north-easterly from Franklin Creek was mapped in 1941 by the writer by plane-table methods on a scale of ½ mile

to 1 inch with 500-foot contours. At that time the geology was mapped by traverses spaced mainly ½ mile apart but many were spaced closer than this. Because the country is mountainous with many creeks cut down to bed-rock, outcrops are abundant and give ample opportunity for geologic study commensurate with the scale of mapping.

The writer wishes to thank the officials of the Alberni Pacific Lumber Company, Limited, for supplying topographic maps of part of the area. Acknowledgments are given to the prospectors and mining operators of the district for their friendly co-operation and, especially, to the officials of the mining companies for their hospitality and for general information useful in the examination of their properties. The writer also gladly acknowledges the help of his field assistants, Alan Smith, Roy Deane, and Isaac Haale.

GENERAL GEOLOGY.

Intrusive and extrusive igneous rocks and sedimentary rocks occur in the area. On the basis of lithologic comparison with other rocks on Vancouver Island, the ages of which have been determined, the rocks in the map area are mainly Mesozoic in age. Fossils found in limestone (*see* below) indicate, however, that the older sediments are Upper Carboniferous or Permian. The younger sediments are lithologically similar to Cretaceous sediments found elsewhere on the island and are themselves also probably Cretaceous. The volcanic rocks may be referred to the Triassic Vancouver group. Scattered erosion remnants of some clastic sediments are referred to the Cretaceous Nanaïmo series. Most of the intrusive igneous rocks are Jura-Cretaceous Coast Range intrusives, although some intrude Cretaceous sediments, and are therefore post-Cretaceous.

Older Sediments.

Two belts of older sedimentary rocks, mainly pyroclastics, are found in the area. One belt, from ¾ mile to 1½ miles wide, extends north-westerly from the eastern slopes of Mount Spencer past Lizard Lake. The other belt, about ¾ mile wide, extends northerly from Summit and Black Lakes to the north boundary of the area. The rocks in these two belts include limestone, jasper, chert, tuff, and volcanic and flow breccias. These rocks do not occur as a regularly stratified succession of beds but as lenses that pass north-westerly along the strike at about the same horizons, from one rock-type to another. The limestone occurs in a north-westerly-trending zone of discontinuous lenses, the largest of which (Plate II., B) is on Mount Spencer, with small lenses both north-westerly and south-easterly from that peak. The limestone is grey to buff in colour, and some of it is silicified and characterized by bands of cherty silica, 1 to 4 inches wide, alternating with buff-coloured limestone. The writer collected fossiliferous material from the limestone bluff, elevation 3,700 feet, north-east of Franklin Creek (*see* fossiliferous locality on geologic map, frontispiece). This material included crinoid disks and stems and a brachiopod. Dr. A. E. Wilson, of the Geological Survey of Canada, kindly examined this material and transmitted the following communication: "Crinoid disks and stems are not diagnostic, they occur at a number of horizons all through the Carboniferous and Permian, the *Spiriferella* is new. Its range is not known, but its development suggests Upper Carboniferous or Permian. More evidence is needed to be specific." Considerable red jasper is found along the strike of the limestone lenses and may represent silicified limestone. The chert is blue-green in colour, some of it is finely laminated and in part fragmental, and is probably partly tuffaceous in origin. Some of the blue-green chert contains material that may be radiolaria but its extremely fragmental nature prevents accurate determination.* The tuffs weather greenish-grey and, where fine-grained, are usually well-banded. They are hornblende-andesite tuffs and, in the coarser phases, broken feldspar

* V. J. Okulitch, personal communication.

and hornblende crystals stand out prominently on slightly weathered surfaces. Some of the tuffs are schistose and are very similar to some of the Sicker schists found 40 miles south-easterly on Mount Sicker, near Duncan. The flow-breccia is a greenish-grey weathering rock similar to the tuff but of easily discernible coarser texture. The flow-breccia consists of angular fragments of volcanic material, 1 inch to 1 foot in diameter, in a matrix of lava; differential weathering has caused the fragments to be well outlined on weathered surfaces.

VOLCANICS.

Two north-westerly-trending belts of volcanic rocks are found in the area. A belt of older volcanic rocks extends north-westerly from the headwaters of the Nitinat River, down McQuillan and China Creeks and north-westerly to beyond Mineral Creek. These rocks comprise the China Creek andesite. A belt of younger volcanic rocks lies to the south-west of the older rocks and extends north-westerly from the Nitinat River, past the western slopes of Mount Spencer and north-westerly across Franklin Creek. These rocks comprise the Franklin Creek basalt.

China Creek Andesite.—The China Creek andesite is principally fine-grained, amygdaloidal andesite, most of which is dark green in colour but some is purple. Although not all the green andesite is amygdaloidal, all the purple andesite is amygdaloidal. Mineralogically the China Creek volcanics are mainly andesites, with either augite or hornblende or, in a few places, with both minerals. Some lenses of porcelain-white -weathering, dark-grey chert, and red jasper are found intercalated with the andesite. The China Creek andesite overlies the older sediments and is folded with the sediments in a synclinal belt between the two belts of older sediments (*see* structure-sections accompanying geologic map, frontispiece).

Franklin Creek Basalt.—The Franklin Creek basalt is dark green to almost black in colour and, where well weathered, is strongly rust-coloured. Most of the basalt consists of pillow-lava with widespread quartz and a little actinolite and epidote occurring as interstitial material in the angles between the pillows. Amygdaloidal lava is scarce, and areas of chert and purple lava such as are found in the China Creek andesite have not been seen in the Franklin Creek basalt. Mineralogically the rock is an augite basalt with remarkably fresh, unaltered labradorite-feldspar.

OLDER INTRUSIVES.

The intrusive igneous rocks include both acid and basic rocks occurring as dykes, sills, and stocks.

Diorite.—Numerous fine-grained diorite sills, ranging from 1 foot to 50 feet in thickness, and larger, irregular bodies up to 500 by 1,000 feet across, intrude the sediments near the *Thistle.*

An elongated area of diorite, 5 miles long by ½ mile wide, extends northerly and southerly from Mount McQuillan. Diabase dykes up to a few feet thick cut this diorite. Much of the diorite is a fracture-breccia (Plate III., A and B) and consists of angular fragments of diorite, replaced and rimmed by more acidic material. The sequence of events in the area of diorite north and south of Mount McQuillan and in the area of diorite sills around the *Thistle* appears to have been first, the intrusion of a large central mass of coarse diorite along a north-south zone of weakness in the China Creek andesite and second, the intrusion of smaller peripheral bodies of fine diorite mainly as sills into the older sediments around the *Thistle.* Brecciation of the main diorite body followed, probably as a result of a volume decrease consequent on both the change from a fluid magma to a crystalline rock and on the contraction of the rock body while cooling. Infiltration of acidic material from the same deep-seated source,

from which the diorite was differentiated, followed and sealed the breccia, rimming the diorite fragments and forming small acidic dykes.

Quartz Diorite.—Hornblende quartz diorite occurs in a tongue-shaped area that extends south-easterly from a longer mass outside the map-area, across Franklin Creek to the South Fork of Museum Creek. The rock in the main mass is uniform both in texture and in composition. The contact-zone is marked by inclusions of basalt in different stages of absorption by the quartz diorite. This zone is usually narrow, but in a few places reaches a width of 100 feet.

Feldspar Porphyry.—Three small stocks of massive feldspar porphyry are strikingly aligned along a course that trends north 15 degrees west. These stocks are accompanied by many sills and dykes of feldspar porphyry which intrude the volcanics adjacent to the stocks. The feldspar porphyry consists principally of feldspar with but little quartz, and no hornblende or other dark mineral.

Younger Sediments and Intrusives.

Scattered erosion remnants of gently-dipping conglomerate, sandstone, and shale are found towards the north-west boundary of the area. These rocks, which are younger than any of those previously discussed, probably belong to the Nanaimo series of Cretaceous age.

Sills of hornblende feldspar porphyry, from 1 foot to 40 feet thick, intrude Cretaceous sediments that cap the flat-topped peak north of Franklin Creek and west of Lizard Lake.

Structural Geology.

Because of the lenticular habit of the sediments and massive nature of the lavas, the writer could not identify any continuous, easily recognizable marker-horizons to serve in unravelling the details of the complex structure of the rocks in the map-area.

Folds.—The rock units trend from northerly to north-westerly, and, where attitudes were determinable, also range in strike from northerly to north-westerly. Since the rocks are strongly folded, the dips vary considerably, and range from south-westward to north-eastward. Drag-folds are very common in the more incompetent members of the sedimentary group of rocks.

The major structures (*see* structure-sections accompanying geologic map, frontispiece) appear to be a north-westerly-trending anticline and accompanying syncline, which plunge 10 to 30 degrees south-easterly. The anticlinal axis is believed to extend from the eastern slopes of Mount Spencer north-westerly to Lizard Lake, and the synclinal axis to extend north-westerly along the McQuillan Creek valley.

Faults.—Faults and related shear-zones are common. Some are short but others are long and of major importance.

A shear-zone along which considerable movement has occurred extends along the west contact of the diorite that extends southerly from Mount McQuillan. This shear-zone has considerable economic importance, as mineralized quartz veins are found in and very close to it.

A major fault occurs along the contact between Franklin Creek basalt and limestone on Mount Spencer, and continues north-westerly, marking the contact between the basalt and the older group of sediments. The fault dips steeply south-westward and is normal, so that the movement along it has been such that the Franklin Creek basalt on the west has dropped at least 3,000 feet with respect to the adjacent limestone and sediments on the east. (*See* section B-C accompanying geologic map, frontispiece.)

A major fault south of Lizard Lake has offset the north-westerly extension of sedimentary rocks in that section about 4,000 feet southward. A smaller fault is probably responsible for offsetting the south-easterly extension of limestone across the West Fork of the Nitinat River.

ORE DEPOSITS.

History.

Small-scale placer-mining was carried on as early as 1862, principally by the Chinese, on China Creek and the creek is reported to have been staked for hydraulic leases for 12 miles in the 1890's. The total placer production is known to exceed $40,000. The gold-quartz veins in the area were found subsequent to the early placer operations.

Prospecting was active between 1892 and 1900, and by 1895 gold-quartz veins had been found and staked on Mineral Creek, in King Solomon basin at the head of McQuillan Creek, and in the Golden Eagle basin at the head of China Creek. In 1898 an 8-stamp mill was built on Mineral Creek to treat ore from the veins on the Consolidated Alberni (Vancouver Island Gold Mines, Limited), property, but only two clean-ups were made.

Activity had died down by 1900 and little was done in the area until 1933 when Vancouver Island Gold Mines, Limited, began to explore the veins on the Consolidated Alberni ground on Mineral Creek. This company worked for three years and built a 35-ton pilot-mill in 1936, but difficulties of operation forced it to close down all work the same year. That same year, however, gold-quartz veins above King Solomon basin were opened up by the Havilah Gold Mines, Limited, and a small quantity of ore was produced between then and 1939.

Between 1938 and 1942 a small tonnage of high-grade ore was shipped from the *Thistle* on Franklin Creek.

During 1941 active prospecting was carried on by Pioneer Gold Mines of B.C., Limited, and by Bralorne Gold Mines, Limited, on the *Black Panther* and *Black Lion* respectively, at the headwaters of the West Fork of the Nitinat River. Since then there has been little activity other than prospecting in the area, although it is understood (February, 1945) that a company has recently been formed to develop the *Black Panther* further.

Production.

Records show that two properties, those of Vancouver Island Golds, Limited, and Havilah Gold Mines, Limited, have produced 1,565 tons of gold ore containing 562 oz. of gold and 1,386 oz. of silver, and that one property, the *Thistle,* has produced 6,867 tons of gold-copper ore containing 2,667 oz. of gold, 1,667 oz. of silver, and 626,556 lb. of copper.

General Features of the Deposits.

The deposits are mainly gold-quartz veins in the China Creek andesite. The vein-quartz contains variable amounts of the sulphides, pyrite, galena, and sphalerite, and small quantities of gold. The gold content of the veins is roughly proportional to the sulphide content, and samples of heavy sulphides have assayed several ounces of gold per ton.

Gold-copper ore is found in a high-temperature replacement deposit on the *Thistle.*

The deposits lie in a belt 1½ miles wide that follows the general trend of a line of feldspar-porphyry stocks and dykes. Those deposits towards the south end of the belt lie close to a north-south area of diorite. This diorite is badly fractured and the resulting breccia sealed by granitic material. It is probable that the same deep-seated source gave rise to the diorite, the feldspar porphyry, the granitic material that seals the diorite breccia, and, as late products of differentiation of the magma, the veins and replacement deposits.

MINES AND PROSPECTS.

Vancouver Island Gold Mines, Ltd. (Consolidated Alberni Gold Mining Co.).

Vancouver Island Gold Mines, Limited, care of W. C. Mainwaring, B.C. Electric Railway Company, Vancouver, owns and has most recently worked the property of the old Consolidated Alberni Gold Mining Company, with workings between 2,600 and 2,800 feet elevations on Mineral Creek, a tributary of China Creek. The property is reported to include the following Crown grants: *Victoria* (Lot 205G), *Alberni* (Lot 206G), *Chicago* (Lot 207G), *Warspite* (Lot 208G), *Missing Link* (Lot 214G), *Last Dollar* (Lot 216G), *Champion* (Lot 217G), and *Last Chance* (Lot 220G).

A motor-road leads from Port Alberni for 9½ miles up China Creek to Mineral Creek, elevation 1,100 feet. Thence a switchback caterpillar-road leads for 1½ miles to the mine camp, elevation 2,600 feet. The workings are on the hillside above and close to the camp.

The property was worked in the late 1890's by the Consolidated Alberni Gold Mining Company, when an 8-stamp mill was built, and again between 1933 and 1936 when it was operated by Vancouver Island Gold Mines, Limited. The latter company built a 35-ton pilot-mill in 1936, but because of operating difficulties milled only a few tons of ore. Work on the property was suspended in 1936. Total production has amounted to 403 tons of ore, containing 303 oz. of gold and 52 oz. of silver.

The rocks on the property include andesitic flows and tuffs, strike north, and dip 25 degrees westward. "Granitic" rocks are reported to have been found a short distance west of the property.

Three quartz veins, two of which strike north-westerly and dip from 40 to 55 degrees south-eastward, and the third which strikes north and dips 80 degrees eastward, have been developed and mined by five drift-adits. The veins in general range in width from a few inches to 12 inches, but occasional sections as much as 4 feet in width are found. The vein-matter is quartz with a small amount of pyrite and occasionally a little free gold.

The quartz veins were developed early in the history of the property, in the late 1890's, and between 1933 and 1936 a strongly carbonatized shear-zone, 40 feet wide, was prospected in Mineral Creek by stripping, open-cuts, and a few short adits. This zone contained many small stringers of quartz that carried a little gold but not enough to make mineable ore.

The geology and workings have been described more fully by the writer in the Annual Report of the Minister of Mines, British Columbia, 1936, pages F 25 to F 30. No work has been done on the property since then.

The property was examined by the writer in 1936 and 1941.

References: Annual Reports, Minister of Mines, B.C. (*see* Consolidated Alberni Gold Mining Co.)—1896, 1, 504; 1897, 566, 569; 1898, 1132, 1160; 1899, 151, 796; 1904, 250; (*see* Vancouver Island Gold Mines, Ltd.)—1934, A 28, 29, F 2; 1936, F 25.

Regina.

The *Regina* group comprises the following Crown grants: *Regina No. 1* (Lot 57G), *Regina No. 2* (Lot 55G), *Regina No. 3* (Lot 54G), *Regina No. 2 Extension* (Lot 94G) and the *Barney Barnato* (Lot 49G). The *Regina No. 2* and *Regina No. 2 Extension* are in good standing and owned by Emelio Marillia, of Port Alberni; the other claims have reverted to the Crown and have been leased to various people.

The workings, between elevations 1,850 and 2,550 feet, are in the heavy timber above the logging slash on the south side of China Creek and from 1,000 feet to 2,000 feet east of Williams Creek, a small stream flowing northerly into China Creek almost opposite Mineral Creek. At present they are most easily reached by following an abandoned and overgrown logging-incline of the Alberni-Pacific Lumber Company, up the slope opposite Mineral Creek, to an elevation of 1,880 feet; thence through the

bush easterly for 125 feet to the first working, a short adit at an elevation of 1,860 feet; from a point 40 feet above this working a trail winds easterly for 800 feet to an old cabin at an elevation of 2,050 feet. This cabin was formerly connected with China Creek by a pack-horse trail, but this is now overgrown and in the logged-off area is obscured by slash.

Near the workings the hillside is of uniform steepness, approximately 25 degrees, and heavily wooded with trees, which, although not merchantable as sawlogs, would be suitable as mine-timber.

Various claims in the *Regina* group were first Crown granted in 1898 and 1899 to the Alberni Gold Development Syndicate. All the workings and cabin are very old, probably dating from the late 1890's, the only recent work being the cleaning-out of the inclines-shaft and possibly some digging in the adjacent open-cut.

Tight quartz-sulphide lenses in green andesite have been explored by the various workings but nothing of value is as yet indicated. Some of the andesite is strongly silicified and pyritized.

The previously mentioned adit at an elevation of 1,860 feet has been driven north 55 degrees east for 15 feet in highly silicified and leached andesite which has so much disseminated pyrite and ankeritic carbonate that the weathered rock contains an abundance of limonite. The rusty outcrop exposed at an elevation of 2,100 feet on the logging-incline, and locally referred to as the " Big Showing," consists of similarly altered and pyritized andesite. A large bulk sample of highly oxidized material assayed: Gold, 0.64 oz. per ton; silver, trace.

A shaft, 100 feet south-westerly from the camp, at an elevation of 2,100 feet, was full of water at the time of the examination. The shaft is at least 30 feet deep and was sunk on a tight shear, partly filled with quartz, that strikes north 50 degrees east and dips 20 degrees south-eastward. In the north-east wall of the open-cut leading to the incline-shaft, a small lens and accompanying veinlets of quartz are exposed. In the south-west wall, close to the floor of the incline, there is a zone of andesite that has been highly silicified over a width of 25 inches and contains a 4-inch quartz lens and numerous related stringers; pyrite and chalcopyrite accompany the quartz; this zone is not continuous for more than 5 feet along the strike. Samples taken across the 4-inch quartz lens assayed only a trace in gold and 1.0 oz. per ton in silver; and a 25-inch sample, including quartz veinlets and sulphides, assayed: Gold, 0.02 oz. per ton; silver, 0.8 oz. per ton. A grab sample of quartz containing considerable pyrite, chalcopyrite, and galena from the dump assayed: Gold, 0.66 oz. per ton; silver, 14.0 oz. per ton.

An adit, at 2,300 feet elevation and 850 feet south of the incline, has been driven south 20 degrees east for 15 feet. The adit is now largely caved, but the exposed part of the face showed a 2-foot length of a 2-inch quartz-chalcopyrite-galena veinlet; and in the east wall at the portal a silicified zone 2 feet wide contains concentrations of pyrite. The zone strikes approximately north 70 degrees east and dips 25 degrees southward.

At 2,370 feet elevation, 100 feet south 25 degrees east from the last working, an adit has been driven southerly for 94 feet along a shear striking north 11 degrees west and dipping 70 degrees eastward. The shear contains approximately 1 foot of gouge and crushed andesite and, over a width of 1 foot in the hanging-wall, replacement veinlets of quartz and pyrite. A sample of this material contained, however, only traces of gold and silver. Twenty-five feet from the portal the shear cuts a sheeted zone 1 foot wide, strike north 80 degrees east, and dip 25 degrees southward. This zone, which contains several 2-inch quartz veinlets and a little pyrite, is seen only in the east wall of the adit. The main shear ends in the face against another shear which is barren and strikes east-west and dips 60 degrees southward. The rock in the working is dark green andesite, mostly massive, but sheared in the crushed zones.

At 2,450 feet elevation, 225 feet south 25 degrees west from the last adit, an adit has been driven south 45 degrees east for 20 feet from a pit at the portal 5 feet deep. The only mineralization seen was disseminated pyrite in highly silicified greenstone and a small quartz veinlet at the face; a sample of the pyritized rock and quartz veinlet contained only traces of gold and silver.

One hundred and twenty-five feet south 25 degrees west from the adit there is a caved cut, and 75 feet westerly from this a second cut, showing similarly mineralized rock.

At 2,500 feet elevation, 75 feet north 30 degrees west from the last cut, the longest adit on the property has been driven south 17 degrees east for 33 feet, south 20 degrees east for 64 feet, and south 47 degrees east for 47 feet to the face. For 95 feet from the portal this working has been driven along a narrow shear which strikes north 30 degrees west and dips 65 degrees north-eastward. The walls consist of silicified andesite containing disseminated pyrite and occasional quartz stringers, and at 90 feet from the portal a small lens of barren quartz. At 97 feet from the portal a 4-inch lens of barren quartz and chlorite strikes north 50 degrees east across the adit and dips 30 degrees south-eastward. Unmineralized andesite extends from here to the face.

No production has been reported from the property.

