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MINING OPERATIONS AND STATISTICS, PART A

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Énergie et Ressources
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Québec 

PROVINCE OF QUEBEC, CANADA

BUREAU OF MINES

Honourable J. E. PERRAULT, Minister of Mines

J. L. BOULANGER, Deputy-Minister

A. O. DUFRESNE, Director

ANNUAL REPORT
OF THE
QUEBEC BUREAU OF MINES

FOR THE CALENDAR YEAR

1934

PART A

Mining Operations and Statistics



QUEBEC
PRINTED BY R. PARADIS
PRINTER TO HIS MAJESTY THE KING

1935

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PREFATORY NOTE

In the statistical tables, and in the review of the mining industry of the Province during the year, the term "production" is synonymous with "quantity sold, shipped, or used" and does not necessarily represent "output". The ore and other mineral products remaining as "stock on hand" at the end of the year are not included in the production figures.

The ton used is, throughout, that of 2,000 lb., unless otherwise stated, and the year referred to is the calendar year, ending December 31st.

The values are given in Canadian funds. In the general table, the total value of the gold production is given in two parts: (1) at the standard rate; (2) additional exchange equalization at average rate for the year. In all other tables, the value given for gold production is the sum of these two items.

The present report was preceded on March 2nd by a statistical statement giving provisional figures of production subject to revision. The figures in this volume supersede the provisional ones.

The Annual Report of the Bureau of Mines for 1934 is published in several parts, of which this volume is Part A. It is followed by Parts B, C, D, and E, which consist of geological reports with accompanying maps.

A. O. DUFRESNE,
Director

QUEBEC BUREAU OF MINES,
May, 1935.

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MINING OPERATIONS

IN THE

PROVINCE OF QUEBEC

DURING THE YEAR 1934

GENERAL REVIEW

The total value of the products of Quebec mines and quarries in 1934 amounted to \$31,310,752, as compared with \$28,164,540 in the preceding year, or an increase of 11.2 per cent.

While it is gratifying to record this advance, the second since the low mark of \$25,683,066 in 1932, analysis of the figures proves somewhat disappointing, since it shows that the improvement was due, in the main, not to increased production but to the higher price of gold, which averaged \$34.50 per fine ounce in 1934, against \$28.60 in 1933. The base-metal average prices were lower in 1934 than in 1933. Copper on the Montreal market was 8.22 cents per pound, against 8.68 cents in the previous year. Lead was 3.409 cents, against 3.705 cents. Zinc, also, was lower on both the Montreal and London markets.

Under these circumstances, it is only natural that attention has been concentrated on the production of gold—and on prospecting for the metal and development work on gold properties—rather to the neglect of the base-metals. Nevertheless, our 1934 production of copper shows an increase in quantity compared with 1933. This,

however, is due to the fact that our main source of gold is the complex copper-gold ores of Western Quebec, and an increased production in one of the metals entails an increase in the other.

Non-metallic products show a slight decrease in value, due to lower shipments of asbestos. This was more than compensated by an increase in the value of building materials.

SUBDIVISION OF QUEBEC'S MINERAL PRODUCTION
FOR THE YEARS 1930-1934

YEAR	METALS	%	NON-METALLICS	%	BUILDING MATERIALS	%
1930	\$ 13,926,682	35	\$ 9,322,151	22	\$ 17,909,907	43
1931	12,367,932	34	5,516,899	15	18,166,535	51
1932	13,914,089	54	3,671,634	14	8,097,343	32
1933	16,360,011	58	6,043,308	22	5,761,221	20
1934	19,258,094	61	5,895,569	19	6,157,089	20

TABLE OF ANNUAL VALUE OF MINERAL PRODUCTION SINCE 1898

YEAR	VALUE	YEAR	VALUE
1898	\$ 1,673,337	1917	\$ 16,189,179
1899	2,083,272	1918	18,707,762
1900	2,546,076	1919	20,813,670
1901	2,987,731	1920	28,392,939
1902	2,985,463	1921	15,522,988
1903	2,772,762	1922	18,335,153
1904	3,023,568	1923	21,326,314
1905	3,750,300	1924	18,952,896
1906	5,019,932	1925	23,824,912
1907	5,391,368	1926	25,740,002
1908	5,458,598	1927	29,124,110
1909	5,552,062	1928	37,325,237
1910	7,323,281	1929	46,454,820
1911	8,679,786	1930	41,158,740
1912	11,187,110	1931	36,051,366
1913	13,119,811	1932	25,683,066
1914	11,732,738	1933	28,164,540
1915	11,765,873	1934	31,310,752
1916	13,287,024		

TABLE OF THE MINERAL PRODUCTION OF THE PROVINCE OF QUEBEC DURING 1934

SUBSTANCE	No. of workmen	Wages	Quantity	Value in 1934	Value in 1933
METALLICS					
		\$		\$	\$
Chrome, tons.....			71	1,098	343
Copper, lb.....	1,646	2,405,410	73,968,545	5,487,948	5,214,177
Gold (at standard rate), oz.....	1,949	2,189,653	390,103	8,064,144	7,914,956
Exchange equalization on gold.....				5,394,410	3,035,584
Molybdenite.....	7	1,910			
Selenium, lb.....			48,764	73,146	16,600
Silver, oz.....			470,254	223,187	178,351
Titaniferous iron ore, tons.....	20	1,170	2,023	14,161	
Zinc and lead.....	22	11,351			
Assessment work on claims.....	1,450	1,357,674			
Sub-totals.....	5,094	\$ 5,967,168		\$19,258,094	\$16,360,011
NON-METALLICS					
Asbestos, tons.....	1,749	1,327,730	155,980	4,936,326	5,211,177
Feldspar, tons.....	76	21,516	9,207	78,853	59,283
Garnet.....	1	225			
Graphite, tons.....			129	6,426	2,222
Kaolin, tons.....			48	504	
Magnesitic dolomite.....	176	114,824		382,927	360,128
Marl, tons.....	10	180	4,962	2,014	9,550
Mica, lb.....	109	46,523	643,967	85,967	39,061
Mineral paints (iron oxide, ochre), tons.....	36	21,474	4,798	64,566	51,965
Mineral water, gals.....	16	2,760	75,665	16,116	3,094
Natural gas.....	13	19,605			
Peat, tons.....					2,549
Phosphate, tons.....	2	75	81	683	805
Pyrite, tons.....			9,974	50,398	146,261
Quartz and industrial sand, tons.....	172	67,350	55,148	226,492	109,533
Tale and soapstone.....	56	19,399		44,297	47,680
Sub-totals.....	2,416	\$ 1,641,661		\$ 5,895,569	\$ 6,043,308
BUILDING MATERIALS					
Cement, barrels.....	320	340,210	1,613,641	2,294,846	2,128,899
Clay products:					
Brick, M.....	539	193,702	29,230	460,998	446,403
Other products.....				170,817	133,687
Granite, tons.....	523	181,434	69,428	488,477	408,207
Lime, tons.....	258	138,426	108,332	641,241	645,467
Limestone, tons.....	1,287	369,759	1,029,092	951,801	930,469
Marble, tons.....	64	33,548	9,302	47,503	42,283
Sand and gravel, tons.....	2,448	522,579	3,670,198	979,827	942,429
Sand-lime brick, M.....	22	8,917	2,445	35,299	25,146
Sandstone, tons.....	207	48,025	86,200	85,577	57,403
Slate and shale, tons.....	2	103	470	703	828
Sub-totals.....	5,670	\$ 1,836,703		\$ 6,157,089	\$ 5,761,221
Totals.....	13,180	\$ 9,445,532		\$31,310,752	\$28,164,540

The increase of 11.2 per cent in the value of our mineral production in 1934 as compared with 1933 is but a partial gauge of the improvement in the mining industry. The number of men employed in the working of mines, in the development of mining properties, and in assessment work, was 13,180 in 1934 against 10,759 in the previous year. These figures do not include most prospectors searching for new mineral deposits and staking claims, in which pursuits the activity which obtained during the previous year was well sustained. The number of claims staked during the calendar year 1934 was 11,397 against 12,370 in 1933, while the average for the four previous years was 8,000.

It is gratifying to record that the work of the prospectors is extending, year by year, the limits of the mineral-bearing territory which is designated by the vague term 'Western Quebec'. In 1934, new promising mineral discoveries were made in Guillet township, situated 40 miles east of Témiscamingue lake, and gold was also found at Madeleine lake, 70 miles north of Senneterre. The two localities are 150 miles apart and the geology of the intervening country is favourable to the presence of mineralization. Both at Madeleine lake and in Guillet township, numerous claims were staked, and early in 1935 diamond drilling was being carried out actively in the two new fields. It is interesting to note that these new discoveries have followed those made in Tiblemont township in 1932 and 1933; in Pascalis and Louvicourt townships in 1930; in Opemisca Lake region in 1929; all of which had been preceded by a period of activity in Bourlamaque township which resulted in the discovery of the ore deposits now worked by the Lamaque and the Sigma mines.

In 1934, there was a renewal of interest in the Chibougamau district, and diamond drilling campaigns were carried out by Noranda Mines, Limited, and Consolidated Chibougamau Goldfields, Limited, on two large groups of claims in McKenzie township.

In a later chapter of this volume, under the title *Mining Operations and Development in Western Quebec in 1934*, R. H. Taschereau, Inspector of Mines, reviews the activities at the operating mines, the development of other mining properties, and prospecting in the area; and G. S. MacKenzie contributes a short description of the Madeleine Lake discoveries and of the work done in the Chibougamau Opemisca region, both of which fields he visited in October, 1934.

METALS

In 1934, the total value of the production of metalliferous mines of the Province amounted to \$19,258,094, against \$16,360,011 in 1933, an increase of nearly 18 per cent. Gold, alone, accounted for 15.3 per cent of this increase.

The list of products, in order of importance, comprises gold, copper, silver, selenium, titaniferous iron ore, and chrome.

The average price of gold for the year, in Canadian funds, was \$34.50 per ounce of fine metal, and of silver, 47.973 cents per ounce, New York funds. The market prices of the base-metals continued very low, as the accompanying table indicates.

AVERAGE YEARLY PRICES OF INDUSTRIAL METALS, 1930-1934
(Figures from Report of Dominion Bureau of Statistics)

METAL	MARKET	UNIT	1930	1931	1932	1933	1934
Copper.....	{ New York...	Cents per lb....	12.982	8.116	5.555	7.025	8.428
	{ Montreal...	" " "	14.980	10.006	7.516	8.684	8.220
	{ London.....	£ per long ton	61.528	42.093	35.962	36.359	33.319
Lead.....	{ New York...	Cents per lb....	5.517	4.243	3.180	3.636	3.860
	{ Montreal...	" " "	5.496	4.168	3.511	3.705	3.409
	{ London.....	£ per long ton	18.007	12.958	11.913	11.670	10.935
Zinc.....	{ St. Louis....	Cents per lb....	4.556	3.640	2.876	4.029	4.158
	{ Montreal...	" " "	5.084	3.961	3.724	4.488	4.059
	{ London.....	£ per long ton	16.570	12.215	13.545	15.666	13.657

NOTE.—London market prices, transposed into Canadian funds, were as follows for 1933 and 1934, respectively: copper, 7.4548c. and 7.4193c.; lead, 2.3916c. and 2.4364c.; zinc, 3.2105c. and 3.0436c.

For the last three years, the value of the products of the metal mines has exceeded the combined value of the non-metallics and the building materials. In 1934, it represented 61.5 per cent of the value of the total mineral production of the Province.

This preponderance is due to the unhalting progress made by the mines of Western Quebec, where, during 1934, eleven mines were in active operation, producing gold, copper, silver, and selenium. Early in 1935, two additional mines started to 'pour' gold—the Lamaque, in Bourlamaque township, and the Canadian Malartic, in Fournière.

One more is expected to start production before July, 1935. This region, during the first quarter of 1935, was mining metals at the rate of approximately \$20,000,000 a year.

Although no lead or zinc appear in the table of production, a small tonnage of concentrates containing these two metals was made from ores of the Tétrault mine, at Montauban, but none of this material was shipped in 1934.

METAL PRODUCTION OF WESTERN QUEBEC, 1927-1934

YEAR	ORE MILLED (Tons)	SHIPMENTS					VALUE \$
		COPPER (Pounds)	GOLD (Ounces)	SILVER (Ounces)	ZINC (Pounds)	SELENIUM (Pounds)	
1927.....	7,570	463,471	741	2,611	.....	.....	76,674
1928.....	271,614	33,019,311	53,397	185,579	.....	.....	6,022,692
1929.....	498,280	51,101,054	86,162	333,792	.....	.....	11,210,882
1930.....	980,419	75,435,415	141,747	555,578	9,754,160	.....	13,286,327
1931.....	1,100,121	62,018,221	299,869	509,571	.....	.....	11,814,979
1932.....	1,331,104	60,584,116	401,005	605,258	.....	.....	13,472,311
1933.....	1,886,617	63,417,206	382,834	451,732	.....	22,131	15,864,182
1934.....	2,436,233	73,968,545	390,103	470,254	.....	48,764	19,212,835
TOTAL....	8,511,958	420,007,339	1,755,858	3,114,375	9,754,160	70,895	\$90,990,882

DIVIDENDS PAID BY MINING COMPANIES OPERATING IN WESTERN QUEBEC (TO JANUARY 1ST, 1935)

COMPANY	AUTHORIZED CAPITAL (shares)	DATE OF FIRST DIVIDEND	DIVIDENDS, 1934		TOTAL DIVIDENDS (To end of 1934)
			TOTAL	RATE PER SHARE	
Noranda Mines Limited.....	2,250,000	Jan. 2nd, 1930.....	\$4,479,544.00	\$2.00	\$17,501,089.13
Siscoe Gold Mines, Ltd....	5,000,000	March 31st, 1932....	875,961.18	0.19	2,021,126.72

NON-METALLICS

The non-metallics have not held their own. Their value is slightly below that of 1933. This is due to a decrease in the sales of asbestos fibre, for which there was less demand. Nevertheless, our asbestos mines are now in a position to greatly increase their production as soon as the market requires it. In the first quarter of

1935, there has been an appreciable improvement in asbestos shipments as compared with the same period of 1934, which augurs well for the future.

Our other non-metallic products show, for the most part, decided increases in value over the 1933 figures, as, for example, feldspar, an increase of 33 per cent; magnesitic dolomite, 6 per cent; ochres and natural iron oxides, 24 per cent; while for both mica and quartz the value was more than twice that in the previous year.

BUILDING MATERIALS

The products of our quarries, clay pits, and sand pits had a slightly higher value in 1934 than in the previous year. It is hoped that this brings to an end the successive declines recorded each year since 1931.

The increase in value as compared with 1933 is 7 per cent, the total for 1934 having been \$6,157,089. This is still very far from the peak production of \$18,534,165 recorded in 1929.

Of the several items which figure in the list of Building Materials, cement, brick and other clay products, granite, marble, and sandstone show small increases, whereas for lime, limestone, sand and gravel, and slate, slight decreases are recorded.

MINING OPERATIONS IN 1934

METALS

COPPER

Production of copper in 1934 exceeded that of 1933 both in quantity and value. It amounted to 73,968,545 pounds valued at \$5,487,948, an increase of 5.7 per cent and 5.3 per cent, respectively. In only one year has the output been exceeded in quantity—in 1930, with 80,310,363 pounds valued at \$10,425,891.

QUEBEC PRODUCTION OF COPPER, 1925-1934

YEAR	QUANTITY (pounds)	VALUE	YEAR	QUANTITY (pounds)	VALUE \$
1925..	2,628,417	\$277,083	1930..	80,310,363	\$10,425,891
1926..	2,674,058	368,886	1931..	68,376,985	5,723,154
1927..	3,119,848	407,146	1932..	67,336,692	4,296,216
1928..	33,697,949	4,909,792	1933..	69,943,882	5,214,177
1929..	55,337,169	10,019,901	1934..	73,968,545	5,487,948

In the latter part of 1934, the world's copper market was in an unsatisfactory condition. The metal was being dumped, from copper stocks, on international markets, so that in January, 1935, the price of electrolytic copper in London, where the great bulk of Quebec copper is marketed, fell below £31 per long ton, whereas the average for the year 1934 was £33.32, and in 1933 it was £36.36.

Owing to this situation, a meeting of the large producers of copper, representing an annual production of 750,000 tons, was held in New York in March, 1935, at which the following agreements were arrived at:

Curtailement of 20,000 tons a month in the production of copper metal, from June 1st, 1935.

Organization of a statistical office, which will collect and compile data of world stocks, production, and sales of copper, with a view to assuring an adequate supply of the metal and avoiding the accumulation of excessive stocks.

Co-operation of the producers attending the conference in adequately supplying markets outside the United States, as the American market is practically closed to foreign copper owing to the customs duty on the metal.

The various terms of the agreement to remain in force until July 1st, 1938.

However, the present Canadian production of copper is not subject to curtailment while the market prices of nickel and gold are maintained at present levels. A substantial proportion of the gold, and the whole of the nickel, produced in Canada comes from complex ores carrying copper.

In 1934, the principal producers of copper in Quebec were the same as last year, namely: *Noranda Mines, Limited*; *The Consolidated Copper and Sulphur Company, Limited*, operating the Eustis mine, near Sherbrooke; and *Aldermac Mines, Limited*, which operates the Aldermac mine, in Beauchastel township. It is interesting to note that this year a small production of copper was also reported by *Greene-Stabell Mines, Limited*, *Bussières Mining Company, Limited*, and *Beattie Gold Mines, Limited*, three gold-mine operators who produced some copper concentrates as a by-product of their flotation mills. Noranda Mines is responsible for more than 92 per cent of the copper produced by Quebec mines.

The Consolidated Copper and Sulphur Company, Limited, operated the Eustis mine throughout the year, but the hoisting of ore was suspended during the greater part of November while extensive repairs were being made to the shaft, in the vicinity of the 1,800-ft. level. At the end of the year, the main shaft had reached a length of 6,320 feet below the entrance adit, in which the hoisting plant is installed. With the additional unused 700 feet of shaft above the adit, the total length is well over 7,000 feet, in an inclination of 38° to the southeast. During the year, a considerable amount of diamond drilling was done, mainly on the 5,900-foot level and in ground beneath the Albert shaft of the adjacent Capelton mine.

All the other copper producing mines are in Western Quebec, and their operations are reviewed by R. H. Taschereau, Inspector of Mines, in the special chapter in this volume devoted to this district.

GOLD AND SILVER

GOLD

The production of gold from Quebec mines in 1934 amounted to 390,103 ounces, valued at \$13,458,554. This total is made up of two factors: (1) the value of gold at the old international standard of \$20.6718 per ounce, plus (2) the difference between this standard value and the average price of gold during the year, \$34.50 in Canadian funds, which represents the exchange equalization. In 1933, the corresponding figures were 382,886 ounces, valued at \$10,950,540 in Canadian funds, with the average price of gold \$28.60 per ounce.

For 1934, as compared with 1933, we therefore record an increase of 7,217 ounces or 1.8 per cent in quantity, and of \$2,508,014 in value.

GOLD PRODUCTION OF QUEBEC BY PRINCIPAL MINES IN 1934

PROPERTY	Ore raised Tons	Ore treated Tons	Gold recovered Fine Ounces	Mill capacity 24 hrs. Tons	See foot- note
Beattie mine.....	360,900	359,200	52,240	1,200	(b) (c)
Bussières mine.....	55,879	38,047	5,039	190	(a) (c)
Granada mine.....	36,266	35,424	6,864	100	(a) (b) (c)
Greene-Stabell mine.....	23,003	21,583	5,682	100	(a) (b) (c)
Venus mine.....	60	60	8	25	(c)
McWatters mine...	5,713	5,081	2,961	50	(a)
O'Brien mine.....	26,743	27,832	7,626	80	(a) (c)
Perron mine.....	5,047	2,646	392	25	(a)
Siscoe mine.....	124,846	124,151	63,394	340	(a) (b)
Sullivan mine.....	7,278	7,960	4,062	50	(a) (b)
Placer mines.....	.....	.....	43	.....	.....
Copper-gold mines.	.....	.....	241,786	.....	(c)
TOTAL.....	.....	.....	390,097	.....	.....

(a) amalgamation; (b) cyanidation; (c) smelter.

Returns of production were received from seventeen sources, which included twelve mine operators in Western Quebec. Of the remainder, two returns represented small amounts produced from prospecting work, and three were recoveries from alluvial diggings in Beauce county.

The twelve operators in Western Quebec were: Aldermac Mines, Limited, Beattie Gold Mines, Limited, Bussières Mining Company, Limited, Granada Gold Mines, Limited, Greene-Stabell Mines,

Limited, McWatters Gold Mines, Limited, Mathews Gold Mines, Limited, Noranda Mines, Limited, O'Brien Mines, Limited, Perron Gold Mines, Limited, Siscoe Gold Mines, Limited, and Sullivan Gold Mines, Limited.

Early in 1935, two new producers were added to the list, the Lamaque mine and the Canadian Malartic mine, both making their first shipment of gold in May; and Arntfield Gold Mines, Limited, were building a mill, which was expected to be in operation in July, 1935.

The progress of gold mining in Western Quebec is reviewed in detail by R. H. Taschereau, Inspector of Mines, in a later section of this volume.

ALLUVIAL GOLD:*

Work on alluvial gold deposits was carried on in the counties of Beauce and Dorchester.

Rigaud Vaudreuil Seigniory, Beauce County.—The *Unit Company* was working from July 21st to November 21st in the basin of Des Meules river. This Company performed both underground and surface operations.

At the end of April, *W. W. Cooke* and *L. K. Lloyd* resumed working of the alluvial deposits in the basin of Gilbert river. Underground operations and surface prospecting were carried on until the middle of July.

On the 30th of June, the *Quebec Gold Dredging Company* started dredging operations at the Devil's rapid, on the Chaudière river, but work was suspended after one week.

Dorchester County.—The *Quebec Gold Dredging Company* carried on operations on the Famine river, at Falls, on lots 6 of ranges III and IV, township of Wattford. A drag-line of one cubic foot capacity was installed and work was continuous from the end of September until winter set in.

George Dion was engaged throughout the summer in placer prospecting on the Famine river.

* By Eugène Larochelle, Inspector of Mines.

THE MONETARY EXCHANGE SITUATION:

As the Canadian monetary exchange situation has had an important influence on the Quebec mining industry, we give, as a matter of record, a short synopsis of the phases through which it has passed in the last few years.

Great Britain abandoned the gold standard on September 21st, 1931, a step which had an immediate repercussion in Canada.

On October 19th, 1931, the Governor-General of Canada, in Council, issued an order that gold in coin, bullion, or bars could only be exported from the Dominion on license granted by the Minister of Finance. This regulation was in effect from October 19th, 1931, to March 1st, 1932.

On May 13th, 1932, *The Gold Export Act* was passed by the Parliament of Canada, empowering the Governor-in-Council to prohibit the export of gold from Canada, in the form of coin or bullion, bullion to include ore, concentrates, and base bullion; and on May 17th, an Order-in-Council was issued prohibiting such exports until December, 1932. This measure has since been extended from year to year, and it now stands effective until December 31st, 1935.

From the time Great Britain abandoned the gold standard, the Canadian dollar fluctuated appreciably in value relatively to the United States dollar, which remained on a gold standard, and in March, 1933, the price of New York funds exceeded \$1.20 in Canadian funds.

On April 20th, 1933, the United States abandoned the gold standard and the rate of exchange between the two currencies soon decreased, until they reached the same level before the end of the year. On May 12th, 1933, the President of the United States was empowered to revalue the dollar by fixing its weight in gold at not less than fifty per cent of its standard weight. On January 31st, 1934, the President issued a proclamation reducing the gold weight of the U. S. dollar from 25.8 grains to $15 \frac{5}{21}$ grains, nine-tenths fine, thus revaluing it at 59.06 cents, which automatically increased the value of fine gold to \$35.00 an ounce, U.S. funds. The President still retains his power to further reduce the gold in the U.S. dollar to 50 per cent of its original weight.

This reduction of nearly 41 per cent in the gold value of the American dollar had a beneficial effect on trade between Canada and the United States, by practically equalizing the value of their respective money units, and by reducing the fluctuations of exchange. Moreover, the fixing of the price of gold at \$35 an ounce, U.S. funds, proved to be of some help to the Canadian gold industry and therefore to the Quebec gold mines, as it facilitated marketing the gold in New York. The exports of Canadian gold to the United States, in the twelve months ending March 1935 amounted to over \$80,000,000, against \$25,600,000 in the preceding corresponding period.

TAX ON GOLD PRODUCTION:

On June 27th, 1934, a special tax was decreed by the Canadian Parliament on gold produced by Canadian mines from April 19th, 1934, until May 31st, 1935, as an emergency measure following the decreasing revenue of the Dominion government. This tax is 25 per cent of the difference between the standard price of gold (\$20.6718 an ounce fine) and the sale price of gold in Canadian funds. At the price of \$35 an ounce, the tax is \$3.58 per ounce of gold produced. Provision is made to exempt mines in the early stage of production, which had not paid dividends between January, 1932, and April 19th, 1934. Nor is the tax operative on gold sold at a price that would reduce the amount payable to the producer below thirty dollars per ounce fine, Canadian funds.

SILVER

The production of silver in 1934 was 470,254 ounces, valued at \$223,187. Compared with 1933, when the total was 471,419 ounces, valued at \$178,351, this is a slight decrease in amount, but an increase of more than 25 per cent in value. In 1934, the average price of silver on the New York market, in Canadian funds, was 47.461 cents an ounce, as compared with 37.833 cents in 1933.

The whole of Quebec's silver production is obtained as a by-product of the treatment of the complex copper-gold ores and the gold-quartz ores of Western Quebec, and of the copper-sulphur ores of the Sherbrooke district. Therefore, all the copper and gold operators also produce silver on a small scale.

MISCELLANEOUS METALS

CHROMIUM

Two returns of shipments of chromite were received, totalling 71 tons and valued at \$1,098. These shipments were reported by *Asbestos Corporation, Limited*, and *Lucien Camiré*, of Thetford Mines.

The chromite shipped by Asbestos Corporation came from the Beaver mine, on lots 31 and 32, range *C* of Coleraine township, and from blocks *A* and *B* of Coleraine. It was used in the manufacture of refractory materials. The ore shipped by Lucien Camiré was recovered from the old dumps of the Hall mine, on lot 26, range *B*, Coleraine.

MOLYBDENITE

The *Height of Land Company* report having done some work on their molybdenite property in Preissac township during the latter part of 1934.

They dewatered their two shafts, cleaned some old workings, and did 157 feet of diamond drilling, and some prospecting by striping.

SELENIUM

The production of selenium metal in 1934 amounted to 48,764 pounds, valued at \$73,146. This was recovered from the sludge resulting from the refining of Western Quebec copper, at the plant of *Canadian Copper Refiners, Limited*, at Montreal East, which is now equipped to recover and refine selenium. Production of the metal commenced in November, 1934, and it is finding markets in the United States, England, Germany, France, India, and South American countries.

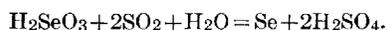
This is the first actual production of selenium metal in the Province of Quebec. The 22,131 pounds of selenium reported in 1933 represented a shipment of selenium-bearing sludge which was sent by the refinery to the United States.

The following notes have been compiled from information kindly supplied by Mr. H. S. McKnight, the works manager of Canadian Copper Refiners, Limited.

The selenium is recovered in the process of refining copper anodes, which are shipped to the refinery from the Noranda smelter of Noranda Mines, Limited, and from the plant of the Hudson Bay Mining & Smelting Company, Limited, at Flin Flon, Manitoba. The percentage of selenium in the copper anodes is extremely low, varying between one-tenth and three-tenths of one per cent. The greater part of the selenium received at the refinery is in the Noranda copper. Present production is at the rate of 15 tons per month.