This property was examined by the writer in July, 1936.

References: Annual Report, Minister of Mines, B.C.—1898, 1197; 1930, 291.

Golden Eagle.

The *Golden Eagle* property is reported to comprise the following contiguous Crown grants held in care of the Canada Trust Company, Victoria, B.C.: *Apex* (Lot 99G), *Skyline* (Lot 100G), *War Lion* (Lot 152G), *Conqueror* (Lot 153G), *Majestic* (Lot 154G), *Empress of India* (Lot 155G), *I.X.L.* (Lot 156G), *Golden Eagle* (Lot 198G), and *Ockolona* (Lot 199G). The *Lakeview* (Lot 151G) is a separate Crown grant, also held in care of Canada Trust Company, that is a considerable distance from the above group of contiguous claims and was not tied to them by the original Crown-grant survey.

The writer did not determine the exact area covered by these claims. The long time that has elapsed since the claims were surveyed for Crown grant and the open nature of the country make it impossible to determine the exact boundaries of the claims without an instrument survey. It is possible that some of the showings described under the *B. and K.* group are on *Golden Eagle* ground, which see.

The *Golden Eagle* workings are between elevations of 2,270 and 2,990 feet at the head of China Creek, about 15 miles from Port Alberni. They are near timber-line, at the base of steep, rocky bluffs that extend up to the eastern peak of Mount McQuillan, about 2,000 feet above.

The property may be reached from Port Alberni by motor-road up China Creek for 12½ miles to the mouth of McQuillan Creek; thence, by a pack-horse trail that follows an abandoned logging-railroad and the remains of the old mine wagon-road for 3 miles to the mine cabin. The former camp buildings have long since collapsed and present cabin is in disrepair. The mine-workings are about ½ mile southerly upstream beyond the cabin.

The *Golden Eagle* vein was found and staked in the fall of 1892 by prospectors who pushed up-stream beyond the Chinese placer-workings lower on the creek in search of the source of the placer gold. By 1895 the four drift-adits on the vein had been driven and in 1896 the long, low-level adit was driven from a point beyond the reach of destructive snowslides. This latter adit, although driven for 2,100 feet, never intersected the vein.

No production has been reported from the property.

Prospecting has been done on a quartz vein, strike north 30 degrees east and dip 65 degrees south-eastward, that cuts a small intrusive mass of feldspar porphyry.

The outcrop area of the porphyry measures 200 feet in an east-west direction and more than 500 feet in a north-south direction. The vein ranges from a few inches to 5 feet in width and has been traced by outcrops for a strike length of about 400 feet and a vertical distance of 325 feet. The vein-matter consists mainly of ribbon-quartz and pyrite, with small amounts of other sulphides scattered through the quartz.

The writer did not take any samples of the vein-matter, but assays up to $103 per ton in gold from well mineralized material have been reported (Annual Report, Minister of Mines, British Columbia, 1894, page 773).

The workings consist of one long exploratory crosscut, and four short drifts on the vein.

The crosscut, elevation 2,270 feet, was driven south-westerly for 2,100 feet and is in fine-grained andesite throughout its length. At 130 feet from the portal a cross-working was driven 60 feet south-easterly, and at 1,000 feet from the portal a cross-working was driven north-westerly for 85 feet. These workings intersect a few small stringers of unmineralized quartz but do not cut any material that resembles the main vein of the upper adits, in attitude or vein-matter.

Four short drifts have been driven on the main vein.

No. 1 drift, elevation 2,675 feet, 1,200 feet up-stream southerly from the cross-cut adit, has been driven south 30 degrees west for 45 feet on the vein which is 5 feet wide at the portal and 3 feet wide at the face.

No. 2 drift, elevation 2,790 feet and 70 feet south-westerly from No. 1, has been driven south-westerly for 65 feet on the vein. The vein-matter consists of 2 feet of ribbon-quartz that contains a small amount of sulphides.

No. 3 adit, elevation 2,870 feet and 60 feet south-westerly from No. 2, has been driven 46 feet south-westerly on the vein. The vein is 3 feet wide at the portal, narrows to 2½ feet half-way in and, 10 feet back from the face, it splits, one branch, 3 inches wide, going south-westerly to the face, and the other branch, 1 foot wide, going westerly into the wall.

No. 4 adit, elevation 2,990 feet and 200 feet south-westerly from No. 3, has been driven 22 feet at south 42 degrees west and 15 feet at north 60 degrees west to the face. At 15 feet from the face a working has been driven 12 feet south-westerly. At the portal the vein consists of a 2-foot shear-zone with a few stringers of quartz, but both the shear and vein-matter narrow to a single unmineralized shear 12 feet from the portal.

The rock in these four drift-adits is feldspar porphyry.

This property was examined by the writer in September, 1941.

References: Annual Report, Minister of Mines, B.C.—1893, 1080; 1894, 773; 1895, 651; 1896, 556, 557; 1897, 566; 1898, 1132; 1899, 607, 779, 785; 1901, 1190; 1902, 230, 257.

B. and K. This group consists of the *B. and K. Nos. 1* to *6*, staked in 1938, the *Panorama No. 1* staked in 1939, and the *I am Alone* staked in 1940, belonging to the estate of Angus Beaton (deceased).

The *K.C. Nos. 1* to *4*, and *B.C. Nos. 1* and *2* mineral claims, staked in 1940 and owned by Ed. Keisig, of Alberni, are adjacent on the south to the *B. and K.* group and have been prospected in conjunction with that group.

These claims have not been surveyed and their exact position relative to the adjacent *Golden Eagle* group is not known. Some of the showings described in this report may therefore be on *Golden Eagle* ground, which see.

These claims are on the divide between China Creek and the East Fork of the Nitinat River, and extend from Summit Lake, the source of China Creek, southerly for several thousand feet along the eastern slopes of the ridge between the West and East Forks of the Nitinat River.

With the exception of a small amount of relatively flat ground around Summit Lake, the slopes are steep and consist mainly of rock bluffs and intervening grassy areas with clumps of small evergreens.

No production has been reported from the property.

The camp cabin and showings at Summit Lake are reached from the *Golden Eagle* cabin by a climb of 1,500 feet along a steep and narrow foot-trail 1¼ miles long. The workings on the hillside above the lake are reached by poorly-defined foot-trails.

The showings consist of many widely scattered, narrow quartz veins in tuffs and basalt. The veins range from a knife-edge to 8 inches in width and consist mainly of quartz with small amounts of pyrite. The richest vein found consists of quartz with abundant banded sulphides.

At the north end of Summit Lake three small veins have been prospected by trenches and strippings. The widest of these is exposed in a cross-trench 130 feet north-easterly from the cabin and in a small pit 40 feet northerly from the trench. This vein consists of a shear-zone with a maximum width of 8 feet, which contains three quartz stringers ranging from 1 inch to 8 inches in width. The quartz does not carry any easily recognizable amount of sulphides. The shear-zone strikes northerly along the contact of purple, amygdaloidal lava on the west and light green tuffs and black chert on the west.

A group of three open-cuts, beginning at a point 175 feet northerly from the cabin and extending 70 feet farther north, expose a leached quartz vein from 2 to 8 inches thick, strike north-westerly and dip 20 degrees south-westward.

At the south end of the lake, between 400 and 500 feet southerly from the cabin, a group of veins has been exposed by trenching.

One vein, strike north 10 to 20 degrees west and vertical, has been exposed by four trenches over a length of 100 feet. This vein is 8 inches wide and consists mainly of quartz with very little pyrite.

Another vein, 20 feet easterly from the first, has been exposed by two open-cuts in a length of 60 feet. This vein, strike north 30 degrees east and vertical, is only 2 inches wide and consists mainly of quartz.

A quartz vein, strike north 25 degrees east and vertical, and 2 to 8 inches wide, is exposed in the bed of a northerly flowing creek where the creek flows past the north end of the workings. Two samples from this vein assayed: Gold, 2.56 oz. and 2.26 oz. per ton respectively. Fifteen feet farther up-stream a 6-foot zone of quartz stringers is exposed. These stringers strike north-easterly and range from 1 to 5 inches in width.

Two small stringers of quartz have been found 400 and 520 feet farther up-stream.

The rocks in the workings at the south end of the lake are light greenish tuff with small areas of dense, black chert, all of which strike north-westerly and are vertical. Close to the veins the tuffs are strongly carbonatized by ankeritic carbonate and weather a buff colour.

A quartz-sulphide vein, known as the "high-grade vein," is exposed ¾ mile south-westerly from Summit Lake, at an elevation of 4,500 feet and within 200 feet of the top of the ridge. There is some doubt as to whether this vein is on the *B. and K.-K.C.* ground or *Golden Eagle* ground. The vein, strike north 4 degrees west and dip 65 degrees westward, has been exposed by five open-cuts for a length of 130 feet. The vein, 5 to 8 inches wide, consists of both ribbon- and comb-quartz and abundant sulphides. A sample across 5 inches of this vein-matter near the north end of the vein assayed: Gold, 3.84 oz. per ton; silver, 3.2 oz. per ton; copper 0.06 per cent. Towards the south the vein pinches to a shear and towards the north it goes under heavy overburden and has not been prospected. The wall-rock is dark green andesite.

A striking feature of the rocks on the hillside is a northerly trending zone of strongly carbonatized andesite that ranges from 6 to 25 feet in width. Because of the iron in the carbonate, the rock in the zone of alteration weathers a strong buff colour.

Near the south end of this zone, about ¾ mile south of the "high-grade vein," two open-cuts at elevations 3,340 and 2,270 feet in the bed of a creek have been driven on a small amount of pyrite, galena, and sphalerite contained in narrow veinlets in the carbonatized rock.

Between the "high-grade vein" and Summit Lake, at an elevation of 3,820 feet, an open-cut has been driven 15 feet north along two parallel shears 18 inches wide, on either side of a 6-foot feldspar-porphyry dyke. A few nodules of quartz, mineralized with galena and pyrite, were found in the shears; a sample across the east shear of such material assayed: Gold, 0.82 oz. per ton; silver, 0.7 oz. per ton.

There are no previous published descriptions of the *B. and K.* group and adjacent claims.

The property was examined by the writer in September, 1941.

Havilah Gold Mines, Ltd.

This company, in the name of Herbert F. Hewitt, liquidator, holds the *Storm Nos. 1* to *4* mineral claims under the "Free Miners' Exemption Act." These claims are at the head of McQuillan Creek and are reported to include the ground mined by the company during the period of its operations between 1936 and 1940.

The workings are reached by motor-road from Port Alberni up China Creek for 12½ miles to the mouth of McQuillan Creek; thence for 2½ miles to a base camp, elevation 2,400 feet, at the head of the creek. From the base camp a pack-horse trail, ¾ mile long, leads to the mine camp, elevation 3,400 feet. During the period of active mining the company operated a high-line tram for ore and supplies between the base camp and the mine camp.

The main workings are on the Gillespie vein between elevations of 3,400 and 3,611 feet on the west side, and near the mouth, of a northerly-trending cirque. The upper workings, not so extensive as the lower, are on the Alberni and McQuillan veins between elevations of 4,200 and 4,370 feet and are 1,700 feet southerly by trail up the cirque from the lowest adit on the Gillespie vein. The workings on the Alberni and McQuillan veins and on a vein on the easterly side of the cirque have been described by the writer in the Annual Report, Minister of Mines, B.C., 1936, pages F 32–33. As very little work has been done since that time on the Alberni and McQuillan veins the reader is referred to the 1936 report.

Although the McQuillan vein was prospected by an open-cut and short adit as early as 1895, most of the work on the vein was done between 1936 and 1940 by Havilah Gold Mines, Limited. The work on the upper showings was done in 1936 and most of that on the lower showings—namely, the driving of the three drift-adits—was done in 1938 and 1939.

Production from the property has been as follows: In 1936, 7 tons containing 7 oz. of gold and 6 oz. of silver; in 1939, 1,039 tons containing 244 oz. of gold and 1,328 oz. of silver.

The hillside in the vicinity of all the workings is very steep. The lower slopes are covered with scrub fir and snow-brush and the upper slopes with heather and large talus boulders.

The Gillespie vein strikes north 8 degrees east and dips from 65 to 80 degrees eastward, but between Nos. 1 and 3 adits it dips, on the average, 75 degrees eastward.

The vein-matter consists of ribbon-quartz (Plate IV., A) and a moderate amount of sulphides. The quartz ribbons are separated by thin laminæ of sheared rock which is commonly replaced by the sulphides. The ribboning of the quartz is made more striking by the marked tendency of the vein to slab-off along the partings of sheared rock. Angular fragments of wall-rock, now largely carbonatized and replaced by

mariposite and sulphides, may be recognized in the vein in places. Veinlets of late comb-quartz cut the ribbon-quartz in a few places. The sulphides are mainly pyrite, with small amounts of arsenopyrite, sphalerite, and galena.

Although the vein was not systematically sampled, thirteen samples were taken from different places along the vein in the three adits. Assays ranged from 0.02 to 0.4 oz. gold per ton over widths ranging from 6 to 33 inches.

The wall-rock consists of lava, of andesitic composition. It is massive, fine-grained, amygdaloidal in places, and mainly dark green in colour; however, purple amygdaloidal lava is found on the west wall of the lower adit for a distance of 500 feet back from the face.

The workings on the Gillespie vein consist of three drift-adits, the 800 adit at 3,600 feet elevation, the 900 adit at 3,500 feet elevation and 270 feet north 15 degrees east from the 800 adit, and the 1,000 adit at 3,400 feet elevation and 250 feet north 14 degrees east of the 900 adit.

The 800 adit has been driven south 2 degrees west for 275 feet. From the portal to a point 180 feet in the vein ranges from 4 to 16 inches wide. An arithmetical average of fourteen equally-spaced measurements gave an average vein-width in this section of 11 inches. At 180 feet the vein is cut by a diagonal fault of unknown displacement beyond which, to 220 feet, no vein has been found. From 220 feet to the face, a 2-inch quartz-pyrite vein, which the writer does not think is the main vein, is found in the back of the drift. This vein contrasts with the main vein in being much narrower, in lacking the characteristic ribboning, and in being vertical rather than dipping perceptibly eastward.

The 900 adit has been driven south 8 degrees west for 540 feet, and 160 feet from the portal a raise has been driven to the surface. From the portal to a point 125 feet from the face the vein ranges in width from 4 to 38 inches, with an arithmetical average based on twenty-three approximately equally-spaced measurements of 15 inches. At 125 feet from the face the vein is faulted and displaced an unknown distance. As in the 800 adit, only a 1-inch quartz-pyrite stringer is found in the back from the fault to the face and, for the same reasons given in describing the vein in the 800 adit, the writer does not think this stringer represents the faulted continuation of the main vein. In the 900 adit the vein splits at a point 90 feet from the portal and a branch 4 to 14 inches wide leads southerly from the main vein and goes into the east wall at 130 feet. At 160 feet from the portal a parallel vein comes into the east wall and follows along this to 300 feet, where it turns into the east wall again. This vein ranges from 2 to 4 inches in width, and is mainly ribbon-quartz with a small amount of sulphides.

The 1,000 adit has been driven south 8 degrees west for 860 feet. At a point 90 feet from the portal a crosscut has been driven westerly for 30 feet and at 550 feet a raise has been driven to the two upper adits.

In the 1,000 adit the vein ranges in width from 2 to 24 inches with an arithmetical average, based on thirty approximately equally-spaced measurements, of 9 inches. At a point 190 feet from the face the vein-shear is seen. It may be noted that this narrowing is coincident with the appearance of purple amygdaloidal lava on the west side of the drift, the usual dense green lava still being on the east side.

The writer last examined the Havilah property in September, 1941.

References: Annual Report, Minister of Mines, B.C.—Under *King Solomon*, 1893, 1080; 1894, 773; 1895, 652; and under *Havilah*, 1936, F 30; 1939, A 40, 88.

Thistle.

This property consists of five Crown grants, the *Thistle* (Lot 91G), the *Pansy* (Lot 92G), the *Primrose* (Lot 93G), the *Rose* (Lot 95G), and the *Jumbo* (Lot 97G), staked between 1896 and 1899. The claims are owned by United Prospectors, Limited, 604 Bank of Toronto Building, Victoria, B.C.

The property is at the head of Franklin (Hiwatches) Creek, with the mine camp at an elevation of 2,150 feet and the workings between elevations of 2,460 and 2,750 feet. The mine camp may be reached from Underwood Cove, 8 miles down the Alberni Canal from Port Alberni, by 12 miles of motor-road. The ore-bunkers are ½ mile beyond the camp by a good road.

The workings are on a very steep (50 to 65 degrees as determined by clinometer) but heavily wooded hillside that slopes south-westerly into the headwaters of Franklin Creek. The hillside is covered with a good stand of fir and hemlock, much of it of sawlog size; there is little underbrush.

The *Thistle* was staked in 1896 and by 1899 the 300 adit had been driven 90 feet and the 500 adit 65 feet. Access to the property was still by trail in 1901 when a San Francisco syndicate took over the property, did considerable development-work and undertook to build a wagon-road from Alberni Canal to the mine.

Although the syndicate had 200 men working for about two months, bad weather prevented their building the road for more than 6 of the 12 miles from the beach. Very little mining was done from then until 1938, when the property was acquired by the United Prospectors, Limited, of Victoria. This company completed the road to the mine, following, in part, abandoned logging-railroads, and drove the adits to their present faces.

United Prospectors, Limited, or its lessees and later, an affiliated company, the Vancouver Island Diamond Drilling and Exploration Company, Limited, also of Victoria, shipped 6,867 tons of ore containing 2,667 oz. of gold; 1,667 oz. of silver; and 626,556 lb. of copper between 1938 and 1942. The latter company ceased operations at the *Thistle* in July, 1942, and since then the property has been idle.

The *Thistle* deposit consists of two chalcopyrite replacement ore-bodies found along two shear-zones about 130 feet apart. These shear-zones are in a band of altered limestone, 200 feet wide, which strikes north 20 degrees west and dips 60 to 75 degrees south-westward. The limestone is enclosed on three sides, north-east, south-east, and south-west, and in part underlain, by fine-grained diorite. The limestone has been largely replaced by fine-grained diopside, resulting in a dense, light-green rock that may be referred to as diopside-rock. Although some small remnants of crystalline limestone, from a few inches to a few feet in maximum diameter, escaped replacement by the diopside, many of them were later replaced by the ore-minerals.

Strong faults are found along the ore-bodies and extend downward beyond the limits of the known ore.

The ore consists mainly of chalcopyrite and some pyrite in a gangue of dirty grey calcite and a little quartz. Very fine magnetite is dispersed through much of the calcite; some of the magnetite has been oxidized to hematite, giving a dull reddish colour to the calcite which encloses it.

The workings, extending north-easterly up the steep hillside from the ore-bunkers at the end of the road, include four adits: the 500 adit, elevation 2,525 feet; the 300 and 300A adits, elevation 2,650 feet; an upper short adit, elevation 2,750 feet; and two large glory-holes, one between the 500 and 300 adits, and another one between the 300 and the uppermost adits. In addition, several open-cuts have been dug above the 300 levels.

The 500 adit, 65 feet above the road, has been driven north 69 degrees east for 45 feet as a crosscut from the face of which a drift has been driven north 16 degrees west for 57 feet and another south 10 degrees east for 52 feet. These drifts follow a well-defined fault that is 2 feet wide at the northern face but narrows to 1 inch at the southern face. This fault is unmineralized and contains only crushed wall-rock and gouge. Seventeen feet back from the south face, a short branch drift has been driven south 45 degrees east for 30 feet along a faulted block of sulphide-calcite ore that is

bounded on the south by a fault, strike south 55 degrees east, dip 80 degrees north-eastward, and on the north by a fault, strike south 40 degrees east, dip 80 degrees south-westward. This block of ore, cut off to the north-west by the fault along the main drift and to the south-east by the junction of the two branch-drift faults, is only about 25 feet long and has a maximum thickness of 4 feet. It has not been stoped, and its vertical extent is unknown. The country-rock in this adit is fine-grained diorite that underlies, in part, the diopside-rock found in the workings above.

The lower glory-hole has been excavated between points 35 feet, elevation 2,570 feet, and 85 feet, elevation 2,580 feet, north-easterly up the hillside from the 500-adit portal, elevation 2,525 feet. The glory-hole measures 55 feet wide in a north-easterly direction and 70 feet long in a north-westerly direction, and its deepest point is 20 feet below the down-hill rim of the excavation. A short open-cut has been driven 6 feet into the north-east face of the glory-hole half-way up the face. The ore mined in the glory-hole apparently came from a north-westerly striking and south-westward dipping lens that, itself, did not extend to the main drift in the 500 adit, although the fault following the strike of the ore extended to this drift. A remnant of the ore, 15 feet long, 3 feet thick and 10 feet down the dip, may still be seen in the north-west face of the glory-hole. Diopside-rock forms both the hanging-wall and foot-wall of the ore. A small portion of a 2-inch bed of crystalline limestone was seen in the remnant of ore, and several small kidneys seen in the diopside-rock. The sulphides, pyrite and chalcoyprite, replace the limestone in preference to the diopside-rock.