The copper of the anodes is refined electrolytically, and the insoluble impurities, which include gold, silver, and selenium, fall to the bottom of the electrolyte tanks with the slime. This slime is dried and roasted in a muffle-type furnace, and, at the proper temperature, it is sprayed with hot concentrated sulphuric acid. The acid reacts with the selenium in the slime, forming selenious acid, which is fumed off and collected in a scrubber system by means of water sprays. The selenious acid is soluble in these spray solutions and the selenium metal is precipitated from them by means of sulphur dioxide gas.

The process is simple and may be theoretically represented by the two equations:



The metallic deposit formed is washed thoroughly, melted, and cast into bricks. Some of the selenium is shipped in this form, but for the most part the bricks are ground and the metal shipped in powdered form, for use principally in the preparation of pigments for the manufacture of paints and enamels, and also in the ceramic industry.

Consumption of selenium in the United States is increasing appreciably. On the other hand, many of the world's copper refiners having, by agreement, reduced operations, production of selenium metal, which is one of their by-products, has, of necessity, also been curtailed, with the result that the output is more easily absorbed than in former years. The glass and rubber industries consume a large proportion of the selenium produced. Another use is in ferro-selenium, employed in the manufacture of certain types of stainless steel, to which it imparts the quality of free machining.

“One of the large electrical instrument companies has developed a new type of selenium cell, the ‘photronic’ cell. This

cell differs from the former type of selenium cells in that it has the faculty of transforming light energy directly into electrical energy, and operates relays without the use of auxiliary apparatus or batteries. As far as is known at present, the cell has unlimited life, and the output is constant. The spectral response of the cell is about the same as the human eye, so that it is sensitive to colour changes and is finding wide application wherever processes must be controlled by change in colour. This type of cell is being used commercially as a smoke detector, burglar alarm, turbidity detector, door opener, counter for all classes of service, safety devices on machines, and as a light meter for photographic work" ①.

TITANIFEROUS IRON ORE

Some 2,023 tons of ilmenite (titaniferous iron ore), valued at \$14,161, was shipped from the General Electric mine, at Saint-Urbain, by the Baie Saint-Paul Titanic Iron Ore.

Some of this material was sent to Niagara Falls, N.Y., probably to the plant of the Titanium Alloy Manufacturing Company, and the balance to the electrical supplies manufacturing plant of the General Electric Company at West Lynn, Mass.

By far the main use of the world's production of titanium-bearing minerals is in the manufacture of titanium-white, which possesses notable advantages over white-lead as a pigment. Titanium-white is non-poisonous, has a greater covering power than white lead, is unaffected by sulphur fumes or sea water, and, being a very stable neutral substance, it does not act in any way on the vehicles or pigments which are added to it; also, in a general way, it is very resistant to effects of exposure. It is marketed both in the form of pure oxide, and with a base of calcium sulphate or barite. The United States Bureau of Mines states that, at the end of 1933, the ruling prices for these materials were ②: For titanium dioxide in bags, car lots, 17 cents per pound; one-ton lots, 18 cents. For calcium- and barium-base titanium pigments, the price was 6 to 6½ cents per pound. The standard titanium-calcium pigment contains 30 per cent titanium

① *The Mineral Industry during 1933*, McGraw-Hill Book Company, New York, 1934, p. 621.

② *Mineral Yearbook, 1934*, United States Bureau of Mines, Department of the Interior, Washington, D.C., U.S.A., pp. 535-539.

dioxide precipitated upon, and coalesced with, calcium sulphate, and the titanium-barium pigment contains 25 per cent titanium dioxide precipitated upon a 'blanc fixe' base.

Figures of production of titanium-white pigments in the United States are not available, but the output has been estimated at about 75,000 tons annually. Other countries where titanium pigments are manufactured, with approximate annual production, are: Norway, 15,000 tons; England, 5,000 tons; and Italy, 1,600 tons. France, also, has been manufacturing titanium pigments since 1923.

Titanium pigments are not manufactured in Canada. In 1927, a company, *Titanium (Canada) Limited*, was formed, for the purpose of manufacturing titanium-white, and to this end acquired an important ilmenite deposit in the township of Beresford. The project, however, did not materialize.

The exact figures of importation into Canada of titanium pigments are not available. The following item is given in the volume *Trade of Canada, March, 1935*: "Imports for the 12 months ending March, 1935: Antimony oxide and titanium oxide, 1,275,321 pounds, valued at \$175,693".

NON-METALLICS

ASBESTOS *

STATISTICS OF PRODUCTION, EXPORTS, ETC.

A total of 155,980 tons of asbestos, valued at \$4,936,326, was shipped from Quebec mines in 1934, as compared with shipments of 158,367 tons, valued at \$5,211,177, during 1933. This is a decrease of 2,387 tons, or 1.5 per cent, in quantity, and of \$274,851, or 5.3 per cent, in value. The average price of all asbestos shipped during the year was \$31.65 per ton, as against \$32.90 for 1933.

The figures given above are exclusive of shipments of material, classed as 'sand, gravel, and stone', which is obtained in the course of milling the asbestos rock, and which amounted to 4,672 tons valued at \$3,480 in 1934, and 6,445 tons valued at \$3,215 in 1933.

In the latter half of 1933, there had been a very marked improvement in the asbestos market, which had raised hopes that the 1934

* By Eugène Laroche, Inspector of Mines.

output would greatly exceed that of the preceding year. This progress was continued during the first half of 1934, but during the balance of the year there was a disappointing falling off in the monthly shipments.

TABLE 1

PRODUCTION OF ASBESTOS IN THE PROVINCE OF QUEBEC FOR 1934

GROUPING OF GRADES	SHIPMENTS AND SALES		AVERAGE VALUE per ton
	Tons	Value	
Crudes.....	1,663	\$ 409,853	\$ 246.45
Fibres.....	77,465	3,456,399	44.62
Shorts.....	76,852	1,070,074	13.92
TOTALS.....	155,980	\$4,936,326	\$ 31.65
Sand, gravel, and stone (waste rock only).....	4,672	\$ 3,480	\$ 0.74
TOTALS.....	160,652	\$4,939,806	

Quantity of rock mined during the year 1934: 2,320,750 tons.

Quantity of rock milled during the year 1934: 1,935,129 tons.

TABLE 2

PRODUCTION OF ASBESTOS IN THE PROVINCE OF QUEBEC FOR 1933

GROUPING OF GRADES	SHIPMENTS AND SALES		AVERAGE VALUE per ton
	Tons	Value	
Crudes.....	1,306	\$ 341,734	\$ 261.66
Fibres.....	82,605	3,843,887	46.53
Shorts.....	74,456	1,025,556	13.77
TOTALS.....	158,367	\$5,211,177	\$ 32.90
Sand, gravel, and stone (waste rock only).....	6,445	\$ 3,215	\$ 0.50
TOTALS.....	164,812	\$5,214,392	

Quantity of rock mined during the year 1933: 1,566,919 tons.

Quantity of rock milled during the year 1933: 1,329,814 tons.

Quantity of tailings re-treated during the year 1933: 521,930 tons.

The quantity of rock mined and hoisted during the year totalled 2,320,750 tons; of this, 385,621 tons, or 16.6 per cent, was sent to the dumps as barren rock. The mill-rock thus amounted to 1,935,129 tons, from which was extracted 173,604 tons of fibre, valued at \$5,700,214. Calculated on the basis of total rock hoisted, the asbestos yield was 7.48 per cent, or 149.6 lb., valued at \$2.455, per ton of rock mined. This is at the prices prevailing during the year and takes into account the stocks on hand at the beginning and end of the year. Corresponding data for the years 1911 to 1934 are as given in Table 3.

Table 4 shows shipments of asbestos for each year from 1925 to 1934, inclusive.

TABLE 3

TABLE OF DATA OF THE QUEBEC ASBESTOS INDUSTRY FOR THE YEARS 1911-1934

YEAR	FIBRE SHIPPED Tons	TOTAL VALUE	AVERAGE VALUE Per ton	FIBRE PRODUCED Tons	ASBESTOS CONTENT PER TON OF ROCK (Pounds)	AVERAGE VALUE OF CONTENT OF ROCK Per ton	ROCK MINED Tons
1911...	102,224	\$3,026,306	\$29.60	94,816	107.80	\$1.53	1,583,076
1912...	111,175	3,050,084	27.52	101,600	108.60	1.38	1,870,608
1913...	136,609	3,830,504	28.04	133,174	105.40	1.45	2,527,410
1914...	107,401	2,895,935	26.96	118,452	111.40	1.43	2,127,395
1915...	113,115	3,544,362	31.33	103,361	96.90	1.46	2,134,073
1916...	133,339	5,182,905	38.87	117,577	102.60	2.12	2,291,087
1917...	137,242	7,198,558	52.45	138,174	108.70	3.08	2,634,410
1918...	142,375	9,019,809	63.35	143,401	117.30	4.08	2,445,745
1919...	135,862	10,932,289	80.47	154,380	100.80	3.88	3,601,690
1920...	179,891	14,749,048	81.89	170,500	109.10	4.53	3,123,370
1921...	87,475	5,199,789	59.44	117,458	107.20	4.28	2,221,138
1922...	160,339	6,053,068	37.75	149,195	102.00	1.70	2,920,280
1923...	216,804	7,364,260	33.97	218,959	117.00	1.42	3,747,576
1924...	208,762	6,561,659	31.37	205,764	124.00	1.83	3,324,727
1925...	273,522	8,976,645	32.82	267,328	129.70	1.95	4,121,258
1926...	279,389	10,095,487	36.13	301,044	134.30	2.35	4,483,361
1927...	274,778	10,621,013	38.65	274,763	113.70	2.13	4,834,761
1928...	271,637	11,181,143	41.16	266,227	103.20	2.17	5,141,263
1929...	306,055	13,172,581	43.04	309,746	99.76	2.21	6,208,970
1930...	242,113	8,390,164	34.65	244,114	99.61	1.90	4,901,206
1931...	164,297	4,812,886	29.29	154,872	136.20	1.99	2,274,048
1932 (1)	122,977	3,039,721	24.72	119,968	129.38	1.60	1,145,340
1933 (2)	158,367	5,211,177	32.90	151,842	145.38	2.39	1,566,919
1934...	155,980	4,939,809	31.65	173,604	149.60	2.45	2,320,750

(1) Calculated on 1,854,434 tons, *i.e.*, 1,145,340 tons of rock mined and 709,094 tons of tailings re-treated.

(2) Calculated on 2,088,849 tons, *i.e.*, 1,566,919 tons of rock mined and 521,930 tons of tailings re-treated.

TABLE 4
ANNUAL SHIPMENTS OF ASBESTOS, 1925-1934 *
(In tons of 2,000 lb.)

YEAR	CRUDE No. 1	CRUDE No. 2	OTHER CRUDES	SPINN'G FIBRE	SHINGLE FIBRE	MILL- BOARD & PAPER FIBRE	FILLERS, FLOATS, & OTHER SHORT FIBRE	TOTAL ASBESTOS SHIPPED	ASBESTIC
1925.....	1,044	3,777	348	16,070	30,010	93,935	128,338	273,522	16,865
1926.....	1,094	3,494	446	15,182	30,497	86,746	135,930	279,389	15,672
1927.....	1,107	3,014	667	14,348	44,573	60,396	150,673	274,778	18,974
1928.....	893	2,713	516	13,504	34,556	78,123	141,332	221,637	22,788
1929.....	802	2,625	931	17,545	34,177	91,157	158,818	306,055	18,976
1930.....	720	1,440	161	10,411	19,909	79,738	129,734	242,113	40,309
Totals... (1925-1930)	5,660	17,063	3,069	87,060	199,722	490,095	844,825	1,647,494	133,584

YEAR	CRUDE No. 1	CRUDE No. 2	OTHER CRUDES	SPIN'G FIBRE	SHIN'LE FIBRE	PAPER FIBRE	WASTE STUCCO OR PLAST'R	REFUSE OR SHORTS	TOTAL ASBESTOS SHIPPED	ASBESTIC
1931.....	206	543		8,560	15,988	39,867	6,309	92,823	164,296	7,209
1932.....	144	313	14	6,004	6,626	32,694	3,984	73,199	122,977	3,473
Totals (1931-32)...	350	856	14	14,564	22,613	72,561	10,293	166,022	287,273	10,682
Totals (1879-1932)	76,203	111,027	71,698	.....	.....	.....	.....	.....	4,754,030	645,100

YEAR	CRUDES	FIBRES	SHORTS	TOTAL ASBESTOS SHIPPED	SAND, GRAVEL, AND STONE (Waste rock only)
1933.....	1,306	82,605	74,456	158,367	6,445
1934.....	1,663	77,465	76,852	155,980	4,672

The greater part of our asbestos is exported in the unmanufactured state. As may be seen in Table 5, which shows our exports of asbestos to various countries, 71.23 per cent in quantity and 57.73 per cent in value of last year's total exports went to the United States of America. Next in order were Japan with 11.80 per cent and 13.30 per cent, Germany, 4.91 per cent and 9.52 per cent, and the United Kingdom, 4.23 per cent and 7.04 per cent, in quantity and value, respectively, of the total exports.

* For figures for 1879-1924, see report for the calendar year 1932.

TABLE 5

EXPORTS FROM CANADA OF UNMANUFACTURED ASBESTOS DURING
THE CALENDAR YEAR 1934

(From *Trade of Canada, Calendar Year 1934*, Dominion Bureau of
Statistics)

IMPORTING COUNTRY	CRUDE AND FIBRE		SHORT FIBRE, SHORTS, AND WASTE		TOTAL	
	Tons 2,000 lb.	Value \$	Tons 2,000 lb.	Value \$	Tons 2,000 lb.	Value \$
United Kingdom.....	4,618	\$ 316,468	2,080	\$ 44,620	6,698	\$ 361,088
United States.....	44,541	1,996,915	68,171	964,429	112,712	2,961,344
Australia.....	998	49,859	181	2,727	1,179	52,586
Belgium.....	3,548	191,519	455	8,968	4,003	200,487
France.....	3,969	243,416	540	10,075	4,509	253,491
Germany.....	5,435	441,188	2,341	47,265	7,776	488,453
Italy.....	618	58,090	186	3,927	804	62,017
Japan.....	18,489	679,723	177	2,519	18,666	682,242
Netherlands.....	734	35,800	579	12,201	1,313	48,001
Spain.....	162	7,887	.....	.....	162	7,887
Uruguay.....	18	1,042	.....	.....	18	1,042
Poland.....	73	5,729	120	1,755	193	7,484
British India.....	63	1,500	60	750	123	2,250
New Zealand.....	1	55	.....	.....	1	55
Porto Rico.....	.....	.....	30	297	30	297
Argentina.....	.....	.....	22	367	22	367
Brazil.....	.....	.....	5	45	5	45
Cuba.....	.....	.....	30	360	30	360
TOTALS.....	83,267	\$4,029,191	74,977	\$1,100,305	158,244	\$5,129,496

The following extract from *Mineral Market Reports*, No. M.M.S. 353, United States Bureau of Mines, indicates that the Province of Quebec continues to supply the great bulk of the asbestos requirements of the United States of America:

“As the United States produces a very small proportion of its consumption, it is dependent upon foreign supplies to satisfy its requirements. In 1934, Canada contributed 93.9 per cent in quantity and 89.6 per cent in value of the total imports of asbestos into the United States. The total Canadian supply (113,060 short tons, valued at \$3,026,563) was classified and divided as follows: crudes (highest grade), 1 per cent; mill fibre, 37 per cent; stucco and refuse, 62 per cent. In 1933, total imports from Canada were 112,915 tons, valued at \$3,192,593. Average values per ton in 1934 were: crude, \$200.04; mill fibre, \$43.08; stucco and refuse, \$14.29. All mill fibre imported in 1934 came

from Canada, and constituted 35 per cent of total imports into the United States. Imports of stucco and refuse from Canada in 1934 constituted 58 per cent of the total for the United States.

"The U.S.S.R. (Russia in Europe) was the second largest source of raw asbestos imported in 1934. The Russian total of 2,595 short tons, valued at \$89,439, was 2.2 per cent in quantity and 2.6 per cent in value of all imports of asbestos into the United States. Corresponding figures for 1933 were 0.8 per cent in quantity and 1.6 per cent in value. Russian totals for 1934 showed gains of 167.3 per cent in quantity and 57.5 per cent in value, compared with 1933. Imports of stucco and refuse showed increases of 143.8 per cent in quantity and 59.8 per cent in value. Imports of crude and mill fibre cannot be compared, because no crude material was reported in 1933 and no mill fibre in 1934. Crude asbestos from this source in 1934 amounted to 657 short tons, valued at \$26,434.

"An interesting development in the import situation is the rise of Malta, Gozo, and Cyprus islands to third place in 1934 in rank of countries exporting asbestos to the United States. Imports from these islands in 1928 were one short ton, and no imports were again reported until 1933, when 2,274 tons entered, followed by 2,463 tons in 1934.

"Africa ranked fourth among sources of raw asbestos imported in 1934. Imports from Africa totalled 1,794 short tons, valued at \$198,479. The material consisted wholly of high-grade crudes with an average value per ton of \$110.63. Corresponding figures for 1933 were 2,324 tons, valued at \$234,557, an average value per ton of \$100.93. The 1934 totals show declines of 23 per cent in quantity and 15 per cent in value, compared with 1933."

Table 6 is reproduced from *Mineral Market Reports*, No. M.M.S. 353. It is accompanied by the following comments:

"The following table shows the tonnage and value of unmanufactured asbestos imported into the United States in 1934, by countries. The countries listed are those from which the asbestos was last shipped; they are not always the countries in which the asbestos was produced.

"Attention is directed to the fact that these figures are not strictly comparable with corresponding data for 1933, for the reason that the Department of Commerce changed its system of reporting this information. In 1933, the figures termed 'General Imports' included commodities entering the United States for bonded warehouses. The 1934 data exclude this item. They include commodities from foreign countries imported for consumption in the United States, plus withdrawals from warehouses for consumption purposes."

TABLE 6

ASBESTOS (UNMANUFACTURED) IMPORTED INTO THE UNITED STATES
IN 1934, BY COUNTRIES AND CLASSES*

(From *Mineral Market Reports*, No. M.M.S.353, U. S. Bureau of Mines)

EXPORTING COUNTRY	CRUDE (INCLUDING BLUE FIBRE)		MILL FIBRE		STUCCO AND REFUSE		TOTAL	
	Short tons	Value \$	Short tons	Value \$	Short tons	Value \$	Short tons	Value \$
Africa, British:								
Union of South Africa.....	595	\$ 62,667					595	\$ 62,667
Other.....	1,199	135,812					1,199	135,812
Canada.....	1,093	218,649	41,960	\$1,807,512	70,007	1,000,402	113,060	3,026,563
Egypt.....					100	1,417	100	1,417
Finland.....					38	1,920	38	1,920
Italy.....	16	9,775			246	1,774	262	11,549
Malta, Goze, and Cy- prus.....					2,463	43,611	2,463	43,611
U.S.S.R. (Russia in Europe).....	657	26,434			1,938	63,005	2,595	89,439
United Kingdom.....	22	5,016					22	5,016
TOTALS, 1934.....	3,582	\$458,353	41,960	\$1,807,512	74,792	1,112,129	120,334	\$3,377,994
1933.....	3,152	\$412,537	48,288	\$2,187,490	68,054	940,648	119,494	\$3,540,675

Table 7 shows which are the countries contributing to the asbestos requirements of the United Kingdom. In 1934, Southern Rhodesia contributed 41.4 per cent in quantity and 47.6 per cent in value of the total. The Union of South Africa was second, with 23.6 per cent in quantity and 23.6 per cent in value. Next in order were: Canada, 22.5 per cent in quantity and 18.1 per cent in value; Soviet Union (Russia) 6.1 per cent in quantity and 5.5 per cent in value; and Cyprus, 3.3 per cent in quantity and 3.1 per cent in value.

* Figures on imports and exports compiled by C. Galihier, of the United States Bureau of Mines, from records of the U. S. Bureau of Foreign and Domestic Commerce.

TABLE 7

UNMANUFACTURED ASBESTOS IMPORTED INTO THE UNITED KINGDOM
FOR THE YEARS 1933-34

(From *Asbestos, 1935*; Dominion Bureau of Statistics, Ottawa)

EXPORTING COUNTRY	1933		1934	
	Tons 2,240 lb.	Value £	Tons 2,240 lb.	Value £
Africa (Rhodesia).....	7,257	£ 151,896	11,266	£ 238,416
Africa (Union of South).....	7,384	129,845	6,415	118,024
Africa (Portuguese East).....	89	1,512	13	259
Australia.....	4	102	72	1,122
Austria.....	20	150	26	178
Belgium.....	.....	.....	2	26
Canada.....	6,477	86,779	6,106	90,681
Cyprus.....	1,826	31,720	908	15,537
Finland.....	71	497	135	879
France.....	.....	78	5	38
Germany.....	62	1,291	2	57
Italy.....	36	2,330	85	930
Netherlands.....	17	581	2	67
New Zealand.....	5	129	.....	.....
Soviet Union (Russia).....	1,376	24,986	1,648	27,666
Switzerland.....	.....	.....	.....	6
United States of America.....	281	10,518	395	5,965
Venezuela.....	14	80	5	202
British India.....	.....	.....	3	151
Fed. Malay States.....	.....	.....	100	800
TOTALS.....	24,919	£ 442,494	27,188	£ 501,004

NOTE.—Pound sterling.—Average value in Canadian currency for the year 1933, \$4.56228; 1934, \$4.9906.

Tables 8 to 14 show the quantity and value, together with the source, of unmanufactured asbestos imported during the years 1933 and 1934 by each of the following countries: Belgium, Netherlands, Germany, Spain, Italy, Austria, Czechoslovakia. Unmanufactured asbestos is not separately listed in the import statistics of France.

TABLE 8

IMPORTS OF RAW ASBESTOS INTO BELGIUM FOR THE YEARS 1933-1934
(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Francs	Kilogs	Francs
Germany.....	2,421,500	5,066,000	190,400	393,000
Canada.....	3,691,400	5,774,000	1,628,000	2,045,000
Portuguese East Africa.....	1,985,400	4,205,000	1,380,200	2,674,000
United States.....	134,300	220,000	2,454,700	3,222,000
France.....	(a)	(a)	(a)	(a)
Hamburg.....	(a)	(a)	(a)	(a)
Netherlands.....	1,462,100	3,353,000	161,500	282,000
United Kingdom.....	107,200	283,000	64,400	211,000
Union of South Africa.....	1,708,200	3,874,000	1,368,700	2,880,000
Cyprus.....	(a)	(a)	(a)	(a)
Other Countries.....	2,523,900	5,546,000	3,538,700	6,515,000
TOTAL IMPORTS.....	14,034,000	28,321,000	10,786,600	18,222,000

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog.—2,204 pounds.

Franc.—Average value in Canadian currency for the year 1933, 3.85 cents; 1934, 4.61 cents.

TABLE 9

IMPORTS OF RAW ASBESTOS INTO NETHERLANDS FOR THE YEARS
1933 AND 1934

(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Gulden	Kilogs	Gulden
Germany.....	8,296	5,289	Statistics by countries not available	
Belgium.....	20,446	3,520		
United Kingdom.....	88,016	14,525		
Russia.....	121,190	20,823		
Cyprus.....	(a)	(a)		
Finland.....	73,240	5,050		
Portuguese East Africa.....	32,465	4,800		
South Africa.....	(a)	(a)		
United States.....	(a)	(a)		
Canada.....	211,996	16,538		
Other Countries.....	803	346		
TOTAL IMPORTS.....	556,452	70,891	287,000	46,000

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog.—2,204 pounds.

Gulden.—Average value in Canadian currency for the year 1933, 55.532 cents; 1934, 66.70 cents

TABLE 10

IMPORTS OF RAW ASBESTOS INTO GERMANY FOR THE YEARS 1933-1934
(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Marks	Kilogs	Marks
Finland.....	349,500	44,000	682,600	49,000
Russia.....	3,378,500	1,040,000	10,038,000	2,505,000
British South Africa.....	3,120,800	1,183,000	2,946,300	1,163,000
British East Africa.....	(a)	(a)	7,100	5,000
British West Africa.....	(a)	(a)	(a)	(a)
Czechoslovakia.....	(a)	(a)	(a)	(a)
Netherlands.....	(a)	(a)	(a)	(a)
British India.....	(a)	(a)	(a)	(a)
Portuguese East Africa.....	(a)	(a)	(a)	(a)
United Kingdom.....	97,600	37,000	42,100	15,000
United States.....	345,100	65,000	279,500	37,000
Canada.....	5,052,200	1,160,000	5,848,100	1,270,000
Other Countries.....	369,200	22,000	310,600	102,000
TOTAL IMPORTS.....	12,612,900	3,651,000	20,154,300	5,146,000

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog.—2,204 pounds.

Mark.—Average value in Canadian currency for the year 1933, 32.813 cents; 1934, 39.0 cents.

TABLE 11

IMPORTS OF RAW ASBESTOS INTO SPAIN FOR THE YEARS 1933 AND 1934
(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Pesetas	Kilogs	Pesetas
Germany.....	53,300	41,252	62,500	44,150
Argentina.....	.....	.....	(a)	(a)
Belgium.....	1,100	252	(a)	(a)
Canada.....	369,800	116,198	95,300	32,068
United States.....	14,600	3,817	(a)	(a)
France.....	51,000	31,407	(a)	(a)
United Kingdom.....	41,900	26,523	(a)	(a)
British India.....	.....	.....	(a)	(a)
Italy.....	600	894	(a)	(a)
French Africa.....	.....	.....	(a)	(a)
British Africa.....	5,346,900	2,387,283	4,190,000	2,070,768
Cyprus.....	.....	.....	(a)	(a)
Other Countries.....	180,200	52,944	354,300	113,169
TOTAL IMPORTS.....	6,059,400	2,660,470	4,702,100	2,260,155

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog.—2,204 pounds.

Peseta.—Average value in Canadian currency for the year 1933, 11.508 cents; 1934, 13.48 cents.

TABLE 12

IMPORTS OF RAW ASBESTOS INTO ITALY FOR THE YEARS 1933 AND 1934

(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Lire	Kilogs	Lire
Austria.....	(a)	(b)	(a)	(b)
Belgium.....	(a)	(b)	(a)	(b)
Finland.....	(a)	(b)	(a)	(b)
France.....	2,000	(b)	700	(b)
Germany.....	29,500	(b)	16,300	(b)
United Kingdom.....	15,900	(b)	10,800	(b)
Netherlands.....	(a)	(b)	(a)	(b)
Yugoslavia.....	(a)	(b)	(a)	(b)
Russia.....	1,502,700	(b)	3,872,700	(b)
Spain.....	(a)	(b)	(a)	(b)
Sweden.....	(a)	(b)	(a)	(b)
Switzerland.....	(a)	(b)	(a)	(b)
Cyprus.....	(a)	(b)	(a)	(b)
British India and Ceylon.....				
Turkey.....	(a)	(b)	(a)	(b)
Australia.....	(a)	(b)	(a)	(b)
South Africa.....	1,149,000	(b)	1,683,300	(b)
Portuguese Africa.....	393,700	(b)	1,085,400	(b)
Algeria.....	(a)	(b)	(a)	(b)
Brazil.....	(a)	(b)	(a)	(b)
Egypt.....	(a)	(b)	(a)	(b)
Canada.....	446,300	(b)	1,332,100	(b)
Chile.....				
United States.....	80,700	(b)	156,800	(b)
Italian Africa.....	(a)	(b)	(a)	(b)
Other Countries.....	45,300	(b)	262,400	(b)
TOTAL IMPORTS.....	3,665,100	5,985,743	8,420,500	11,491,523

(a) Not specified—any imports are included under 'Other Countries'.

(b) Statistics of value by countries not available for 1933 and 1934.

NOTE: Kilog.—2,204 pounds.

Lire.—Average value in Canadian currency for the year 1933, 7.201 cents; 1934, 8.48 cents.

TABLE 13

IMPORTS OF RAW ASBESTOS INTO AUSTRIA FOR THE YEARS 1933-1934

(From Memorandum by Dominion Bureau of Statistics, External Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Schillings	Kilogs	Schillings
Germany.....	90,100	74,000	73,800	130,000
Italy.....	24,500	26,000	49,300	28,000
Poland.....	(a)	(a)	(a)	(a)
Switzerland.....	(a)	(a)	(a)	(a)
Yugoslavia.....	(a)	(a)	(a)	(a)
Czechoslovakia.....	281,200	93,000	324,200	115,000
Hungary.....	(a)	(a)	(a)	(a)
France.....	(a)	(a)	(a)	(a)
United Kingdom.....	(a)	(a)	9,800	11,000
Netherlands.....	(a)	(a)	(a)	(a)
Russia.....	549,200	291,000	335,200	369,000
Dutch East Indies.....	(a)	(a)	(a)	(a)
Brazil.....	(a)	(a)	(a)	(a)
United States.....	(a)	(a)	1,100	2,000
British India.....	(a)	(a)	(a)	(a)
Egypt.....	(a)	(a)	(a)	(a)
British Africa.....	32,200	27,000	44,800	30,000
Portuguese Africa.....	(a)	(a)	(a)	(a)
Canada.....	268,500	243,000	290,100	207,000
Other Countries.....	20,800	22,000	49,500	47,000
TOTAL IMPORTS.....	1,266,500	776,000	1,177,800	939,000

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog—2,204 pounds.

Schilling.—Average value in Canadian currency for the year 1933, 17.052 cents; 1934, 18.72 cents.

TABLE 14

IMPORTS OF RAW ASBESTOS INTO CZECHOSLOVAKIA FOR THE YEARS
1933 AND 1934(From Memorandum by Dominion Bureau of Statistics, External
Trade Branch)

EXPORTING COUNTRY	1933		1934	
	Kilogs	Krone	Kilogs	Krone
Canada.....	356,200	779,000	(a)	(a)
Russia.....	752,500	1,981,000	162,000	4,210,000
British South Africa.....	100,100	169,000	(a)	(a)
Cyprus.....	(a)	(a)	(a)	(a)
Germany.....	109,900	314,000	(a)	(a)
British East Africa.....	(a)	(a)	(a)	(a)
United States.....	3,600	5,000	(a)	(a)
Other Africa.....			(a)	(a)
Hamburg.....	869,900	2,299,000	102,600	2,331,000
Tunis.....	(a)	(a)	(a)	(a)
French Morocco.....	(a)	(a)	(a)	(a)
Austria.....	5,700	50,000	(a)	(a)
Other French Africa.....	(a)	(a)	(a)	(a)
British India.....	(a)	(a)	(a)	(a)
United Kingdom.....	(a)	(a)	(a)	(a)
British West Africa.....	(a)	(a)	(a)	(a)
Finland.....	(a)	(a)	(a)	(a)
Hungary.....	(a)	(a)	(a)	(a)
Egypt.....	(a)	(a)	(a)	(a)
Italy.....	(a)	(a)	(a)	(a)
Poland.....	(a)	(a)	(a)	(a)
Netherlands.....	(a)	(a)	(a)	(a)
Switzerland.....	(a)	(a)	(a)	(a)
Argentina.....	(a)	(a)	(a)	(a)
Other British America.....	(a)	(a)	(a)	(a)
Other Countries.....	400	6,000	229,200	4,606,000
TOTAL IMPORTS.....	2,208,100	5,643,000	493,800	11,147,000

(a) Not specified—any imports are included under 'Other Countries'.

NOTE: Kilog.—2,204 pounds.

Krone.—Average value in Canadian currency for the year 1933,
4.106 cents; 1934, 4.21 cents.

TABLE 15

IMPORTS OF UNMANUFACTURED ASBESTOS INTO PRINCIPAL COUNTRIES
OF WORLD, 1931-33—(LESS RE-EXPORTS)(From *The Mineral Industry of the British Empire and Foreign Countries: Statistical Summary, Production, Imports, and Exports, 1931-1933*)

(Long tons)

IMPORTING COUNTRY	1931	1932	1933
BRITISH EMPIRE:			
United Kingdom.....	19,433	17,222	24,365
Australia.....	1,200	.....	2,676
FOREIGN COUNTRIES:			
Austria.....	4,992	3,412	1,246
Belgium—Luxemburg E. U.....	12,411	5,382	13,807
Bulgaria.....	8	5	4
Czechoslovakia.....	5,263	7,331	2,173
Denmark.....	693	724	707
Finland (including mica) (c).....	61	42	67
France.....	(a)	(b) 6,583	14,127
Germany.....	9,653	7,462	12,414
Greece.....	139	47	54
Hungary.....	2,356	1,562	(a)
Italy.....	5,194	4,629	3,607
Latvia.....	49	69	46
Lithuania.....	79	10	80
Netherlands.....	267	155	548
Norway.....	978	769	958
Poland.....	395	319	541
Portugal.....	79	39	126
Roumania.....	64	64	100
Spain.....	3,225	4,067	5,964
Sweden.....	953	1,174	1,044
Switzerland (including mica).....	1,135	584	824
U.S.S.R. (Russia).....	86	269	27
Yugoslavia.....	1,281	457	339
Egypt.....	100	72	88
Mexico.....	400	272	349
Panama.....	17	(a)	(a)
United States (b) (c).....	121,751	86,387	106,012
Brazil (c).....	33	22	(a)
Chile.....	49	1	47
Columbia.....	36	13	(a)
Venezuela.....	4	8	(a)
Japan (c).....	7,127	7,502	13,546
Netherlands East Indies.....	12	1	12

(a) Information not available.

(b) (France) April-December only.

(c) (United States) Re-exports of unmanufactured were 762, 820, and 13 long tons in 1931, 1932, and 1933, respectively.

(c) Total imports.

TABLE 16

EXPORTS OF UNMANUFACTURED ASBESTOS FROM VARIOUS COUNTRIES,
1931-33

(Domestic Produce)

(From *The Mineral Industry of the British Empire and Foreign Countries: Statistical Summary, Production, Imports and Exports, 1931-1933*)

(Long tons)

EXPORTING COUNTRY	1931	1932	1933
BRITISH EMPIRE:			
United Kingdom.....	770	370	498
Southern Rhodesia.....	25,007	12,385	26,887
Union of South Africa.....	13,526	10,287	14,307
Canada.....	142,355	100,384	133,033
Cyprus.....	3,571	1,600	4,567
FOREIGN COUNTRIES:			
Austria.....	81	110	162
Belgium—Luxemburg E. U.....	237	274	2,745
Czechoslovakia.....	461	398	508
Germany.....	553	283	234
Italy.....	141	898	1,209
Netherlands.....	5	6	4
Poland.....	6	2	2
Spain.....	180	1	.....
Sweden.....	2	3	26
Switzerland (including mica).....	9	30	5
U.S.S.R. (Russia).....	13,030	16,290	21,119
United States.....	1,530	1,524	1,230

TABLE 17

EXPORTS OF UNMANUFACTURED ASBESTOS FROM CYPRUS, SOUTHERN RHODESIA, UNION OF SOUTH AFRICA, AND CANADA FOR THE CALENDAR YEARS 1932 and 1933

(Compiled from Memorandum by Dominion Bureau of Statistics,
(External Trade Branch)

(Tons of 2,240 lb.)

IMPORTING COUNTRY	1932				1933			
	CYPRUS	SOUTH-ERN RHODESIA	UNION OF SOUTH AFRICA	CANADA	CYPRUS	SOUTHERN RHODESIA	UNION OF SOUTH AFRICA	CANADA
United Kingdom...Tons	1,519	4,064	5,810	2,295	1,786	8,758	7,214	6,651
\$	104,205	284,585	393,747	108,397	132,977	659,674	576,139	358,471
United States...Tons		1,481	128	83,046	2,151	2,098	195	100,192
\$		116,613	14,875	2,176,573	39,231	213,633	18,232	3,194,240
Australia Tons			4	403		525	948	668
\$			287	24,800		43,684	88,812	39,252
Belgium Tons			477	1,559	137		660	5,325
\$			37,639	61,436	7,943		46,736	290,057
Egypt...Tons	12				10			
\$	247				223			
France...Tons			898	2,425			1,030	2,838
\$			62,217	156,890			85,158	177,067
Germany Tons	56		751	2,412	43		860	5,570
\$	3,237		64,460	131,082	452		86,439	338,935
Italy...Tons	13		536	702			992	1,524
\$	533		55,273	50,933			105,694	94,735
Japan...Tons		700	508	6,232	71	810	969	8,555
\$		51,912	21,293	342,031	2,153	67,179	74,341	423,135
Netherlands...Tons			327	969			533	1,245
\$			26,014	36,685			49,206	56,123
Spain...Tons			848	204	304		886	238
\$			45,784	11,789	14,180		55,856	14,976
Syria...Tons								
\$					14			
Rhodesia Tons		34						
\$		720					5	
Port. E. Africa Tons		7,521				17,603		
\$		531,052				1,336,967		
Union of S. Africa Tons		66				240		
\$		3,102				12,336		
Other Countries...Tons		5		137	65	79	20	229
\$		278		1,619	3,969	4,056	1,295	2,803
TOTAL Tons	1,600	13,871	10,287	100,385	4,567	30,113	14,307	133,035
\$	108,222	983,262	721,589	3,101,235	201,142	2,337,534	1,187,908	4,989,794

MINING OPERATIONS IN 1934

Returns of sales and shipments of asbestos were received from six companies, *viz*:

- Asbestos Corporation, Limited, Thetford Mines.
- Canadian Johns-Manville Company, Limited, Asbestos.
- Keasbey & Mattison Company, Thetford Mines.
- Johnson's Company, Thetford Mines.
- Nicolet Asbestos Mines, Limited, Norbestos.
- Quebec Asbestos Corporation Limited, East Broughton.

Shipments of short fibre were also made by the Northern Asbestos Company, at Thetford Mines. This Company works over some of the tailing of one of the large mills to reclaim the short fibre left in the serpentine sands.

Asbestos Corporation, Limited.—The King mine of the Asbestos Corporation, Limited, was in operation steadily throughout the year. The system of block-caving inaugurated at the mine in 1932 was carried on actively during 1934. Stope block No. 2 was brought into production and preparatory mining was started on three additional stope blocks.

The Vimy Ridge mine, in Coleraine township, was operated day and night during the months of June, July, and August. Prior to and following this, a small crew of men was employed for the recovery of crude. The Beaver-Consolidated mine, at Thetford Mines, was also worked on a small scale for recovery of crude. All the other properties of the Asbestos Corporation, Limited, remained closed throughout the year.

Canadian Johns-Manville Company, Limited.—Mining and milling operations were carried on throughout the year at the property of the Canadian Johns-Manville Company, Limited, at Asbestos. A great deal of stripping was also done, in preparing new ground for mining.

An interesting new departure of the Company was the opening of a rock-wool plant at Asbestos. Rock-wool is the trade name for a high-grade insulating material, composed in part of limestone.

Johnson's Company.—The Johnson's Company operated its mine and mill at Thetford Mines during the whole year. Work was also carried on actively on the removal of overburden as a preliminary to extending the mine workings in a westerly direction.

An important addition was made to mining equipment with the acquisition of a large electric shovel which has an excavating capacity of from one thousand to fifteen hundred tons of broken rock per day. This machine is operated by 550 volt direct current, and is equipped with a two-cubic-yard dipper. It is of the full revolving type, the under-carriage having two caterpillar belts each separately propelled. The general dimensions are as follows: caterpillar traction belts, length 16 feet, width 30 inches, centre to centre, 9 ft. 6 in.; overall width, 12 feet; length of rotating frame and cab, 17 ft. 3½ in.; width of cab, 10 feet; height of cab, 9 feet; overall height from ground, 16 ft. 9 in.; length of boom, 28 feet; length of dipper sticks, 18 feet; size of dipper, 2 cubic yards; approximate shipping weight, 70 tons.

This electric shovel was designed and manufactured for the Johnson's Company by the Hall Machinery Company, at Sherbrooke, Que.

The Johnson's mine at Black Lake remained closed throughout the year.

Keasbey & Mattison Company.—The Keasbey & Mattison Company operated the Bell mine the whole year, working ten hours per day, as well as one unit of the mill, which was on a schedule of 24 hours per day. Stripping operations were also carried on on the southwest side of the pit. Tertiary crushing equipment was changed during the year, a Symons short head cone crusher replacing the roll hammer crushers.

Nicolet Asbestos Mines, Limited.—There was no rock mined at the Nicolet mine, at Norbestos, but the mill worked on fibre purchased from other mines, supplemented from stocks on hand, and shipments made from these sources.

Quebec Asbestos Corporation, Limited.—After closing down for three of the winter months, the Quebec Asbestos Corporation, at East Broughton, was continuously active for nine months. During the period of inactivity, an extension, 60 feet wide by 100 feet long and four stories high, was added to the mill. The removal of the overburden on the southwest of the pit was pushed actively throughout the year. The Company also did some prospecting work on lots 13 and 14 of range VIII, township of Broughton.

Philip Carey Company, Limited.—Mr. George D. Crabbs, President of the Philip Carey Manufacturing Company, Cincinnati, U.S.A., has announced the acquisition of a manufacturing plant at Lennoxville, Que., and the formation of the Philip Carey Company, Limited, incorporated under Canadian federal charter. The Company will carry on the manufacture and sale of insulating material, asphalt bridge planking, asphalt expansion joints, and other asbestos and asphalt products. The following have been elected directors of the Company: George D. Crabbs, R. B. Crabbs, W. J. Moeller, William Burchenal, and E. E. Spafford.

THE ASBESTOS INDUSTRY IN OTHER COUNTRIES

RHODESIA:

The Southern Rhodesia Chamber of Mines gives the total sales of asbestos from Southern Rhodesia during 1934 as 32,214 short tons, valued at £402,745, as against 30,182 short tons, valued at £555,993, in 1933. The amount and value of the Rhodesian asbestos production for each year since 1908 is shown in Table 18.

TABLE 18

ANNUAL PRODUCTION OF ASBESTOS IN RHODESIA, 1908-34

(Rhodesian Chamber of Mines, Fortieth Annual Report, 1934, Bulawayo)

YEAR	SHORT TONS	VALUE	YEAR	SHORT TONS	VALUE
1908.	55	£ 552	1921.	19,528	£ 795,698
1909.	272	2,722	1922.	14,249	577,699
1910.	332	3,320	1923.	20,364	626,898
1911.	460	6,397	1924.	26,141	603,423
1912. . . . .	.....	.....	1925.	34,349	765,926
1913.	290	5,224	1926.	33,344	726,835
1914.	487	8,612	1927.	33,176	794,215
1915.	2,010	32,190	1928.	39,960	970,327
1916.	6,157	99,059	1929.	42,634	1,186,627
1917.	9,562	189,890	1930.	37,765	1,070,847
1918.	8,574	158,684	1931.	24,042	386,494
1919.	9,798	425,240	1932.	15,766	197,092
1920.	18,823	459,572	1933.	30,182	555,993
			1934.	32,214	402,745

We extract the following from the address of Mr. Samuel Turner at the annual general meeting of Turner & Newall, Limited, held in York, England, on the 17th January, 1935:

"I would like to give you a resumé of the past year from the operating point of view. Dealing first with the mining companies in South Africa, the small improvement in demand to which I referred last year has been maintained throughout the year under review, with the result that the African mining companies in which we are interested have been able to make some small increase in their production and have also been able to resume on a normal basis the development work which was reduced to a minimum in the very depressed conditions of two years ago. This does not mean that the mines concerned are producing to anything like their maximum capacity; indeed, the contrary is the case, as it would in fact be quite possible for our mines in Africa to produce double the present quantities without in any way straining their resources. Improvement in demand for raw asbestos, in comparison with two years ago, does, however, definitely exist. With regard to the future, we expect during the course of the ensuing year a further small increase in our production of raw asbestos, but we are not anticipating that any unduly heavy demands will be made on our productive capacity".

UNION OF SOUTH AFRICA:

In 1934, the production of asbestos in the Union of South Africa amounted to 17,594 short tons, valued at £203,033, as compared with 15,887 tons, valued at £197,120, in 1933. The production included amosite, blue, and chrysotile asbestos, as shown in Table 19. Details of the annual production of the Union for each of the years 1921 to 1934 are given in Table 20.

TABLE 19

ASBESTOS PRODUCTION IN THE UNION OF SOUTH AFRICA, 1933-34

(From *Asbestos*, March, 1935)

	1933		1934	
	TONS (2,000 lb.)	VALUE	TONS (2,000 lb.)	VALUE
TRANSVAAL:				
Amosite.....	3,089.75	£ 31,099	3,756.42	£ 37,104
Chrysotile.....	9,572.20	105,715	11,025.30	114,241
Blue.....			1.40	15
CAPE:				
Blue.....	3,224.66	60,306	2,810.76	51,673
TOTAL.....	15,886.61	£ 197,120	17,593.88	£ 203,033

TABLE 20

ASBESTOS PRODUCTION IN THE UNION OF SOUTH AFRICA, 1921-1934*

(Short tons)

YEAR	TRANSVAAL	CAPE PROVINCE	NATAL	TOTAL QUANTITY	TOTAL VALUE
1921.....	1,593	3,467	62	5,122	£103,067
1922.....	1,392	2,991	6	4,389	81,230
1923.....	4,076	4,317	..	8,393	121,453
1924.....	4,240	3,001	..	7,241	110,075
1925.....	7,628	2,540	..	10,168	152,115
1926.....	10,104	3,993	..	14,097	216,466
1927.....	17,313	4,827	..	22,140	343,301
1928.....	18,976	5,078	..	24,054	399,550
1929.....	26,984	6,030	23	33,037	497,393
1930.....	13,800	5,481	..	19,281	340,795
1931.....	12,025	3,656	..	15,681	249,868
1932.....	9,106	2,964	..	12,070	130,704
1933.....	12,662	3,224	..	15,886	197,120
1934.....	14,783	2,810	..	17,593	203,033

* Statistics published by the Department of Mines and Industry of the Union of South Africa.

CYPRUS:

According to figures supplied by the Cyprus Trading Corporation, Limited, the asbestos production of Cyprus during 1934 amounted to 6,779 long tons, as against 3,486 long tons in 1933. Table 21 shows the amount and the destination of unmanufactured asbestos exported from Cyprus during the year 1934.

TABLE 21

EXPORTS OF UNMANUFACTURED ASBESTOS FROM CYPRUS DURING THE
CALENDAR YEAR 1934

(From Memorandum by Dominion Bureau of Statistics, External
Trade Branch)

(Tons of 2,240 lb)

IMPORTING COUNTRY	QUANTITY	VALUE
United Kingdom.....	960	£14,692
United States.....	2,889	11,120
Austria.....	.....	.....
Australia.....	.....	.....
Belgium.....	473	6,510
Egypt.....	23	95
France.....	.....	.....
Germany.....	1,400	15,425
Italy.....	262	3,109
Japan.....	724	3,315
Netherlands.....	.....	.....
Spain.....	348	3,584
Syria.....	.....	.....
Yugoslavia.....	.....	.....
Other Countries.....	511	6,404
TOTAL EXPORTS.....	7,590	£64,254

NOTE: Pound sterling.—Average value in Canadian currency, \$4.9906.

RUSSIA (U.S.S.R.):

The following particulars of asbestos production in Russia are reproduced from *Asbestos*, June, 1935:

EXPORTS OF ASBESTOS FROM SOVIET RUSSIA

(Figures supplied by Soyuspromexport of Moscow, sole exporters of asbestos from U.S.S.R.)

	YEAR 1933	YEAR 1934
METRIC TONS.....	21,458	33,715
OR		
SHORT TONS.....	23,653	37,164

TABLE 22

WORLD PRODUCTION OF ASBESTOS, 1931-1933

(From *The Mineral Industry of the British Empire and Foreign Countries, 1931-1933*)

(Long tons)

PRODUCING COUNTRY	1931	1932	1933
BRITISH EMPIRE:			
Southern Rhodesia.....	21,466	14,077	26,948
Swaziland.....		4	
Union of South Africa (b).....	11,480	7,844	15,185
CANADA:			
Chrysotile.....	141,470	112,902 (c)	147,135 (c)
Actinolite.....	31		
Cyprus.....	1,138	1,520	3,494
India.....	6	90	
Australia.....	122	130	279
Total, British Empire.....	176,000	137,000	193,000
FOREIGN COUNTRIES:			
Finland (amphibole).....	572	800	(a)
France.....	500	300	(a)
Greece.....	10	8	(a)
Italy.....	571	1,461	(a)
U.S.S.R. (Russia).....	63,653	(a)	(a)
United States (sales):			
Amphibole.....	331	3,178	4,237
Chrysotile.....	2,551		
Argentina.....		7	(a)
China.....	160	(a)	(a)
Japan (estimated).....	1,000	1,000	1,000
"Manchoukuo".....	168	118	(a)
Turkey.....	4		118
Total, Foreign Countries.....	69,000	(a)	(a)
WORLD TOTAL.....	245,000	(a)	(a)

(a) Information not available.

(b) Production is not available by kinds, but sales were as follows:

	1931	1932	1933
Amosite.....	1,863 long tons	1,242 long tons	2,765 long tons
Blue.....	3,259 " "	2,647 " "	2,879 " "
Chrysotile.....	8,873 " "	6,888 " "	8,546 " "

(c) Sales and shipments.

FELDSPAR *

The entire output of feldspar in 1934 came from the Lièvre River Basin area. The production was estimated at 9,207 tons valued at \$78,853. As compared with 1933, this is an increase of 49 per cent in quantity, but of only 33 per cent in value, the average price per ton having fallen from \$9.58 to \$8.51.

The bulk of the production came from properties owned by *O'Brien & Fowler, Limited*, but leased to other operators, and from the *W. E. Evans* mine. Sales of feldspar were reported by fourteen producers. As in former years, the crude feldspar was consigned mainly to the grinding plant of the *Canadian Flint & Spar Company, Limited*, located in Buckingham, and to that of *Bon Ami, Limited*, in Montreal. An appreciable tonnage of crude feldspar was also shipped to the United States.

Feldspar is generally extracted from open pits, but at a few properties it is found profitable to resort to underground mining. At a mine operated by the *Derry Mining Company*, on lot 1, range V, of Derry township, a feldspar dyke outcrops near the top of a high hill which slopes at a steep angle. This deposit was at first worked by open-pit methods to shallow depth, but afterward by underground workings, the broken material being brought out through adits. At other points in the Province, rich bodies of feldspar are stoped out from underground openings made into the walls of open pits. In such cases, the broken feldspar is generally brought to the surface through the open pit, by means of incline planes.

Data compiled by the Dominion Bureau of Statistics show that production of feldspar for the whole of Canada in 1934 was 17,335 tons, valued at \$140,975. Exports were estimated at 10,532 tons having a value of \$65,158. Imports, consisting of ground feldspar together with a small tonnage of crude high-soda spar, were 1,039 tons, valued at \$15,245.

* Notes on feldspar, garnet, graphite, kaolin, magnesitic-dolomite, mica, ochres and iron oxides, phosphate, and quartz and industrial sand, by Paul E. Bourret, Inspector of Mines.

GARNET

McLean & McNicoll, Limited, of Montreal, started operations at the beginning of 1934 on a body of garnetiferous gneiss located near the village of Labelle, on lot 25, range B, Joly township.

In a geological report entitled *The Labelle-L'Annonciation Area*, to be published as Part E of our Annual Report for 1934, F. Fitz Osborne gives the following description of the deposit: "The rock exposed is, in part, a garnetiferous Grenville gneiss, rich in biotite. This includes a small pod of silicated limestone and is cut by veins or dykes of quartz and dykes of garnetiferous pegmatite which have the same strike as the gneiss".

A mill was built near the deposit and equipped with an Acme jaw crusher, a scalping screen, a No. 12 Universal hammer mill, rolls, Niagara vibrating screens, bucket elevators, and bins. The capacity of the plant is estimated at 40 tons per day.

The ore-body, which occupies a high bluff on the east side of the Rouge river, is worked by open-cut methods, in benches. The broken ore is sorted by hand, the garnetiferous pegmatite material and the quartz constituting the mill-feed. The marketed product consists of a mixture of quartz, feldspar, and garnet, and is available in three sizes: 10-20 mesh, 20-40 mesh, and 40-60 mesh. The material is used principally for sand-blasting purposes.

In the general table of mineral production on page 7, the sales of these garnet products are included with the production of quartz and industrial sand.

GRAPHITE

No operations have been carried on at any of the Quebec graphite mines since 1930. However, a shipment of 129 tons of concentrates was reported during 1934 by the *Canadian Graphite Corporation*, whose mine is located in Boyer township, at a short distance from the village of Guenette. This shipment came entirely from stocked material.

Prices have apparently not improved during the past year and market conditions remain unfavourable to the Quebec producers.

KAOLIN (CHINA-CLAY)

A deposit of kaolin-bearing quartzite of Grenville age located near Saint-Rémi, in Amherst township, has been worked during the past few years by the *Canadian Kaolin Silica Products, Limited*.

The principal products made by the Company are silica-sands, but kaolin is also recovered as a by-product. A trial shipment consisting of 48 tons of kaolin was made in 1934 by this producer. The material was consigned to a paper mill in Trois-Rivières.

No work was carried out in 1934 on the china-clay property located on lots 2 to 8, range VI South, of Amherst township, and formerly operated by the *Canadian China Clay Company*.

MAGNESITIC-DOLOMITE

The calcined and dead-burned magnesitic-dolomite marketed in 1934 was valued at \$382,927, which is an increase of \$22,799 over the previous year. *Canadian Refractories, Limited*, at Kilmar in Grenville township, and the *International Magnesite Company*, in Harrington township, were the only producers.

As compared with 1933, notable changes in the markets for dead-burned magnesite were reported. The quantity of clinker used by Canadian consumers increased nearly 100 per cent, and shipments to England approximately 50 per cent. On the other hand, due largely to lack of activity in the steel industry, the tonnage of clinker consigned to United States consumers decreased by 20 per cent. A gain of 80 per cent over 1933 is recorded in sales of finished products. Considering the large imports into Canada of magnesite products, valued at \$469,198 in 1934, the remarkable gain recorded in the domestic trade is gratifying.

A new plant for the manufacture of chrome-magnesia and other refractory products went into operation in September, 1934, at Kilmar. Officials of Canadian Refractories, Limited, state that the Company is now in a position to supply the whole Canadian market with all types of basic or neutral chrome-magnesia products. A new product, known to the trade as *695 Plastic*, was marketed last year by this Company. Its use in open-hearth furnace tap-holes has been very satisfactory. Considerable progress was also made in developing a refractory product to be used in furnaces burning Nova Scotia coal, and several satisfactory installations have been made.

MICA

Practically all the mica mined in Quebec in 1934 was of the phlogopite, or amber, variety. Sales during the year had a total value of \$85,967, as compared with \$39,061 in 1933 and only \$4,076 in 1932. The marked progress registered by the industry since the beginning of 1933 is attributed largely to the more favourable conditions that are now prevailing in the export trade.