The 300 adit, portal elevation 2,650 feet, and 150 feet north 55 degrees east from the 500 adit, has been driven north 63 degrees east for 30 feet, thence north 84 degrees east for 60 feet to the face. Thirty feet back from the face a short drift has been driven 30 feet southerly. No ore appears to have been found in this adit. It cross-cuts slightly-banded diopside-rock and some limy bands, which strike north 20 degrees west and dip 60 degrees westward.

The 300A adit, portal elevation 2,650 feet, and 25 feet south 40 degrees east from the 300 adit, has been driven south 76 degrees east for 30 feet, as a diagonal crosscut, and then as a drift south 52 degrees east for 115 feet to the face. For a distance of 40 feet the drift follows the downward extension of ore which was mined in the glory-hole above, and then follows the north-eastern side of a fault, 2 to 20 inches wide, that cuts the ore-body at an angle of 10 degrees on a strike of south 60 degrees east and dip of 75 degrees south-westward. Eighteen inches of heavy sulphide ore found at the face (September 27th, 1941), in the foot-wall of the fault, narrows to 1 inch, 12 feet back from the face. Farther back, three lenses of unmineralized quartz, 1 to 3 inches thick, are found in the fault. From the beginning of the drift-section, but 6 feet above the floor of the drift, a branch working has been driven south-westerly for 15 feet, thence south-easterly for 13 feet along the same fault that is found farther to the south-east in the main drift. Two 1-inch stringers of quartz are found along the fault in this working. The 300A adit is in diopside-rock except for the branch-working in the hanging-wall of the fault, where fine diorite is found. This suggests displacement of the fine diorite against the otherwise south-westerly extension of the diopside-rock.

The upper glory-hole, above the 300 and 300A adits, is 80 feet long in a north-easterly direction. The downhill rim is at an elevation of 2,670 feet and the uphill rim at an elevation of 2,690 feet, with the floor, at its deepest point, 10 feet below the down-hill rim. The north-western end, elevation 2,685 feet, is 50 feet north 30 degrees east from the portal of the 300 adit and the south-eastern end, elevation 2,685 feet, is 80 feet, south 70 degrees east from the same point. A flat piece of ore was followed south-easterly for 60 feet from the south-eastern end of the glory-hole in a stope, 18 feet high by 25 feet broad. Towards the entrance of the stope, ore which bent downward

was followed to the drift-section of the 300A adit. A few small patches of ore remain in the face of the stope and in the north-western end of the glory-hole. Diopside-rock forms the walls and floor of the glory-hole; some small limestone kidneys are found in the ore.

From a point north-west of the glory-hole and 70 feet east of the 500-adit portal an open-cut, elevation 2,710 feet, has been driven north-easterly for 30 feet, exposing diopside-rock with a few small kidneys of limestone. A fault, strike north 10 degrees east, dip 35 degrees eastward, is found at the face, but no ore is found.

Forty feet northerly up the hillside a small open-cut, elevation 2,785 feet, has been driven for 6 feet across a poorly-defined, rusty shear-zone, strike north 20 degrees west, and 6 inches to 3 feet wide. A small amount of scattered chalcopyrite and pyrite is found in the diopside-rock of the cut.

The uppermost adit is a short one at an elevation of 2,750 feet and 110 feet in a direction south 64 degrees east from the 300 adit. This adit has been driven south for 50 feet along a lens of heavy sulphide ore, a few inches wide at the portal but plunging down and widening to 8 feet near the face. However, at the face it is cut off by a cross-fault, strike south 70 degrees east and dip 75 degrees south-westward. Diopside-rock and small remnants of crystalline limestone are found in this working.

The *Thistle* mine was examined by the writer in August and September, 1941.

References: Annual Reports, Minister of Mines, B.C.—1899, 606, 778; 1901, 1097, 1101; 1902, 307; 1927, 340; 1928, 366; 1930, 291; 1938, A 38; 1939, A 40; 1940, A 27, 73; 1941, A 27, 71; 1942, A 66.

Black Panther.

The *Black Panther Nos. 1* to *4*, staked in 1936 and owned by Walter Harris and family, of Port Alberni, are at the head of the West Fork of the Nitinat River, and extend northerly to the divide between the Nitinat and McQuillan Creek.

The hillside around the workings is very steep and bluffy and is covered by a good stand of timber, mainly hemlock and some fir.

The property is reached from Port Alberni by way of the *Thistle*. From the ore-bunkers at the *Thistle*, elevation 2,460 feet, a steep pack-horse trail, 2 miles long, leads south-easterly over the divide, elevation 3,180 feet, between Franklin Creek and the West Fork of the Nitinat River, to the present mine camp on the *Black Panther*; elevation at the cook-house, 2,500 feet.

The upper adits were driven by the owner shortly after the claims were staked in 1936, but the 2,450- and 2,700-foot lower adits near the present mine camp were driven in 1941 by Pioneer Gold Mines of B.C., Limited, who at that time held an option on the ground. It is understood that the property is under development at present by a newly formed company, Nitinat Golds, Limited, of 221 Hall Building, Vancouver.

No production has been recorded.

Prospecting has been done on a strong shear-zone that, for at least 2 miles, follows the contact of andesite lava on the west with diorite-breccia on the east, northerly from the headwaters of the West Fork of the Nitinat River over the divide and into the McQuillan Creek basin.

Along the shear, ankeritic-carbonate alteration of the volcanics has been very pronounced over widths ranging from a few inches to 30 feet. In surface outcrops the carbonate zone is marked by a pronounced buff-weathering of the otherwise green volcanics.

Along the shear are found quartz lenses and faulted segments of lenses, some of which have been prospected. The most promising lenses found so far are explored by the main workings on the *Black Panther*. The mineralized material consists of quartz and sulphides, from 1 inch to 3 feet thick and up to 40 feet long; is in a well-defined section of the shear-zone; and, as seen in the main or 2,700-foot adit, occurs

both along a main shear and a branch (Plate IV., B) of it. In this adit the main shear has been followed for 400 feet, north 2 degrees west, by a drift, from a point about midway along which a branch shear has been followed for 260 feet, south 20 degrees west, in a branch drift. The main shear consists of gouge and badly crushed rock, over widths of 1 to 5 feet. Along this shear about 35 per cent. of the drift length is vein-matter, and the remainder is barren crushed rock. The branch shear is narrower, and, although along it about 75 per cent. of the drift length is vein-matter, the vein-widths are less than in the main shear.

The vein-matter in the adits ranges from 6 inches to 3 feet in width and consists of ribbon-quartz with varying amounts of sulphides. In some places the sulphides are sparse, in other places they are abundant. Heavy sulphides give assays of several ounces in gold per ton. Two samples of heavy sulphides taken by the writer in the north drift of the 2,700 adit assayed: Gold, 2.68 oz. and 2.30 oz. per ton respectively; one from the ore-dump at the portal of this adit assayed: Gold, 2.88 oz. per ton; and a sample of heavy sulphides from the portal of the north adit at 2,790 feet elevation assayed: Gold, 2.54 oz. per ton. The sulphides are mainly pyrite, but small amounts of galena and sphalerite are also found.

In the *Black Panther* workings the shear-zone tends to follow the contact between green andesitic lava on the west and diorite on the east; but towards the southern end of the 2,700 adit the shear is in the diorite 70 feet east of the contact. This is because of a local, westerly bulge in the diorite rather than because of any bend in the general north-south trend of the contact or of the shear-zone. The wall-rock of the shears is altered to a pale, yellowish grey rock consisting mainly of ankeritic carbonate. The zone of carbonate alteration follows both the main and the branch fault and ranges from a few inches to 30 feet in width. The alteration preceded the period of vein-formation as may be seen in the quartz-sulphide stringers that cut the carbonate zones. In one place along the main drift in the 2,700 adit, these stringers in the carbonate rock are so numerous and of such diverse orientations that they form a stockwork about 10 feet in diameter.

The main or 2,700 adit, elevation 2,700 feet, is on the east side of the West Fork of the Nitinat River, across from and 200 feet above the mine camp. This working consists of a crosscut driven north 67 degrees east for 210 feet to the main drift which extends 285 feet, north 2 degrees east, and 120 feet, south 2 degrees west, from the face of the crosscut. This drift follows the main fault and contained vein-matter. A crosscut has been driven north-westerly for 70 feet from the south face of the main drift and another has been driven north-westerly for 30 feet from a point in the main drift 100 feet north of the entry crosscut. A second drift branches from the main drift at a point 50 feet north of the face of the main crosscut and follows a branch vein in a direction south 18 degrees west for 260 feet to the face. This drift crosses both the main crosscut and the crosscut from the southern end at the main drift.

A lower adit, elevation 2,450 feet, and 650 feet south 85 degrees west from the 2,700 adit, has been driven south 27 degrees east, and intersects a vein-shear 160 feet from the portal. The shear, containing quartz 8 inches wide, has been followed for 10 feet both north and south. The crosscut entry was not continued beyond this shear to the projected downward continuation of the veins in the upper, or 2,700, adit.

Two short adits, each at elevation 2,790 feet on opposite sides of a small stream, and two near-by open-cuts comprise the uppermost workings near the main adits. The northern short adit is 175 feet, north 67 degrees east, from the portal of the 2,700 adit, and extends northerly for 45 feet along the vein-shear. Quartz is found at the portal, but only barren fault material at the face. A raise connects the 2,700 adit with this adit. The southern adit is 50 feet south of the northern and extends for 20 feet in a southerly direction. The vein is 12 inches wide at the portal, but peters out towards the south and in the face there is only the vein-shear.

The quartz vein may be seen in two short open-cuts 15 feet and 25 feet respectively, south-westerly from the south adit.

The 2,450, 2,700, and 2,790 adits are easterly across the creek and up-stream from the camp.

Up-stream from the camp at an elevation of 2,680 feet on the east side of the creek and 280 feet north 35 degrees east from the portal of the 2,450 adit, an adit has been driven north 67 degrees east for 37 feet and then south 10 degrees east for 18 feet. At 2,700 feet elevation on the western side of the creek and 35 feet north-westerly from the 2,680 adit, an adit has been driven 35 feet in a north-westerly direction.

These adits are about 100 feet west of the main contact of the greenstone and diorite, close to but not on the main shear-zone. They prospect a quartz vein, strike north 20 degrees west and dip 70 degrees north-eastward, that is exposed in the creek-bed between them. It may be noted that the vein in these adits is on the projected strike of the vein cut by the 2,450 adit, but the vein in the two short adits has a markedly different strike and, if they are the same vein, a decided change in strike has taken place. The vein in these upper adits is from 1 inch to 12 inches wide in the creek but narrows in going north-westerly, and in the face of the north adit it has pinched out, and only the narrow vein-shear and a 4-foot zone of less strongly sheared rock is seen. In the south adit the vein is 3 inches wide and has been followed for 18 feet. The vein-matter consists of ribbon-quartz with a small amount of sulphides, mainly pyrite and a little galena. The rock in these adits is amygdaloidal lava, with a few lenses of banded chert.

A third adit, elevation 3,700 feet and 600 feet below the pass into McQuillan Creek, has been driven on the east side of the stream and close to the contact of the diorite and volcanics, from a point that is 800 feet northerly from the two adits just described. This adit has been driven north 18 degrees east for 16 feet along a shear dipping 60 degrees eastward and then north 10 degrees west for 22 feet along a shear, dipping 35 degrees eastward, which cuts off the steeper shear. In the adit these shears are unmineralized, but outside the portal for a distance of 30 feet the shear contains a lenticular quartz vein, 1 inch to 12 inches wide, mineralized with pyrite and a little galena. The wall-rock in the adit is carbonatized andesite, but the diorite lies only a few feet easterly.

The property was examined by the writer in August and September, 1941.

References: Annual Reports, Minister of Mines, B.C.—1939, A 88; 1941, A 71.

Black Lion.

This group includes the *Black Lion Nos. 5*, *6*, *8*, *10*, and *12*, staked in 1941 by Len Belliveau and G. Moffett, and the *Pan Nos. 1* and *2*, staked in 1941 by R. L. Horie. All these claims are now owned by Bralorne Mines, Limited, of Vancouver.

The claims cover the southward continuation of the *Black Panther* vein-shear, adjoining the *Black Panther* group and lying southerly and easterly from it.

The property is on the steep, heavily timbered hillside that slopes westerly into the West Fork of the Nitinat River.

The workings are reached by a foot-trail, about 2,000 feet long, leading southerly past the *Black Panther* 2,450 adit.

The property was staked in 1941 and open-cut work was done that year by Bralorne Mines, Limited. The company prospected for a length of 1,500 feet the southerly continuation of the main vein-shear and accompanying carbonate-zone explored in the 2,700-foot adit on the *Black Panther*.

On the *Black Lion* group, in the length of the 1,500 feet prospected, the vein-shear strikes northerly and dips 75 degrees eastward. Usually, the break follows the contact between diorite on the east and fine-grained volcanics on the west; but because of a tendency of this contact to weave, the shear- and carbonate-zones may be either in diorite or in volcanics, but are never far from the actual contact.

At the time of the writer's visit (September 28th, 1941) four open-cuts had been made on the vein at an elevation of about 2,700 feet over a distance, north and south, of 175 feet. However, since then, the vein is reported to have been found about 1,300 feet southerly from these cuts. These cuts expose a strong carbonate-zone which ranges from 10 inches to 9 feet in width. In places strong shearing accompanies the zone. Quartz-sulphide stringers are found in zones 1 to 1½ feet wide in some of the trenches. The sulphides include pyrite and a little galena and evidently carry the main amounts of gold, as samples, taken by the writer, of quartz and heavy sulphides, assayed up to 1.2 oz. per ton in gold. Samples taken of the quartz-sulphide stringers and intervening carbonatized rock assayed from 0.27 to 0.43 oz. per ton in gold. The carbonatized rock itself, devoid of quartz stringers, assayed only traces to 0.03 oz. per ton in gold.

The property was examined by the writer on September 28th, 1941.

GEOLOGIC SETTING OF KNOWN MINERAL DEPOSITS AND DISCUSSION RELATING THEM TO PROSPECTING POSSIBILITIES.

Stocks and dykes of feldspar porphyry, in an alignment which trends northerly, and east of this line of feldspar-porphyry intrusives, an elongated mass of diorite trending northerly, are conspicuous features of the geology of the area mapped.

The line of feldspar-porphyry intrusives extends from the southern edge of the sheet, east of the West Fork of Nitinat River, northerly to a point west of McQuillan Creek. The fact that "granitic rock" has been reported from near the western boundary of the property of Vancouver Island Gold Mines, Limited, suggests that the line of feldspar-porphyry intrusives probably extends farther north, beyond the property. It is to be noted that the Vancouver Island Gold, *Regina, Thistle,* Havilah, *Black Panther,* and *Black Lion* properties are found within a belt 1½ miles wide along the general trend of these feldspar-porphyry intrusives. Feldspar-porphyry dykes are particularly numerous in the upper workings on the Havilah, and immediately west of these working on the ridge between the Havilah and *Black Panther.*

The diorite is 5 miles long and ½ mile wide and extends from a point 2 miles north of Mount McQuillan to a point 3 miles south of it. The diorite is intensively brecciated in most outcrops and the breccia is sealed by granitic material (Plate III., A and B). The total amount of granitic material, in the matrix of the breccia and in irregular dykelets, is large. Mineralized quartz veins have been found on both sides of this diorite, on the *Golden Eagle* and *B. and K.* on the east and on the Havilah, *Black Panther,* and *Black Lion* on the west. The west contact of the diorite with andesite is marked by a carbonatized shear-zone that follows south from the headwaters of McQuillan Creek over the divide and down the valley of the West Fork of the Nitinat River. At several places along its strike this carbonatized shear-zone contains narrow ribbons and lenses of quartz mineralized with pyrite and galena and some gold. As examples may be mentioned the upper workings on the Havilah and the showings on the *Black Panther* and *Black Lion.*

A deep-seated source, that was responsible not only for the infiltration of granitic material into the diorite breccia, but also for the introduction of the feldspar-porphyry intrusives, could reasonably be expected to supply the same general area with the mineralizing solutions necessary for vein formation.

The border areas of the feldspar-porphyry and of the diorite intrusives possess structural features favourable for ore-deposition. The contact-zone between the diorite and the andesite west of it appears to have been particularly favourable to the formation of a break suitable for the access of mineralizing solutions.

The line of feldspar-porphyry intrusives and the diorite mass are 1½ miles apart at the southern end. The small area towards the southern end of the diorite is

therefore characterized by rock-types, feldspar porphyry, andesite and diorite, of varying competency or physical characteristics. This area would therefore be suitable for the formation of breaks, either fractures or shear-zones; moreover, the nearness of the feldspar porphyry suggests the probable presence of a deep-seated, potential source of mineralizing solutions. Because of this combination of features, the writer would suggest that prospectors pay careful attention to the area towards the southern end of the diorite.

As indicated by both the known occurrences of mineralization and by the local geology, the best general area for prospecting is a belt, about 2 miles wide, that includes the diorite and feldspar-porphyry intrusives, and extends from the West Fork of the Nitinat River, at the south boundary of the area, northerly to beyond Mineral Creek at the north boundary of the area.

LITTLE BILLIE MINE, TEXADA ISLAND.

(Latitude 49°, Longitude 124° N.W.)

BY

JOHN S. STEVENSON.

CONTENTS.

ILLUSTRATIONS.

INTRODUCTION.

The Little Billie mine, in the Nanaimo Mining Division, is near Vananda, on the north-eastern coast of Texada Island. It is one of four copper-gold properties near Vananda which produced intermittently between 1896 and 1929. These properties were acquired by Industrial Metals Company, Limited, and in 1943 work was begun on the Little Billie, the first to be reopened. Recently, a new company, the Vananda Mining Company, Limited (N.P.L.)—company office, 607 Rogers Building, Vancouver, B.C.; H. T. James, President and Managing Director—acquired three of these properties, the *Copper Queen, Cornell,* and the Little Billie. The ground owned by the new company includes the following Crown grants: *McLeod No. 1 Fraction* and *McLeod No. 2 Fraction* (Lots 521 and 522), *McLeod Nos. 3* to *8* (Lots 515–520), and *L.A.P. No. 1 Fraction* and *L.A.P. No. 2 Fraction* (Lots 523, 524), *L.A.P. Nos. 3* to *6* (Lots 525–528), *L.A.P. No. 8 Fraction* (Lot 530), the *Copper Queen* (Lot No. 40), and *Cornell* (Lot No. 201). The Little Billie workings are on the *McLeod No. 1 Fraction* and *McLeod No. 2 Fraction.* (*See* Fig. 1.)

The writer first visited the Little Billie mine in July, 1937, but because the mine was full of water at that time was only able to collect rock and ore specimens from the dump. Subsequently he made three visits to the property between 1943 and 1944, examining the workings as they were progressively unwatered by Industrial Metals Mining Company, Limited. In April, 1943, six days were spent in mapping the geology on the 100- or 40-foot and 200- or 80-foot levels and in December of the same year five days were spent in mapping the 300-foot and 400-foot levels as of that date. Thin sections were made of rocks collected at that time, and studied under the microscope. During three weeks in June, 1944, the writer, with two assistants, completed the level-mapping, logged the diamond-drill core, mapped the accessible workings at the *Copper Queen,* and commenced the detailed geologic mapping of an area originally planned to cover the Little Billie and adjacent properties; at that time only the work around the Little Billie was completed. No polished-section work has been done on the ore. Because of the current interest in the Little Billie, it is deemed advisable to publish the information available at the present time.

LOCATION.—The mine and workings are about half a mile south-easterly along the coast from the village of Vananda and are reached by a good motor-road from the Vananda wharf. Vananda is served by a twice-weekly service of the Union Pacific Steamships Company, and by telephone via Powell River on the mainland with Vancouver.

TOPOGRAPHY, TIMBER, WATER, AND CLIMATE.—The ground near the workings rises gently from the beach (Plate VI., B), so that development of the property has had to be by a shaft, collar elevation 105 feet, rather than by adits. Low rocky knolls are common and rocky outcrops therefore abundant. Except close to the camp buildings the ground is covered by a dense growth of underbrush and small evergreens. Although very little timber is available close to the Little Billie, good saw-timber is available only a few miles north. Water for domestic and mine use is pumped from Emily Lake, three-quarters of a mile from the mine. The climate, typical of the southern coast of British Columbia, is extremely mild, neither hot in summer nor cold in winter. The annual mean precipitation at Vananda over a period of thirty years is 35.19 inches.

WORKINGS.—The Little Billie workings consist of a shaft 280 feet deep with levels 42 feet, 70 feet, 170 feet, and 270 feet respectively below the collar. These levels were formerly known as the 40-, 80-, 180-, and 270-foot levels, but the present owner, the Vananda Mining Company, Limited, has renamed the levels so that the 180-foot becomes the 300-foot and the 280-foot the 400-foot levels. The writer infers that the 40-foot and 80-foot become respectively the 100-foot and 200-foot levels. The most

recent numbering of the levels will be used in this report. An old shallow shaft is found 160 feet south-easterly from the main shaft. This seems to be the one referred to as the Taylor shaft in a sketch by Brewer on page 289 of the Annual Report, Minister of Mines, British Columbia, 1925. Recently, Industrial Metals Mining Company, Limited, raised to this shaft from the 200-foot level. Several old pits, or shallow shafts, now caved, may be found south-easterly from the main shaft.

HISTORY.—Although the showings on the Little Billie are reported by McConnell (1914, page 62) to have been discovered in 1880, the first mention of the property is in the 1897 Annual Report of the Minister of Mines for British Columbia, page 562, where the Vananda Copper and Gold Mining Company, Limited, is reported to have done work on the Little Billie claim on which an adit had been driven and a shaft sunk many years before on an irregular deposit containing chalcopyrite and pyrite. This company shipped 30 tons of ore in 1896 and in 1899 erected a smelter at Vananda and smelted ores from the *Cornell* and *Copper Queen* mines adjacent to the Little Billie.

The shaft was sunk from 70 to 170 feet in 1911, and a little farther in 1912. The mine was shut down in 1913. It was reopened in 1916 and ore, amounting to 1,222 tons, was mined. This ore is reported to have averaged: Gold, $5 per ton (at the 1916 value of gold); silver, 102 oz. per ton; copper, 2½ per cent. Work continued through 1917 and preparations were made at that time to drive a crosscut from the lowest level on the Little Billie to traverse the ground under the *Cornell* and *Copper Queen* mines. Then followed an eight-year period when lessees mined small amounts of ore from the Little Billie and the adjacent properties. In 1925 the owners of the Little Billie and near-by properties made preparations, that did not materialize, to operate them as a group and had a comprehensive report made on them. Unfortunately, the mine workings were not pumped out for this report and consequently no new information was given about conditions underground. In 1928 the Central Copper and Gold Company of Vancouver acquired the Little Billie, *Copper Queen*, and *Cornell*. In that and the following year they did some diamond-drilling and geophysical surveying. The white 2-inch square stakes, nearly rotted away, that mark the survey-grid used in this survey may still be found throughout the woods south-easterly of the Little Billie.

From 1929 the property lay idle until 1943, when it was acquired, together with adjacent properties, by the Industrial Metals Mining Company, Limited, 626 Pender Street, Vancouver, B.C.; L. A. Prosser, Managing Director. In the winter of 1943–44 this company built a camp of well constructed frame buildings, sufficient for about twenty-five or thirty men, and installed mining machinery and a Diesel power plant. During this period the company unwatered the mine, cleaned up the levels, did considerable underground work, but no stoping, and started very extensive and well directed diamond-drilling. By July, 1944, seventy-six holes aggregating about 7,700 feet had been drilled and the results obtained have shown that the diamond-drilling was well justified. In January, 1945, Industrial Metals Mining Company, Limited, sold the Little Billie, together with the *Cornell* and *Copper Queen*, to the present owner, the Vananda Mining Company. This company has started (May, 1945) to sink the Little Billie shaft a proposed 200 feet below the 400-foot level.

PRODUCTION.—The production from the Little Billie is given in the following table:—

Table I.—Production from Little Billie Mine, Texada Island.

Date.	Tons.	Gold.	Silver.	Copper.
		Oz.	Oz.	Lb.
1896	30	¼	18	7,200
1907	58	35	290	7,644
1908	178	9	900	14,240
1912	1,970	281	1,333	63,942
1913	1,713	617	2,356	105,248
1915	1,130	359	975	45,539
1916	1,217	309	1,216	57,866
Total	6,296	1,610¼	7,088	301,679

It is understood that several hundred tons of ore were shipped from the mine in 1944.

ROCK-TYPES.

The main rocks on the property include limestone, quartz diorite, and many small greenstone dykes. In addition to these, bodies of calcic-silicate rocks consisting mainly of garnet have replaced limestone and have partly replaced greenstone dykes along the contacts of the quartz-diorite. Parts of these replacement rocks have been sufficiently well mineralized with bornite and chalcopyrite to form the ore-bodies of the mine.

LIMESTONE.—The limestone is grey to white in colour and is completely crystalline, ranging from finely crystalline with 1/16-inch crystals of calcite to coarsely crystalline with ½-inch crystals. Most of the limestone in the Little Billie workings has a relatively low magnesium content, although material from the 18-inch bed of mottled limestone on the 300-foot level and from the 2-foot bed of black limestone on the 400-foot level contains sufficient MgO to be called magnesian limestone. The total quantity of such magnesian limestone, in beds which are easily recognizable as different from the usual greyish-white limestone, is not thought to be very large underground. Table II. gives analyses of typical material.

*Table II.—Analyses of Limestone, Little Billie Mine, Texada Island.**

Description of Sample.	CaO.	MgO.	Fe_2O_3.
	Per Cent.	Per Cent.	Per Cent.
Typical white grey limestone from west working on 300-foot level	51.1	3.1	2.9
18-inch bed of mottled limestone in the extreme western end of the 300-foot level	44.8	12.1	2.05
2-foot bed of black limestone in the extreme south face in the east working on the 400-foot level	26.7	14.5	4.1

* G. C. B. Cave, Analyst.

Bedding in the limestone is poorly defined and was observed in only a few places. Although minor folds may occur, the limestone away from the workings strikes in general a few degrees west of north and dips gently westward (*see* Fig. 1). However, underground the strike has swung around to a few degrees east of north, and dips indicating gentle folding are found (*see* Fig. 2 and Fig. 3, sections D-D′, E-E′, G-G′).

QUARTZ DIORITE.—Quartz diorite extends south-easterly for 2,500 feet along the sea-shore north of the workings and from the shore extends southerly towards the workings for 300 feet. Two narrow dyke-like bodies extend for 300 feet and 600 feet respectively farther south.

The quartz diorite is a medium-grained, non-porphyritic rock, light grey in colour, containing quartz, plagioclase feldspar, and glistening black biotite and hornblende. White phases of the quartz diorite, lacking the black biotite and hornblende, are often found underground towards the borders of the darker rock. It is possible that the lighter phases represent a leaching of the black minerals by the mineralizing solutions responsible for the garnet rocks.

GREENSTONE DYKES.—Greenstone dykes of two ages are found, an older group that cuts only the limestone and a younger group that also cuts the quartz diorite. The two groups differ markedly in strike and dip, the older group striking north-easterly and dipping south-eastward and the younger group striking easterly and dipping southward.

The older greenstone dykes are dark green in colour, dense to fine-grained in texture. These dykes are usually so much altered that none of the original minerals are recognizable, although some of the less altered material shows glistening black crystals of hornblende. Close to quartz diorite the dykes are altered to a fine-grained rock, definitely brown in colour because of an abundant fine-grained biotite. This alteration seems to be due to the heat effects of the quartz diorite. Some dykes are cut by numerous veinlets of green diopside and brown garnet, and in some large blocks of greenstone have been entirely converted to a light green, dense rock consisting of diopside and brown garnet. The writer also believes that some of the green garnet, and brown garnet bodies to be described later, are, in part, replaced older greenstone dykes.

These dykes are definitely older than the quartz diorite. They have been cut off along their strike by that rock and in places are cut by granitic stringers and small blebs. Stringers of granitic material may be seen cutting an older greenstone dyke towards the east end of the north drift on the 300-foot level.

The younger greenstone is found in dykes that strike easterly rather than north-easterly, and dip steeply southward. Hornblende porphyry and even-grained, typical diorite are found, both of which are decidedly fresher-looking as compared with the older greenstone. Hornblende porphyry is found in the long east-west 10-foot dyke that outcrops 375 feet south of the shaft (Fig. 1) and in a faulted dyke, strike easterly, that is found on the 400-foot level (Fig. 2). These may be the downward extension of the surface outcrops. Some of the hornblende porphyry contains conspicuous feldspar phenocrysts up to ⅜ by ¼ inch in size. Even-grained diorite is found in the eastern workings on the 300-foot level and in both east and west workings in the 400-foot level (Fig. 2).

The younger dykes cut the older dykes but displace them only slightly. They also cut both the quartz diorite and the garnet bodies at the quartz diorite contacts. Although they cut through the garnet bodies they still may have preceded the alteration of the limestone and older greenstones to garnet bodies, the dykes having been relatively resistant to the altering solutions because of chilled impervious edges. It would require careful study of contacts of the later greenstone with the garnet bodies to make sure that the greenstone had not been replaced by either the calcic-silicates or the sulphides.*

QUARTZ-FELDSPAR PORPHYRY.—Light-grey weathering, quartz-feldspar porphyry is found in scattered outcrops that begin 100 feet west of the shaft and extend 525 feet southerly (Fig. 1). The porphyry is not found in the underground workings because the contacts dip westward and therefore away from the workings. This porphyry is cut by an easterly striking hornblende-feldspar porphyry dyke and is therefore older than the dyke. It has not been observed in actual contact with the quartz diorite and

* Geologically, a somewhat analagous condition existed at the Horne Mine, Quebec, where it has required several years of close observation to prove that the "later gabbro" is earlier than the sulphide replacement ore.

its age-relations to that rock are unknown, but, being of the composition of granite, it may be inferred to be later in age than the near-by quartz diorite.

REPLACEMENT ROCKS.—The replacement rocks are calcic-silicate rocks in which tan, green, and brown garnets are found. The tan garnet is never found with the other garnets, but the green and brown may be found grading into each other.

Spectrographic analyses of carefully selected cleaned garnets are given in Table III. The writer recommends the increased use of the spectrograph in distinguishing between different garnets. This method is much quicker than, and as accurate as, the indirect methods of determination from their specific gravities and indices of refraction.

*Table III.—Spectrographic Analyses of Little Billie Garnets.**

Description of Sample.	Calcium.	Aluminium.	Iron.†	Magnesium.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Light tan garnet	Less than 10	About 5	1	Less than 1.
Light brown garnet stringer in greenstone	Less than 10	About 10	11	Less than 1.
Brown garnet altering from green	Less than 10	Less than 5	30	Less than 1.
Dark brown garnet	*Less than 10*	*Less than 5*	*30*	*Less than 1.*
Deep green garnet	Less than 10	Less than 5	30	2–3.
Deep green garnet from massive garnet body	Less than 10	Less than 5	30	Less than 1.
Deep green garnet found in alternating layers with wollastonite	Less than 10	Less than 5	30	Less than 1.
Deep green garnet, brown garnet found in some body	Less than 10	Less than 5	40	Less than 1.

* G. C. B. Cave, Analyst.

† Checked by a standard colorimetric method.

It will be seen from Table III. that the light tan garnet is a high calcium-aluminium garnet low in iron and magnesium and therefore falls within the compositional range ascribed to grossularite. It may similarly be seen that the brown and the green garnets are high calcium-iron garnets low in aluminium and therefore fall within the range ascribed to andradite.

Light olive-green andradite garnet, lacking the brown zones of the brown andradite, is found associated with wollastonite and diopside. This type of replacement rock contains considerable bornite and chalcopyrite and, where sufficiently well mineralized, constitutes copper ore-bodies.

Dark brown andradite garnet, usually entirely brown in colour but sometimes zoned in alternating colour-bands of brown and green, is found associated with considerable magnetite. This type of replacement rock contains disseminated chalcopyrite and small amounts of bornite and, where sufficiently well mineralized, constitutes copper ore-bodies.

The light tan to cinnamon-coloured grossularite garnet is found adjacent to and as a replacement of quartz diorite. Apart from evidences of replacement seen underground, the chemical composition of the grossularite (*see* Table III.), high aluminium but low iron and magnesium, would suggest replacement of a rock chemically like quartz diorite. The iron-aluminium garnet, almandite, often found in granitic rocks, formed with the igneous rock at the time of its crystallization and did not form, as the Little Billie grossularite has formed, by replacement after consolidation of the igneous rock. The grossularite is associated with diopside and wollastonite and clusters of quartz, epidote, and feldspar. Sulphides are not found in this type of replacement rock.

Clusters, from 1 inch to several feet across, of coarsely cleaved calcite are found in all types of replacement rock. This calcite appears to be recrystallized limestone left unreplaced by the calcic-silicate solutions that formed the garnet rocks.

Both the brown garnet and the green garnet rocks are found near quartz diorite where the limestone is cut by older greenstone dykes. In some of the larger garnet bodies angular fragments of unreplaced greenstone are found at some distances away from a dyke. The garnet bodies extend beyond bodies of greenstone dykes well into limestone, indicating that both limestone and greenstone were replaced. This feature, plus the remnants of both greenstone and calcite or limestone in the garnet bodies, indicate that the garnet bodies were formed in part by replacements of greenstone and in part by replacement of limestone.

Wollastonite and green garnet are often found in parallel, alternating layers, from ¼ to several inches thick. These appear to be the result of preferential replacement of limestone-beds of slightly different chemical composition. The variation in chemical composition, which would probably be from a high calcium-low magnesium limestone to a higher magnesium limestone, probably was not great however, because neither the wollastonite, pure calcium silicate, nor the garnets (*see* Table III.) contains very much magnesium.

STRUCTURE.

The main structural features in the rocks at the mine are the configuration of the south-western contact of the quartz diorite, the shallow folds in the limestone, and one major and several minor faults.

CONFIGURATION OF THE QUARTZ DIORITE.—Within the surface area mapped (Fig. 1) the contact of the quartz diorite strikes south-easterly and dips moderately south-westward (Fig. 3, section F-F′). However, at the mine and 1,200 feet south-easterly from it, this trend is modified by V-shaped areas of quartz diorite that extend southerly (*see* Fig. 1). The quartz diorite at the mine splits and extends southerly as two quartz-diorite dykes that extend to points about 400 feet and 700 feet south of the shaft. These two quartz-diorite dykes are markedly different in width, the westerly dyke is the wider of the two, with a surface outcrop from 20 to 30 feet, widening downward to about 100 feet, whereas the easterly dyke has a surface outcrop of 10 feet, and, on going down, maintains this width (*see* Fig. 3, section D-D′). These dykes coalesce and become part of the main body of quartz diorite a few feet below the 400-foot level (Fig. 3, section D-D′).

FOLDS.—The few bedding-planes recognizable in the limestone near the Little Billie indicate that it has been only gently folded. The limestone in the surface outcrops east and west of the shaft strikes a few degrees west of north and dips gently south-westward (*see* Fig. 1).

Folding, however, is evident in the underground workings. Bedding-planes seen in the western workings on the 300-foot level strike north-easterly to northerly and dip gently north-westward, and opposed dips indicating folds are seen in the eastern stopes on the 400-foot level. An eastward dip is seen 40 feet above the 400 level in the northern end of the narrow stope in the eastern workings and a westward dip in the shallow stope just east of the narrow one. These dips indicate a shallow syncline with its axis approximately followed by the eastern quartz-diorite dyke (*see* Fig. 3, sections D-D′, E-E′, G-G′) and west of this syncline, a low anticline, the crest of which would be approximately followed by the western quartz-diorite dyke (*see* Fig. 3, sections B-B′, D-D′, E-E′). The limestone in the flat eastern stope on the 400-foot level indicates a slight plunge southward for these folds. Further evidence of deformation of the limestone is also seen underground in crumpled and broken portions of the older greenstone dykes. These are bent in places into open drag-folds that were subsequently surrounded by limestone that flowed between the broken parts of the dykes and recrystallized. This feature is particularly evident in some greenstone dykes in the western workings on the 300-foot level.

FAULTS.—Both pre-mineral and post-mineral faults are found at the Little Billie. Three sets of early, pre-mineral faults appear to have existed. Their existence is not determined by the presence of crushed rock and gouge but by the presence of clean-cut dykes that, because of their clean-cut walls and parallelism of many of the dykes, are thought to occupy faults. The earliest faults are occupied by the older greenstone dykes. As inferred from the trend of the dykes, these faults striked northeasterly and dipped about 50 degrees north-westward. A later possible set of faults may have guided the emplacement of the two quartz-diorite dykes. The easterly of the two quartz-diorite dykes is narrow and moderately parallel-walled and may have come up along a fault. A third set of early faults, pre-mineral, but later than the quartz diorite, was followed by the easterly striking, southerly dipping, younger greenstone dykes.

The post-mineral faults are not recognizable at the surface near the Little Billie, but several have been seen underground (*see* Fig. 2 and Fig. 3), where they are recognized by the presence of crushed rock and gouge.

A major fault, striking easterly and dipping 50 degrees southward, apparently follows the same trend as the most recent pre-mineral fault. This major fault is found on the 300- and 400-foot levels where it contains up to 2 feet of crushed rock and gouge. As may be seen in Fig. 2 and the sections in Fig. 3, the foot-wall is nearly always quartz diorite and the hanging-wall may be any one of the rocks found underground. Except for a few very late calcite stringers, this fault is later than both the ore and the younger greenstone. The writer did not recognize any features along the fault to indicate whether it was a normal or a reverse fault. On a priori grounds, however, the relative steepness of the fault, 50 degrees, would suggest a normal fault, in which the rocks on the hanging-wall or south side moved down relative to those on the foot-wall or north side.

Several minor faults of apparently small displacements are also found (*see* Fig. 2). A vertical, southerly-striking fault has been followed by the long south drift on the 200-foot level, this fault is cut by another that follows the hanging-wall of a greenstone dyke. A fault of moderate dip is found in the hanging-wall of the ore in the north stope on the 300-foot level, where it has brought granite against the ore to form the back of the stope (*see* Fig. 3, sections A-A′, B-B′, and C-C′). A small vertical fault is also found in the same stope (Fig. 3, sections A-A′ and B-B′).

Several small cross-faults offset the dyke that strikes along the north-eastern working on the 300-foot level. Relatively strong north-westerly striking and steeply dipping faults are found in the eastern end of these workings; these faults may be a continuation of the main east-west fault found farther west on this and on the 400-foot level (*see* Fig. 2 and Fig. 3, section F-F′). Three minor faults are found in the southeastern workings on the 400-foot level. As with the main fault in the mine, all these minor faults are younger than both the ore and the younger greenstone, and the only mineralization they contain is a small amount of calcite in hair-like stringers.

ORE-BODIES.

The ore-bodies are, as previously mentioned, portions of the brown garnet or the green garnet rocks that have been sufficiently well mineralized with bornite and chalcopyrite to make ore. Their form and localization are therefore determined by that of the garnet rocks. Within these rocks the outline of the actual ore-bodies are indefinite and an ore-body gradually becomes non-commercial through a diminution in the amount of chalcopyrite and bornite present.

SIZE.—The size of the ore-bodies can at present be determined only from the size of the old stopes and the few remnants of ore left in the stopes. Stopes are found on

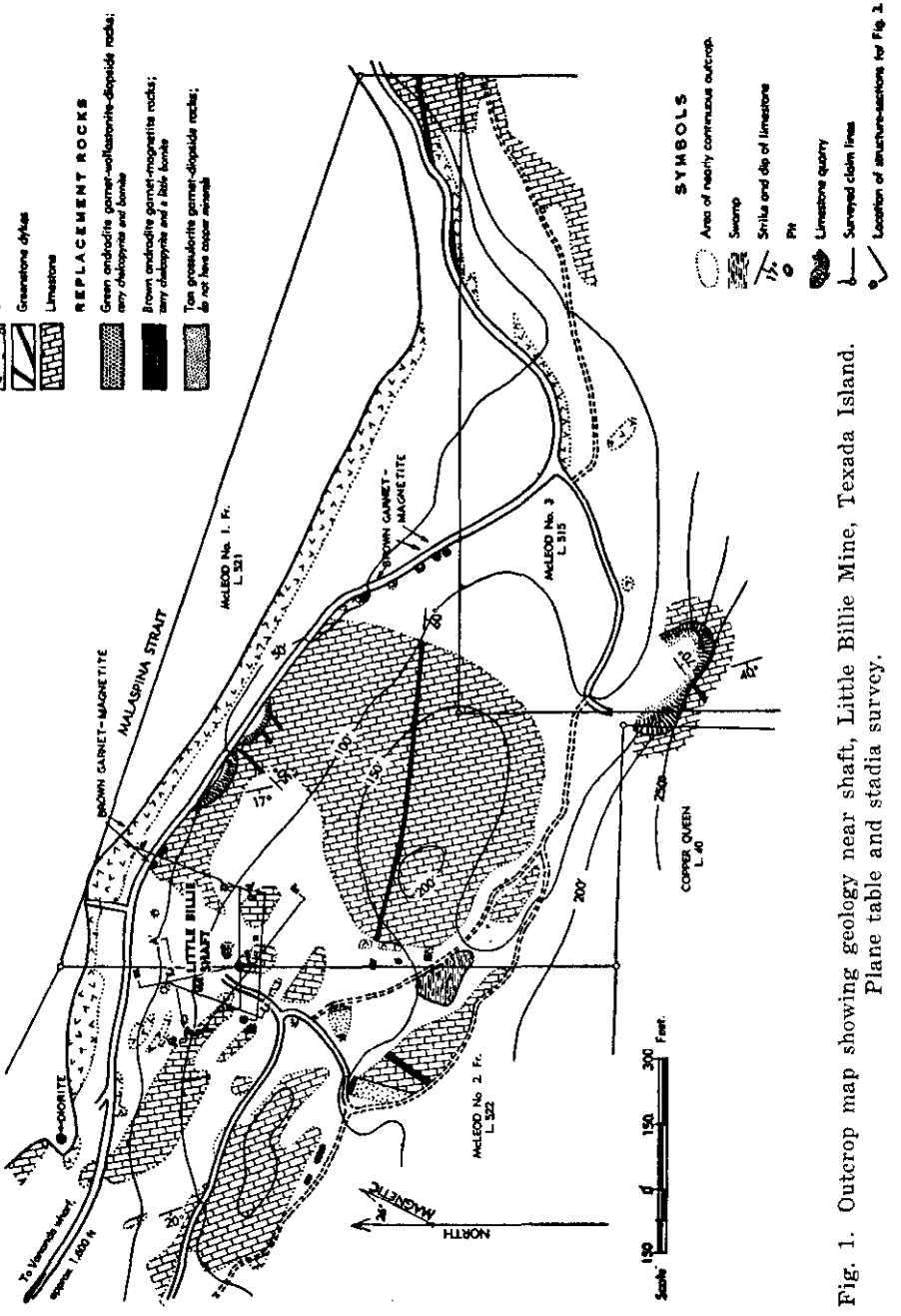


Fig. 1. Outcrop map showing geology near shaft, Little Billie Mine, Texada Island. Plane table and stadia survey.