Shipments of mica in 1934 and 1933, as reported by the Department of Mines, Ottawa, were as follows:

SHIPMENTS OF MICA, 1933 AND 1934

DESCRIPTION	1934	1933
Splittings.....	75,050 lb.	73,150 lb.
Trimmed mica.....	121,111 "	17,642 "
Ground and scrap mica.....	447,806 "	420,675 "
Total.....	643,967 lb.	511,467 lb.

The increase in sales of trimmed mica is notable. In compliance with the requirements of a certain number of consumers, a large portion of the output of sheet mica was knife-trimmed.

The bulk of last year's mica production came from the *Blackburn mine*, in Portland East township, and the *Martin mine*, in Hull township. There were few other mines in actual operation, but the increase in demand was accompanied by a liquidation of stocks carried over from previous years.

Dealers' quotations at the close of the year were as follows:

KNIFE-TRIMMED SHEET:

1 in. by 3 in.....	\$0.35 per lb.
2 in. by 3 in.....	\$0.50 to 0.55 "
2 in. by 4 in.....	\$0.75 to 0.80 "
3 in. by 5 in.....	\$1.25 to 1.35 "
4 in. by 6 in.....	\$1.75 to 1.75 "
5 in. by 8 in.....	\$3.00 "

SPLITTINGS:

1 in. by 1 in.....	\$0.48 per lb.
1 in. by 2 in.....	\$0.50 "

GROUND MICA:

20-mesh.....	\$25.00 per ton (in ton lots, f.o.b. Ottawa)
60-mesh.....	\$35.00 " " "
120-mesh.....	\$45.00 " " "

NATURAL GAS *

The *Canadian Seaboard Oil & Gas, Limited*, completed one deep test during 1934, on lot 300, Parish of Saint-Grégoire, in Nicolet county. The site of the well is about four miles south of the Sainte-Angèle well, which was drilled by the same Company without success the previous year. The Saint-Grégoire well was spudded some time in February and had reached a depth of 6,030 feet in October, when it was finally plugged and abandoned. Eight gas horizons were encountered in the course of drilling, but none of these proved of economic importance. Between the depths of 5,400 feet and 5,650 feet, strong puffs of gas were encountered regularly which lifted the string of tools in the well, but each of these had dwindled considerably after a day or two of open flow. With the abandonment of the Saint-Grégoire well, the Canadian Seaboard Oil & Gas, Limited, definitely left the field.

The following is the log of the Saint-Grégoire well, as condensed from the reports of the Borings Division, Geological Survey, Ottawa:

0	—	50	feet	—Surface deposits
50	—	470	"	—Queenston red and grey shale
470	—	2,950	"	—Lorraine grey and sandy shale, with limestone
2,950	—	4,000(?)	"	—Lower Lorraine or/and Utica shale
4,000(?)	—	4,810(?)	"	—Utica shale and shaly limestone
4,810(?)	—	5,340(?)	"	—Trenton limestone
5,340(?)	—	6,030	"	—Beekmantown dolomite

The marked absence of fossils in this section made it difficult to affix definite thicknesses to the formations traversed by the drilling.

The *Cartier Natural Gas Company*, successors to the Lanoraie Oil & Gas Syndicate, Limited, held considerable acreage on the North Shore of the St. Lawrence between Montreal and Trois-Rivières and also south of the island of Montreal, in the counties of Chambly, Verchères, Laprairie, and Richelieu.

* Notes by Marc Boyer, Inspector of Mines.

This Company drilled two wells in 1934. One, on lot 322 of the Parish of Lanoraie, Berthier county, was started in July with a semi-portable rig and had reached about 2,000 feet in depth at the end of the year. Streaks of sand and water encountered in the drilling occasioned many delays. The other well, on lot 26, Parish of Saint-Hubert, Chambly county, was started some time in August and stood at 3,200 feet at the end of the year.

The logs of the two wells may be summarized as follows:

LANORAIE WELL

0— 200 feet —Surface deposits
200—1,210 “ —Lorraine shale
1,210—1,780 “ —Lower Lorraine or/and Utica shale
1,780—2,500 “ —Trenton shaly limestone

SAINT-HUBERT WELL

0— 10 feet —Surface deposits
10— 800 “ —Lower Lorraine shale
800—1,240 “ —Lower Lorraine or/and Utica shale
1,240—2,330 “ —Trenton limestone
2,330—2,430 “ —Chazy sandy limestone
2,430—3,200 “ —Beekmantown impure dolomite

One other well was drilled in the Parish of Lanoraie, on lot 729, by *Carl M. Mohr*. It struck a flow of gas, estimated at 15,000 cubic feet per day, at a depth of 1,206 feet, but on further deepening to 1,390 feet, a heavy flow of highly saline water was encountered. This water was shut off with a lead plug, and the well remains with a valve at the casing-head to seal-off the gas.

The following is the log of this well:

0— 70 feet —Surface deposits
70— 840 “ —Lower Lorraine and Utica shale
840—1,380 “ —Trenton shaly limestone

The accompanying table gives the results of analyses made by the Fuel Research Laboratory, in Ottawa, of samples of natural gas collected during the summer of 1934 by P. V. Rosewarne of the Fuel Research Laboratory and by Marc Boyer, provincial mining inspector.

ANALYSES OF SAMPLES OF NATURAL GAS FROM QUEBEC IN 1934

Owner or Operator of Well	Lot No.	Depth of Well ft.	Btu's per cu. ft.	Sp. Gr. Air=1	Methane %	Ethane %	Propane %	Butanes %	Pentanes plus %	Carbon Dioxide	Oxygen %	Nitrogen %	Helium %
PARISH OF ST-GRÉGOIRE-LE-GRAND													
Jean Trudel.....	501	1100	1070	0.624	91.3	5.9	1.3	0.5	0.2	Nil	0.3	0.5	0.05
PARISH OF STE-ANNE-D'YAMACHICHE													
Lucien Milot.....	822	300	....	0.589	95.1*	....	....	....	....	0.3	0.0	4.6	0.004
A. Descoutaux No. 1.	813	200	1007	0.577	96.5	1.2	0.0	0.2	0.2	0.3	0.2	1.4	0.004
Hervé Garceau.....	486	280	992	0.580	97.0	0.1	0.1	0.2	0.2	0.5	0.4	1.7	Nil
PARISH OF LA VISITATION DE LA POINTE DU LAC													
Maxime Houle.....	390	140	976	0.590	93.2	1.2	0.0	0.1	0.3	0.5	0.3	4.5	Trace
PARISH OF ST-HENRI DE MASCOUCHE (CABANE RONDE)													
St. Paul Oil & Gas Co. A	3	187	996	0.582	98.0	0.1	0.1	0.0	0.1	0.9	0.0	0.8	0.004
" " " No. 1	3	300	....	0.605	....	....	....	....	....	0.8	0.0	5.9	0.0 8
PARISH OF SAINT-JOSEPH-DE-LANORAIE													
Carl Mohr, No. 1.....	729	1206	970	....	93.2	1.7	....	....	Trace	0.4	0.3	4.3	0.01
Seepage occurring south of Carl Mohr No. 1**	729	Surface	....	....	88.3*	....	....	....	....	2.1	0.0	9.6	Nil

* The sample obtained was not large enough to fractionate. The amount shown is total hydrocarbons obtained from combustion in Burrell apparatus, and is composed principally of methane.

** The sample was contaminated with air and therefore the results were calculated to an air-free basis.

OCHRES AND IRON OXIDES

The 1934 production of ochres and iron oxides, sold either in the raw state or as a calcined product, amounted to 4,798 tons valued at \$64,566. Sales by Quebec producers accounted for nearly 98 per cent of the total Canadian output of these materials.

Sales were reported by three operators. Outstanding among these is the *Sherwin-Williams Company of Canada, Limited*, who, near Red Mill, in Champlain county, operate two iron oxide deposits, together with a large plant for the production of mineral pigments for paint manufacture. Last summer, the crude-oxide washing plant was rebuilt and provided with improved equipment, and, in the latter part of the year, construction was started on a calcining plant which, upon its completion early in 1935, will replace the unit in use at present. The new plant will embody eight wood-fired reverberatory furnaces of modern design. A conveyor to stock-pile fire-wood is also being built. These plant changes have been made with the object of increasing capacity and also to ensure a better finished product. Notable progress was made last year in the production, from local ores, of certain grades of pigments which are at present imported. Some of these products will probably be manufactured on a commercial basis during the coming year.

Crude iron oxide, used chiefly for the purification of coal gas, in plants located in eastern and central Canada and in the United States, constitutes the bulk of the Quebec production. This material is supplied almost entirely by *Thomas H. Argall* from deposits at La Pointe du Lac, near Trois-Rivières. One small shipment was also made by *Eugène McNicoll*, of Montreal, from a deposit opened last year on lot 76 of the Northwest range of the Rouge river, in Marchand township.

PHOSPHATE

Sales of phosphate (apatite) in 1934 totalled 81 tons, as compared with 105 tons in the previous year. The average value per ton was higher, at \$8.43, as against \$7.67.

Last year's output was obtained either in conjunction with mica mining or from certain abandoned mines in the Buckingham district. It was all consigned to the *Electric Reduction Company*, at Buckingham, where apatite is used in the manufacture of phosphorus and phosphorus salts.

PYRITE

Returns of shipments of pyrite concentrates, used as a source of sulphur, were received from two operators. They totalled 9,974 tons, valued at \$50,398.

The two producers were *Aldermac Mines, Limited*, in Beauchastel township, Témiscamingue county, and the *Consolidated Copper and Sulphur Company*, who operate the Eustis mine, in Ascot township, near Sherbrooke. The Aldermac mine was worked for eight and a half months, and the mill for six and a half months. The Eustis mine and mill were operated throughout the year.

QUARTZ AND INDUSTRIAL SAND

The production of quartz and industrial sand in 1934 is the highest on record, being estimated at 55,148 tons valued at \$226,492.

The silica mining and milling industry in Quebec has made remarkable progress during the past few years, due in part to the possibilities offered by the development of recently opened deposits, but also to the initiative and excellent work of operators, who have succeeded in preparing products for the market that are of a quality to meet fully the requirements of consumers who heretofore used imported silica-sands.

The Quebec output is derived from several sources: the Potsdam sandstone formation, quartz-kaolin deposits, pegmatites, and quartz veins.

Three producers use Potsdam sandstone as raw material. The *Canadian Carborundum Company*, at Saint-Canut, produces silica-sand which, for the most part, is shipped to Shawinigan Falls, where it enters in the manufacture of carborundum. The *Ottawa Silica and Sandstone, Limited*, operates a quarry and grinding mill at East Templeton. Various grades of sand are produced, but the bulk of last year's output was used for sand-blasting purposes. Potsdam sandstone is also quarried at Melocheville, in Beauharnois county, by *Euclide Montpetit*, who operates a grinding mill in conjunction with the quarry.

The *Canadian Kaolin Silica Products, Limited*, has worked successfully during the past few years a kaolin-bearing quartzite deposit, and a grinding plant of large capacity, near Saint-Rémi, in Amherst township. In addition to silica-sand used as an ingredient in the manufacture of glass, which is the chief product, the Company produces several grades of sand used by many industries. These include: sand-blasting materials; granules used in digester linings; paper spacers; core sand; sand used in cleansers, enamelware, pottery, and in the paint industry; fillers used in paper, linoleum, and rubber manufacture; and moulding sand. In the course of 1934, the primary crushing plant, formerly located near the quarry, was transported and installed within the main grinding plant, so that all milling operations now take place under one roof. At the quarry, the drag-line scraper was replaced by a mechanical shovel. The quartzite is at present loaded directly from the quarry faces into motor trucks and conveyed over the Company's road to the mill. The output of this Company has contributed largely in increasing the total production of silica in the Province of Quebec.

Silica Products of Canada, Limited, started operations at the beginning of the year on their property near Lac-Bouchette, in Dequen township. The deposit consists of a large mass of quartz which, as shown by analyses of the surface material, is sufficiently free of impurities to be of commercial value. The construction of a large mill, started in 1933, was completed early in the year. This mill was in operation for a few months in 1934, and some shipments of silica-sand were made. The mill flow-sheet was modified and improved during the year, and the Diesel engine which supplied motive power to the mill was replaced by another of much larger capacity.

An appreciable tonnage of quartz, obtained chiefly as a by-product from feldspar mining in the Buckingham district, was sold to the Electric Reduction Company to be used as a flux in the manufacture of phosphorus and phosphorus salts.

SOAPSTONE AND TALC *

In spite of a substantial reduction in price per cubic foot of soapstone blocks, the soapstone quarrying industry was fairly active during 1934. The production for the year was valued at \$44,297, as

* By Eugène Larochelle, Inspector of Mines.

compared with \$47,680 in 1933. The major portion of this output consisted of sawn blocks, used for lining alkali recovery furnaces in the kraft and soda pulp industries. Some 300 tons of lump ore, however, were shipped to a grinding mill in Montreal. Returns were received from three operators.

The *Broughton Soapstone and Quarry Company, Limited*, operated its quarry on lot 12 of ranges X and XI, Broughton township, throughout the year and made regular shipments. The plant is equipped with seven saws. An average of twenty-five men were employed during the year.

Charles Fortin, of Robertsonville, produced sawn blocks from his quarry on the east half of lot 2, range V, Thetford township. Three saws were in use during the greater part of the year. The number of employees varied, with a maximum of fifteen.

L. C. Pharo had an average of six men working in his quarry on lot 11, range IX, Broughton township, from April until October. One saw was in use for cutting blocks. From October until the end of the year, Mr. Pharo transferred his operations to a quarry on lots 12 and 13, range III, Thetford township.

BUILDING MATERIALS *

As a result of somewhat improved conditions in the building trade during 1934, an increase of 10 per cent was recorded in the value of the output of our pits and quarries, thus bringing to an end the declines which have been recorded every year since 1931. Last year's production of structural materials remains, nevertheless, at a very low level, the value being appraised at \$6,157,089, as against an average of \$13,725,000 for the previous ten years.

It is estimated that 89 per cent of the 1934 output was used in construction work, and the balance in chemical and other industries.

Statistics compiled by MacLean Building Reports, Limited, show that the value of building and engineering contracts awarded

* By Paul Bourret, Inspector of Mines.

during 1934 in the Province of Quebec amounted to \$34,135,000, which is an increase of 5 per cent on the preceding year. During the same period, contract awards for the whole Dominion increased by 29 per cent. It is thus evident that, for the moment, the progress of the building industry is lagging in Quebec in comparison with other provinces. It must be recalled, however, that in Quebec this industry was one of the last to suffer from the depression, and that, even in 1931, the production of building materials compared favourably with the average for the preceding five years. The recovery of the building trade in this Province became apparent during the second half of 1933, and since then progress, though moderate, has been fairly steady. Indications are that this improvement will continue during 1935.

A feature of the Quebec building trade in 1934 was a substantial increase in demand for dimension stone. On the other hand, consumption of building materials such as crushed stone, cement, and sand, in engineering work was somewhat lower than in 1933, and very much less than in the immediately preceding years. During the first six or seven years of the past decade, several million tons of quarry products have been used in engineering work, and particularly in connection with water-power developments; but work on these undertakings is either completed or else suspended until conditions improve. Due largely to financial difficulties, little construction work was carried on in 1934 by cities or municipalities. Such recovery as there has been in the building trade is to be attributed in large measure to construction work sponsored by governmental authorities or by non-commercial institutions. Nevertheless, it is gratifying to report that, encouraged by the low price of building materials which prevailed in 1934, there was an appreciable increase in the amount of building construction carried on by private firms.

The number of quarries operated for the production of crushed stone in 1934 was 67, against 64 in 1933. The combined maximum capacity of all crushed-stone plants in the Province is about the same as for 1933. It is very much above the present-day requirement.

The following table shows the tonnage of stone produced each year since 1929, and the purpose for which it has been used:

CLASSIFICATION OF STONE PRODUCTION FOR THE YEARS 1929-1934

(In tons)

Year	Crushed stone	Stone used in lime and cement plants	Dimension stone	Rubble and rip-rap	Other products	Stone quarried
1929	2,564,000	1,606,000	113,000	637,000	161,000	5,081,000
1930	2,935,000	1,544,000	87,000	650,000	146,000	5,362,000
1931	3,666,000	1,531,000	63,000	298,000	172,000	5,730,000
1932	1,939,000	607,000	39,000	153,000	90,000	2,828,000
1933	1,088,000	575,000	28,000	92,000	111,000	1,894,000
1934	903,000	591,000	41,000	123,000	127,000	1,785,000

The men employed in the quarrying industry worked for a total of 747,377 days, and were paid, in wages and salaries, \$1,836,703. The corresponding figures for 1933 were 663,185 days and \$1,563,124. Not only was there a substantial increase in the number of men employed, but the average daily wage also was higher.

CEMENT

Sales of Portland cement produced by the Canada Cement Company and by the National Cement Company amounted to 1,613,641 barrels valued at \$2,294,846. This was a gain both in quantity and in value over the 1933 production, which totalled 1,517,555 barrels, worth \$2,128,899.

In the Province of Quebec, the *Canada Cement Company* operates two very up-to-date plants, one at Montreal East and the other near Hull, both employing the wet process. The raw material used in these plants is Trenton limestone, with addition of gypsum and dyke rock at the Montreal East mill and of gypsum and clay in the Hull plant. The No. 1, or Montreal East, mill has a capacity of 10,000 barrels per day, and is one of the largest, if not the largest, cement plant in the world operating by the wet process.

The Canada Cement Company extended their operations last year to the production of crushed stone. For this purpose, a stone grading and storage plant was built as an addition to the cement mill at Hull.

The plant of the *National Cement Company* was idle throughout 1934, but small shipments from stocked material were made during the first part of the year.

The average market price of cement per barrel, f.o.b. plant, was \$1.42, which is an advance of two cents per barrel on the price of 1933.

CLAY PRODUCTS

Sales of products manufactured from domestic clay and shale during 1934 had a total value of \$631,815, an increase of 8.8 per cent as compared with the previous year, but still very much below the average for the past ten years, estimated at \$2,290,000. Applying the same comparison to the production of brick alone, the figures are 29,230 thousand in 1934 and an average of 109,278 thousand for the ten-year period 1924 to 1933. All divisions of the clay and shale industry shared in the slight increase recorded over 1933. Only 18 per cent of last year's brick output was produced by clay-brick manufacturers.

Fourteen brick plants operated during the year, as against eleven in 1933. After two years of inactivity, production was resumed at the plant at Saint-Grégoire-de-Montmorency, formerly operated by the Frontenac Brick Company. Present operations are conducted by a company recently incorporated under the name of *La brique Champlain, Limitée*. A small but efficient plant was erected at Kingsey, in Drummond county, by *Georges Bourbeau*, to supply a local demand. It employs the soft-mud process. The *Richmond Brick Company* has acquired the property of Proulx Brothers, at Richmond, and operations were resumed there in June, 1934, after several years of inactivity. The Victoriaville brick plant has also changed ownership, the present operator being *Napoléon Brunelle*.

In the course of 1934, the Delson plant of the *Laprairie Company Incorporated* was modified so as to include the de-airing process. It will be recalled that the shale-grinding and processing plant built by the *St. Lawrence Brick Company, Limited*, at Laprairie in 1933 also embodies this process.

In addition to the fourteen brick manufacturers who operated their plants in 1934, three other companies marketed material carried over from the previous year.

Besides its use in the manufacture of brick, ground shale is employed for a variety of other purposes. Production of shale for uses other than brick making is dealt with on a later page under the heading *Sandstone and Shale*.

CLAY PRODUCTS IN 1933 AND 1934

CLASSIFICATION	1934		1933	
	QUANTITY	VALUE	QUANTITY	VALUE
BRICK:				
Common brick, soft mud process.....M	2,180	\$ 17,908	1,241	\$ 9,862
Face brick, stiff mud process.....M	7,601	156,623	7,234	153,990
Common brick, stiff mud process.....M	18,839	270,516	17,114	264,385
Face brick, dry press.....M	610	15,951	601	18,166
Sub-total.....	29,230	\$ 460,998	26,190	\$ 446,403
OTHER CLAY PRODUCTS:				
Structural tile..... tons	13,666	\$ 107,674	7,677	\$ 66,196
Drain tile.....No.	540,119	14,191	533,657	15,421
Sewer pipe.....	.....	48,952	.....	45,890
Unclassified.....	.....	.....	.....	6,180
Sub-total.....	.....	\$ 170,817	.....	\$ 133,687
TOTAL.....	.....	\$ 631,815	.....	\$ 580,090

GRANITE

The granite industry made a first step towards recovery during 1934, with a production valued at \$488,477, or almost 20 per cent higher than in the previous year. The increase in output was due entirely to an improved demand for dimension stone and paving blocks, the market for other granite products being less active than in 1933. It will be noted for instance, in the accompanying table, that the production of curbstone was practically *nil*.

The Stanstead and Saint-Samuel areas remain, as they have been for many years, the largest centres of production, but some grey granite was quarried during the year at Scotstown and Stanhope.

Twelve operators in the Stanstead district reported sales of granite products, consisting of building and ornamental stone together with a small tonnage of paving blocks. The output of most of these operators was moderately higher than in 1933. The considerable increase in the operations of the *Stanstead Granite Quarries Company, Limited*, is particularly noteworthy. Granite from the quarry of this Company was used in 1934 in the construction of the Roman Catholic cathedral in the city of Salaberry-de-Valleyfield and in facing the piers of the bridge, now under construction, connecting Isle d'Orléans with the mainland. Stone for this bridge was supplied also by the *Silver Granite Company*, of Saint-Samuel. No shipments of curbstone were made from the Stanstead area in 1934. A few years ago, this formed an important part of the total output.

In the Little Megantic Mountain area, shipments of grey granite were made by three operators: the *Silver Granite Company*, *Amédée Bussières*, and *Oscar Gosselin*. The Silver Granite Company, which is one of the most active producers of granite in the Province, adopted a new method of quarrying at the Saint-Samuel property. This quarry consisted formerly of an excavation on the side of a steep hill, the floor of the quarry being kept practically at the level of the stone-dressing plant while the face was advanced into the hill. This method has been abandoned in favour of underhand quarrying operations, in which only the lower sheets are quarried, which, however, necessitates hoisting the stone to the level of the dressing shed. This will not only lower the cost of operations but it will also have the effect of reducing considerably the amount of grout, or waste material, in the quarry output, since, in this quarry, both the quality of the stone and the sheeting are known to improve with depth. Granite from the quarry of the Silver Granite Company was used during 1934 in the construction of the piers of the Isle d'Orléans bridge, and in the Jesuits' college in Quebec and the Notre-Dame-de-Grâce post-office in Montreal.

Quarrying operations at Rivière-à-Pierre, in Portneuf county, were comparatively quiet. Only three quarries were worked, and these for short periods only. However, considerable interest was

aroused in this area during the year by the extraction of a very large monolith of clear granite, which was later shaped to form a cross thirty-two feet long and nine feet wide at the arms, and weighing forty-two tons. This cross was shipped to Gaspé, where it was erected by the Federal Government as a memorial to Jacques Cartier's first landing in Canada. The quarry of *Auguste Dumas*, from which this monolith was extracted, is one of the few in this Province where such a huge block could be obtained at a relatively low cost. Owing to its unusually large size and great weight, the quarrymen were faced with some difficult problems in handling, dressing, and finally loading the cross for transportation to Gaspé. The block selected was from one of the upper sheets, which was already free on two faces; the two other faces were developed, and the block dislodged, by blasting in a few suitably placed holes. The block was then cut to form a cross of the required size and shape, and the exposed faces were dressed. Next, a number of jacks were inserted in openings made in the underlying sheet, and by means of these the cross was lifted and canted, making it possible for the men to dress all the remaining faces. To remove the finished cross from the quarry, skids were placed beneath it and on these it was hauled down a short skid-way and run on to a flat-car which had been brought as near as possible to the quarry face over a short spur-line that had been built expressly for that purpose. As there was a steep up-grade on this spur between the quarry and the main line, it was necessary to haul the loaded flat-car to the latter by means of a small tractor and an arrangement of cables and pulley blocks. Transportation to Quebec over the railway presented no difficulties. Arrived there, the cross was transferred from the flat-car to a boat, the powerful floating crane of the Quebec Harbour Commission being requisitioned for this purpose.

The other two quarries operated at Rivière-à-Pierre are owned by *Arthur Dumas Cie., Enrg.*, and *Fortunat Voyer & Frère*. The latter supplied part of the stone used in the construction of the Jesuits' college in Quebec.

Dark grey and black granite, used for monuments, was produced on a moderate scale at Mount Johnson by *Brodie's Limited*, and at Saint-Gédéon, in the Lac-Saint-Jean district, by *Le Granit National, Limitée*, and *Le Granit Noir Canadien Enrg.* *Le Granit National* operates, in addition to its quarry, a stone-dressing plant at Roberval.

Small shipments of red and pink granite were made from the Roberval quarries and from Guenette, in Labelle county. Large quantities of paving blocks, consigned chiefly to the Montreal Harbour Commission, were cut in the Guenette quarry of *Brodie's Limited*. Similar but smaller shipments were also made in 1934 from Stanstead, Scotstown, and Brownsburg.

The production of crushed granite amounted to less than half the output of the preceding year. This is attributable in part to the fact that much less crushed granite was produced by municipal and government-owned quarries than formerly.

It is estimated that 62 per cent of the building and ornamental granite quarried in Quebec during 1934 was dressed in plants owned by quarry operators.

QUANTITY AND VALUE OF GRANITE PRODUCTS SOLD IN 1933 AND 1934

CLASSIFICATION	1934		1933	
	QUANTITY (Tons)	VALUE	QUANTITY (Tons)	VALUE
Building stone, rough.....	4,329	\$ 12,969	472	\$ 1,883
Building stone, dressed.....	9,733	215,657	3,413	110,796
Monument stone, rough.....	3,414	24,917	3,037	25,794
Monument stone, dressed.....	2,844	143,852	1,529	111,120
Curbstone.....	276	1,066	1,554	6,233
Paving blocks.....	4,929	42,382	837	6,577
Rubble and rip-rap.....	1,110	959	21,784	20,044
Crushed stone.....	42,793	46,675	99,211	125,760
Total.....	69,428	\$ 488,477	131,837	\$ 408,207

LIME

The production of lime remained at about the same level as in 1933. A slight decrease in the output of quicklime was compensated by an increase in sales of hydrated lime.

All the lime produced in Quebec last year was of the high-calcium variety, made from limestone—either Ordovician or Silurian—quarried and calcined at Joliette, Saint-Marc-des-Carrières, Limeridge, Montreal, Hull, and certain other points. In all, there were thirty-six kilns in operation.

Operations at the Saint-Marc kilns of the *Standard Lime Company, Limited*, which had been discontinued in 1932, were resumed last year. The Company's quarry was not operated, however, the kilns being supplied with waste products of the cut-stone industry.

At Limeridge, the *Dominion Lime Company* has partially developed two quarry sites, one located a few hundred feet to the south of the main quarry and the other to the north of the plant, beyond the Quebec highway No. 1. Although the Company's lime kilns were fed, in part, with limestone extracted in the course of these operations, the bulk of the supply was obtained as heretofore from the main quarry.

No modifications of importance were made at any of the other lime plants.

DISTRIBUTION OF THE PRODUCTION OF LIME IN 1933 AND 1934

(In tons)

CLASSIFICATION	1934		1933	
	Quick-lime	Hydrated lime	Quick-lime	Hydrated lime
Building trade.....	3,447	183	2,448	242
Chemical works.....	28,916	2,265	40,887	45
Sugar refineries.....	466	631	77	.....
Tanneries.....	617	300	624	238
Pulp and paper mills.....	44,997	16,362	39,846	16,422
Agricultural uses.....	.....	1,091	110	864
Foundries.....	107	.....	535	263
Dealers.....	5,722	1,891	4,017	1,631
Unclassified.....	476	861	895	889
Total.....	84,748	23,584	89,439	20,594

LIMESTONE

The production of limestone in 1934 amounted to approximately 1,620,000 tons, and was used as follows: 591,000 tons in the manufacture of cement and lime; 803,960 tons as crushed stone; 92,606 tons as rubble and rip-rap; 112,652 tons as filler, for agricultural purposes, and in chemical industries; and 19,874 tons as dimension stone. Limestone used in the manufacture of cement and lime is not included in the limestone production as given in the general table on page 7 or in the accompanying table, in which the output is classified according to uses.

CRUSHED STONE:

Production of crushed limestone again declined, due to the small volume of engineering construction carried out during the year. Returns show a reduction in the total number of limestone crushing plants, now estimated at sixty-eight, and also in their combined maximum capacity, which is approximately 2,600 tons per hour. These figures include the estimated capacity of a number of plants which probably will never be operated again on account of their obsolescence, but which have not as yet been definitely abandoned. Forty-four producers, with a combined maximum crushing capacity of 1,600 tons per hour, reported sales of crushed limestone in 1934.

Prices for crushed limestone were in general slightly higher than in 1933. The average price, for the whole of the Province, was \$0.728 per ton, an increase of more than four cents per ton. Quarries located on the Island of Montreal and on Isle Jésus reported sales of 360,740 tons at an average price, f.o.b. quarry, of \$0.593 per ton, against 581,686 tons at \$0.582 per ton in 1933. In the City of Quebec district, sales of 84,567 tons of crushed limestone were recorded, with the average price \$0.782 per ton; this compares with 54,613 tons at \$0.914 per ton in 1933.

BUILDING STONE:

Most of the centres producing limestone for building purposes reported an improvement in output over 1933. The most notable gain was recorded in the Montreal area.

The construction of an addition to the Saint-Jean-de-Dieu hospital, near Montreal, called for a considerable tonnage of dimension limestone; the dressed stone was supplied mainly by the Saint-

François-de-Sales quarry of *Stone & Quarry, Limited*, while the rock-faced stone was produced by *Cousineau & Frères*, who leased for this purpose the Villeray quarry, and by several other quarry operators of Isle Jésus. A large proportion of the stone used in this construction was cut by hand, and this work provided employment for various lengths of time for one hundred stone-cutters.

Shipments consisting in large part of rough building stone were made from Saint-Marc-des-Carrières by the *Deschambault Quarry Corporation*, *J. Olivier Gauthier*, and *Gingras & Frère, Ltée*. In the course of 1934, the quarry equipment of the Deschambault Quarry Corporation was moved over to lot 8 of the parish of Saint-Alban, on the property partially developed a few years ago by A. Légaré; their former quarry site on lot 388 of the parish of Deschambault was abandoned. *Marcotte & Normand*, of Montreal, have acquired a property on lot 21 of Saint-Alban, where they have carried out a considerable amount of stripping and have built an embankment for a railway spur from the Canadian National Railways main line to the quarry site. The *Lasalle Stone Company, Limited*, also has purchased a quarry site in this area, on which they did a certain amount of diamond drilling in 1934. The quarry of *Martineau & Fils, Limitée*, remained idle throughout the year.

In Joliette, *J. P. Beaudry* supplied the limestone for the construction of the Saint-Eusèbe hospital. All the stone was dressed by hand.

Returns show that 60 per cent of the building limestone extracted in the Province of Quebec in 1934 was dressed in plants owned by the quarry operators. These plants provided stone-cutters with much more employment than in 1933.

INDUSTRIAL LIMESTONE:

The quantity of limestone and high-calcium marble sold by quarry operators for use as filler, flux, or for chemical purposes is estimated at 112,652 tons, against 81,761 tons in 1933. Including limestone burned to lime and used in industries other than construction, the total would be 275,000 tons. As shown in the accompanying tables giving the distribution of the production of limestone, lime, and marble, the increase in demand for industrial limestone was general and reflects the improvement that has taken place in lime-consuming industries.

Among the important producers of industrial high-calcium limestone are: The *Shawinigan Chemicals, Limited*, at Stanbridge; the *Standard Lime Company, Limited*, at Joliette; *J. J. Leclerc*, at Nouvelle, in Bonaventure county; and the *Deschambault Quarry Corporation* and *J. Olivier Gauthier*, at Saint-Marc-des-Carrières. Some calcite was produced last year by *Emile Gagnon* from a deposit on lots 1, 2, and 3, range I, Métabetchouan township, in the Lac-Saint-Jean district. Coarsely crystalline calcite occurs here as a twenty-foot vein cutting granite. The vein is parallel to, and at a short distance from, a limestone contact. It is of interest to note that, in the workings, a narrow vein of barite cuts the calcite. The output was sold to neighbouring pulp and paper mills.

RUBBLE:

The construction of submerged rubble dams between several islands facing Berthier and Sorel, in the St. Lawrence river, to retard the current in the upper reaches, which had been discontinued in 1930, was resumed last year. The material used in this work consists entirely of run-of-quarry limestone obtained from the quarry of the *Dufresne Construction Company, Limited*, at Rivière-des-Prairies.

QUANTITY AND VALUE OF LIMESTONE PRODUCTS SOLD
IN 1933 AND 1934

CLASSIFICATION	1934		1933	
	QUANTITY (Tons)	VALUE	QUANTITY (Tons)	VALUE
Building stone, rough	7,785	\$ 19,770	14,468	\$ 30,159
Building stone, dressed.....	11,872	160,333	4,270	68,737
Monument stone, rough.....	47	349	.....	.....
Monument stone, dressed.....	123	3,488	118	2,867
Flagstone.....	47	47	24	62
Curbstone.....	.....	.....	5	25
Flux.....	4,053	10,070	887	1,180
Pulp and paper mills.....	71,440	58,684	53,462	44,188
Other chemical uses.....	.....	.....	25	162
Asphalt filler.....	3,738	7,843	24,540	70,497
Agricultural limestone.....	33,421	57,106	24,019	33,625
Rubble and rip-rap.....	92,606	48,587	26,134	13,082
Crushed stone.....	803,960	585,524	957,421	665,885
Total.....	1,029,092	\$ 951,801	1,105,373	\$ 930,469

MARBLE

Returns received by the Bureau of Mines show that very little building or ornamental marble was sold in 1934 by Quebec producers. On the other hand, the demand from glass manufacturers for dolomitic marble has considerably increased. The output of high-calcium marble, which is used in pulp and paper mills and in several other industries, was about the same as in 1933. The crushed, or granulated, marble reported in the table which follows was used in artificial stone, terrazzo flooring, stucco work, as filler, and as poultry grit; sales of this material were more than three times as high as in the previous year.

Last year's output of marble came from the quarries of three companies, namely, the *Wallace Sandstone Quarries, Limited*, at Philipsburg, in Missisquoi county; the *White Grit Company*, at Portage-du-Fort, in Pontiac county; and the *Canada Marble & Lime Company*, at L'Annonciation, in Labelle county.

F. Fitz Osborne made a geological survey of the Labelle-L'Annonciation area for the Bureau in 1934. His report gives a detailed description of the dolomitic-marble deposit on the property of the Canada Marble & Lime Company at L'Annonciation. This report will be published shortly as Part *E* of the Annual Report of the Bureau for 1934.

MARBLE PRODUCTS SOLD IN 1933 AND 1934

CLASSIFICATION	1934	1933
Building and ornamental stone, rough.....	17 tons	35 tons
Building and ornamental stone, dressed.....	358 "	165 "
Glass factories.....	1,450 "	50 "
Pulp and paper mills.....	3,230 "	3,318 "
Crushed marble.....	4,217 "	1,266 "
Rubble and rip-rap.....	30 "	3,149 "
Total.....	9,302 tons	7,983 tons

SAND AND GRAVEL

The production of sand and gravel for the year 1934 is estimated at 3,670,198 tons, against 3,356,232 tons for the previous year. Increases are recorded in the volume of sand and gravel used in the construction and maintenance of roads and as ballast for railways; on the other hand, less sand was used as concrete aggregate. The tonnage of crushed and screened gravel produced during the year was much higher than heretofore.

SANDSTONE AND SHALE

Sales of sandstone for building purposes amounted to 86,200 tons, valued at \$85,577. The output consisted of 56,723 tons of crushed stone and 29,477 tons of rubble. It was used in municipal work, road construction, and to a lesser extent in the construction of buildings. Sandstone quarries were in operation in the city of Sherbrooke and its vicinity, at Ste. Foy near Quebec, and at various points along the south shore of the Saint Lawrence river.

QUANTITY AND VALUE OF SANDSTONE SOLD IN 1933 AND 1934

CLASSIFICATION	1934		1933	
	QUANTITY (Tons)	VALUE	QUANTITY (Tons)	VALUE
Rubble and rip-rap.....	29,477	\$ 17,240	41,212	\$ 30,906
Crushed stone.....	56,723	68,337	31,774	26,497
Total.....	86,200	\$ 85,577	72,986	\$ 57,403

Red and grey shale to the value of \$703 was shipped last year from the Sainte-Hénédine quarry of the *Broughton Soapstone & Quarry Company, Limited*, and from the property of the *Citadel Brick Company* at Boischatel. Finely pulverized shale is used as a filler by various industries, as in paint and linoleum manufacture, and the coarser products for such purposes as surfacing tennis courts and as an ingredient in artificial stone.

For data concerning the production of shale used in the manufacture of brick, see under heading *Clay Products*.

MINING OPERATIONS AND DEVELOPMENT IN WESTERN QUEBEC IN 1934

by R. H. Taschereau, Inspector of Mines

INTRODUCTION

New and promising developments continued in the mining industry of western Quebec in the twelve-month period under review. The mines producing gold were greatly benefitted by the increase in the price of the precious metal. Two new properties, the Sullivan Consolidated and the McWatters, were brought into profitable production, and at the close of the year mills were under erection at the Canadian Malartic and Lamaque mines. At several other properties, ore deposits have been developed of a size and grade to warrant extraction.

The enhanced value of gold was also reflected in greatly increased activity in the search for new properties. Discoveries were made in widely separated areas, and some of these promise to be of major importance.

DESCRIPTION OF PROPERTIES

BEAUCHASTEL TOWNSHIP

Aldermac Mines, Limited.—The annual report of this Company for the year ending December 31st, 1934, contains the following information:

“Early in the year the main shaft at the Aldermac mine was enlarged from two to three compartments from the surface to the 500-foot level. At that time, the only ore development underground consisted of drifting and cross-cutting on the main levels.

“On May 26th last, the Aldermac mining plant, consisting of hoist and compressor room, blacksmith’s shop, warehouse, hoist, compressors, steel sharpener, *et cetera*, were destroyed by a bush fire. The plant was fully covered by insurance and has since been replaced. The delay, however, caused by the fire turned out to be quite serious, as production was stopped for a period of over two months during shipping season. Concentrate shipments were stopped in October at the close of navigation.

“Number 4 ore-body has been fully developed between the 375- and 500-foot levels. Twenty-nine thousand two hundred and twelve tons of ore were hoisted during the period. Of this amount, 8,770 tons were produced from drifting and cross-cutting operations, and 20,442 tons from stope development. The mine is now in a position to produce ore at a very low cost.

“Diamond drilling was carried on from the third sub-level above the 500-foot level to explore an easterly extension of Number 4 ore-body. The extension carried to the east about 80 feet beyond the main ore-body, and was found to contain a much higher content of copper than the main body. The extension averaged approximately 3 per cent copper. During the development operations, the addition of the ore taken from this section raised the grade of ore hoisted to well above 2.25 per cent copper.

“Your Company has secured an option for eastern Canada and Newfoundland on the exclusive right to use the chlorination process for producing elemental sulphur from pyrites.

“Your Management has investigated the advisability of erecting a sulphur producing plant at the mine and has recommended that this be done, in view of the fact that sulphur is readily marketable when in the elemental form, that a very much larger percentage of the sulphur in the ore can be saved, and that the net revenue from the mine should be very materially increased.

“Your Company is also assured of firm contracts over a period of years for the amount of sulphur that would be produced from 500 tons of ore daily.

“In order to instal a sulphur producing plant, it will be necessary to arrange for additional finances. A reorganization of the capital structure of Aldermac Mines, Limited, will be necessary.”

The Company reported a net loss on operations for the twelve-month period of \$80,143.30 before depreciation, amortization, director's fees, and interest on first mortgage bonds; the bond interest amounted to \$28,000.

Arntfield Gold Mines, Limited.—This property was in continuous operation throughout the year 1934, and underground exploration and development work was attended with very encouraging results.

A substantial body of ore has been exposed in the No. 3 shaft workings, and plans were prepared to put the mine in production. In the spring of 1935, the construction of a 125-ton cyanide mill was commenced, and this unit will be in operation in the summer months.

The No. 2 shaft was completed to the 625-foot horizon, and lateral work was carried out on the 500- and 625-foot levels. The exploration work carried out to date in this section of the property has indicated that ore values occur intermittently throughout the mineralized zone. One fairly continuous deposit of ore grade has been exposed on the 375- and 500-foot levels, and diamond drilling has shown that the body extends to the 600-foot horizon.

The mineralized zone in the No. 3 shaft workings, 2,000 feet east of No. 2 shaft, responded very favourably to development. Drifting to the east on the 250-foot level encountered a lens of ore at a distance of about 600 feet from the shaft. The drift continued in this ore for a length of 300 feet. A raise was driven on the ore at an inclination of 50 degrees to the southeast, to a height of 160 feet. A hundred feet east of the raise, a winze was sunk at an inclination of 59 degrees to the north, to an inclined depth of 146 feet. Some diamond drilling was also performed. The results attained in this work would indicate that the ore averages from 0.3 to 0.4 ounces gold per ton across more than drift width. Lateral work on the 375-foot level has proved the continuity of the deposit to this horizon.

Mill tests carried out on this ore have indicated that, given reasonably fine grinding, the ore is readily amenable to straight cyanidation ^①. It was noted, in microscopic examinations of the bulk samples, that a considerable amount of the gold occurs in a fine free form.

Francaeur Gold Mines, Limited.—In previous diamond drilling and surface work on this property, it was estimated that a body of ore was indicated with a length of 120 feet, a width of 13 feet, and containing 13,500 tons averaging 0.375 ounces gold per ton. In 1932, with the aid of light mining equipment, an inclined shaft was started in the footwall of the ore-body but was stopped at a depth of 45 feet.

^① Report No. 595, Ore Dressing and Metallurgical Laboratories, Mines Branch, Department of Mines, Ottawa.

Further diamond drilling was carried out, and in the spring of 1934, sinking of the shaft was resumed. New equipment was installed, and this included a 370 cu. ft. Diesel-driven compressor and a 6 in. by 5 in. clutchless air-driven hoist; this hoist has since been replaced by an 8 in. by 10 in. machine. The annual report of the Company contains the following information:

“Shaft Sinking.—An incline shaft dipping 43 degrees from horizontal and located in the footwall of the main shear-zone was extended from 45 feet to 305 feet. Stations were cut at 140 feet and 290 feet in the shaft, giving the stations a vertical depth below the surface outcrop of 100 feet and 200 feet respectively.

“Lateral Work.—To date (March 21, 1935) 465 feet of cross-cutting and 927 feet of drifting has been done. Three hundred and twenty-seven feet of the drifting, or 35 per cent, is in ore. On the first level, 222 feet, or 58 per cent, is in ore averaging 0.22 ounces per ton over an average width of 6.15 feet. On the second level, 105 feet, or 20 per cent, is in ore averaging 0.23 ounces per ton over an average width of 6.5 feet. Westward exploration was carried on through the second level, and, although no ore was found, values averaging 0.10 ounces per ton were secured over a length of 100 feet. At a point where we secured a breast sample assaying 0.25 ounces per ton, and where conditions for the finding of ore appeared very favourable, a winze was sunk to a depth of 15 feet, showing increased silicification and assays up to 0.27 ounces per ton. A second winze gave similar results.

“Sampling.—The drifts were back-sampled every 5 feet. The following table is a summary of the results. The surface assays are taken from old plans.

	LENGTH	AVERAGE WIDTH (Horizontal)	GOLD (Per ton)	VALUE PER TON (Gold at \$35)
Surface.....	125 feet	15.4 feet	0.34 oz.	\$ 11.90
First level.....	222 “	6.15 “	0.22 oz.	7.70
Second level.....	105 “	6.5 “	0.23 oz.	8.05

"The above-mentioned ore sections appear to be one and the same shoot, although not proven by connecting raises. There are several other short sections showing commercial values but, due to their shape or lack of size, cannot be considered as ore.

"*Diamond Drilling.*—During 1934, sixteen hundred and ninety feet of diamond drilling was accomplished on veins numbers 4, 8, 9. The results were not as encouraging as those obtained on number 1 vein.

"In March, 1935, lateral work was suspended, and sinking of the shaft, to open up a third level, was resumed".

Halliwel Gold Mines, Limited.—In previous operations on this property, in 1926 and in 1928, diamond drilling and surface work had indicated the presence of a gold-bearing sulphide zone. In the fall of 1934, a new diamond-drilling programme was commenced, and four holes were put down to permit the correlation of results obtained in the previous work. It is now indicated that the zone is a flat-lying lens, dipping gently to the west.

One hole is reported to have encountered a five-foot section of ore averaging 6.5 per cent copper and 3.03 ounces per ton in gold; an adjoining five-foot section assayed 1.35 per cent copper and 0.18 ounces per ton in gold. A second hole drilled forty-three feet to the southeast encountered a five-foot section assaying 0.28 ounces gold per ton with low copper values.

Lake Fortune Gold Mines, Limited.—Operations were resumed at the Lake Fortune mine in the summer of 1934. A number of new buildings were erected, including a bunk-house, cook-house, hoist-house, blacksmith shop, and an office. A sub-station was constructed, and hydro-electric power was available in September. The mining equipment included a 15½ in. by 9½ in. by 8 in. compressor, belt-driven by a 100 h.p. motor; and an 8 in. by 10 in. reversible hoist, driven by air. The hoist was later replaced by a double-drum electrically-driven machine.

The sinking of a two-compartment vertical shaft was commenced in the late summer months. This shaft is located about five hundred feet east of lake Fortune. In December, a depth of 365 feet had been attained, and the first level was established at the 355-foot horizon.

A review of the previous work on this property is contained in the annual report of the Bureau of Mines for the year 1932.

Normont Gold Mines, Limited.—This Company holds the mining rights to the old Huronian Belt group of claims, which are astride the Rouyn-Beauchastel boundary. In previous years, trenching, diamond drilling, and test-pitting had indicated the presence of several quartz lenses carrying gold values. One lens, known as No. 12, is apparently of high enough grade to be considered an ore-body.

In 1933, further trenching and diamond drilling were carried out, and an inclined shaft was sunk to a depth of 100 feet to explore the No. 12 zone. Lateral work was in progress on the 100-foot level in early 1934, but the destruction of the mining plant by fire in the month of February caused suspension of operations. It is probable that work will be resumed at an early date.

Previous to the shut-down, a sample of ore was sent to the Ore Dressing Laboratory of the Federal Department of Mines for a mill test ①. This shipment weighed 750 pounds and assayed 0.52 ounces in gold per ton. The experimental tests indicated that the ore is amenable to cyanidation or flotation, and that cyanidation followed by table concentration with regrinding of the concentrate is to be recommended; by this practice upwards of 95 per cent of the gold can be recovered as gold bullion.

O'Leary Malartic Mines, Limited.—A group of fourteen claims consisting of R-12490 to R-12493 in Duprat township and R-15967 to R-15976 in Beauchastel township is registered in the name of this Company.

In 1934, some surface work was completed and a diamond-drilling programme carried out. Fourteen holes, totalling 2,500 feet, were drilled. It is reported that this work was confined to a mineralized zone, and that the drilling encountered some encouraging ore sections; one 9½-foot section assayed 0.45 ounces per ton in gold. Drilling was resumed in the spring of 1935.

ROUYN TOWNSHIP

Adanac Gold Mines, Limited.—Operations were continued on this property in 1934. Light mining equipment was moved in, and sinking of the shaft was resumed. This is a two-compartment ver-

① Ore Dressing and Metallurgical Investigations, No. 562.

tical shaft and is located on claim R-7169. It was completed to a depth of 270 feet, and stations were cut at the 125- and 250-foot levels. Several quartz stringers were intersected in this work.

The *H* vein outcrops about 250 feet south of the shaft. Cross-cuts were driven on both levels to the south to intercept the *H* and *F* veins. It is reported that the veins were encountered, and some drifting carried out. Results were indefinite, and operations were suspended in October.

The geology of this property is fully described by J. E. Hawley in the Annual Report of the Bureau for 1933, Part *C*, pages 60-63.

During the year, new camps were erected near the mine workings. The mining equipment installed includes a 6 in. by 8 in. steam hoist, a 300 cu. ft. steam-driven compressor, and two boilers of 60 and 70 horse-power, respectively.

Astoria Rouyn Mines, Limited.—During 1934, further diamond drilling was carried out on this property to a total length of 3,000 feet. No important discoveries have been reported.

Bagamac Rouyn Mines, Limited.—A diamond drilling programme was carried out on this property, close to the northeast corner of the group. It is reported that the drilling totalled 5,550 feet. No results of importance have been made public.

Clérick Consolidated Mines, Limited.—This Company performed further work on the Christie claims, T-4741 to T-4744. The seventh annual report of the Company, covering operations for the years 1933 and 1934, contains the following information regarding this property:

“In Rouyn township, the Christie property, situated on the north shore of Rouyn lake, held under option by the Company, was investigated by diamond drilling. A zone of sulphide mineralization was revealed in altered rhyolite, having a general east-west trend. In 1933, seven holes were drilled, covering a linear distance of approximately 240 feet along the sulphide zone. Assay results indicated that the sulphides were gold bearing. In 1934, four additional holes were put down. The results of this drilling, together with the surface sampling, were disappointing, and in August, 1934, the option on these claims was dropped”.

Granada Gold Mines, Limited.—Operations were continued throughout 1934, with little change. The mill continued to treat about 100 tons of ore per day. Early in 1935, some alterations were made in the Hadsel unit, and tonnage was increased.

Underground exploration work did not indicate any new deposits of importance. Ore for the mill was obtained at a number of points from the 1st to the 13th level. Stopping operations were commenced on the upper levels on the No. 1, No. 3, and No. 5 veins, but the main bulk of the ore continued to come from the No. 2 vein structure.

The 'lensy' nature of the vein matter necessitated high development costs, and profitable operation was not maintained during the year.

McWatters Gold Mines, Limited.—In the early part of 1934, operations were, for the most part, confined to the development of the ore-bodies above the 150-foot level. Three raises were driven on the ore to the 75-foot horizon, where a sub-level was opened up. One of the raises was continued to the surface.

A mill with a rated capacity of about 50 tons per day was erected during the summer months. A 12,000-volt power-line was built from the Noranda sub-station of the Northern Quebec Power Company, and the necessary mine sub-station equipment was installed at the property.

The original mill is of simple design. The ore is crushed, and is then passed over a picking belt, where the waste is removed. It then enters the mill bins. From the bins, it is fed to a Hardinge ball-mill in closed circuit with a Dorr drag classifier and several cone classifiers. The pulp is concentrated on blanket tables. The blanket concentrate is amalgamated in a barrel, and the barrel tailing is stored pending the installation of a re-treatment plant. It is reported that this plant treated from 60 to 65 tons of ore per day, and recovered about 85 per cent of the gold content of the ore. The blanket tailing has been impounded for later treatment.

Tests carried out at the Ore Dressing and Metallurgical Laboratories of the Federal Department of Mines at Ottawa have indicated that a high recovery of the gold could be effected by cyanidation of the residues from the mill ①, and early in 1935 preparations were made to erect a 150-ton unit at the property.

① Ore Dressing and Metallurgical Investigations, No. 573.

The property responded very favourably to development. The ore recovered in the actual stoping operations was higher in grade than estimates had indicated, and the property has the distinction of being the highest grade gold mine in Canada. The annual report of the Company for the year 1934 points out that, in the initial milling period from September 11th to December 31st, the mill treated 5,081 tons of ore and recovered \$101,984.84 in gold and a small amount of silver. Unbroken ore reserves are estimated at 50,000 tons averaging 0.715 ounces gold per ton, and broken ore is estimated at 6,768 tons averaging 0.43 ounces gold per ton.

The geology of this property is described by J. E. Hawley in Part C of the Annual Report of the Bureau for 1933, pages 33-43.

Noranda Mines, Limited.—The annual report of this Company for the year 1934 contains the following complete record of the operations on the Horne property:

“Mine:

“No. 4 shaft was deepened from 3,048 to 3,094 feet; No. 3 shaft remaining at the previous depth of 2,527 feet.

“15,480 of drifting, 2,436 feet of raising in rock, and 49,947 feet of diamond drilling was done, and 178,000 cubic feet of rock was excavated in cutting stations and widening drifts.

“Exploration at the Horne mine during the past year was largely confined to the work of further outlining and developing the *Lower H* ore-body below the 2,475-foot level, and to the investigation on a number of levels of the area immediately west of No. 4 shaft, to determine its suitability for the location of a proposed new shaft.

“In the previous annual report, mention was made of some diamond-drill holes put down in *Lower H* ore-body from the 2,475-foot level, to obtain a general idea of the shape and probable extent of the body below that level, so that plans could be drawn up for developing and mining it. This preliminary drilling indicated that the massive sulphide ore in this lens might be expected to bottom at a depth of about 200 feet below the 2,475-foot level; that the ore along the south side of this body was good-grade copper ore and the rest of it concentrating ore of somewhat higher grade than average.

“During the past year, drives were put out from No. 4 shaft, on the 2,725-foot and 2,975-foot levels, to more thoroughly explore this body, and from these drives 12 horizontal diamond-drill holes were put in on north-south sections 100 feet apart. As a result of this work, it was found that the massive sulphide ore in this lens extended farther down than was indicated by the preliminary drilling from the 2,475-foot level, and on the 2,725-foot level the sulphide body was found to be approximately 500 feet long; the average width over this length being approximately 110 feet, and the average grade 5.76 per cent copper and 0.33 oz. gold per ton. It has not yet been determined just how far this body extends below the 2,725-foot level, but it is known to terminate somewhere above the 2,975-foot level, as, although on the latter level a body of well mineralized rhyolite breccia, averaging 1.07 per cent copper and 0.143 oz. gold per ton over a length of 340 feet and a width of 67 feet was found, no massive sulphide ore was found in the area so far explored.

“*Ore Reserves:*

“In former reports, ore averaging over 4 per cent was designated direct smelting ore, and that under 4 per cent copper concentrating ore, because originally the routing of ore through the plant was based largely on the copper content. With the present low price of copper and higher price of gold, attention has to be paid to the gold content on the routing of ore through the plant, so that a considerable amount of ore that had been classified in previous ore-reserve estimates as concentrating ore has been going to the smelter. As a consequence, the former scheme of classification has lost much of its significance, so in this report the two types of sulphide ore have been designated ‘over 4 per cent copper’ and ‘under 4 per cent copper’.

“From the information obtained in drifting, diamond drilling, inclined raising and other openings in the various ore-bodies, there is now indicated above the 2,725-foot level the following tonnage of ore:

	AMOUNT (tons)	COPPER (per cent)	GOLD (oz. per ton)
Sulphide ore over 4% copper.....	6,826,000	7.25	0.166
Sulphide ore under 4% copper.....	20,497,000	1.04	0.191
Siliceous fluxing ore.....	982,000	0.15	0.142

"The above estimate shows an increase of 4,868,000 tons of sulphide ore over last year's figures, notwithstanding the removal during the year of approximately 1,390,000 tons of the two classes of sulphide ore. This means that some 6,258,000 tons of new sulphide ore were developed, or put in sight, last year. While an important part of this is due to taking in the section of *Lower H* ore-body between the 2,475-foot and 2,725-foot levels, approximately 2,425,000 tons were from the *Upper H* ore-body above the 1,225-foot level, and the smaller outlying ore-bodies. This increase is made possible largely by the fact that the increased price of gold, together with decreased operating costs, permitted the inclusion of material that was formerly too low grade.