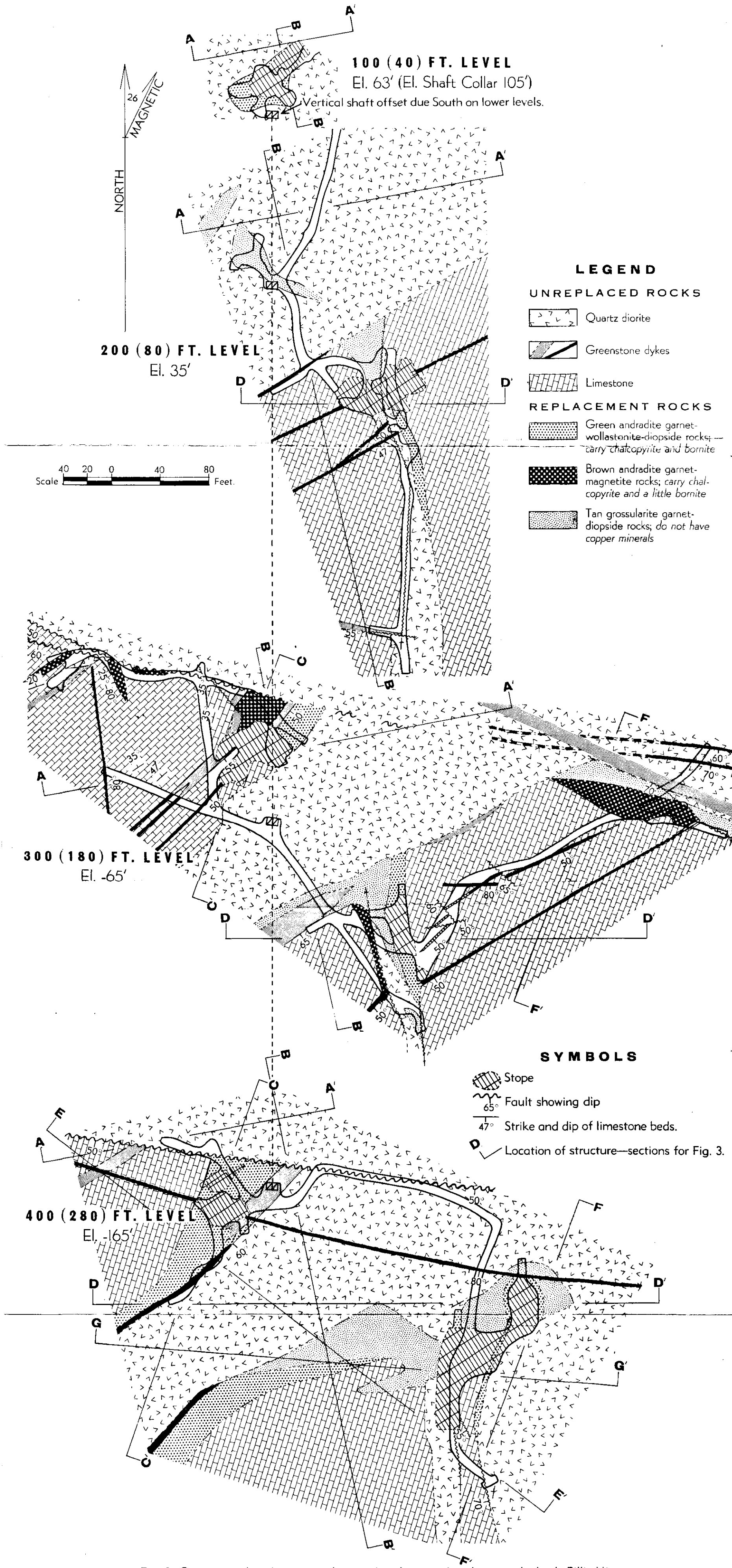
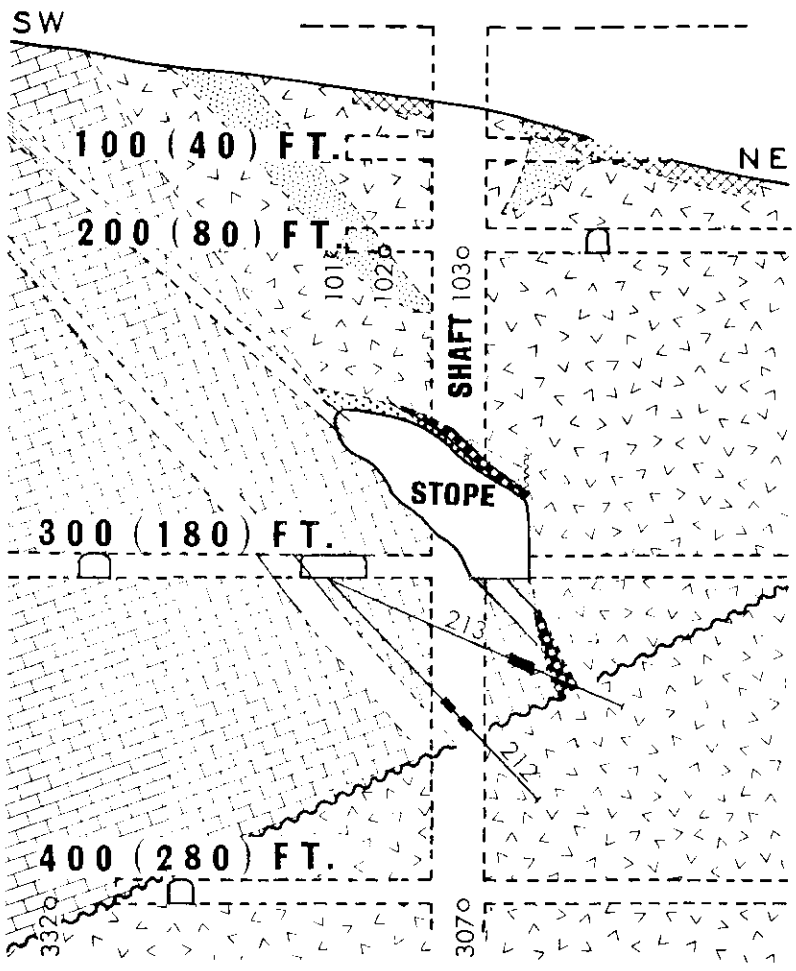
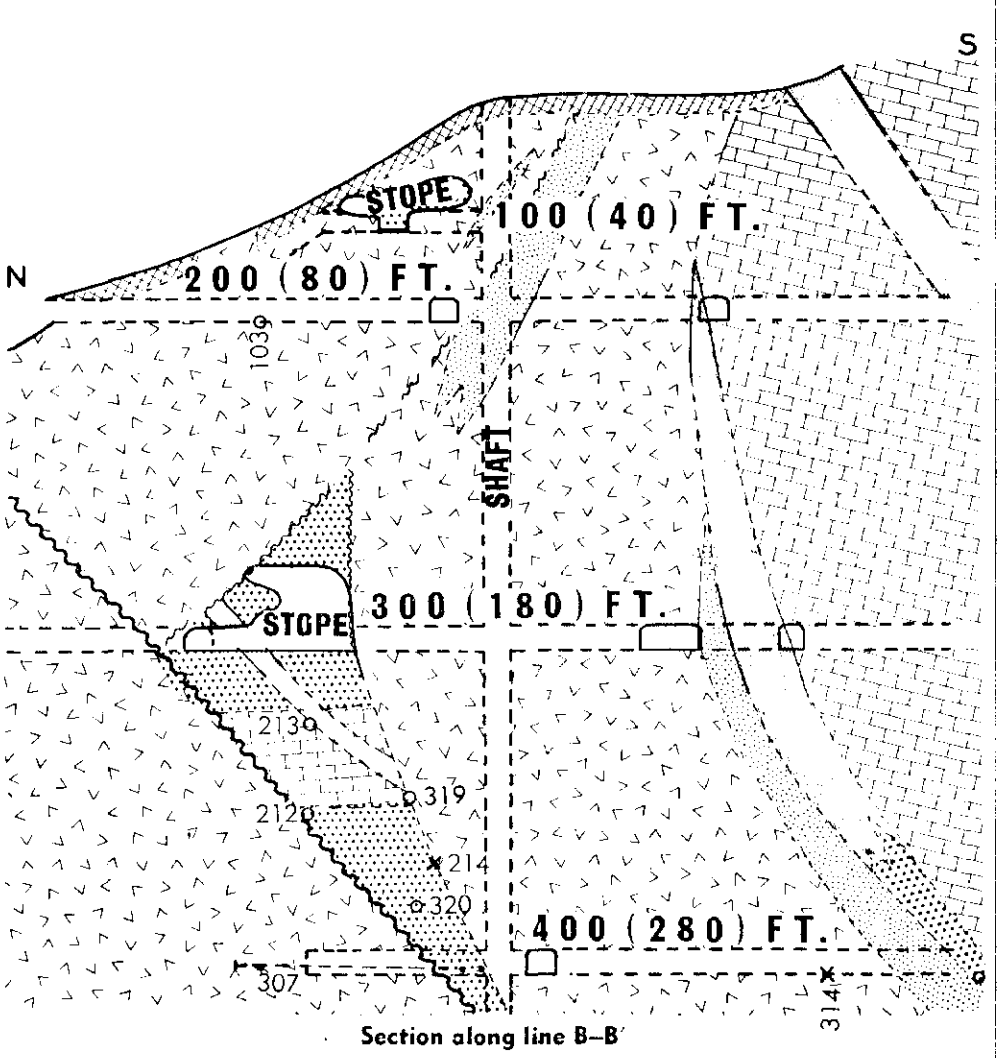


Fig. 2. Composite plan showing geology and underground workings at the Little Billie Mine.

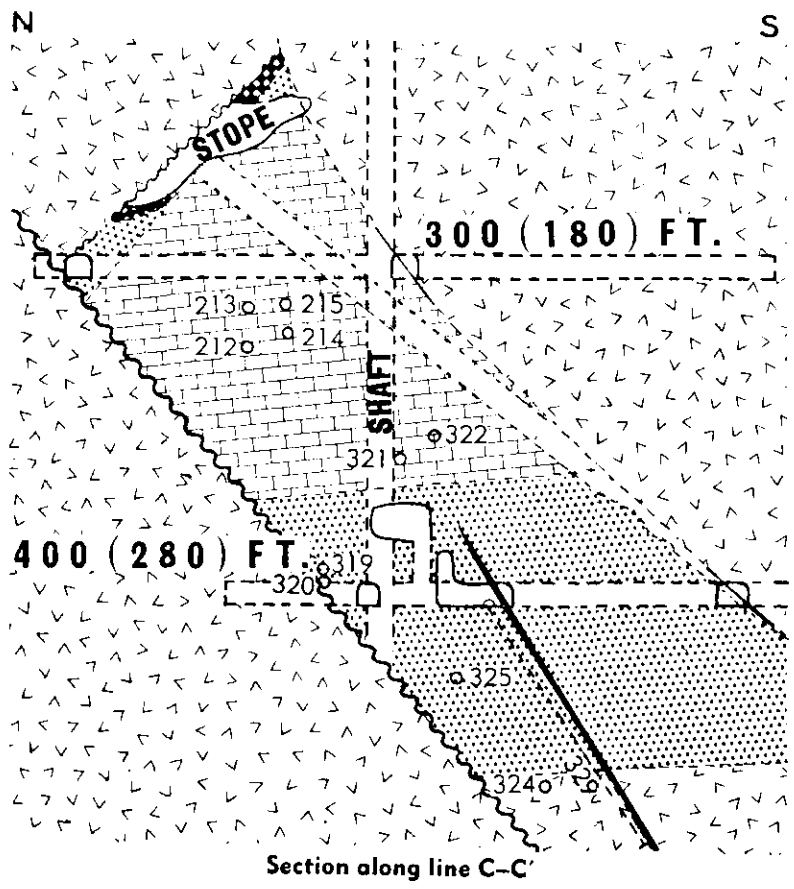
Texada Island.



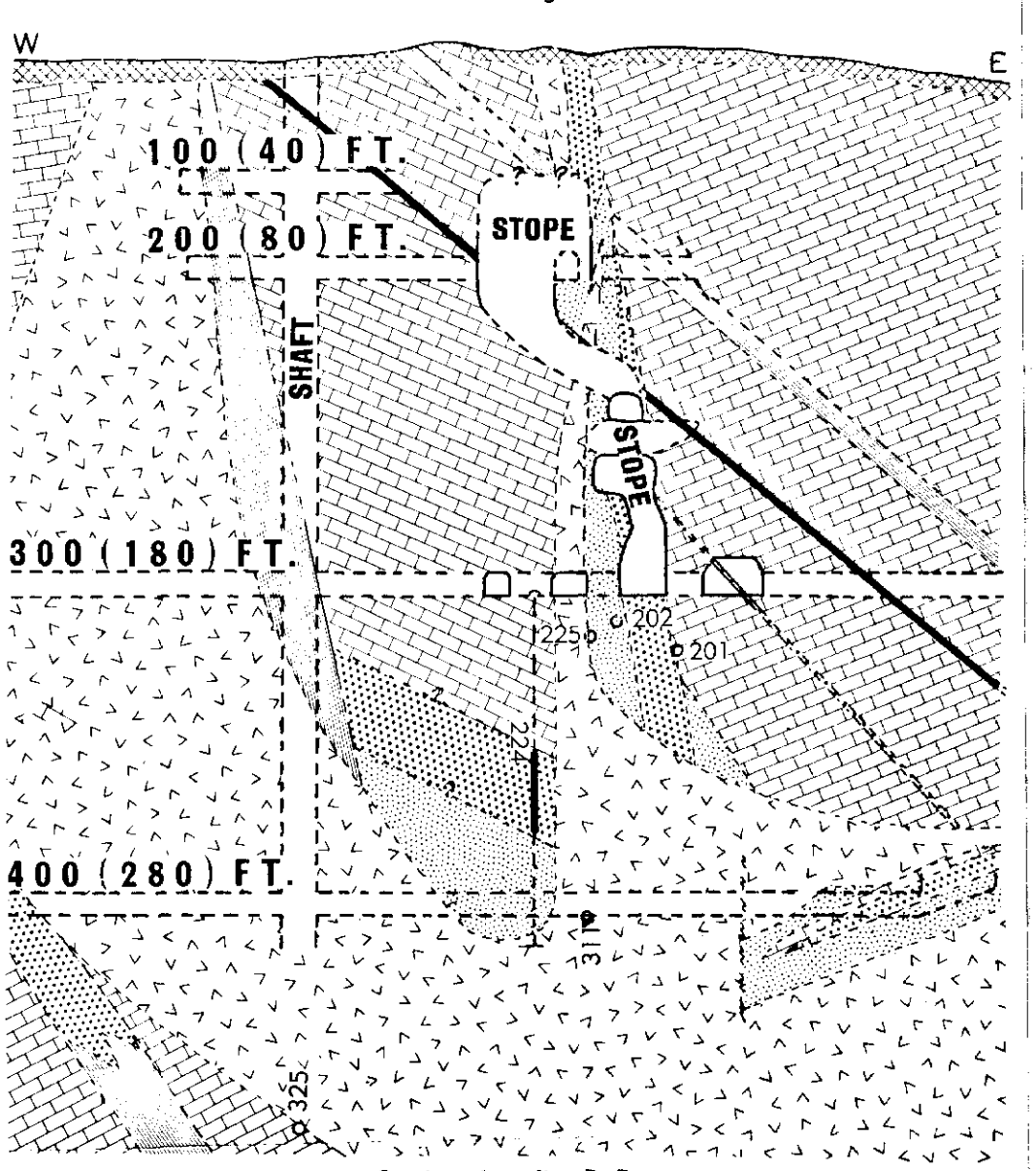
Section along line A–A′



Section along line B–B′



Section along line C–C′



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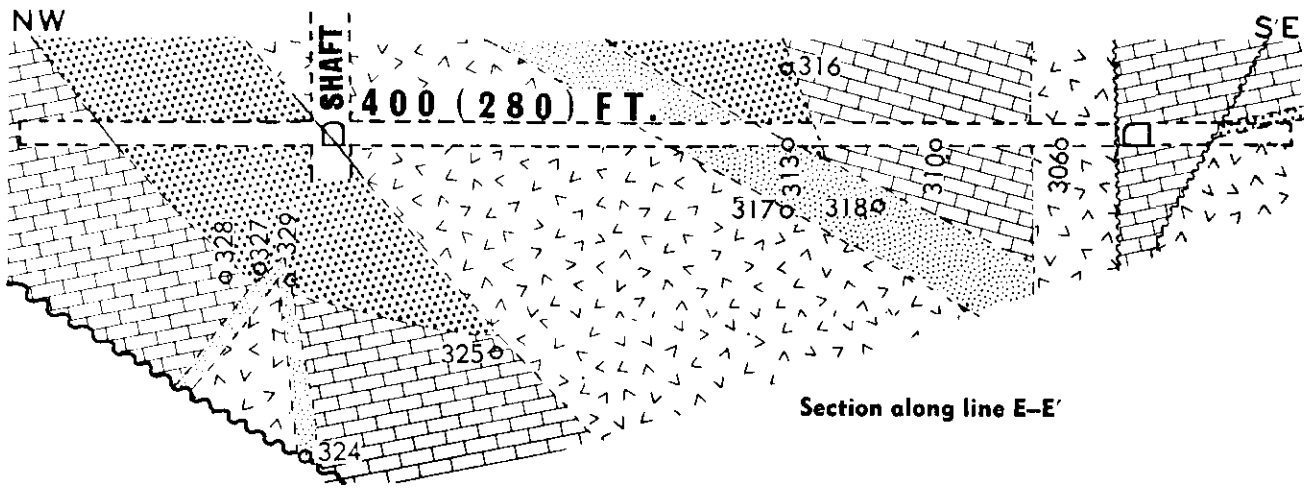