"At the present rate of mining sulphide ore, the above tonnage is sufficient to keep the plants operating for 18 years.

"*Ore Shipments:*

"The tonnages and average grade of ore shipped from the Horne mine to the smelter and concentrator in 1934 were as follows:

	AMOUNT (tons)	COPPER (per cent)	GOLD (oz. per ton)	SILVER (oz. per ton)
Direct smelting sulphide ore...	471,861	3.20	0.232	0.43
Concentrating sulphide ore....	918,288	2.34	0.125	0.32
Siliceous fluxing ore.....	386,872	0.31	0.134	0.13

"The above total represents an increase of 15.2 per cent over that of the previous year.

"*Smelter:*

"During 1934, the smelter treated 1,050,684 tons of ore, concentrate, and refinery slag, and produced 70,607,764 pounds of anodes, the average analysis of which was 99.39 per cent copper, 7.04 oz. gold per ton, and 15.66 oz. silver per ton.

"The following table shows the amount of material treated in the smelter and the production each year since commencement of operations:

Year	Ore, Concentrate, and Refinery Slag Smelted (tons)	Fine Copper Produced (pounds)	Gold Produced (ounces)	Silver Produced (ounces)
1927.....	10,740	552,345	767	2,644
1928.....	271,926	33,065,261	52,949	186,277
1929.....	428,221	51,223,115	68,732	334,279
1930.....	734,072	73,509,373	117,393	691,920
1931.....	765,544	62,859,355	253,363	558,801
1932.....	918,567	63,013,485	341,350	619,597
1933.....	1,010,629	65,008,731	284,675	510,739
1934.....	1,050,684	70,175,512	248,615	552,809

"Concentrator:

"During 1934, the concentrator treated 920,363 tons of ore from the Horne mine, the average assay of which was 2.34 per cent copper, 0.125 oz. gold per ton, and 0.32 oz. silver per ton, from which 181,938 tons of concentrate were produced and sent to the smelter.

"The following table shows the amount of ore treated by the concentrator since it was placed in operation:

Year	Tons
1928.....	4,468
1929.....	51,689
1930.....	191,856
1931.....	317,792
1932.....	379,637
1933.....	676,168
1934.....	920,363

"In April, 1934, the rated daily capacity of the concentrator was increased from 2,000 to 3,000 tons and at the same time additional equipment, designed to regrind and retreat the entire mill tailing, was placed in commission. This tailing retreatment plant is operating very satisfactorily and is effecting a substantial saving of gold that was formerly lost in the tailing.

"Following an extensive campaign of research and experimental work in the laboratory, a hundred-ton experimental cyanide unit, designed to extract additional gold from the pyrite residue of the retreated mill tailing, was constructed and placed in operation last June. The results obtained from this experimental unit were so satisfactory that it was decided to construct a separate 500-ton cyanide mill to treat the entire pyrite portion of the tailing and it is expected that this will be completed and ready for operation in April.

"New Construction:

"In addition to the completion of the concentrator which was started in 1933, and the building of the cyanide mill mentioned above, a modern new change-house was built at the mine to provide increased room and conveniences for the underground employees to dry and change their clothes; the converter Cottrell plant was increased to twice its former size and capacity; and the power-house was extended 36 feet to accomodate a 2,600 k.w. steam turbine driven generator, which will be installed this year as an auxiliary source of power. A number of improvements and alterations were also made to improve efficiency and working conditions".

In past years, attention has been drawn in this part of the report of the Bureau of Mines to the extraordinary flexibility of the Noranda operation. The severe decline in the price of copper and other base-metals several years ago was offset by a greatly increased gold production. In 1934, there was a notable increase in the production of copper as compared with the previous year. At the same time, the value of the gold produced showed an increase of more than seven per cent. The following table may be of interest:

YEAR	COPPER Average price per pound	GOLD Average price per ounce	VALUE OF GOLD IN EACH TON OF COPPER PRO- DUCED
1928.....	14.570 cents	\$ 20.67	\$ 66.20
1929.....	19.978 "	"	55.50
1930.....	14.980 "	"	64.30
1931.....	10.006 "	"	166.40
1932.....	7.516 "	"	224.00
1933.....	7.445 "	28.40	248.30
1934.....	7.419 "	34.50	244.45

The anode copper produced at the Noranda smelter contains the gold and silver of the original charge. The separation of these metals is accomplished at the electrolytic refinery of Canadian Copper Refiners, Limited, at Montreal East. In addition to the precious metals, two rare metals are present in sufficient quantity to warrant extraction at the refinery. These metals, selenium and tellurium, are probably present in the ores of the Horne mine in the form of gold selenides and gold tellurides. The Company's report contains the following information with reference to these metals:

"Selenium is now being produced in substantial tonnage at the refinery of the Company's subsidiary, Canadian Copper Refiners, Limited, at Montreal East, under the brand *C.C.R.*, and no difficulty has been met with in marketing. Production of tellurium has been delayed as, owing to the demand for selenium, our efforts were concentrated on the production of this metal, but tellurium will be produced some time this year. These two new by-products should provide a substantial additional revenue to your Company".

In 1934, the Company made an extensive survey of its hydroelectric power-site on the Upper Ottawa river, and it is reported that an initial development of from 20,000 to 25,000 horse-power will probably be undertaken.

The Company also retained an exploration staff to examine and report on outside properties with a view to their purchase. The successful development of the Coffin-Gilligan property in the Chibougamau area, as described in the Company's report, is referred to on page 123.

Dividends paid during the year totalled \$2.00 per share, bringing the total disbursement to shareholders in the seven years since production commenced to \$17,581,088.

Norlake Mining Corporation, Limited.—This Company performed surface work and diamond drilling on the Dasserat-Rouyn group on Osisko lake. It is reported that encouraging gold values were obtained, and drilling was continuing at the end of the year. At that time, a total of 8,373 feet had been completed.

Northern Quebec Gold Mines, Limited.—In the early months of 1934, the sinking of a small inclined shaft was commenced on this property, to the south of the adit workings. Operations were suspended when a depth of about 40 feet was attained, and were not resumed during the remainder of the year.

Pontiac Rouyn Mines, Limited.—In November, 1933, a diamond drilling programme was commenced on this property, and this work was continued during the spring and summer of 1934. In this programme, 9089.9 feet of drilling was completed in thirty-seven holes. Of this amount, eighteen holes, totalling 4,540 feet, were drilled to intersect the No. 1 quartz vein. According to Company records, the exploratory work indicated an ore-body approximately 725 feet in length, 7 feet in width, and 450 feet in depth, with an average gold content of over 0.18 ounces per ton.

The No. 1 quartz vein is apparently a continuation of the *Powell* vein structure. It lies on the contact of a body of acidic intrusive, granitic in character, with flow rocks of andesitic composition. It dips at from 60 to 64 degrees to the east, and strikes approximately N.20°W. The andesite forms the footwall of the zone. The drilling and subsequent underground work have indicated that this lens peters out towards the south, and is cut off by a major fault at the north end. The fault has formed a deep depression, and beyond this point heavy overburden prevented further exploration. Mineralization in the vein is not pronounced. Where present, it consists of fine-grained pyrite and chalcopyrite. In a few places, visible gold has been observed.

In the fall of 1933, light mining equipment was moved in to the property. The necessary buildings were erected, and the deepening of a two-compartment shaft, sunk in 1928 to a depth of 50 feet, was commenced. This shaft is inclined to the east at 60 degrees. In the spring of 1935, it was completed to a depth of 230 feet, and lateral work was commenced on the 100- and 200-foot horizons.

Powell Rouyn Gold Mines, Limited.—This property consists of Blocks 58, 59, 60, and 61, situated to the northwest of Noranda. The first gold discovery was recorded in 1922, and this attracted a number of prospectors to the Western Quebec field. In 1923, the Nipissing

Mining Company, Limited, obtained an option on the group, and explored the Powell gold vein by diamond drilling and underground work. This option was relinquished in the following year. In 1928, Powell Mining Properties (Rouyn), Limited, resumed operations, and in the three succeeding years a large amount of surface trenching, diamond drilling, and underground work was performed. A large part of this work was confined to some copper-bearing zones on the east side of the group, and to a gold-bearing vein lying about 3,000 feet to the north of the old Nipissing workings. The geology of this property is described in Memoir 166, *Geology and Ore Deposits of the Rouyn-Harricana Region*, of the Geological Survey of Canada, pages 236-240. The mining operations are detailed in reports of the Quebec Bureau of Mines for the years 1924, 1929, 1930, and 1931.

During 1934 and the early part of 1935, further surface work and diamond drilling were performed on the property. This work was confined to three gold-bearing zones known respectively as the *North Powell*, the *South Powell*, and the *Northwest* showings. Thirty-two drill holes, totalling 6,882 feet, were put down. It is reported that this work resulted in the development of indicated ore of commercial grade. The ore occurs over a length of 1,000 feet, and averages about 8.5 feet in width. Tonnage indicated is estimated at 440,000 tons, with an average gold content of 0.18 ounces per ton. The drilling also indicated that the Powell zone contains two parallel quartz veins, thirty-five feet apart, and that the ground between the veins is mineralized and contains a number of quartz stringers.

Sequin Rouyn Mines, Limited.—In the summer of 1934, some further work was carried out on this property. A test pit was sunk on the discovery zone to a depth of thirty-five feet, and 2,100 feet of diamond drilling was completed. Operations were then suspended, but were renewed in the spring of 1935.

Stadacona Rouyn Mines, Limited.—In past years, some gold-bearing quartz veins on this property were partially explored by trenching, diamond drilling, and underground work. The underground work was confined to the 300-foot level. At this horizon, a cross-cut to the north encountered the No. 2 vein at a distance of 250 feet from the shaft. This vein was drifted-on for a length of more

than 250 feet, and it is reported that ore of mineable grade was exposed. The ground in the vicinity of the vein is much fractured, and parts of these workings caved shortly after being driven.

In 1933, further exploratory drilling met with encouraging results. Underground work was resumed, and during the year under review the property responded very favourably to development, with the result that a substantial body of gold ore is now indicated.

To avoid the area of extreme fracturing north of the shaft, a drift was driven to the west from the south cross-cut. This drift follows the No. 1 vein, a sheared, mineralized zone containing frequent narrow quartz lenses. Visible gold has been observed in the quartz, but sampling did not indicate continuity of gold values. At a distance of 200 feet from the shaft, a cross-cut (No. 46) was driven to the north, and the No. 2 vein was picked up at 206 feet from the drift. This vein was followed to the west for a length of 500 feet, and short cross-cuts were driven beyond the walls at 50-foot intervals.

The No. 2 vein consists of a mineralized zone containing fine pyrite. Quartz is present in large amount, in the form of elongated kidneys, and in places it is almost massive throughout the zone. Over a length of 400 feet in this drift, bulk sampling has indicated that the ore averages 0.2 ounces per ton in gold. The Company reports the following results from channel sampling in the cross-cut sections:

	WIDTH	GOLD PER TON
100 feet west of No. 46 cross-cut.....	23 ft. 6 in.....	0.213 ounces
150 " " " " " "	18 ft. 2 in.....	0.460 "
200 " " " " " "	15 ft. 3 in.....	0.378 "
250 " " " " " "	5 ft. 4 in.....	0.252 "

To the west of the above sections, the quartz has narrowed to about a foot in width, but it is reported that sampling indicates an average grade of 0.2 ounces gold per ton across drift width.

Lateral work was discontinued in the fall of 1934, and diamond drilling was resumed. Three holes were drilled from the No. 1 vein drift to intersect the downward extension of No. 2 vein. This drilling encountered the vein at the 450-, 600-, and 750-foot horizons, and it

is reported that it indicated a higher grade of ore than that exposed on the 300-foot level. Some exploratory holes were also drilled from the No. 2 vein drift.

In view of the results obtained, it is planned to continue the shaft to the 600-foot horizon, and to open two more levels at depths of 450 and 600 feet. This work was in progress in early 1935.

New construction included additions to the hoist-house, boiler-house, and 'dry'. The light mining equipment was replaced by an 800 cu. ft. steam-driven compressor and a 10 in. by 12 in. reversible hoist; and additional boiler capacity was installed.

A shipment of ore was sent to the Ore Dressing and Metallurgical Laboratories of the Federal Department of Mines for mill test ①. It is indicated that the ore is readily amenable to straight cyanidation, and that a high gold recovery can be obtained with comparatively coarse grinding.

Wiltsey-Coghlan Mines, Limited.—Diamond drilling was continued on this group during the summer months, to a total of about 1,580 feet. It was confined to the east part of the group, and was carried out for the purpose of locating a possible extension of a vein on the neighbouring Christie property.

Later in the year, two shafts were sunk to shallow depths on the west part of the group. No. 1 shaft was completed to a depth of 84 feet, and a 38-foot cross-cut was driven to the east at the 77-foot horizon. It is reported that sulphide mineralization is exposed in the cross-cut face, with some chalcopyrite and with low gold values.

The second shaft is about 675 feet to the northeast of shaft No. 1. It was completed to a depth of 101 feet, and a cross-cut was driven to the south at the 97-foot horizon for a length of about 42 feet. Some sulphide mineralization is exposed in these workings. The underground work was carried out with the aid of a light gasoline-driven mining plant.

Operations on this property were suspended at the end of the year.

① Ore Dressing and Metallurgical Investigations, No. 586.

JOANNÈS TOWNSHIP

Teck-Hughes Gold Mines, Limited.—In 1934, a group of claims situated on Davidson creek was held by individuals connected with this Company. The claims are as follows: R-12854 to R-12858, R-12965 to R-12969, R-13255 to R-13258.

The work consisted in deep stripping, trenching, and test-pitting. It was confined for the most part to the exploration of a gold-bearing quartz vein, which strikes east and west, and dips steeply to the south. It has been traced for a length of about 200 feet, and is up to two feet in width. It is composed of dark quartz, and contains coarse free gold. At the end of June, two test-pits had been sunk by hand to depths of twelve feet and thirty feet, respectively. Operations were suspended in the summer months.

MONTBRAY TOWNSHIP

Robb-Montbray Mines, Limited.—In the summer of 1934, this mine was de-watered, and an examination was made to determine its production possibilities. The results of this examination indicated the advisability of removing the known ore without further exploration.

In the fall, this plan was put into effect, and preparations were made to extract the small copper-gold ore-body. In early 1935, 1,220 tons were shipped by winter road and railway to the customs smelter at Noranda. On completion of this work, all operations were suspended, and the plant was removed.

DUPRAT TOWNSHIP

Birrell Gold Mines, Limited.—This Company was incorporated in July, 1934, with an authorized capitalization of 3,000,000 shares of no par value stock. The property consists of twelve claims, situated on the south boundary of Duprat township, to the southwest of Flavrian lake. The claims are as follows: R-11447 to R-11451, R-15867 to R-15871, R-10217 and R-10218. The camps are situated near the east boundary of claim R-11448, and may be reached by a winter road from the Kirkland Lake-Rouyn highway, a distance of about seven miles.

Surface work was commenced in January, 1934. In April, a diamond drill was brought in, and at the end of May, 906 feet of drilling had been completed in nine holes. Most of this work was confined to a highly-altered mineralized zone in the walls of a well-defined fault, which strikes approximately S.80°W. It is filled with gouge and schistose material across a width of from one to six inches, and is exposed on the higher ground for a length of over 400 feet. The claims are in the contact zone of the Flavrian Lake granodiorite batholith, and the rocks in the vicinity of the discovery consist of Keewatin volcanics intruded by acidic intrusives. In places, the mineralized zone is impregnated with quartz, and it is reported that free gold has been observed in it.

Later in the year, trenching to the north uncovered a more promising gold-bearing zone, and plans were made to carry out a programme of underground work.

CLÉRICY TOWNSHIP

Bouchard-Coallier Group.—Several years ago, some gold-bearing quartz veins were explored on the Bouchard-Coallier property ①. In 1930, L. V. Bell, of the Division of Geology of the Bureau of Mines, made a detailed study of the geology of the group, and his report appears in the Annual Report, Part B, 1930, pages 30 to 35.

In August, 1934, operations were resumed by a new Company, *Bouchard-Cléricy Gold Mines, Limited*. New log-buildings were erected on the old camp-site, and eight men were employed throughout the following fall and winter months in stripping, trenching, and the sinking of a shallow test-pit.

The test-pit was sunk to a depth a thirty-three feet on the south, or *E*, zone, about 400 feet to the southwest of the old 50-foot shaft. Here, a quartz vein is exposed by stripping and trenching for a length of some 200 feet. At the surface, the vein is about four feet wide, but at a depth of fifteen feet in the test-pit it narrows to a width of six inches, and for the remaining eighteen feet it varies from six

① See Que. Bur. Mines, Ann. Rept., Part A, 1929, p. 124; 1930, p. 81.

inches to a foot in width. Very coarse free gold was observed in the upper part of the vein. It is reported that the sheared zone has been traced at intervals for a length of more than 1,000 feet, and that other quartz lenses have been encountered in it.

Surface work was also carried out at other points on the property. The north, or *B*, zone was explored, and a new vein was uncovered. This new vein is up to two feet in width, and was exposed by trenches for a length of about 200 feet.

DUPARQUET TOWNSHIP

Beattie Gold Mines, Limited.—During 1934, this Company continued to expand operations at the Beattie mine. The Main shaft was deepened from 603 feet to 1,140 feet, and three new levels were established at the 830-, 980-, and 1,130-foot horizons. Lateral work was in progress on the new levels at the end of the year.

Development work was continued on the upper levels in the North ore-body. During the summer months, a large part of the mill feed was obtained from the open-cuts, but, as winter approached, open-cut work was suspended, and the production was obtained from a number of underground stopes and from development work. During the year under review, 359,200 tons of ore, with an average gold content of 0.18124 ounces per ton, were milled. The total recovery amounted to approximately 53,000 ounces, of which 48,000 ounces were recovered in a shipping concentrate, and 5,000 ounces were extracted by cyanidation at the property, and refined to gold bullion.

In 1931, diamond drilling encountered a body of ore lying to the south of the principal ore-zone, but as this body did not extend to the surface, no further exploration was attempted. It was encountered in the Main shaft at a depth of 560 feet, and it continued in the shaft to a depth of more than 800 feet. It is known as *A* ore-body. Diamond drilling during the past year has indicated that it extends to a distance of 900 feet west of the shaft, and averages thirty-three feet in width. At the west end, it was intersected by drill holes at a depth of 800 feet.

The annual report of Beattie Gold Mines, Limited, for the year 1934 contains the following estimate of ore reserves:

NORTH ORE-BODY:	TONS	GRADE
Ore developed ready for stoping	2,915,800	
Ore indicated by diamond drilling and partially developed	915,500	
Total	3,831,300	0.160 oz./ton
A ORE-BODY:		
Ore indicated by diamond drilling between 3rd and 5th levels	300,000	0.1525 "
GRAND TOTAL	4,131,300	0.1595 "

The gold in the Beattie ores is refractory, and is not amenable to ordinary milling practice. Cyanidation tests were carried out on flotation concentrates in the Ore Dressing and Metallurgical Laboratories of the Federal Department of Mines at Ottawa ^①. These tests indicated that extractions ranging from 68.7 per cent to 77.8 per cent could be obtained by cyanidation, and that from 55 to 88 per cent of the remaining gold could be recovered in a flotation concentrate containing from 0.50 to 0.75 ounces gold per ton. Extremely fine grinding was advocated.

The erection of a 200-ton cyanide plant was commenced in the spring of 1934, and it was completed and in operation by November. The flow-sheet follows:

The flotation concentrate is pumped to a 16 ft. Dorr bowl classifier in closed circuit with a 6 ft. by 16 ft. regrinding tube-mill. The overflow from the classifier is agitated to clean the pulp of flotation oils and reagents, and a high percentage of lime is added to neutralize cyanicides, and to provide the necessary protective alkalinity for the ensuing cyanide treatment. The pulp then enters a 40 ft. Dorr thickener. The thickener discharge is filtered and washed on a 10 ft. by 16 ft. Oliver filter. The filter cake is then repulped in the presence of sodium cyanide. The pulp passes through two Dorr agitators in series, followed by a thickener. The spigot product is filtered on Oliver filters providing three stages of filtration. The pregnant solution is clarified in bag clarifiers, and the gold precipitated by the Crowe-Merrill process.

^① Ore Dressing and Metallurgical Investigations, No. 579.

It is reported that the results attained in the cyanide plant were in keeping with expectations. Approximately seventy per cent of the gold is recovered as bullion. The residues from this plant are refloated to a grade which permits shipment to the customs smelter at Tacoma, Washington. Experimental work was continued in an endeavour to extract all the gold at the property, to avoid excessive shipping costs. It is reported that a method of extraction was developed which gave excellent laboratory results, and, early in 1935, a two-ton pilot plant was erected to determine the value of the new process in actual practice.

During the summer months, the railway from the Beattie mine to Davangus, on the Noranda-Taschereau branch of the Canadian National railways, was ballasted, permitting the use of standard rolling stock. In the winter months of 1934-35, the low-grade concentrate resulting from the re-flotation of the cyanide residues was stock-piled at Quebec city, pending the opening of navigation from that port.

The Company reported a net profit on operations in 1934 of \$467,425.90 before providing for deferred development and depreciation.

Duparquet Mining Company, Limited.—Operations were renewed on this property in the summer of 1934. A geological map was prepared, and a diamond drilling programme inaugurated. Trenching and stripping was carried out along the north and south contacts of a bostonite porphyry mass, and nine diamond-drill holes were put down to a total length of 2,143 feet. It is reported that this work did not give conclusive results.

A more promising discovery was made in the fall. A sheared zone occurs in the centre of the porphyry mass, and is exposed on claims R-7557, R-7558, and R-7559. It strikes east and west, and is apparently vertical in dip. The zone is partially silicified, and fine pyritic mineralization is present; the sulphides carry encouraging gold values. Trenching and diamond drilling have indicated that the gold-bearing zone is over 800 feet in length, and varies from six feet to thirty-six feet in width. Gold values are low in the wider sections.

Diamond drilling was in progress on this property at the end of the year.

Galatea Gold Mines, Limited.—Operations were resumed on this property in the summer months of 1934. A number of men were employed in stripping and trenching, with, it is said, encouraging results. Operations were confined largely to the exploration of the main, or A, zone. It is reported that gold has been found at intervals along the strike of this zone for a distance of approximately 950 feet.

DESTOR TOWNSHIP

Del Rio Mining Company, Limited.—This Company was incorporated in October, 1933. It is capitalized at 100,000 shares of no par value stock. The property consists of claims R-11659 to R-11663, R-11767 to R-11776, R-12470 to R-12479, and R-16286 to R-16290, situated in the west-central part of Destor township.

Surface work was commenced in April, 1934, and was continued for the remainder of the year. In the late summer months, a diamond drilling programme was commenced, and in early 1935, eleven holes had been completed with a total length of about 5,000 feet.

Most of the work was confined to claim R-12474. A dyke-like mass of feldspar porphyry outcrops on this claim, intruding the Kee-watin volcanic rocks. Fine pyritic mineralization occurs in the intrusive, and in places the nearby flow rocks are well mineralized. Gold occurs in association with the sulphides. Deep trenching has exposed these rocks for a length of over six hundred feet along the strike of the dyke, which is approximately N.75° W.

Eclipse Gold Mining Company, Limited.—This Company holds the mining rights to the following claims: R-10307 to R-10311, R-10365 to 10369, R-10377 to 10379, R-12925 to R-12934, R-13653 to R-13656, R-13227, R-16016 to R-16020, R-16096 to R-16100. This group is situated in the north part of Destor township.

Throughout the summer months of 1934, surface work was in progress. On claim R-16100, a silicified zone, mineralized with fine pyrite, was explored. It is reported that some gold values were obtained in assays of this material. Some trenching was carried out at other points on the property.

Engineers Exploration Group.—Surface work and diamond drilling were continued on this group in the spring and summer of 1934. The drilling was carried out in ten holes totalling 3,077 feet. The results were inconclusive, and operations have been suspended.

LA REINE TOWNSHIP

Manley Quebec Gold Mines, Limited.—This Company was incorporated in August, 1934, with a capitalization of 3,000,000 shares of \$1 par value stock. The property consists of several lots in the south part of the township of La Reine. The camps and mine buildings are on lot 29, range IV, a distance of about seven miles by road from the village of Dupuy.

Some underground work was carried out on this property in 1928 by Adrien Gold Mines, Limited ^①. Since that time, further prospecting has resulted in the exposure of more promising vein material.

In the summer of 1934, a small shaft was started with hand steel at a point about 600 feet to the north of the old workings. It was carried to a vertical depth of fifty feet. Later in the year, a mining plant was moved in, and new camp and mine buildings were erected. The shaft was enlarged to three-compartment size, and was continued to a depth of 170 feet. In early 1935, lateral work was in progress on the 150-foot level.

The equipment now installed at the property includes a 135 h.p. H.R.T. boiler, a 9 in. by 12 in. steam hoist, a 930 cu. ft. steam-driven compressor, and a small steam-driven electric generator for lighting purposes, all housed in a combined power-house, repair shop, and 'dry'. A new bunk-house and an office building were also constructed.

Several gold-quartz veins are exposed in the vicinity of the shaft. They occur in fractures in a coarse-grained granitic rock and are generally narrow, ranging from a few inches to a foot in width. The Main vein outcrops on the south side of the shaft. In places, it is well mineralized with auriferous pyrite, and some free gold has been observed. It dips to the north at 60 degrees, and was encountered in the upper portion of the shaft. A second vein was exposed by stripping in the low ground to the north, and it is reported that this vein contains encouraging gold values.

^① See Que. Bur. Mines, Ann. Rept., 1928, Part A, p. 111.

DESMELOIZES TOWNSHIP

Normetal Mining Corporation, Limited.—In 1934, underground work was continued on the new 675- and 800-foot levels of the Abana mine. At both horizons, drifting was carried out to east and west in the hanging-wall of the ore-zone, and diamond drilling with flat holes was performed to establish widths and grades of ore on these levels. Some work was also carried out on the 550-foot level to explore the No. 3 ore-body east of the diabase dyke. Later in the year, the shaft was deepened to 950 feet in preparation for ore pockets, crusher station, and loading apparatus.

A new hoist-house was constructed during the year, and a new hoist, driven by a 75 h.p. electric motor, was installed.

The Annual Report of the Mining Corporation of Canada for 1934 states that, following completion of this work, operations were suspended in February, 1935, until such time as the prices of copper and zinc justify putting the mine in production.

PERRON TOWNSHIP

Midland Mining Corporation, Limited.—This Company was incorporated in January, 1934, with a capitalization of 4,000,000 shares of \$1 par value stock. Operations were confined to a group of claims situated on the Perron-Desmeloizes boundary and formerly held by Own Mines, Limited.

Some trenching and test-pitting was carried out in 1934. This work was for the most part confined to sheared zones containing quartz stringers, and to a band of coarse tuffaceous material. No gold values have been reported.

The log camp is located about three miles from the Abana mine, and is close to post XXVIII-XXIX of range I, Perron township.

LAVERLOCHÈRE TOWNSHIP

Aura Mines, Limited.—This Company holds the mining rights to lots 33, 34, and 35 of range IV, and the east half of lots 32, 33, and 34 range III, Laverlochère township.