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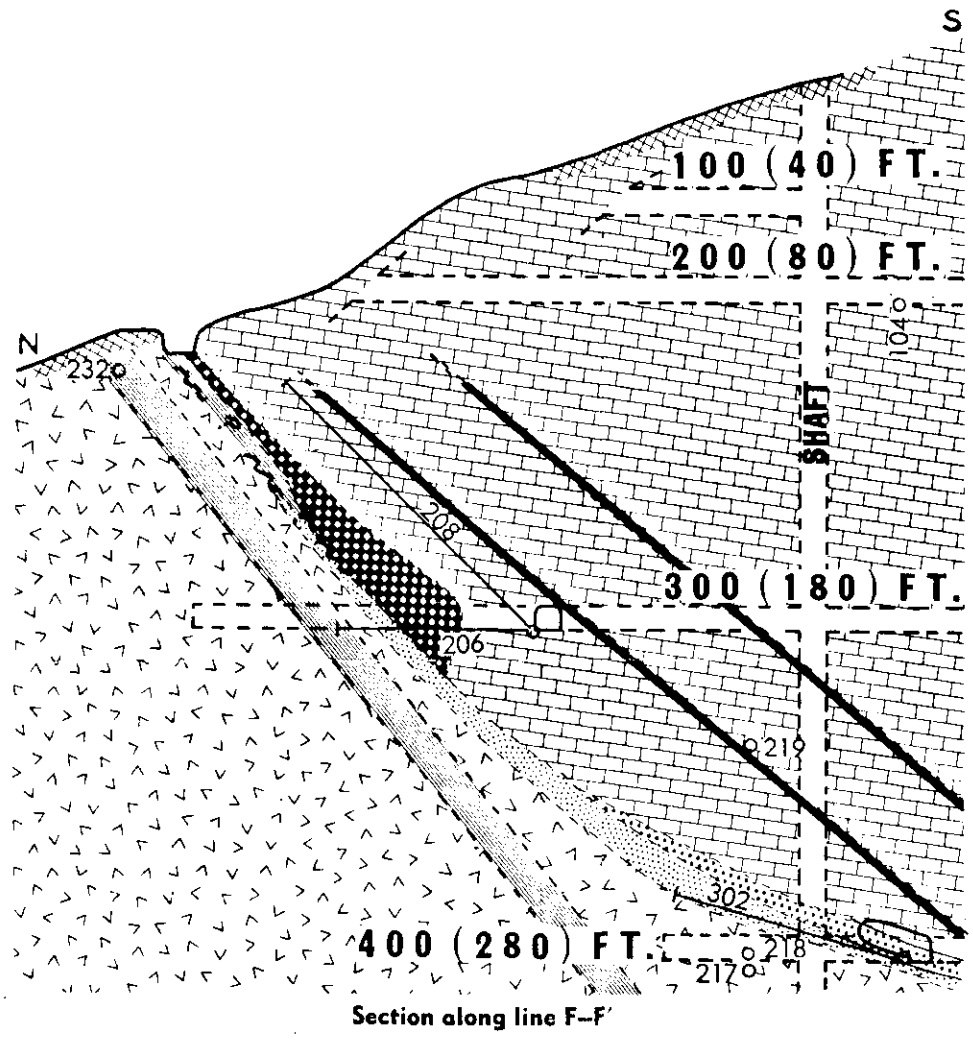
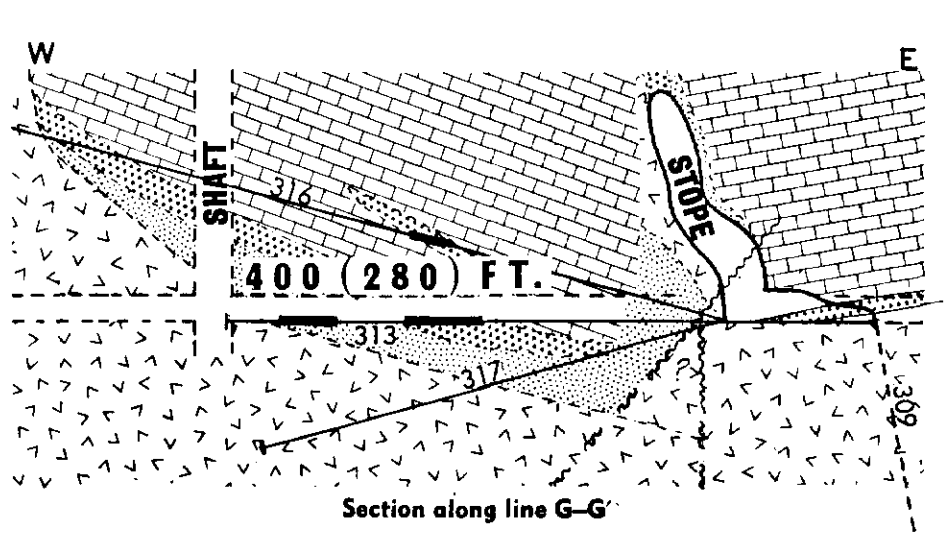


Section along line F–F′



Section along line G–G′

SYMBOLS

- Overburden
- Underground workings
- Underground workings projected into plane of section.
- Diamond-drill hole, and projected hole.
- Actual and projected diamond-drill hole intersections.

Scale 40 20 0 40 80 Feet.

Fig. 3. Geologic structure-sections, Little Billie Mine, Texada Island.
(See Figs. 1 and 2 for location of sections.)

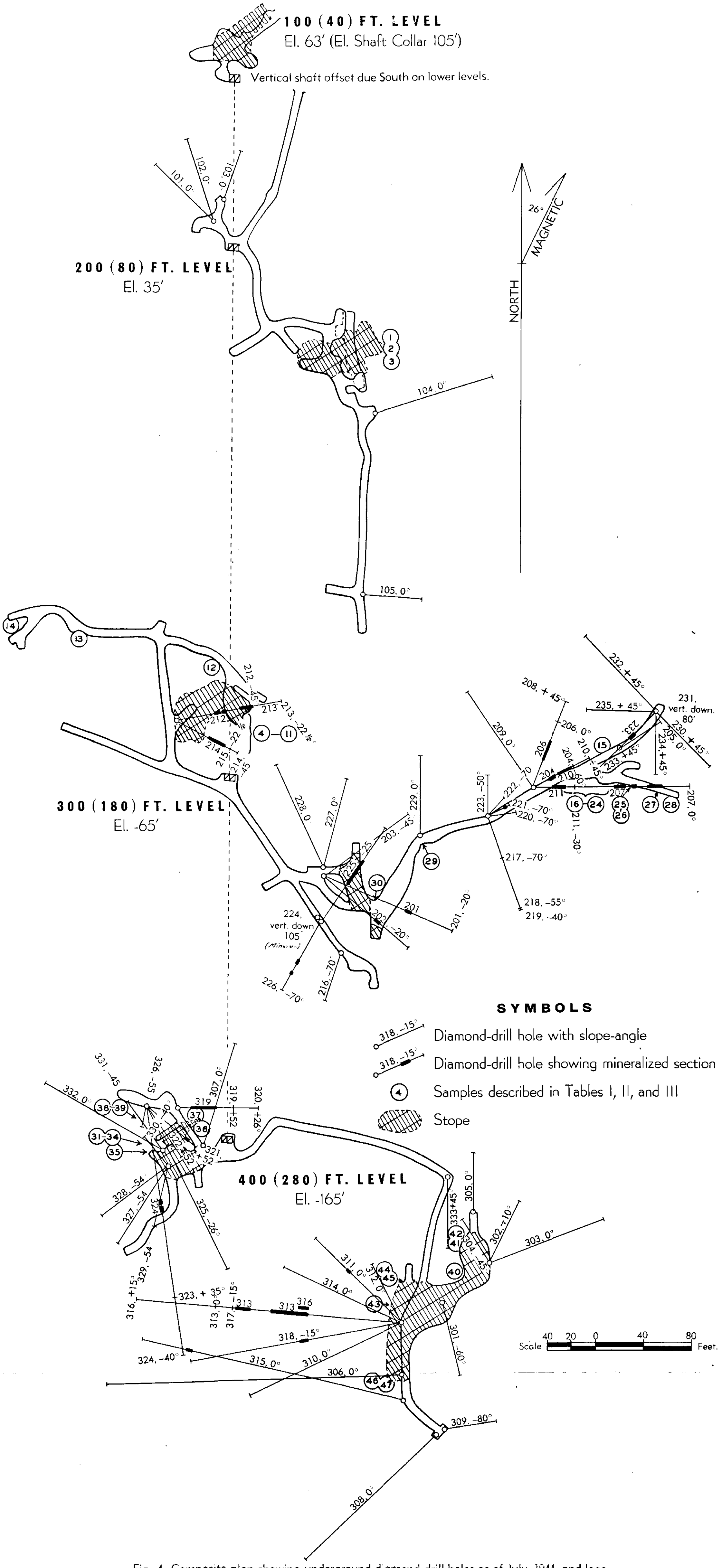


Fig. 4. Composite plan showing underground diamond-drill holes as of July, 1944, and location of samples, Little Billie Mine, Texada Island.

all the levels, but the two largest are on the 300- and 400-foot levels. A stope on the north-western end of the 300-foot level extends upwards on a 45-degree slope for 80 feet, with a breadth of 30 feet and a depth of 10 to 20 feet. A narrower but longer and higher stope is found at the south-eastern end of the 400-foot level. This stope measures 80 feet in length by about 10 feet in width for approximately 60 feet above the level. Above this point the stope is shorter, but extends upwards to the 300-foot level. Several other stopes are found, but these are all smaller than the two just described. It is hard to say how much of the rock excavated from the stopes was ore and how much was waste, and therefore the actual ore-bodies may have been smaller than the stopes would indicate.

Extensive and well-directed diamond-drilling, undertaken by Industrial Metals Mining Company, Limited, in 1944, disclosed mineralization that indicated new ore-bodies and extensions to the old ore-bodies. Up to July, 1944, seventy-six holes, aggregating about 7,700 feet, had been drilled underground and of these, twenty-one holes intersected mineralized garnet bodies. The distribution of the drill-holes and the mineralized sections of ore are shown in Fig. 4. The writer did not sample the diamond-drill core and therefore can not give any figures for grade of the mineralized material. However, much of it was similar to the better grades of mineralization sampled in the workings, assays of which are given in Tables III., IV., and V. The diamond-drill hole intersections of well-mineralized rock in themselves have not supplied sufficient information to determine the exact size of the indicated ore-bodies.

SHAPE.—Although the shape of the ore-bodies, as inferred from the shape of the old stopes and the attitude of the few remnants of ore left, is extremely variable, the general shape is tabular. This tabularity does not approach the regularity of a vein-deposit. In shape, the ore-bodies assume a tabularity that parallels one of two prominent structural features, either the attitudes of the greenstone dykes where near quartz diorite or the contacts of the quartz diorite itself. Some of the ore-bodies assume a tabularity that roughly parallels the strike and dip of adjacent, partly replaced, greenstone dykes. This is seen in the west stope on the 300-foot level. Other tabular ore-bodies parallel the contact of the eastern quartz-diorite dyke which extends vertically from the eastern workings on the 400-foot level to the surface.

MINERALOGY.—The ore-bodies contain bornite, chalcopyrite, and, in part, magnetite, in a gangue consisting mainly of green or brown garnets, wollastonite, and diopside. Although chalcopyrite and bornite occur together in both the green and brown garnet bodies, the chalcopyrite favours the brown garnet-magnetite bodies and the bornite favours the green garnet-wollastonite-diopside bodies.

Sulphides occurring in small amounts include molybdenite and pyrrhotite. Molybdenite is found disseminated in small amounts in all the altered rocks and particularly in the white phases of the quartz diorite. Small amounts of pyrrhotite are found along joints in some altered greenstones.

TEXTURE.—The texture of the two types of ore is different. That characterized by a gangue of coarse brown garnets and abundant magnetite is apt to be coarsely granular and loosely held together, whereas that characterized by a gangue of green garnets plus wollastonite and (or) diopside is dense and tough.

GRADE OF ORE.—The grade of ore mined in the past may be roughly determined from the figures for past production given in Table I. An average of these figures gives: Gold, 0.25 oz. per ton; copper, 2.4 per cent. However, McConnell (1914, page 64) says, "The Little Billie ores usually carry from 4 per cent. to 8 per cent. in copper but the precious metal tenor is much lower than in the other mines, seldom exceeding $3." These two approximations at the grade of ore do not indicate what may be mined in the future from new ore-bodies.

In order to get an idea of the grade of different types of mineralized material the writer took forty-seven samples from three lower levels. These samples included both brown garnet and green garnet rocks. Some were channel-samples, some chip and some only specimen samples of the mineralization. It was only possible to sample remnants of ore in the old stopes and mineralized material found elsewhere in the workings but not mined-out. The location of these samples is shown in Fig. 4. No samples were taken of the mineralized sections of the drill-holes shown in Fig. 4.

The assays of the underground samples are shown in Tables IV., V., and VI. It must be emphasized that these assays are of a few samples only, and by no means indicate the grade of ore that either has been mined or may in the future be mined.

A study of the assays in Tables IV., V., and VI. will show that the gold content in general is proportional to the copper content. There are, however, exceptions to this generalization as may be seen in Sample No. 7, Table IV., where the gold is low and the copper very high, and in Sample No. 47, Table VI., where the gold is very high and the copper low. The very high gold in No. 47 may be attributed to minute gold-quartz veinlets and blebs not easily recognizable in the hand specimen.

Table IV.—Samples taken on 200-foot and 300-foot Levels.

Sample No.	Description of Sample.	Gold.	Silver.	Copper.
	Stope 44 feet below 200 level—	Oz. Per Ton.	Oz. Per Ton.	Per Cent.
1	Across 10 feet of tan garnet	0.03	Trace	0.15
2	Across 5 feet of green garnet	0.01	0.3	0.2
3	Across 3 feet of green garnet	0.11	0.3	0.4
	North stope on 300 level—			
4	Across 4 feet of brown garnet, 25 feet above level	0.02	0.3	1.3
5	Across 4 feet of brown garnet, 30 feet above level	0.01	0.1	1.3
6	Across 2 feet of wollastonite and green garnet, 30 feet above level	0.28	0.3	4.9
	Same stope, 40 feet above level—			
7	Across 10-inch nodule of heavy chalcopyrite	0.01	1.2	17.8
8	Across 5 feet of brown garnet in hanging-wall of dyke	1.28	0.5	0.15
9	Across 2 feet of green garnet between quartz diorite and limestone	0.01	0.1	1.0
	Same stope, 60 feet above level—			
10	Across 3 feet of wollastonite in foot-wall of dyke	0.07	0.5	0.8
11	Across 2 feet of magnetite-sulphide replacement of dyke	0.01	0.2	1.5

Three other long chip samples (Nos. 12, 13, and 14) were taken of the mineralized brown garnet in the drift along the main fault on the 300-foot level. These assayed only traces in gold and silver and from 0.5 to 1 per cent. in copper.

The working extending for a considerable distance north-easterly from the eastern stope on the 300-foot level is new and opened up a considerable body of mineralized brown garnet and some green garnet (*see* Fig. 2). Fourteen samples were taken of the mineralized garnet rocks in this new working. These samples are described in Table V.

Table V.—Samples taken in New Drift North-east on 300-foot Level.

Sample No.	Description of Sample.	Gold.	Silver.	Copper.
		Oz. Per Ton.	Oz. Per Ton.	Per Cent.
15	Along 18 feet of south-east wall of north-east working	Trace	Trace	0.05
	Along north wall of easterly working, from west to east—			
16	Along 18 feet	0.01	1.6	1.9
17	Along 6 feet	0.01	0.6	0.5
18	Across 18-inch nodule of calcite with sulphides	0.01	0.3	1.1
19	Along 6 feet	0.01	0.5	0.7
20	Along 6 feet	Trace	Trace	0.5
21	Along 18 feet	Trace	0.3	0.65
22	Along 6 feet on south wall	0.01	1.9	3.8
23	Across 2 feet of bornite in crush-zone in green garnet	0.18	1.8	2.9
24	Across 3 feet of some bornite patches on south wall near back	0.08	1.2	2.8
25	Across 3 feet of some bornite patches on south wall near floor	0.09	1.2	3.0
26	Across 10-inch nodule of green garnet in drag in fault-zone	0.82	9.0	14.5
27	Across 2½ feet of green garnet in drag	0.09	1.7	2.2
28	Across 2½ feet of green garnet in drag	0.04	0.9	4.1

At 29, a pocket, 2 feet in diameter, of crushed, heavy sulphide was found in the hanging-wall of the silicated greenstone dyke. A grab sample of this material assayed: Gold, 2.2 oz. per ton; copper, 14.3 per cent.

At 30, a sample taken across 2 feet of mineralized wollastonite assayed: Gold, 0.04 oz. per ton; copper, 1.8 per cent.

Table VI.—Samples taken on the 400-foot Level.

Sample No.	Description of Sample.	Gold.	Silver.	Copper.
		Oz. Per Ton.	Oz. Per Ton.	Per Cent.
31	Across 4 feet of green garnet and wollastonite, west wall of 10-foot raise	Trace	Trace	0.08
32	Across 2 feet of green garnet and wollastonite, between greenstone on east and limestone on west, across back of 10-foot raise	0.28	1.1	1.2
33	Across 1 foot similar to and just west of No. 2	0.19	2.0	2.6
34	Across 4 feet of northerly continuation of No. 1	0.06	0.3	0.3
35	Across 18 inches of green garnet and wollastonite on north-east side of greenstone	0.21	1.5	1.6
36	Chip sample along 30 feet of wall, mostly dark green garnet	0.09	0.6	0.8
37	Chip sample along 10 feet of wall, mostly dark green garnet	Trace	0.2	0.08
38	In small stope 15 feet above level across back, green garnet and wollastonite	Trace	Trace	0.02
39	Same stope—streak of heavy sulphides at contact of green garnet and limestone	0.6	4.7	9.5
	Flat stope in south easterly workings—			
40	Across 2-foot band of wollastonite and green garnet, beneath limestone	0.01	0.3	0.3
41	Across 2-foot band of wollastonite and green garnet, beneath limestone	0.06	0.7	0.02
42	Across 3 feet of tan garnet, relatively unmineralized, below Nos. 10 and 11	Trace	Trace	0.02
	High, vertical stope in south-easterly workings—			
43	Across 3 feet of wollastonite and quartz, 24 feet above level	0.23	0.6	2.0
44	Across 2 feet of wollastonite and green garnet, between limestone above and brown garnet below	0.10	5.3	5.0
45	40 feet above level, across five feet of brown garnet in foot-wall of No. 44	0.01	0.2	0.35
46	Patches of heavy sulphide in wollastonite and quartz in hanging-wall of greenstone, 45 feet above level	0.25	0.9	11.6
47	Across 2 feet of green garnet in foot-wall of greenstone, below No. 16; contains streaks of chalcopyrite between greenstone and garnet, quartz diorite immediately below the garnet	3.69	2.1	2.6

RELATION OF ORE TO STRUCTURE.—The ore is related structurally to the quartz diorite, particularly the two quartz-diorite dykes, and to the older greenstone dykes and to some extent to folding in the limestone. The mineralizing solutions appear to

have come up along the quartz-diorite dykes and formed copper-bearing garnet bodies where the older greenstone dykes are close to the quartz diorite, and to have replaced both the limestone and the greenstone. The eastern and thinner of the two quartz-diorite dykes appears to have been more favoured by the ore than the thicker dyke, possibly because shearing along the dyke served to localize ore-deposition near it.

Scattered bodies of mineralized garnet have been found along the south contact of the quartz diorite and a moderately large body along this contact has been opened by the east drift on the 300-foot level and by a couple of surface pits. What may be a continuation of the same mineralization, but not necessarily of the same ore-body, may be seen in pits north-easterly along the beach-road from the mine (Fig. 1).

A shallow synclinal fold in limestone, close to quartz diorite, seems to have been a localizing structure in the formation of ore recently found by diamond-drilling between the east and west workings of the 400-foot level (Fig. 3, sections E-E′ and G-G′). This basin appears to plunge southerly and to widen in doing so.

Not all the intersections of the older greenstone dykes with quartz diorite have ore-bodies and it is probable that there are other controlling structural features for which good evidence is at present (July, 1944) lacking. These features include the angle at which an older greenstone dyke comes into the quartz diorite and the attitude of the limestone-beds at the intersections of the quartz diorite and the greenstone dykes. Both the structure in the limestone near such intersections and variations in chemical composition of the limestone may be determining factors in the localization of ore. A detailed chemical study of the limestone underground might shed more light on this question.

The ore does not seem to have come from the immediately adjacent quartz-diorite body but rather from some deeper source. Several of the sections in Fig. 3, particularly sections D-D′ and F-F′, suggest that the solutions rose along the main contacts of the quartz diorite from some deeper source, possibly the source in which the quartz diorite originated.

References.—*McConnell, R. G. (1914): Texada Island, B.C.—Geol. Surv., Canada, Mem. 58, pp. 9, 45, 46, and 62. LeRoy, O. E.: Portions of the main coast of British Columbia and adjacent islands—Geol. Surv., Canada, Publication No. 996, p. 53. Annual Report, Minister of Mines, B.C.—1897, pp. 560, 572; 1898, pp. *1136, 1144; 1899, p. 802; 1907, p. 45; *1908, p. 154; 1910, p. 166; *1911, p. 212; 1912, pp. 197, 238, 323; 1913, pp. *287, 324, 421; 1914, pp. *381, 420; 1915, pp. 289, *368, 447; 1910, pp. 355, 431, 519; *1917, p. 258; 1925, pp. 284, 288; *1928, p. 387; 1943, pp. A 45, 69.

* References of particular interest.

WHITESAIL LAKE AREA.

(53° 127° S.E.)

BY

STUART S. HOLLAND.

Discovery of gold values in quartz veins in Tweedsmuir Park, in the vicinity of Whitesail Lake, attracted a good deal of interest to that part of the Province in 1944. The new discovery, on the Harrison group, brought individual and company prospectors into the Whitesail Lake area. As a consequence, mineral showings that had been known for many years were re-examined and restaked while additional claims were staked on ground not previously located.

The writer spent eleven days from September 13th to September 23rd on the Harrison property. Six days were lost because of bad weather. The other properties in the area were not examined.

The following notes contain information about means of access and some generalized geology that may have wider application than just to the Harrison group. There is no previous information on the Harrison group because of its recent discovery. The following publications contain information applying to a large area along the east side of the Coast Mountains.

References.—Eutsuk Lake Area—Geol. Surv. Can., Sum. Rept. 1925, Pt. A. Whitesail-Tahtsa Lakes Area—Geol. Surv. Can., Sum. Rept. 1924, Pt. A. Eutsuk Lake District—Geol. Surv. Can., Sum. Rept. 1920, Pt. A. Tahtsa-Morice Area—Geol. Surv. Can., Map 367A—1936. Ann. Rept. Minister of Mines, B.C., for 1916, 1919, 1926, 1927.

HARRISON GROUP.

LOCATION AND ACCESS.—The group is in Tweedsmuir Park and lies south-west of Burns Lake, on the Prince Rupert Branch of the Canadian National Railway. From Burns Lake a road runs 15 miles south to Francois Lake. The lake is crossed by ferry to Southbank, whence the road continues 27 miles to Ootsa Landing on Ootsa Lake and an additional 13 miles west along the north side of the lake to Wistaria. From Wistaria it is 57 miles by boat to the west end of Whitesail Lake by way of Ootsa Lake, Tahtsa River, Sinclair Lake, Whitesail River, and Whitesail Lake. Shallow-draught, flat-bottomed river-boats must be used on the waterway.

The Harrison Group consists of twenty-eight claims and one fraction, the *Harrison Nos. 1* to *18*, *Harrison Nos. 21* to *30* mineral claims, and the *A.E. Fraction.* The ten claims comprising the original Harrison group were staked in the autumn of 1943 and the remainder in 1944. The claims are held by location by the Harrison brothers, of Wistaria, and by Franc Joubin and A. E. Pike. The original Harrison group is reported to be under option to Pioneer Gold Mines of B.C., Ltd.

The claims lie north of Lindquist Lake and extend from the lake-shore, elevation 2,900 feet, to the top of the ridge, elevation 5,800 feet. Pioneer Gold Mines of B.C., Ltd., established their camp just below timber-line at an elevation of 3,800 feet. It is 1,100 feet above, and 5 miles by newly constructed pack-horse trail from, the west end of Whitesail Lake.

The main showings lie above 4,000 feet elevation. They are at and above timber-line on the south-sloping hillside.

GEOLOGY.—The eastern contact of the Coast Range batholith runs in a north-westerly direction from the west end of Pondosy Lake, through the west end of Eutsuk Lake and between Lindquist and Whitesail Lakes to the west end of Tahtsa Lake.

The Harrison group lies along the eastern contact of the batholith on the south side of a prominent, unmapped embayment. As a consequence, the intrusive contact runs

in a westerly direction across the Harrison group. More specifically, the contact extends in a fairly straight line almost due west across the *Harrison No. 22, No. 13, No. 12, No. 5, No. 1,* and *No. 2* mineral claims.

Coast Range intrusive rocks, where seen on the Harrison claims, consist of two types: a medium-grained, pale pinkish-weathering granodiorite and a medium-grained grey quartz diorite. The grey quartz diorite appears to extend along the margin of the batholith with white to pink granodiorite lying down-hill to the south of it.

The granitic rocks intrude sediments and volcanics of the Hazelton group. On the Harrison claims the Hazelton group rocks include slate, tuffaceous argillite, pale green thinly-bedded tuff, and some coarse volcanic breccia. Close to the contact slates are metamorphosed to andalusite schist. These rocks strike nearly parallel to the igneous contact, north 70 to 80 degrees west, and dip towards it, from 50 to 75 degrees to the south-west.

Black, post-vein dykes outcrop in several places.

A fault striking about south 45 degrees east was seen on the *Harrison No. 22* and *No. 23* claims. It is just west of the camp and is followed southward by a small creek. The fault displaces the contact between granodiorite and adjacent slate a horizontal distance of about 900 feet.

VEINS.—In the autumn of 1943 interest was first aroused because of the scheelite content of quartz veins that outcrop near the initial posts of the *Harrison No. 1* and *No. 2* mineral claims. In 1944 sustained interest centred on the outcrops of gold-bearing vein-quartz on the *Harrison No. 5* and *No. 13* claims. These are natural outcrops of three quartz veins; two of them are on the *Harrison No. 13* claim and one is on the *Harrison No. 5* claim.

The east quartz vein outcrops at an elevation of about 4,000 feet. The local topography causes the vein to outcrop in an arc which between end exposures is about 260 feet long. At the south-east end the vein terminates on the side of a prominent gully striking about north 25 degrees east. This gully may possibly be the topographic expression of a shear zone or fault. On the north-east side the vein ends at a second, less prominent, gully running about north 25 degrees east which might coincide with another shear zone or fault. Drift obscures bed-rock so that no evidence of displacement was observed along either gully.

This east quartz vein is in grey quartz diorite. At its north-west end it strikes about north 65 degrees west and dips 30 degrees to the north-east. No stripping had been done on the vein at the time of examination.

A second quartz vein outcrops in the east corner of the *Harrison No. 13* claim. It is believed to extend for 315 feet from an exposure of quartz in a small creek, about 250 feet north-west of the end of the east vein, to vein quartz exposed at a waterfall in a second creek to the south-west. The absence of trenching in the intervening ground makes the continuity still uncertain. The trend and approximate strike of the vein is south 60 degrees west. Its dip is about 45 degrees to the north-west.

At the time of examination no trenching had yet been done on the vein so that any extensions beyond the present terminal outcrops were not known.

A third quartz vein outcrops on the *Harrison No. 5* claim. Vein-quartz is exposed at close intervals for a length of 480 feet. The trend of the outcrop on the rising sidehill is about 10 degrees north of the actual strike of the vein which is south 75 degrees west. Its dip is 60 degrees to the north. About 150 feet from the eastern end the vein appears to split; a branch of the vein 150 feet long outcrops on the foot-wall side.

At the time of examination the company had begun to strip and trench the vein near the presumed split. No work had yet been done beyond the terminal outcrops.

The three quartz veins are in quartz diorite close to its contact with the intruded sediment and volcanics. The west vein is about 500 feet south of the contact and the central one 300 to 400 feet from it. The veins appear to occupy tight fractures; where observed the quartz is frozen to the walls.

At the time of examination trenching and stripping had just been started. Observations were made on natural outcrops where both walls of the vein were rarely exposed. As a consequence, the full widths of the veins are not known. Quartz widths as great as 6 feet are exposed in numerous places and occasional greater widths may be seen. It is impossible to give any average vein-widths until further work is done.

The three quartz veins are mineralized with pyrite, galena, and sphalerite. The amount of sulphide varies in different places and on the average may amount to about 5 per cent. of the vein. A small amount of magnetite was observed in one exposure. The presence of a telluride mineral, probably a bismuth telluride, has been confirmed. No visible gold was seen in any of the ore nor has any been reported from the showings.

The sulphide minerals occur in bands which run parallel to the walls of the vein and lie between barren or sparsely mineralized quartz. The bands show no preference for either wall. Pyrite which has been leached from most quartz outcrops to a depth of several inches leaves a coarse honeycomb structure in the quartz. The leaching of iron is so complete that in some places the surface quartz is scarcely stained by iron oxide.

SAMPLING.—No attempt was made to sample the veins at close intervals. Seven samples were taken to indicate the possible values in the veins. The width sampled is the maximum width of quartz exposed at the point but is not necessarily the full vein width.

Two samples from the east vein assayed, per ton: Gold, 0.36 oz. and 0.32 oz.; silver, 5.0 oz. and 1.3 oz., across widths of 6 feet and 9 feet respectively.

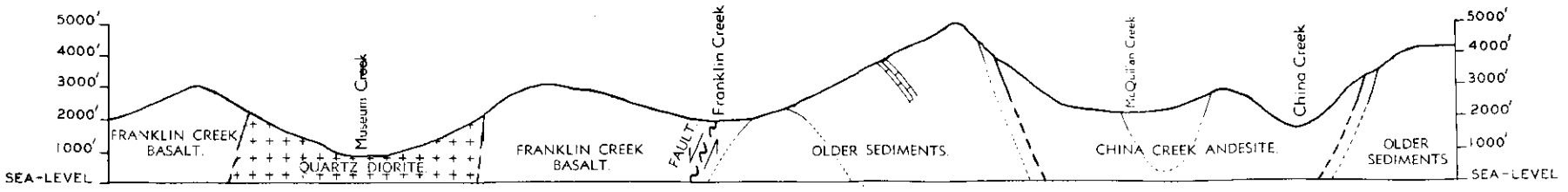
Three samples from the central vein assayed, per ton: Gold, 0.13 oz., 0.20 oz., and 0.09 oz.; silver, 2.3 oz., 1.6 oz., and 1.5 oz. across widths of 5 feet, 7 feet, and 7 feet respectively.

Two samples from the west vein assayed, per ton: Gold, 0.22 oz. and 0.22 oz.; silver, 4.6 oz. and 5.9 oz. across widths of 10 feet and 6 feet respectively.

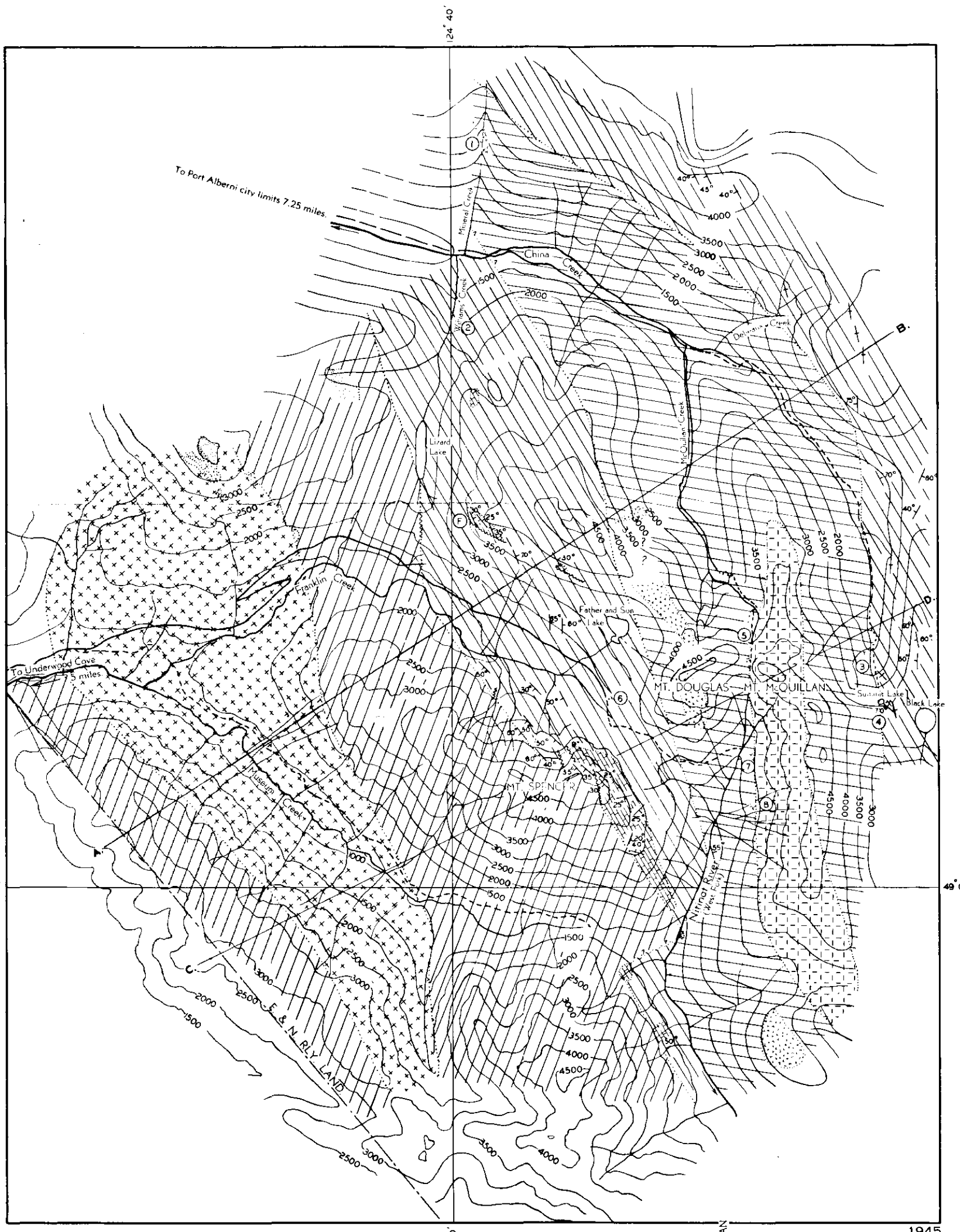
CONCLUSION.—Natural exposures of vein-quartz indicate for the three veins lengths of at least 260 feet, 315 feet, and 480 feet—a total of 1,055 feet. The combined length of quartz, on the three veins, exposed in natural outcrops between drift-covered areas is 285 feet. No attempt has yet been made to trace vein extensions beyond the present outcrops.

The difference in elevation between terminal outcrops of each vein is: West vein, about 150 feet; middle vein, about 25 feet; and east vein, about 75 feet. The veins are in quartz diorite and dip towards the sedimentary contact. Neither the dip of the contact is known nor is there any information regarding the behaviour and persistence of the veins to any great depth in quartz diorite below the outcrops. Consequently, the distance to the sedimentary contact on the projected dip of the veins is unknown.

During 1944 the company's attention was devoted largely to trail and camp construction and to a small amount of stripping and trenching on one of the three main veins. The most important showings are the three veins already described. Other quartz veins whose relations to the main veins are not apparent, but which are mineralized with sulphides in varying amounts, may warrant exploratory work.



Diagrammatic structure-section along line A–B.



LEGEND

YOUNGER SEDIMENTS AND INTRUSIVES

- Feldspar-hornblende porphyry.
- Cretaceous conglomerate, sandstone, and shale.

OLDER INTRUSIVES

- Feldspar porphyry.
- Quartz diorite.
- Diorite.

VOLCANICS

- Franklin Creek Basalt.
- China Creek Andesite.

OLDER SEDIMENTS

- Limestone, jasper, chert, tuff, and volcanic breccia.

Geologic boundary

Fault

Strike and dip of sediments

Fossil locality (F)

Adit

Prospect

Road

Trail

Contour interval 500 feet

Magnetic declination 25° East.

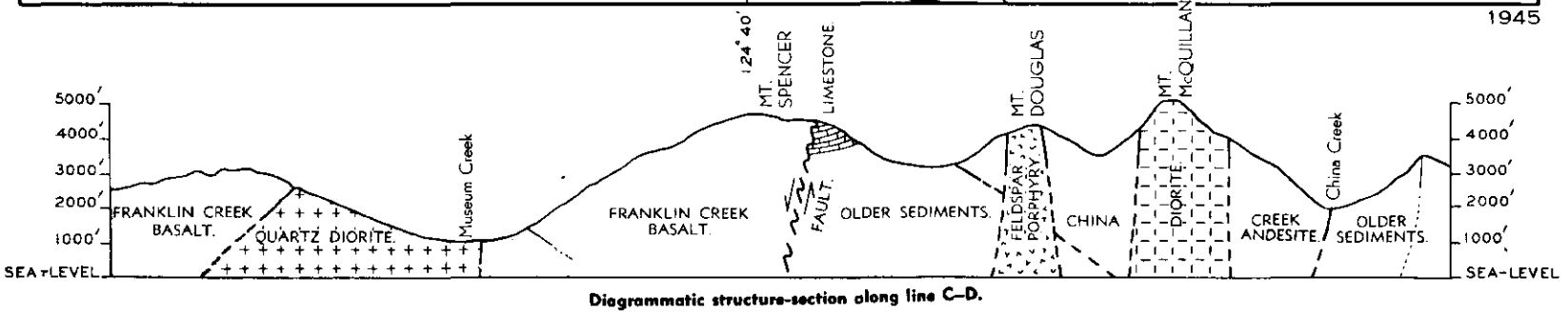
Topography in part from information supplied by the Department of Lands, British Columbia, and in part by the writer.

Geology by John S. Stevenson, 1941. British Columbia Department of Mines.

Scale ½ 0 ½ 1 Miles

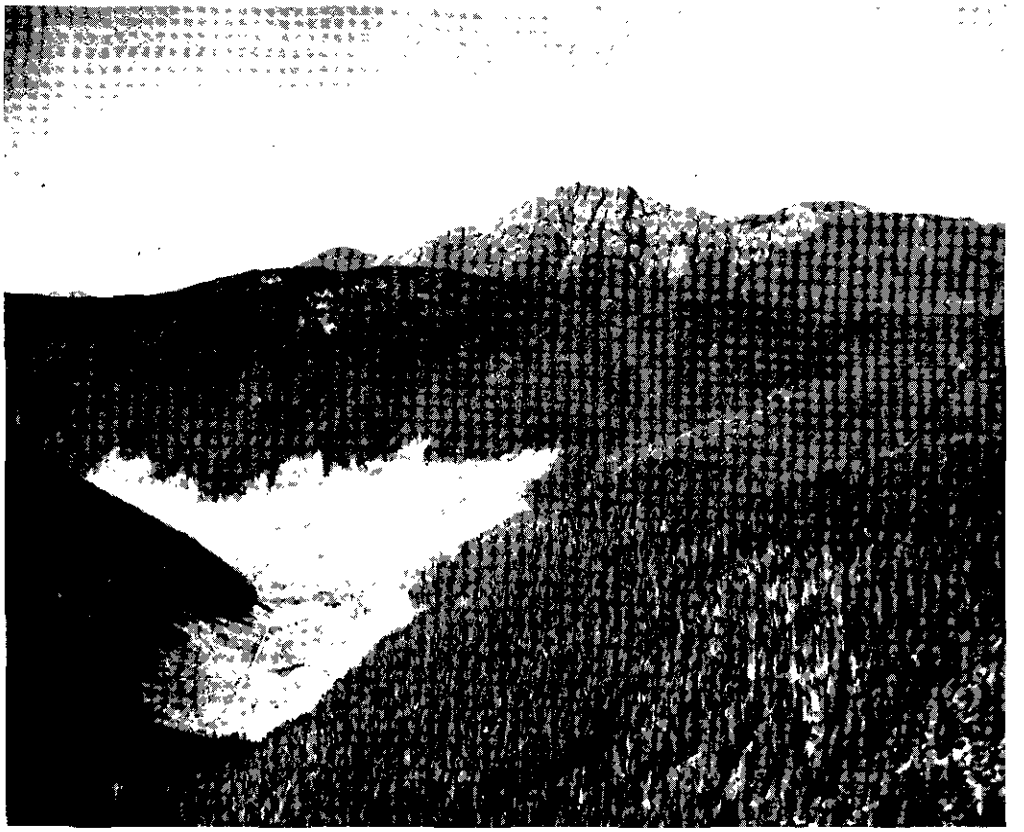
INDEX TO PROPERTIES.

1. Vancouver Island Golds. (Consolidated Alberni.)
2. Regina
3. Golden Eagle.
4. B. & K.
5. Havilah.
6. Thistle.
7. Black Panther.
8. Black Lion.



Diagrammatic structure-section along line C–D.

Geologic map of China Creek area. Scale 1 inch to 1 mile.

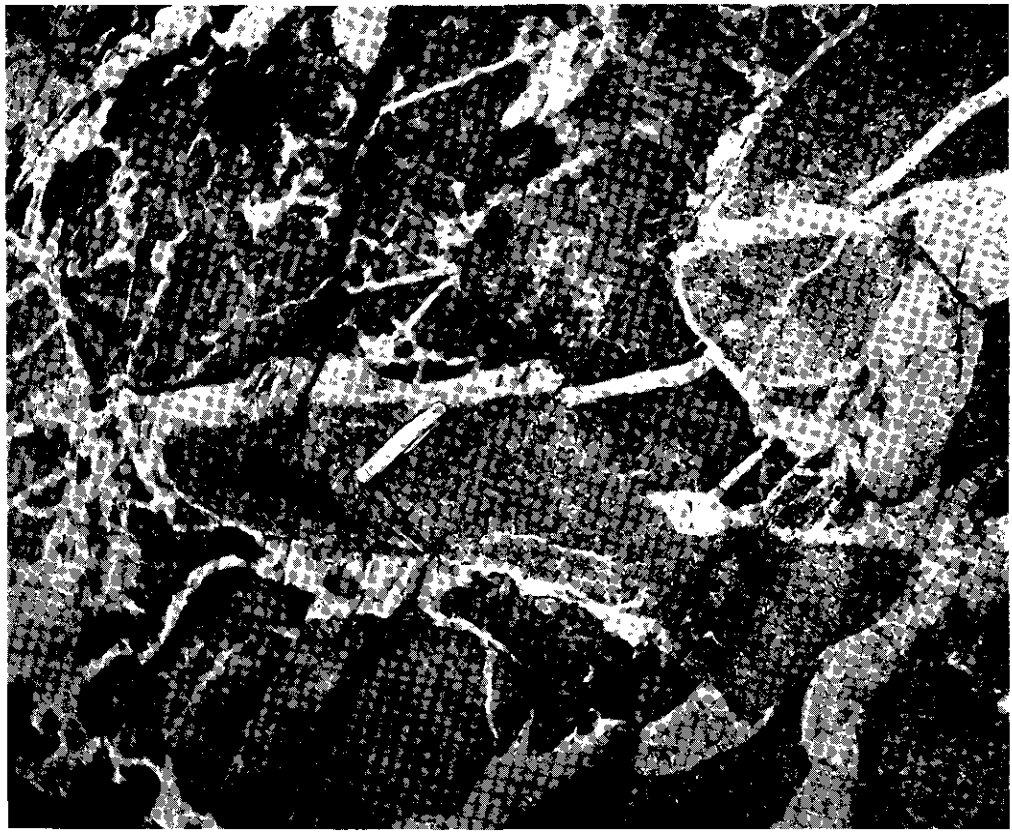


A. Looking down McQuillan Creek from Havilah mine, towards Mount Arrowsmith in background. White patch in left centre is logged-off area. (Page 143.)