Frame camp-buildings have been erected on Rousselot lake, and some work has been carried out to the northwest of the camps. At this point, Keewatin volcanic rocks are intruded by a body of gabbro or diabase. The intrusive is probably a dyke with the general north-south strike of the Keweenawan intrusives, and is more than fifty feet wide. A well-defined fracture in the volcanic rocks parallels the intrusive contact. Pegmatitic stringers in the neighbourhood indicate that the granite is not far distant.

The fracture has been traced for a distance of about 500 feet. In a few places, shearing extends for some feet on either side of the fracture, and quartz stringers occur in these zones. Slight pyritic mineralization accompanies the quartz, but assays of samples taken by the writer gave no gold values.

A diamond drill was brought in, and by August, 1934, one hole had been drilled. Operations were suspended at that time.

Bellehumeur Mining Company, Limited.—In the spring of 1934, operations were resumed on this property by United Gold Exploration, Limited. The new Company carried out some surface work, and in June, a diamond drilling programme was commenced.

The work was confined to the further exploration of a quartz vein which outcrops on lots 19 and 20 of range IV. It is reported that in previous work some spectacular free gold was found in a short section of this vein. In August, 1934, five diamond-drill holes, totaling 1,870 feet, had been completed.

GUILLET TOWNSHIP

Coniagas Reduction Company, Limited.—In the summer of 1934, an important gold discovery was made on the south side of Mud lake, in Guillet township. There was a rush of prospectors to the area, and a large number of claims were staked. The claims on which the original discovery was made were optioned to the Coniagas Reduction Company, Limited, and throughout the late summer and fall, a large amount of surface trenching was carried out. The claims are as follows: R-20387 to R-20398, R-20346.

The discovery consists of a silicified zone in Keewatin volcanic rocks. The zone contains quartz stringers, and is mineralized with fine pyrite, said to be auriferous, and free gold. The values occur in

lenses up to six feet in width, over a length of about 700 feet. The deposit strikes approximately N.10° E., and crossing it is a sheared zone, up to thirty feet in width, which is reported to contain encouraging gold values.

The work to date has been confined to claims R-20387 and R-20389. In January, 1935, substantial log camps were under construction, and a winter road was cut out to the McIntyre camps, a distance of about one mile.

McIntyre-Porcupine Mines, Limited.—This Company had a few men at work during the summer of 1934 exploring a group of fifteen claims situated to the north of aux Sables lake. It is reported that some quartz veins were discovered, but gold values were negligible.

On the adjoining O'Leary-Malartic property, north of Guillet lake, stripping and trenching resulted in the uncovering of several promising gold-quartz veins, and in early October the Company acquired an option on this group. It consists of the following claims: R-20515 to R-20528 and R-20639 to R-20647. Camps were erected on claim R-20521.

Surface work was continued until the end of the year, and was confined to the exploration of three discoveries known respectively as the No. 1, No. 2, and No. 3 veins.

No. 1 vein is exposed in the southwest corner of the property. It strikes in a northeasterly direction, and dips at about 80 degrees to the south. It outcrops along the foot of a ridge, and has been traced by short trenches for a length of about 900 feet. The wall-rocks are highly sheared. The quartz occurs in narrow lenses, up to 200 feet in length and with a maximum width of about four feet. Sulphide mineralization is not pronounced, but fine free gold occurs in the east part of the deposit.

No. 2 vein is situated in the west part of claim R-20520. It is reported that it occurs in two lenses. The easterly section is from eighteen inches to four feet in width, and was traced for a length of 150 feet. The westerly section is about 200 feet in length, and varies from eighteen inches to eight feet. Gold occurs in fine particles, well distributed in both sections.

No. 3 vein is located on claim R-20526. It is a quartz lens with a maximum width of three feet, and is exposed over a length of fifteen feet.

In January, 1935, the construction of permanent camps was commenced on the boundary between claims R-20523 and R-20527. A winter road was cut to the village of Latulipe, a distance of twenty-four miles. A diamond drill was brought in, and preparations were made to sink a two-compartment shaft to explore the No. 2 vein.

BOUSQUET TOWNSHIP

Calder Bousquet Gold Mines, Limited.—A group of claims situated to the north of Bousquet lake is reported to be held by this Company. The group is now registered in the name of E. J. Thompson. It includes the following claims: A-36363 to A-36372 and A-37292 to A-37301.

In 1934, Minefinders, Limited, optioned the property, and eleven diamond-drill holes were put down, totalling 3,153 feet. The option has been relinquished.

Golden Quebec Mines, Limited.—During 1934, an adit was driven in the hillside for a length of 270 feet. This underground work was undertaken with the object of exploring the gold-quartz veins which outcrop on the high ground.

At 165 feet from the adit entrance, a drift was driven to east and west for 41 feet. It is reported that this drift follows a narrow quartz vein. The main, No. 1, vein was encountered at 216 feet, and this vein was followed in a general east and west direction for a length of 215 feet.

The small test-mill was not in operation during the year.

Graham-Bousquet Mining Corporation, Limited.—Exploration work was resumed on this property in the summer of 1934. Some surface work was performed, and a diamond drilling programme was completed. At the end of June, four holes had been drilled.

The work was for the most part confined to the shaft area. It is understood that results were not in keeping with expectations, and operations were discontinued.

Mooshla Gold Mines, Limited.—It is reported that this Company holds the mining rights to a group of 54 claims situated astride the north-south centre line of Bousquet township. The claims are not registered in the name of the Company.

According to a report issued by the Company in 1934, operations were concentrated on claim A-40602, where a 25-foot test-pit was put down, and a considerable amount of stripping and trenching performed. It is reported that this work indicated a mineralized zone carrying high gold values. A programme of underground work was commenced on this property in 1935.

CADILLAC TOWNSHIP

Canadian Pandora Gold Mines, Limited.—Early in 1934, the shaft was completed to a depth of 520 feet, and new levels were established at the 375- and 500-foot horizons. Drifting and cross-cutting on the 250-, 375-, and 500-foot levels is reported to have given encouraging results.

In a progress report dated August 28th, 1934, the Company's engineer presents the following data in regard to sampling:

125-FOOT LEVEL			
"BELL VEIN			
	<i>Width</i>	<i>Length</i>	<i>Assay*</i>
East shoot.....	31 in.	50 ft.	\$16.76
Central shoot.....	30 in.	50 ft.	9.80
<i>Note.</i> —These two shoots are practically continuous, making a total length of 100 ft.			
West shoot.....	40.7 in.	40 ft.	\$18.78
"No. 5 VEIN			
Centre shoot.....	27 in.	85 ft.	\$21.98
West shoot.....	30 in.	25 ft.	23.55

"On this level, the average value for the five shoots of ore having a total combined length of 250 ft. is indicated at approximately \$18.00.

* Gold at \$35.00 per ounce.

250-FOOT LEVEL

"BELL VEIN	<i>Width</i>	<i>Length</i>	<i>Assay*</i>
Main shoot.....	26 in.	117 ft.	\$9.82
<i>Note.</i> —This assay was obtained from bulk sampling, with over one ton being sent to the Dept. of Mines at Ottawa, which returned the above value.			
"No. 5 VEIN			
East shoot.....	17 in.	46 ft.	\$50.57
West shoot.....	19 in.	102 ft.	23.03

"The average grade for the No. 5 vein on this level is indicated at \$36.00 across 18 inches, with combined lengths, so far developed in two shoots, of 148 feet".

It is reported that the No. 5 vein on the 500-foot level was explored by drifting for a length of twenty feet, and that considerable free gold was evident.

In December, 1934, operations were suspended, due, it is reported, to shortage of funds.

Maritime Cadillac Syndicate.—This organization holds the mining rights to a group of claims situated to the east of the Pandora group. The claims are as follows: T-693, A-41069 to A-41078, and A-41186 to A-41190. Camps have been erected on claim A-41078.

Trenching and stripping has been carried out at several places on the group, where quartz occurs in the sedimentary rocks in the form of stringers and lenses. The most important discovery is on claim T-693. It is a quartz vein striking N.55°W., and dipping to the south at a steep angle. It was stripped for a length of 100 feet, and varies in width from a stringer to a maximum of about four feet. In places, it contains pyrite, and it is reported that gold values accompany the sulphide mineralization.

O'Brien Gold Mines, Limited.—This Company was incorporated in September, 1934, with an authorized capitalization of 4,000,000 shares of \$1 par value stock. A 100-ton mill was erected at the property in 1932, and since that time continuous production has been

* Gold at \$35.00 per ounce.

maintained at a rate of about 75 tons per day. In the first eighteen months of operation, 42,692 tons of ore were treated, with an average gold content of 0.45 ounces per ton.

In a report of the General Manager of the Company dated March 14th, 1935, production and estimated operating costs for the six months' period from September 9th, 1934, to February 23rd, 1935, are reported as follows:

Tons treated.....	12,752 tons
Ounces of gold contained.....	4,161.057 ounces
Average gold content per ton treated.....	0.326 ounces
Percentage recovered (of which 73% was bullion shipped to the Royal Canadian Mint and 27% remained in concentrates awaiting further treatment).....	92.3 per cent
Estimated operating costs per ton treated (includes provision for extraction losses and cost of treating concentrates).....	\$7.42

In the fall of 1933, the shaft was completed from the 300-foot level to a depth of 500 feet, and lateral work was commenced on the 400- and 500-foot levels. The report of the General-Manager contains the following information regarding the results obtained at these horizons:

“Development results on the new 400- and 500-foot levels indicate that up to January 26th, 1935, 43 per cent of the total drift advance had been in possible ore, averaging 3.3 feet in width and of a grade of 0.22 ounces per ton (average car sample and channel assays). During the last four weeks of this period, approximately 69 per cent of the total advance was in possible ore. Further raising, box-holing, and back stoping will be necessary before an estimate of the possible tonnage which this represents can be obtained. Since January 26th, milling results have checked the above sampling results quite closely, and an additional 300 feet of possible ore has been encountered in No. 4 vein east on the 500-foot level.

“In No. 477 south cross-cut on the 400-foot level east, a new vein was intercepted at a distance of 14 feet south of No. 4 vein. This new vein consists of 2 feet of quartz, in which 44 feet advance up to February 23rd constitutes an almost continuous ore-shoot for that distance, and from which 123 tons of drift material put through

the mill yielded an average of 0.334 ounces over the drift width of 6 feet. This vein dips south, and cross-cut No. 579 south of the 500-foot level has been started to pick up the downward extension of this new vein on the 500-foot level. This cross-cut has advanced 18 feet of an estimated distance of 40 feet south of No. 4 vein on the 500-foot level".

Throughout the year, stoping was continued on the upper level on the No. 1 and No. 4 veins. In July, an ore reserve estimate reported 41,812 tons of ore averaging 0.34 ounces per ton in gold, of which 8,000 tons averaging 0.437 ounces per ton were broken in the stopes.

In the spring of 1934, the Northern Quebec Power Company's transmission line was completed to the centre of Cadillac township. The necessary sub-station was erected at the mine, and the change over to hydro-electric power was made in early July. Other construction during the year included an office building and a number of residences for married employees.

Sudbury Contact Mines, Limited.—This Company performed exploratory work on a group of twenty-two claims situated to the north of the east-west centre-line of Cadillac township. The claims are as follows: A-35107 to A-35110, A-35095, A-35096, A-35689, A-35690, A-35932, A-35975, A-35976, A-42329 to A-42336, A-47919, A-47920, A-47921. The group has since been transferred to Lapa-Cadillac Gold Mines, Limited.

The claims are largely covered by overburden. A diamond drill was brought in, and six holes were completed to a total length of 2,503 feet. It is reported that this drilling indicated the presence of a gold-bearing zone composed of quartz stringers in contact with an aplitic dyke. The zone was traced by drilling for a length of 400 feet, and is up to 30 feet in width. The overburden is too deep to permit trenching, and, in the spring of 1935, the sinking of a shaft was commenced.

Thompson-Cadillac Mining Company, Limited.—During 1934, this property was equipped with a mill and all necessary equipment to place the mine on a production basis. This mill was started in November, and a small tonnage of low-grade material was treated.

Profitable operation was not immediately maintained, and this, combined with other untoward circumstances, forced the cessation of operations, and the bankruptcy of the Company.

The mill was designed with a capacity of 150 tons of ore per day. An electric sub-station was built, and this was connected with the Northern Quebec Power Company's lines. A new hoist-house and a power house were also erected, and new electrically-driven hoist and compressors were installed.

A small amount of underground work was completed in preparation for production. It is apparent that the property had not been developed to an extent that warranted a mill of large capacity, and more extensive ore deposits must be developed before profitable production can be realized.

Tonawanda Mines, Limited.—During the summer of 1934, this Company continued the exploration of a group of claims, A-24162 to A-24171, in the northeast quarter of Cadillac township. They are registered in the names of J. H. Murray and N. Sparker.

Previous work on this property had consisted in stripping, trenching, and the drilling of two diamond-drill holes to a total length of 960 feet.

The principal discovery, the No. 1 vein, consists of banded iron formation, and is up to twenty feet in width. It is exposed close to the west boundary of claim A-24170, and has been traced to the east for a distance of 900 feet. Elongated kidneys of quartz and quartz stringers occur in the walls of the deposit, and pyritic mineralization is present in small amount.

Quartz veins occur at other points on the property, and it is reported that free gold has been observed on the surface, and in one of the diamond-drill cores. No continuous deposits of economic importance have been developed.

MALARTIC TOWNSHIP

Malrobic Mines, Limited.—Light mining equipment was moved in to this property in the spring of 1934, and the shaft was de-watered to the bottom, 250-foot, level. A 2,000-foot diamond drilling programme was carried out from the underground workings, and on completion of this work, operations were suspended.

FOURNIÈRE TOWNSHIP

Canadian Malartic Gold Mines, Limited.—Underground work was continued throughout most of the year 1934, for the purpose of blocking out the known ore zones, and preparing the property for production. Some diamond drilling was also completed. A two-compartment shaft was raised, at a 60-degree incline, from the 375-foot level to the surface, and was deepened to 96 feet below the level to allow for a loading pocket. The erection of a cyanide mill of from 125 to 150 tons capacity per day was commenced in the fall, and this unit was in operation in May, 1935. The crushing plant will have a capacity of about 400 tons per day. The mill is designed to permit the addition of another 150-ton unit if underground development warrants.

A power line was erected from the Pandora sub-station of the Northern Quebec Power Company to the mine, a distance of 12.7 miles, and power from this source was available early in 1935.

The annual report of the Company for the year 1934 contains the following information in regard to ore reserves:

“Underground development and diamond drilling has indicated extensive mineralized zones, parts of which have been sufficiently delineated to permit estimates of assured grade and tonnage. A larger portion, classed as Indicated Ore, is determined by relatively few sections, and grade and tonnage figures are less precise. In addition, there is some further tonnage to which definite figures cannot be assigned, because data as to extent and grade are even more limited; this tonnage is not included in the estimate.

“The situation on the three levels now partly developed, and the diamond drilling below the 375-foot level, indicate that ore conditions may be expected to duplicate themselves down to the 600-foot level horizon. About this horizon syenite porphyry was encountered in four drill holes, the size and attitude of this occurrence being as yet unknown. This porphyry has not hitherto proved as favourable a host rock for ore as the sediments, but all the known ore-bodies are closely associated with it. It is expected that ore conditions will continue to greater depth in other, if not the same, ore-shoots. The deepest point at which ore has been found in drill holes U.69 (M) and U.70 (N) is 218 feet below the 375-foot level, where the average grade is 0.2 oz.

"The estimated ore reserves as of December 1st are as follows:

	QUANTITY	GOLD PER TON	VALUE (Gold at \$34)
Assured ore reserves.....	198,000 tons	0.238 oz.	\$ 8.07
Indicated ore.....	340,000 tons	0.186 oz.	6.32
Total.....	538,000 tons	0.205 oz.	\$ 6.97

"The ore-bodies are irregular in shape and in gold content. It is possible to increase the grade somewhat by reducing the tonnage or to increase the tonnage at the expense of the grade. It is expected that the mill now under construction will determine what grade of ore will be the most economic to mine".

A winter landing field for aeroplanes was cut in the swamp, half a mile to the east of the mine. Transportation in the summer months will be improved with the building of a road from the mine to the Malartic river.

Recent milling tests on Canadian Malartic ore were carried out at the Laboratories of the Department of Mines at Ottawa ①. These tests indicate that a recovery of from 88 to 90 per cent of the gold can be made by cyanidation with comparatively coarse grinding of from 50 to 60 per cent minus-200 mesh.

East Malartic Mines, Limited.—This Company was incorporated in September, 1934, with a capitalization of 3,000,000 shares of \$1 par value stock. It holds the mining rights to a group of thirty-five claims consisting of A-51307 to A-51341. An adjoining group of ten claims, A-40256 to A-40265, is registered in the name of interests associated with the Company.

In the fall of 1934, a promising gold discovery was made on claim A-40257. This discovery consists of a zone, twenty feet in width, containing quartz stringers and visible free gold. Pyrite is present in the quartz and the nearby wall-rock, which is apparently granodiorite.

Some trenching was completed, and early in 1935 a diamond drill was transported to the property.

① Ore Dressing and Metallurgical Investigations, No. 585.

DALQUIER TOWNSHIP

Nortrac Mining Company, Limited.—This Company was incorporated in November, 1934, with a capitalization of 5,000,000 shares of \$1 par value stock. It is reported as holding the following lots: range IV, north half of lots 17, 18, 19 and 20; range V, lots 16, 17, 18, 19, and 20, and the north half of lots 14 and 15; range VI, lots 12, 13, 14, 15, 16, 17, and 18; and range VII, south half of lots 12, 13, 14, and 15. Lots 12 and 13 of range VI comprise the old Gold Star holdings under M.C. 248.

Several years ago, a shallow test-pit was sunk at a point about 200 feet west of the lot line on lot 12, and a quarter of a mile north of the south boundary of M.C. 248. It is reported that some high gold assays were obtained in sampling this pit. In late 1934, a new discovery was made on lot 13, to the northwest of the original showing.

The new discovery apparently consists of a body of quartz lying at the contact between a granitic porphyry and Keewatin volcanics. It strikes N.14° W. and dips at approximately 35 degrees to the east. The surface outcrop is up to 30 feet in width and is approximately 100 feet in length. Free gold was observed in this deposit, and it is reported that channel sampling returned encouraging results.

A diamond drill was brought in, and in February, 1935, fifteen holes had been drilled to a total length of 1,600 feet.

LANDRIENNE TOWNSHIP

Mines Development Corporation, Limited.—In the late summer of 1934, this Company resumed the underground exploration of the 'Randall' property.

The hoist-house was enlarged to include a 'dry' and a repair shop. The equipment includes an 80 h.p. boiler, a 10 in. by 12 in. steam hoist, and a 650 cu. ft. steam-driven compressor.

Cross-cuts have been driven to the south from several points on the main drift at the 200-foot level. Quartz lenses have been exposed, and some free gold occurs in this material. Lateral work was continuing at the end of the year.

BARRAUTE TOWNSHIP

Venus Consolidated Gold Mines, Limited.—In the summer of 1934, the underground workings were de-watered, and some exploratory work was carried out. Operations were then suspended.

VARSAN TOWNSHIP

Dorval-Siscoe Gold Mines, Limited.—Diamond drilling was resumed on this property in 1934, and by the end of the year 2,283 feet had been completed. The results of this work are not known to the writer.

Stanley Siscoe Extension Gold Mines, Limited.—In the fall of 1933, mining equipment was installed on this property, and a shaft was sunk to a depth of 377 feet. Lateral work was commenced on the 350-foot level, but early in 1934 all operations were suspended, and had not been resumed at the end of the year.

In the late spring months, the mining plant was destroyed by a bush fire.

DUBUISSON TOWNSHIP

Greene Stabell Mines, Limited.—This property was brought into production in the late fall of 1933. Throughout 1934, the mill treated over 60 tons of ore per day, and the total recovery for the twelve-month period amounted to 6,900 ounces of gold and 257,463 pounds of copper.

Stoping was carried out above the 450-, 300-, and 150-foot levels, and a small open-cut was started on the surface. The surface ore-dump which had accumulated over a number of years from exploration work was removed and milled.

On the 600-foot level, a cross-cut was driven to a distance of about 1,500 feet to the north to explore a granodiorite-lava contact zone. A large amount of diamond drilling was completed from this cross-cut, and at other points on the property.

In July, a power line was completed to the property from the Blouin Lake sub-station of the Northern Quebec Power Company, and hydro-electric power then displaced the Diesel-driven generator. The Company also constructed a substantial new bunkhouse.

Minrand Gold, Limited.—It is reported that the diamond drilling programme carried out on this property in 1934 consisted of fourteen holes with a total length of over five thousand feet. On completion of this work, operations were suspended. A new Company, Cross-roads Golds, Limited, resumed operations in early 1935.

Shawkey Gold Mining Company, Limited.—This Company was incorporated in March, 1934, with a capitalization of 3,500,000 shares of \$1 par value stock. The Company owns the old 'Martin' mine, situated on the south shore of lake de Montigny. The surface geology of this property is described in previous reports. In past years, a shaft was sunk to a depth of 325 feet, and a small amount of lateral work was carried out on the 125-, 225-, and 325-foot levels. Some diamond drilling was also carried out, but the results of this work are not available. A small stamp-mill was erected, but no output was ever recorded from the property.

The property was reopened in the late summer of 1934. New mine and camp buildings were erected, and a complete mining plant was installed. A new headframe was erected, and the old workings were de-watered.

Lateral work on the three levels was attended with encouraging results. A number of minor faults were encountered in drifting on the vein, and this hindered development to some extent, as some difficulty was experienced in solving these problems. In early 1935, some good lengths of ore were opened up, and the property will probably be in production in 1935.

Siscoe Gold Mines, Limited.—During 1934, this Company again expanded operations, and, with the increased price of gold, production passed the two-million dollar mark. A substantial growth in the tonnage of ore treated has been recorded every year since 1930, and this young property has now produced gold to the value of more than six million dollars. The total amount disbursed to shareholders in the form of dividends, since production commenced, has reached a total of \$2,021,126.72. In the year under review, dividends totalling 19 cents per share were paid.

The following data are taken from the annual report of the Company for the year ending December 31st, 1934 ①:

“The following table shows comparative results since 1930:

Year	Production	Tons Milled	Heads	Tailings	Per Cent Extraction
1930.....	\$ 367,266.20	33,744	\$11.11	\$ 0.230	97.70
1931.....	787,724.24	55,675	14.45	0.302	97.91
1932.....	1,135,931.91	63,998	17.99	0.247	98.63
1933.....	1,616,487.08	96,348	17.27	0.492	97.14
1934.....	2,116,603.49	124,151	17.60	0.551	96.86

“MINING:

“Down to and including the sixth, stoping operations were conducted quite equally on all levels. The seventh and eighth levels were in preparation. The ninth and tenth levels were still undeveloped.

PLACE	TONS—1933	TONS—1934
First level.....	17,342	12,408
Second level.....	19,165	30,445
Third level.....	17,699	21,122
Fourth level.....	15,353	18,236
Fifth level.....	20,349	24,439
Sixth level.....	3,324	12,005
Seventh level.....	3,116	4,811
Eighth level.....	.....	1,360
Total.....	96,348	124,826

“BROKEN-ORE RESERVES:

“We are carrying approximately four months' supply of broken-ore in the various stopes. The present reserve is 48,106 tons, which is an increase of 9,483 tons over last year. This reserve represents an investment of \$75,960.81; a cost of \$1.579 per ton, which is the average mining cost over the whole period since the accumulation of broken-ore reserves commenced.

① Figures in the Company's report include the exchange equalization converting the standard value of gold (\$20.671834/ounce) into Canadian funds.

“DEVELOPMENT:

“In the search for new veins and in the further development of veins already discovered, we sank the main shaft an additional 400 feet in depth, drove 3,181 feet of cross-cuts, 5,856.8 feet of drifts, and 2,714.6 feet of raises, a general total of 12,152.4 feet, or more than 2.3 miles, of development work. Of this total, 5,482.4 feet, or 45 per cent, was development in ore.

“25,427 feet of diamond drilling was also done. Of this total, 7,622 feet was done in holes from the surface and 17,805 feet underground. Three diamond drills were in operation most of the year.

“As a result of this programme of development and exploration, we increased our ore reserve 37 per cent, to its present total of 283,426 tons having an average value of \$15.56 per ton. This is 76,700 tons over and above the 124,151 tons milled.

“PROGRAMME OF DEVELOPMENT AND EXPLORATION:

“Through the work done during the past year, we have learned that the granodiorite intrusive is not bounded on the south by the *K* zone, as previously thought, but extends into the greenstone area. This considerably enlarges our ore-finding possibilities.

“The programme outlined a year ago is still in effect and will be continued, except insofar as parts have been completed.

“It consists in the development, both horizontally and downward, of ore-bodies already discovered, and, secondly, in the exploration of new territory.

“Within the first classification we have the development of the main vein and the Siscoe vein on the new bottom levels. We propose to continue the opening-up and development of the *K* zone on all levels. Our work in this zone during the past year has resulted in the finding of many high-grade lenses. We will continue prospecting for the extensions of all these, and also the *F* vein, on all levels.

“Under the second classification, our development work will take us into the *M* and *N* area to the south of the *K* zone, which has been partly explored by diamond drilling from the surface. The promising area to the southeast and to the northwest of the main vein will also be further explored. To explore the mainland, rather than sink a shaft on the mainland, we propose to drive through underneath the lake on the fourth level from our present workings.

“MILLING OPERATIONS:

“With the object of improving milling conditions and increasing tonnage capacity, three important additions were made to the milling plant. First, a crushing and picking plant was constructed. This will provide secondary crushing to minus 1-inch, and will eliminate by hand picking in excess of 50 tons per day of waste from the run-of-mine ore. Secondly, a third agitator was installed in the mill itself, which increased the period of cyanidation from sixteen to twenty-four hours, with consequent higher recoveries. Thirdly, trays were placed in the Dorr thickeners, thereby considerably increasing their settling capacity so that larger tonnages of the ‘talc’ ore from the *K* zone could be efficiently handled. During the year, tonnage milled was gradually increased from an average of 263.9 tons in 1933 to 340.7 in 1934, or 76.8 tons per day. Of the total recovery of 96.86 per cent, 92.03 per cent was by amalgamation and 4.83 per cent by cyanidation. Tailing loss was 3.14 per cent”.

A new hoist-house was erected, and a double-drum hoist with a rope speed of 1,000 feet per minute was installed. This hoist is driven by a 250 h.p. induction motor. Loading pockets and ore passes were prepared underground, and additional hoisting capacity was provided with the installation of skip-over-cage combinations in the two hoisting compartments of the main shaft.

Housing facilities were augmented with the completion of a new bunkhouse for ninety-two men, a building to house the doctor and the medical department, and four new residences.

Plans were made to construct a rock-ballasted road from Siscoe island to the mainland, a distance of approximately half a mile.

Sullivan Consolidated Gold Mines, Limited.—Early in 1934, the erection of a 50-ton mill was commenced at this property. The power supply was augmented by two 120 k.v.a. generators driven by Diesel engines. As mill construction advanced, the mine was de-watered, and lateral work was resumed on all levels. Throughout the remainder of the year, the mill-feed was obtained from the surface dump and from development ore.

The mill is a very compact unit, and it operated with a high degree of efficiency. The flow-sheet follows:

The mine ore is screened through a 7-inch grizzly to a 100-ton ore-bin. The bin discharge passes over another grizzly to a 20 in. by 10 in. jaw crusher, and is then conveyed to the 150-ton mill-bin. Fine grinding is accomplished in a 4 ft. by 8 ft. rod-mill in closed circuit with a Dorr duplex classifier. Three traps at the head of the classifier remove coarse free gold. The classifier overflow passes through a separating box. The underflow from this box goes to a James shaking table; the overflow to two blanket tables. The table tailings are thickened in a Dorr thickener. Sodium cyanide is added at the thickener discharge, and the pulp is pumped to three 26 ft. by 14 ft. Pachuca tanks in series. Following a 48-hour agitation, the pulp enters another thickener. The overflow from the second thickener is clarified and goes to precipitation. The underflow is filtered on a 4-leaf, 6 ft. American disc-filter, followed by an 8 ft. Oliver filter for final wash.