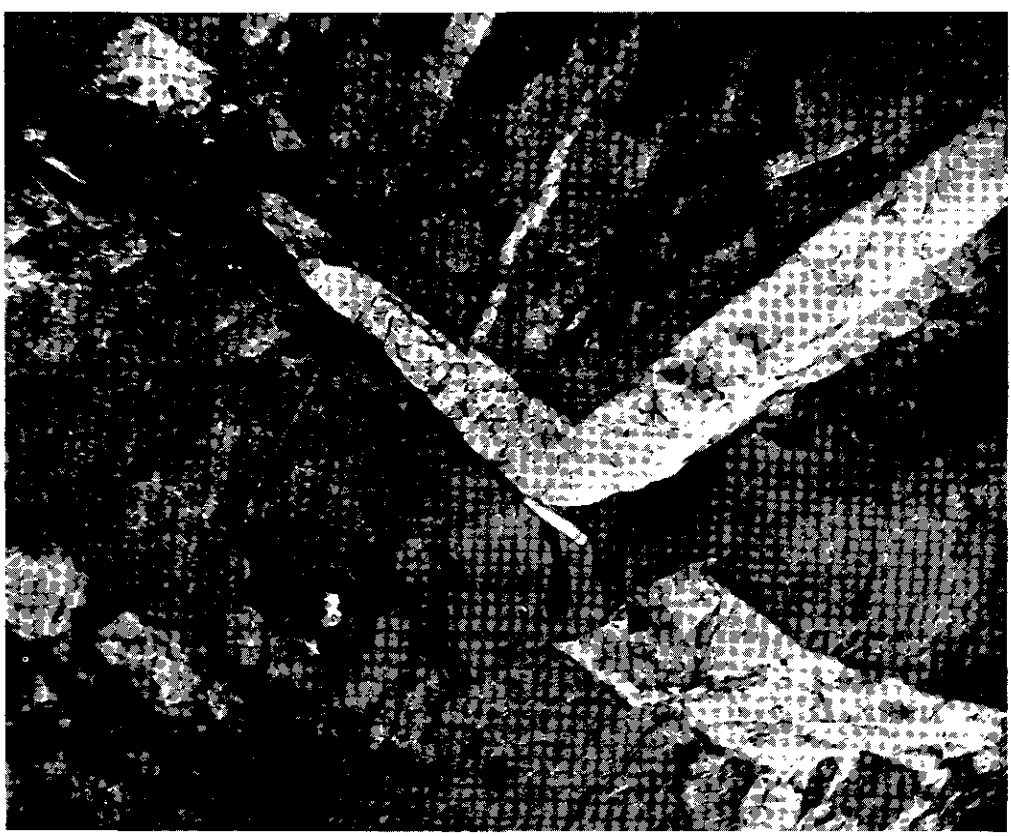
B. Headwaters of McQuillan Creek, with Mount McQuillan (left) and Mount Douglas (right) in background. (Page 143.)

A. Mount McQuillan (left) and Mount Douglas (right), between headwaters of McQuillan Creek and the West Fork of the Nitinat River. (Page 143.)

B. High, steep bluffs, typical of limestone on Mount Spencer. (Page 144.)

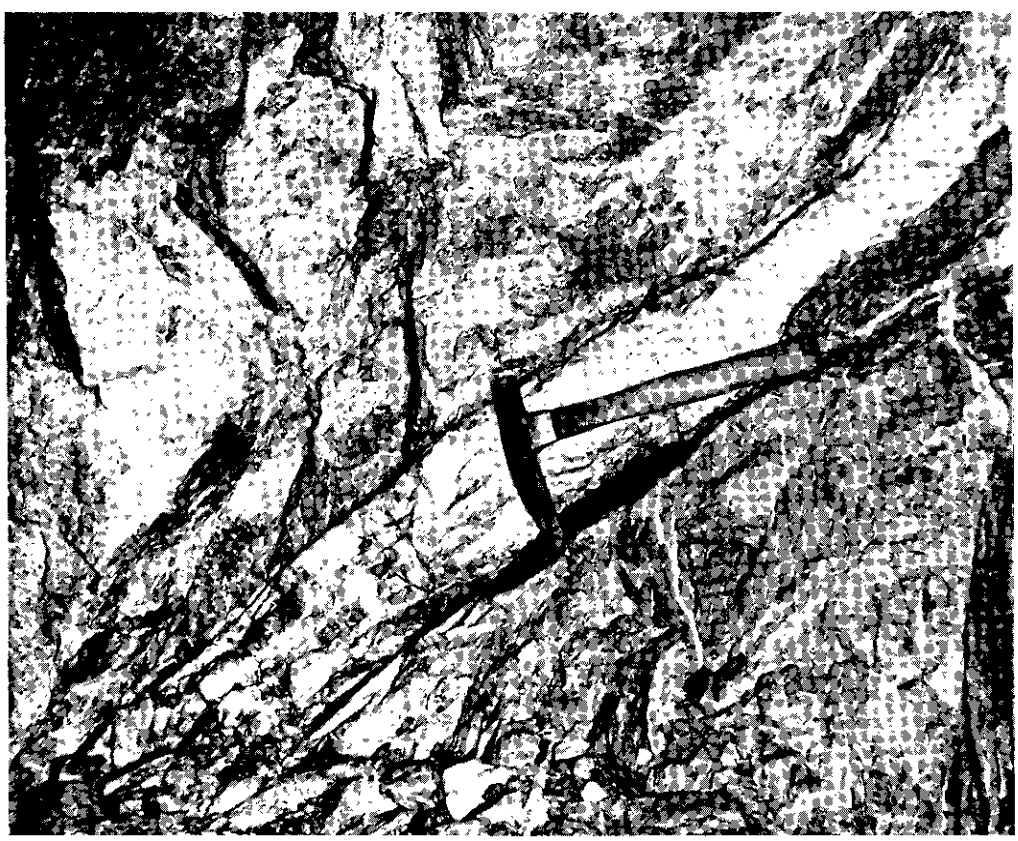


A. Typical diorite breccia, Mount McQuillan. (Page 145.)



B. Acidic dyke (white) cutting diorite, and in turn cut by diabase dyke (smooth, dark grey), Mount McQuillan. (Page 145.)

A. Ribbon-quartz, characteristic of Gillespie vein, in back of 800 adit, Havilah mine. (Page 153.)



B. Section of branch vein in 2,700 adit, *Black Panther* mine, width of vein shown by head of pick. (Page 158.)

PLATE V.

A. Looking south-westerly from the Harrison Group towards the west end of Lindquist Lake and the low divide into the head of the Gamsby River. Whitesail Lake area.

B. Looking south-easterly towards Granite Mountain on the south side of Lindquist Lake. Whitesail Lake area.

A. Ore-bin, Mount Sicker (Twin "J" Mines, Ltd.).

B. Surface at Little Billie Mine, Texada Island. Head-frame left of centre.

(Courtesy B.C. Government Travel Bureau.)

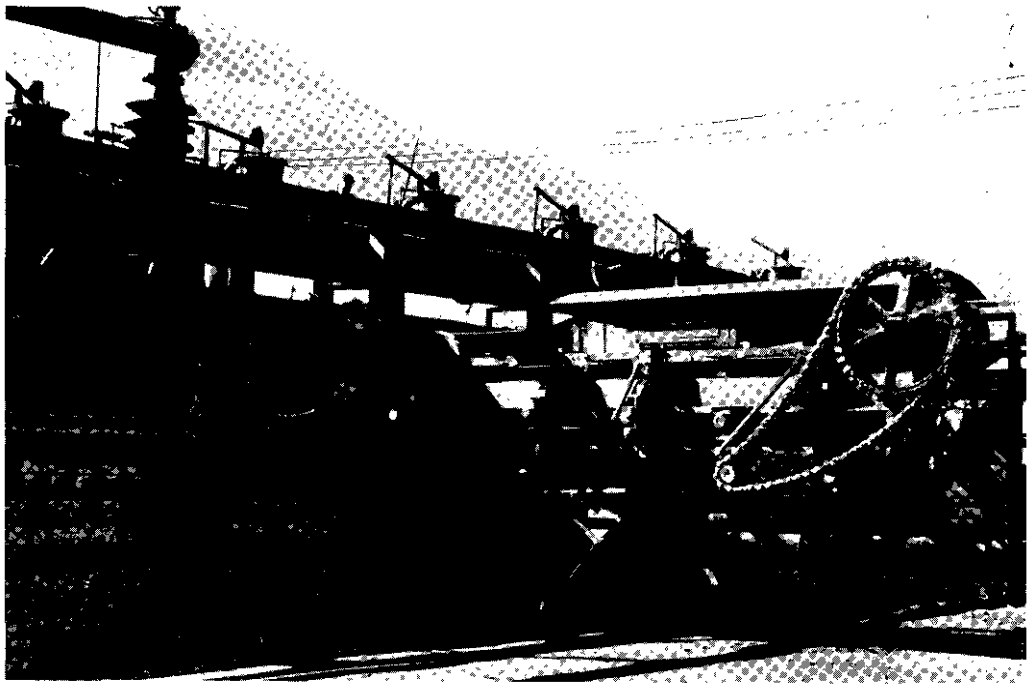
A. Open-pit coal mine, Corbin.

(Courtesy B.C. Government Travel Bureau.)

B. Loading coal with power-shovel, open pit, Corbin.

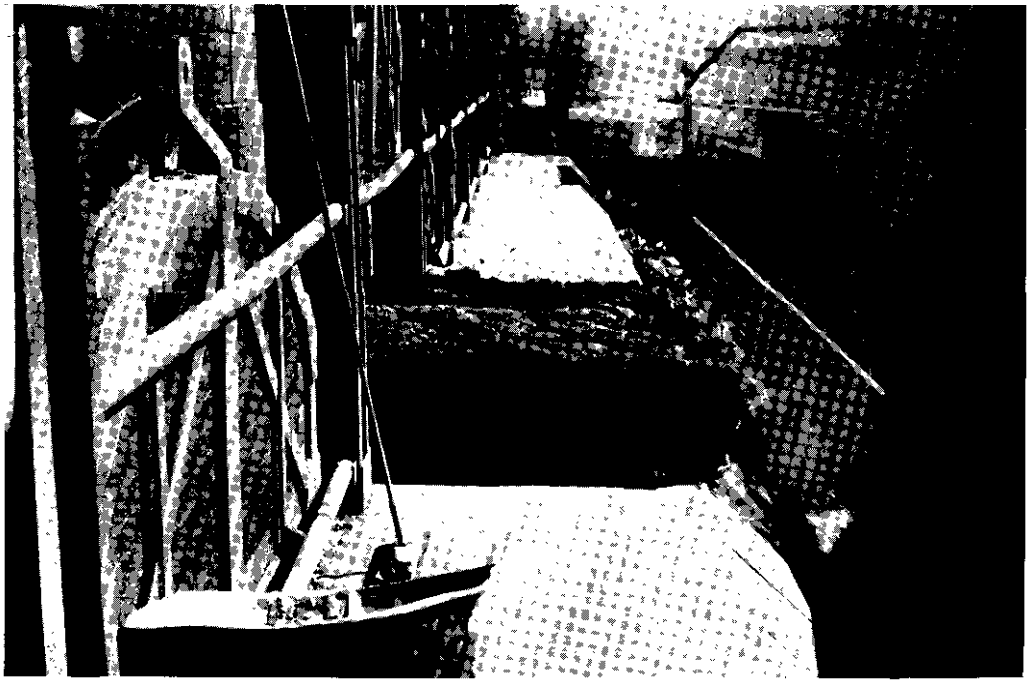
PLATE VIII.

CURRAN-KNOWLES BY-PRODUCT COKE PLANT, MICHEL.



(Courtesy B.C. Government Travel Bureau.)

A. Showing ram at charging end of oven.



(Courtesy B.C. Government Travel Bureau.)

B. Showing coke being discharged from oven.

LIST OF PUBLICATIONS.

The following publications of the Department are available for distribution, except as noted:—

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.

Year.	Paper Bound, Free.	Paper Bound, Charge 50c.	Cloth Bound, Charge $1.	Not Available.
1874–1896				X
1897		X		
1898				X
1899				X
1900				X
1901		X	X	
1902				X
1903				X
1904				X
1905				X
1906				X
1907		X		
1908		X		
1909		X	X	
1910	X			
1911				X
1912				X
1913		X		
1914		X		
1915	X		X	
1916	X		X	
1917	X			
1918	X		X	
1919	X		X	
1920	X		X	
1921	X			
1922	X			
1923	X			
1924		X		
1925		X	X	
1926				X
1927	X			
1928	X		X	
1929	X			
1930	X			
1931		X		
1932				X
1933	X		X	
1934	X		X	
1935	X		X	
1936	Parts A–F		X	
1937	Parts A–F		X	
1938	Parts A–F		X	
1939	X		X	
1940	X		X	
1941	X		X	
1942	X		X	
1943	X		X	
1944	X		X	

BULLETINS, OLD SERIES.

Bulletin No. 2, 1918: Bumps and Outbursts of Gas. (By George S. Rice.)
Bulletin No. 2, 1919: The Commercial Feasibility of Electric Smelting of Iron Ores in British Columbia. (By Alfred Stansfield.)
Bulletin No. 2, 1932: Report on McConnell Creek Placer Area. (By Douglas Lay.)

MISCELLANEOUS.

Special Reports on Coal-mine Explosions. (By George Wilkinson, Thomas Graham, and James Ashworth.) 1918.
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.
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.
Prospectors' Guide for Strategic Minerals in Canada. (Third Edition.) (By Mines and Geology Branch, Department of Mines and Resources, Ottawa, Canada.) 1942.
Notes on Placer-mining in British Columbia. (By Officers of the Department.) 1938, reprinted in 1943.
Preliminary Investigations into Possibilities for Producing Silica Sand from British Columbia Sand Deposits. (By J. M. Cummings.) 1941.

BULLETINS, NEW SERIES.

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.)
Bulletin No. 6: Geology of Camp McKinney and the Cariboo Amelia Mine. (By M. S. Hedley.)
Bulletin No. 7: Lode-gold Deposits of the Upper Lemon Creek Area and Lyle Creek-Whitewater Creek Area, Kootenay District. (By R. J. Maconachie.)
Bulletin No. 8: Preliminary Report on the Bedwell River Area. (By H. Sargent.)
Bulletin No. 9: Molybdenite in British Columbia. (By John S. Stevenson.)

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.)

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.

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 said 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.

"(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:—

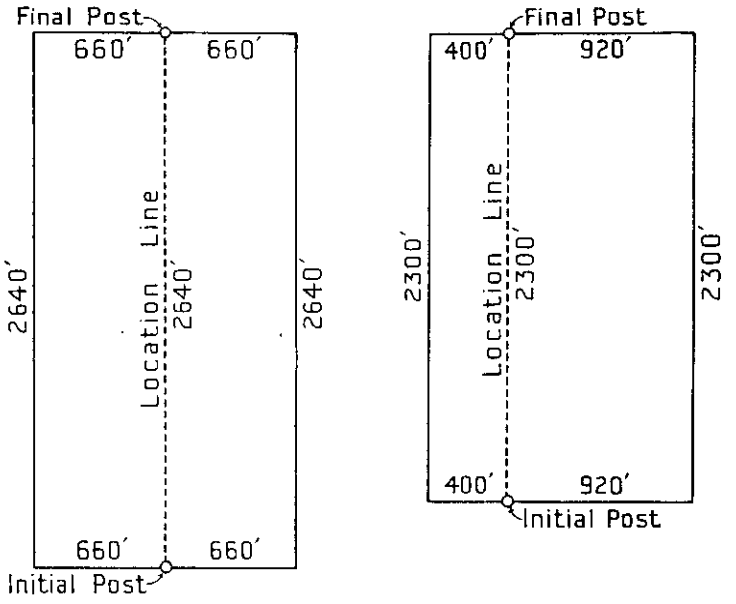
"(*a.*) The name of the intending applicant or each applicant if more than one, and the numbers of their free miners' certificates:

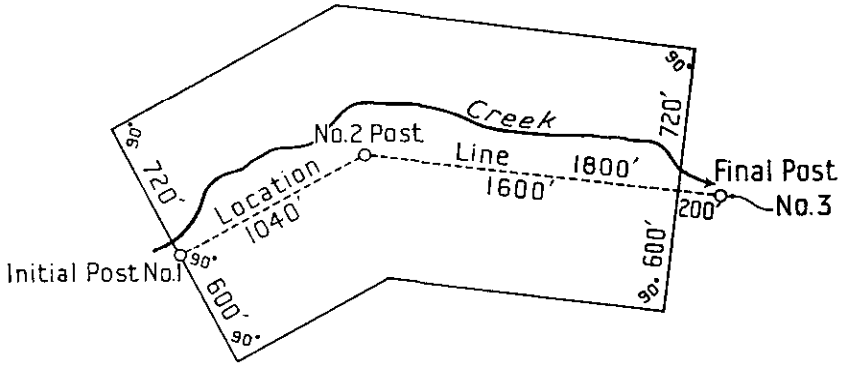
"(*b.*) The date of the location:

"(*c.*) The number of feet lying to the right and left of the location-line, and the approximate area or size of the ground.

"EXAMPLES OF VARIOUS METHODS OF LAYING OUT PLACER LEASEHOLDS.

"Showing Areas secured with Location-lines of Various Lengths.





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.

According to the provisions of this Act, any free miner who, since the 3rd day of September, 1939, has joined or joins, 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 service (full-time service) shall be exempted from doing assessment-work and from paying recording fees and rentals for the duration of the war and six months thereafter on any mineral claim or placer-mining lease recorded in his name at the time of his enlistment.

WAR MARINERS' BENEFITS ACT.

This Act was passed at the 1944 session of the British Columbia Legislature and confers on mariners any benefits, rights, privileges, or exemptions which have hereto-

fore been conferred upon members of the Allied Forces. A person qualifying as a mariner is entitled to the same exemption as accorded to members of the Allied Forces under the "Allied Forces Exemption Act, 1939."

In this Act "mariner" means a person who has 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.

CORPS OF CANADIAN FIRE-FIGHTERS ACT.

This Act, like the "War Mariners' Benefits Act," confers on Canadian fire-fighters who have proceeded overseas any benefits, rights, privileges, or exemptions which have heretofore been conferred upon members of the Allied Forces.

FREE MINERS' EXEMPTION ACT AMENDMENT ACT, 1944.

The "Free Miners' Exemption Act" was amended at the 1944 session of the British Columbia Legislature by an Act entitled "Free Miners' Exemption Act Amendment Act, 1944." The amendment was passed to permit those persons who were entitled to apply in 1943 and failed to do so, but kept their mining properties in good standing until 1944 or subsequent year, to gain the benefits of the said Act. Such persons may make application to the Mining Recorder for the mining division in which their properties are situate, but application need not be made until the anniversary date in the last year during which the properties are in good standing. The fees payable and the number of mineral claims and placer-mining leases which may be benefited remain unchanged.

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.

(Reverted Crown-granted Mineral Claims.)

A preliminary note is essential to the understanding of this Act. As the law has stood, a Crown-granted mineral claim on which taxes were in arrears for a number of years was offered for sale by the Government at a *tax* sale, with arrears of taxes plus interest and charges and Crown-grant fees as an upset price. If no sale was made the property remained in the hands of the Assessor until desired by some one, when it could only be purchased by tender. It was not open to location under the " Mineral Act " and a prospector had no protection, and to relieve the situation an amending Act was passed.

Under the amended Act such reverted Crown-granted mineral claim may be obtained by any person under a lease for one year upon payment of $25, and a renewal of such lease may be granted upon payment of further $25 for a further period of one year, but no longer. During the period of such lease the lessee has the right to enter, prospect, and mine on such mineral claim, save for coal, petroleum, and natural gas, and during such time the lessee has the option to purchase such Crown-granted mineral claim upon payment of all taxes, costs, and interest which remained due and unpaid on such claim on the date of its forfeiture to the Crown, together with an amount equal to all taxes and interest which, except for its forfeiture to the Crown, would have been payable in respect thereof from the date of the lease to the date of application for a Crown grant. If, however, 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 $200 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. There is also payable a Crown-grant fee of $25. Provision also is made for the grouping of adjoining claims, not exceeding eight in number, and the performing on one of such claims mining-development work for all of the claims.

A person may obtain a lease, or interest in a lease, of eight such claims in the same mining division.

Such leases are not transferable and are subject to the rights any person may already hold to any portion of the surface of such Crown-granted mineral claim.

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
War-time Coal-mine Employment Act	.15

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