A large percentage of the gold is caught in the traps and tables, and this is recovered by amalgamating in a barrel.

The underground work was attended with encouraging results. The A vein was well developed on the 1st and 2nd levels, and stopes were in the course of preparation in early 1935. On the 3rd level, a cross-cut to the east intersected a promising body of ore at a distance of about 700 feet from the shaft, and drifting was in progress on this vein in early 1935.

In the late summer, a transmission line was constructed to the Blouin Lake sub-station of the Northern Quebec Power Company, and hydro-electric power displaced the Diesel-generated supply.

The annual report of the Company for the year 1934 contains the following information:

"During May, we tuned your mill up, and to August 24th, 1934, we treated two thousand five hundred and sixty-two (2,562) tons of ore, although we experienced during that time difficulties with our Diesel engine power. From August 24th to December 31st, 1934, we operated with electric power furnished by the Northern Quebec Power Company, and during that time we have brought production up to capacity. The mill itself has always operated splendidly and the recovery has been around 98 per cent. We treated eight thousand

one hundred and eighty-seven (8,187) tons of ore, which yielded \$138,906.00 or \$16.96 per ton, and this ore came mostly from development work.

“During that period we have proceeded with the development of your property and did 110 ft. of cross-cutting, 1,359 ft. of drifting, 449 ft. of raises, and 6,855 ft. of diamond drilling. This work has opened up considerable ore, which we estimate today to be as follows:

“NORTHEAST SECTION ORE RESERVES:

“Seventy-two thousand (72,000) tons reasonably indicated by drifts and raises and an additional twenty-two thousand (22,000) tons by drifts and diamond drilling, making a total of 94,000 tons of gold content of 0.40 oz. to 0.50 oz. per ton. This covers the ore developed and opened to April 1st, 1935. We are pleased to report that on all three levels of the mine today we have splendid ore showings, from which ore is being sent to the mill. It is important to know that the bottom or third level of the mine has developed ore-bodies equal to those previously established on the first and second levels.

“The present programme is to keep on drifting on all three levels, especially in the northwest section, where diamond drilling indicates their continuation.

“In order to keep pace with the increased ore reserves, we have decided to raise the capacity of your mill from fifty (50) to one hundred (100) tons per day, and we hope this new unit will be in operation around the 15th of June, 1935.

“DEVELOPMENT POSSIBILITIES:

“The development of the mine in the period under review has removed all doubt regarding the continuation of the ore-bodies to depth. Diamond-drill holes have intersected ore and vein structure to a point 700 feet below the surface, and the possibilities for the development beyond present ore exposures are considered to be decidedly encouraging.

“SOUTHWEST SECTION:

“Past diamond drilling indicated ore of commercial value, and with a view to checking these results, three diamond-drill holes were drilled from the ice. Two of these holes showed three quartz veins, with widths up to fifteen feet, each indicating ore of commercial grade,

with sections showing high-grade ore. With this information at hand, it was decided to cross-cut 400 feet in order to establish the dips and the strikes of these veins and prove their real value.

“TOWNSITE:

“During the year, we had a subdivision plan made in order to supply our employees with suitable building lots and, if deemed advisable, these will be sold to the general public”.

West Shore Gold Mines, Limited.—This Company performed surface work on a group of claims consisting of lots 13, 14, and 15, and the east half of lot 16, of range X.

A large amount of stripping and trenching was performed. This work was for the most part confined to a sheared zone in the Keewatin volcanic rocks. The zone strikes N.65° E., and has been traced for a length of about 500 feet. Quartz lenses occur at intervals, and fine pyrite and pyrrhotite occur in the quartz and in the nearby schist. It is reported that some free gold has been found in the quartz.

The Company also prospected an optioned group of claims lying to the west of this group.

BOURLAMAQUE TOWNSHIP

Erie Canadian Mines, Limited.—This exploration Company performed work on two groups of claims in Bourlamaque township. The ‘Neelands’ group, situated on the west side of the north-south centre line was prospected, and some stripping and rock trenching was carried out on several quartz veins.

The second group, known as the ‘Hughes-Wettlaufer’ group, is in the southwest quarter of the township. In July, 1934, 3,000 feet of diamond drilling had been completed in eight holes. It is reported that drilling was continued to a total of 5,068 feet. The option on this group was relinquished.

Lamaque Contact Gold Mines, Limited.—This group of claims includes A-34425, A-34426, and A-34427. It previously was held by the Herbin Lake Gold Syndicate, and during 1933, nine diamond drill holes totalling 7,688 feet were put down by the former owner.

The exploration work has been concentrated on a quartz-tourmaline vein in a highly-altered intrusive rock. It strikes east-west

and is nearly vertical. It has been stripped and deeply trenched at intervals for about 1,300 feet, and varies in width from a few inches to two feet. It is reported that some gold values were found in the vein.

Lamaque Gold Mines, Limited.—During the year 1934, this property continued to respond favourably to development. The No. 3 shaft was deepened to 721 feet, and lateral work was commenced at the 450-, 575-, and 700-foot levels. No. 5 shaft, situated about 1,300 feet to the south of No. 3 shaft, was continued to 310.3 feet. A large flow of water was encountered in the shaft bottom, and it was necessary to grout the fissures. Some lateral work was carried out at the 180-foot horizon to explore the No. 1 vein, and these workings were connected with the 200-foot level of No. 3 shaft. In the fall, work was discontinued in the No. 5 shaft workings.

Later in the year, underground operations were largely confined to placing the property on a producing basis. Raises and box-holes were driven on ore sections, and chutes were built. The sinking of a 60-degree inclined shaft was commenced. This shaft, No. 6, is located about 350 feet to the north of No. 3 shaft. It contains two skipways and a manway, and all ore for the mill will be hoisted through this opening in two-ton skips.

Diamond drilling was continued throughout most of the year under review, and at December 31st the total drilling carried out on the property by the present operators amounted to 35,693.5 feet.

Plans were completed for the construction of a mill with an initial capacity of 225-tons per day. Rapid progress was made, and the plant was in operation in April, 1935.

The ore is hoisted through No. 6 shaft in two-ton skips. It passes over a 4-in. grizzly to a 24-in. jaw crusher. The oversize passes over a 2-in. grizzly to a second 24-in. by 14-in. crusher. It is then screened on a 4-ft. by 8-ft. shaking screen, the oversize going to a 4-ft. cone crusher. The screen and crusher are in closed circuit, the undersize going to a 250-ton mill-bin.

The mill is of the straight cyanide type. The flow-sheet may be subjected to alterations, but present plans are as follows:

The crushed ore is fed to two 4 ft. by 10 ft. Marcy rod-mills in closed circuit with two 3 ft. by 10 ft. Simplex classifiers. The

overflow is delivered to two Dorr bowl classifiers. The sands are re-ground in two 5 ft. by 16 ft. tube-mills, and the discharge is returned to the bowl classifiers. The bowl classifier overflow enters a primary agitator, followed by two thickeners. The thickener overflow is clarified and goes to precipitation. The pulp from the thickeners passes through a series of five agitators and then enters two thickeners. The solution is returned to the mill circuit. The pulp is washed on two Oliver filters and is sent to tailings.

Additional space is provided in the mill for the installation of another 225-ton unit.

The Northern Quebec Power Company's transmission line was completed to the Lamaque mine in July, 1934.

An interim progress report of the Company detailing results to March 1st, 1935, contains the following information:

DEVELOPMENT RESULTS TO DATE (MARCH 1ST, 1935)

LEVEL	STATION	TOTAL LATERAL WORK (Feet)		ORE FOUND			RAISING (Lineal feet)		WINZES (Lineal feet)	
				Lineal feet		Grade	In Ore	In Waste	In Ore	In Waste
		Cross-cuts	Drifts	Length	Width	Dwt				
100	132.5	880.5	1,856.5	605	5.9	5.15	105.0	166.5	..	....
150	19.0	64.0	78.0	65	5.95	10.50	0.0	0.0	..	....
200	113.0	1,527.8	3,627.0	1,990	5.7	4.62	186.5	18.0	..	....
250	20.0	0.0	0.0	.....	.....	.....	0.0	0.0	0.0	4.5
300	115.0	1,389.7	2,054.5	218	4.9	6.10	183.5	129.5	..	....
400	20.0	229.5	590.0	247	5.5	6.73	158.0	14.0	..	....
450	20.0	579.5	1,033.5	796	5.4	8.30	330.5	118.0	16.0	5.5
575	30.0	481.5	1,809.5	1,020	6.5	6.60	231.0	42.0	..	....
700	30.0	317.0	702.0	426	5.1	6.26	68.0	16.0	..	....
Totals and averages	499.5	5,469.5	11,951.0	5,367	5.7	5.97	1,282.5	502.0	16.0	10.0

SUMMARY OF POSITIVE ORE RESERVES (MARCH 1ST, 1935)

	Tons	Av. grade Dwt.	Total dwt.
Blocked ore.....	97,792	7.10	695,040
Broken ore.....	29,165	6.89	200,985
Total positive ore.....	126,957	7.06	896,025

"GENERAL REMARKS:

"No. 6 shaft (60-degree incline production shaft) was deepened 283 feet and reached the floor of the 450-level station. A station was cut on the 300 level. Ore haulage cross-cuts were well advanced on the 200 and 300 levels and will be broken through to the mine proper during March.

"Preparation for stoping on No. 3 vein on the 200 level has shown the vein width to be from nine to twelve feet over a length of 250 feet.

"Of major interest during the last quarter was the proving up of the upper extension of No. 6 vein from the 575 level up through the 450 and 400 levels to the floor of the 300 level".

A new general office was erected, and adequate hospital accommodation has been provided, with a resident physician in charge. A large number of residences were also constructed for employees. Communication was augmented by the addition of a short-wave wireless station.

Paymore Gold Mines, Limited.—This Company acquired the following claims, formerly held by the Herbin Lake Gold Syndicate and others: A-10472 to A-10479, A-35960 to A-35964, A-45649 to A-45663, A-47662 to A-47666 in Bourlamaque township, and A-52772 to A-52774 in Senneville township.

During the year, 3,334 feet of diamond drilling was performed on the Herbin Lake group, and preparations were made to sink a shaft and to carry out a programme of underground exploration work.

Rocdor Gold Mines, Limited.—This Company holds the mining rights to claims in Bourlamaque and Dubuisson townships. The Bourlamaque claims include A-42938 to A-42941 and A-43162 to A-43166.

In the fall of 1934, a diamond drilling programme was commenced. It is reported that this programme totalled 2,728 feet.

Sigma Mines, Limited.—In February, 1934, Dome Mines, Limited, acquired an option on a group of twenty-one claims previously held by Read-Authier Mine, Limited. A promising discovery was made

on the group in the fall of the previous year, and surface trenching and diamond drilling had indicated the presence of a substantial body of gold ore. A new Company, Sigma Mines, Limited, was formed by the optioners to operate the property. This new Company is capitalized at 3,000,000 shares of no par value stock.

Diamond drilling was continued during the early winter months of 1934 and was attended with favourable results. In the spring, light mining equipment was moved in, a headframe was erected, and a small shaft was started on the principal discovery, known as the South zone. The shaft is inclined to the south at sixty-five degrees. It was completed to a depth of 124 feet, and a large amount of drifting and cross-cutting was carried out at the 100-foot level. Later in the year, the shaft was deepened to 264 feet, and exploration of the 225-foot level was commenced.

The upper portion of the shaft is in ore. To a depth of 124 feet, it is reported that sampling indicated an average gold content of over 0.47 ounces per ton across a 7.4-foot width. The vein consists of massive quartz and tourmaline, or a stockwork of quartz stringers. It is well mineralized with pyrite and contains a small amount of chalcopyrite. Visible gold was observed in a number of places, and the presence of scheelite was noted.

Lateral work on the 100-foot level confirmed the presence of a substantial body of ore, varying from three feet to thirty feet in width. A drift driven to the east, with cross-cuts at 25-foot intervals, has exposed a length of 272 feet of ore, with an average width of 9.6 feet, and an average gold content of better than 0.17 ounces per ton. Drifting and cross-cutting to the west of the shaft have indicated a length of 250 feet of ore averaging approximately 0.4 ounces gold per ton across a width of 6.7 feet.

By February, 1935, drifting on the South vein on the 225-foot level had been completed to a length of 1,000 feet. The vein had practically petered out in both faces at this distance. Where first encountered, near the shaft, it was only a few inches in width, and preliminary work indicated a number of short shoots of ore averaging 0.125 ounces per ton in gold, separated by varying lengths of vein material too low in grade to be considered ore. As the east drift advanced, the vein improved, and a 235-foot section averaged about 0.65 ounces gold per ton across a width of 4.7 feet.

The North vein, lying about 200 feet to the north of the South zone, was explored by diamond drilling. A drift was opened on the vein on the 225-foot level, and the Company reports an average gold content of approximately 0.31 ounces per ton over a length of 155 feet and an average width of 5.4 feet.

A large amount of diamond drilling was completed during 1934. This drilling encountered some very good sections of ore, and it guided the underground exploration work.

In the fall of the year, a transmission line was constructed from the Northern Quebec Power Company's sub-station at Blouin lake to the mine. With a supply of hydro-electric power available, operations were enlarged. A power house was erected, and a 1,030 cu. ft. air compressor, driven by a 200 h.p. motor, was installed. A new bunk-house, office, dry-house, and several residences were built. A winter landing-field for aeroplanes was cut in the muskeg, a few hundred yards to the north of the mine buildings.

Exploration work was also carried out by a number of other companies in the township of Bourlamaque. These organizations included: Amity Gold Mines, Limited, Bidlamaque Gold Mines, Limited, East Lamaque Gold Mines, Limited, Northern Aerial Canada Gold, Limited, and others.

PASCALIS TOWNSHIP

Beaufor Gold Mines, Limited.—Operations were resumed at this property in 1934. The inclined shaft was deepened to the 450-foot horizon, and lateral work was carried out on the bottom level. A diamond drilling programme was then commenced, and in February, 1935, seven holes had been put down. On completion of this programme, operations were suspended.

Perron Gold Mines, Limited.—This Company was incorporated in March, 1934, with a capitalization of 2,000,000 shares of \$1 par value stock, to acquire and operate the Mathews Gold Mines property. Deepening of the shaft was commenced in January, and a new level was established at a depth of 325 feet. Lateral work was carried out on the 175- and 325-foot levels. This work was attended with encouraging results, and several small lenses of ore were opened up.

The capacity of the small test-mill was increased, and, in the last half of the year, this mill treated about twenty tons of ore per day. Power is provided by a 50 h.p. single-cylinder Diesel engine, and the mill equipment is driven from line shafting.

The ore is crushed in a small jaw crusher and enters a ball-mill, which operates in closed circuit with a Dorr classifier. The gold is recovered by concentration on blanket tables, and the concentrate is amalgamated in a barrel. The ore for the mill was obtained from exploration and development work, and was not of high enough grade to cover operating expenses at this small daily tonnage.

Early in 1935, these efforts were rewarded with more promising results. Substantial lengths of ore have now been opened up on both levels. Plans have been prepared to erect a 100-ton mill, and to place the property on a self-sustaining basis.

LOUVICOURT TOWNSHIP

Bussières Mining Company, Limited.—The Bussières mine was brought under the control of the Quebec Gold Mining Corporation in early 1934, and this Company operated the property throughout the remainder of the period under review. The mill was kept up to capacity except for a short period in the early winter months, when a shortage of hydro-electric power at the Company's plant at the head of Simon lake, necessitated a curtailment of operations.

A large amount of drifting and raising was completed on the four levels of the mine, and a winze was sunk at an inclination of 30 degrees, from the 650-foot level to the 775-foot horizon. The exploration work included the drilling of a number of diamond-drill holes to a total length of 13,951 feet.

A total of 55,879 tons of ore was hoisted and milled. This ore was obtained from an open cut, from underground stopes, and in the course of development work.

The results obtained in this work were not in keeping with expectations, and no substantial bodies of ore were developed. At times, promising faces were exposed in the stopes, but lack of continuity to the deposits made their development and extraction both difficult and costly. Operations were suspended in March, 1935. A

large part of the property remains to be explored, and it is probable that operations will be resumed at an early date in an effort to discover more substantial deposits.

Some changes were made in the mill flow-sheet. Flotation of the tailing from the blanket tables was incorporated in the circuit. During the summer months, the concentrates were stored, and they were shipped to the Noranda smelter in the fall and winter of 1934-35.

New Roy Gold Mines, Limited.—This Company was incorporated in March, 1934, with an authorized capitalization of 3,500,000 shares of \$1 par value stock.

The underground exploration of the LeRoy mine was resumed on April 1st, 1934. The drifts and cross-cuts on the 125- and 250-foot levels were re-sampled, and lateral work was resumed. Some short sections of ore were encountered on both levels. A diamond drilling programme was commenced, and over 4,000 feet was completed.

Some additions were made to the mining plant and equipment. The 6 in. by 8 in. hoist was replaced by a 10 in. by 12 in. machine, and a cage was installed in the shaft.

The results attained in the exploration work were not conclusive, and all operations were suspended in September.

TIBLEMONT TOWNSHIP

Murwood Gold Mines, Limited.—This Company was incorporated in June, 1934, with an authorized capitalization of 3,000,000 shares of \$1 par value stock, to explore and develop the Woods group of claims. This property was previously under option to Hollinger Consolidated Gold Mines, Limited, and at that time a large amount of surface work and diamond drilling was carried out to explore a spectacular gold-quartz zone.

Operations were resumed on the group in the early spring of 1934. New camps were constructed, and a pole-track was built from Tiblemont lake to the camps, a distance of about one mile. Some trenching and stripping was performed during the summer months. East of the camps, a sheared zone occurs in the granodiorite. This zone parallels a fourteen-foot-wide rhyolite dyke which intrudes the

nearby flow rocks. Quartz occurs in the sheared zone in the form of stringers, and in short lenses. Sulphide mineralization is not pronounced, and no free gold was observed. To the north of the camps, trenching in deep overburden has exposed several quartz veins, and these appear to line on the strike of the sheared zone. One vein, containing visible gold, is about two feet in width, and has been traced for a length of about ten feet.

In the late summer, light mining equipment was transported to the property, and the sinking of a vertical, two-compartment shaft was commenced at a point about twenty-five feet south of the Woods discovery zone. This shaft was completed to a depth of 117 feet, and lateral work was commenced on the 100-foot level. By February, 1935, the underground work had failed to indicate continuity to the rich surface showing. Some quartz veins were encountered, and it is reported that some gold values were found, but results, as a whole, were not very promising.

South Tiblemont Mines, Limited.—During the summer of 1934, a vertical, three-compartment shaft was sunk on this property to a depth of 240 feet. Levels were established at depths of 125 and 225 feet, and 1,019 feet of lateral work was completed on the 225-foot level. The shaft is located on the boundary between A-43398 and A-43399.

In the previous year, a number of parallel stringers and narrow veins of quartz were stripped and trenched, and some free gold was found in the material. The underground work encountered similar geological conditions, but gold values of interest were not found. Underground work was discontinued, and the shaft has been allowed to fill.

The mining equipment includes an 8 in. by 10 in. steam hoist, two steam boilers of 45 h.p. and 70 h.p., respectively, and two steam-driven compressors, one of 140 cu. ft. capacity and the other 340 cu. ft.

Some surface work was carried out during the summer on a new discovery on claims A-46111 and A-46112. The discovery lies to the northeast of the shaft workings. It is reported to consist of a series of quartz veins and veinlets striking N.46½° E., and dipping to the north at 60 degrees. Visible gold was observed in the quartz. A

diamond drill was brought in, and 1,200 feet of drilling was completed in seven holes. Operations were suspended on this group in February, 1935.

Tiblemont Island Mining Company, Limited.—Operations were continued on this property throughout 1934. The adit, started near the southeast shore of Tiblemont island, was extended to a distance of 1,180 feet. At a point about midway from the entrance, a winze was sunk to a depth of 25 feet. Some flat-lying stringers of quartz were intersected in the winze, and it is reported that visible gold was observed.

Surface work was resumed in the summer months. Stripping to the east of the discovery zone resulted in the exposure of a number of quartz veins and veinlets, irregular in size and with varying dips and strikes. In one place, about 500 feet east of the adit, a two-foot quartz vein is exposed for a length of about 30 feet. It strikes N.30° E. and dips to the northwest at approximately 50 degrees. Some particles of free gold were observed in this body.

A diamond drilling programme was carried out. In August, 1934, fourteen holes had been drilled to a total length of 4,500 feet.

In the late summer, the sinking of a three-compartment shaft was commenced. The shaft site is vertically above the adit face. The adit was reached at a depth of 110 feet from the collar, and by February, 1935, a depth of 260 feet had been attained, and a station had been cut out at the 235-foot horizon.

The light mining equipment in use in the early part of the year was destroyed by fire, and was replaced by the following: a double-drum 9 in. by 8 in. steam hoist, two 30 h.p. steam boilers, a 370 cu. ft. portable Diesel-driven compressor, and two 320 cu. ft. gasoline-driven compressors.

New buildings erected during the year included a hoist house, power-house, dry-house, and several camp buildings.

VAUQUELIN TOWNSHIP

Avocalon Mining Syndicate.—A group of claims consisting of A-44507 to A-44509, A-44514 to A-44528, and A-44530 and A-44532 is held in the name of individuals connected with this organization.

A gold-bearing quartz vein was discovered in 1934 on the south boundary of claim A-44524. Some trenching was completed, and towards the close of the year the sinking of a small shaft was commenced.

The shaft is inclined at 75 degrees to the south. Light mining equipment includes a 22 h.p. steam boiler, a 110 cu. ft. steam-driven compressor, and a small hoist. Camp buildings have been erected on the north part of claim A-44509, and a road was cut through from the Louvicourt river.

CHIBOUGAMAU DISTRICT*

Consolidated Chibougamau Goldfields, Limited.—In early 1934, this Company acquired the mining rights to the Chibougamau-McKenzie claims. This group is situated at Cedar bay, Doré lake.

The geology of the property is described in a number of government reports. The original discovery consists of a quartzose lens, mineralized with pyrite and chalcopyrite, and having a length on the surface of ninety feet. In previous years, a small pit was sunk to a depth of nineteen feet on the deposit, and it is reported that sampling indicated an average grade of 0.35 ounces gold per ton and 4 per cent copper. The pit is in claim Q-581.

In 1934, the new holders commenced a diamond drilling campaign. The drilling encountered a new deposit lying to the south of the original discovery. It is of similar character, but surface work and diamond drilling have indicated that it is of substantial size. It has been traced on the surface for a length of over six hundred feet.

The annual report of the Company for the year 1934 contains the following information:

“CHIBOUGAMAU MCKENZIE GROUP:

“In July, 1934, a progress report was published and made available to the public, summarizing the results of the early diamond drilling. These results were encouraging and the drilling was continued. In all, 34 holes were bored for a total core length of 10,517 feet, indicating

* Further details are given in the preliminary report by G. S. MacKenzie, on *Mining Properties of the Chibougamau Opemisca Region*, this volume, pp. 133-145.

a sulphide zone approximately 1,200 feet in length. On the strength of diamond drilling results, it was decided to sink a three-compartment shaft to an objective of 500 feet to explore the zone at various levels. On January 31st, 1935, the shaft was 193 feet deep, and a station cut at the 125-foot level.

"To start this work, a small oil-burning engine, directly connected to a two-stage compressor, was installed at the property. Recently, this equipment has been superseded by two water tube boilers with a nominal rating of 60 h.p. each, but which, with proper fuel, can furnish three times their rated h.p. Other equipment includes one 7 in. by 6 in. single-drum air or steam hoist; one steam-driven compressor, 12 in. by 12 in. by 10 in., with volumetric capacity of 365 cu. ft. of air per minute; two boiler feed pumps; one service pump; one sinking pump; two rock drill machines; and a small 12-20 h.p. Cletrac tractor.

"Camp buildings, capable of caring for fifty men, were completed in the fall and the necessary mine buildings erected for sinking the shaft".

McIntyre Porcupine Mines, Limited.—This Company has acquired an option on the Rangeley-Wolson group, consisting of Q-16158 to Q-16172, in the west part of McKenzie township.

A discovery was made in the fall of 1934 on the north side of Gwillim lake. It consists of an intimate mixture of quartz and calcite in greenstone schist. It is heavily mineralized in places with pyrite and smaller amounts of chalcopyrite. No free gold is evident, but very high gold assays have been returned from grab samples. Three trenches were excavated across the zone at 75-foot intervals, and the widths as exposed in these trenches are twenty-two feet, fifteen feet, and fifteen feet, respectively.

In the spring of 1935, a diamond drilling programme was commenced.

Noranda Mines, Limited.—The annual report of this Company for the year 1934 contains the following reference to the Bourbeau Lake property:

"On the Coffin-Gilligan claims in the Chibougamau area, 120 miles north and 200 miles east of Noranda, optioned in 1933, diamond drilling was continued throughout the winter and summer, a total of 45 holes having been drilled. This drilling has indicated an ore-shoot approximately 800 feet long and 500 feet deep, in a quartz vein 4.5 feet wide. The values obtained were quite erratic, making it difficult to estimate the probable average grade of ore that could be mined, but the weighted average of the drill core obtained from vein intersections within the ore-shoot was 0.35 oz. per ton. This indicated grade is low for the profitable working of a narrow vein situated 135 miles from a railway, but the option payments have been met, as other properties are being developed in this district and, eventually, improved means of transportation into the district may be provided".

MADELEINE LAKE GOLD DISCOVERY TERRITORY OF ABITIBI

by G. S. MacKenzie

A gold-bearing quartz vein was discovered on the south shore of Madeleine lake in the fall of 1934 by John Wabanoni, an Indian trapper in the district. News of the discovery led to a considerable influx of prospectors to the area. The original showing was secured by the Prospectors Airways Company, Limited, and many claims were staked by others. The writer was enabled to pay a brief visit to the area in the middle part of October through the courtesy of Mr. G. R. Burge, pilot for Prospectors Airways. Because of the short stay and unfavourable weather conditions, the examination was necessarily a very hasty one.

Madeleine, Rose, or Florence lake, as it is variously named, is seventy-five miles north of Senneterre, six miles southwest of Waswanipi lake, and about twelve miles northwest of Pusticamica lake (see Figure 1). It is at the headwaters of the Florence river, which enters the Bell two miles north of the mouth of the Wedding river. The Florence is navigable by canoe. The lake may be reached by way of either the Bell or Laflamme rivers.

A. H. Lang ^① visited the lake in 1931 and mapped the geology in the immediate vicinity, but the surrounding area has not yet been examined. However, it appears that the lake is on the northern edge of a large area of Keewatin rocks which outcrop on the Wedding river to the south and on the Florence and Bell rivers to the west. To the north and northeast there is a large area of granitic rocks. The contact between the two formations follows the south shore of the lake. The Keewatin rocks outcrop on a series of hills which parallel the south shore and extend for two or three miles westward. South and east of the hills are low, rolling, sand plains.

The Keewatin rocks are mostly volcanic flows of intermediate composition, with some interbedded volcanic breccia, fine-grained tuff, and graphitic schist. The general trend of the formation is N.65° W. Locally, there has been pronounced drag-folding and

^① Geol. Surv. Can., Summ. Rept., Part D, 1932, pp. 36-43.

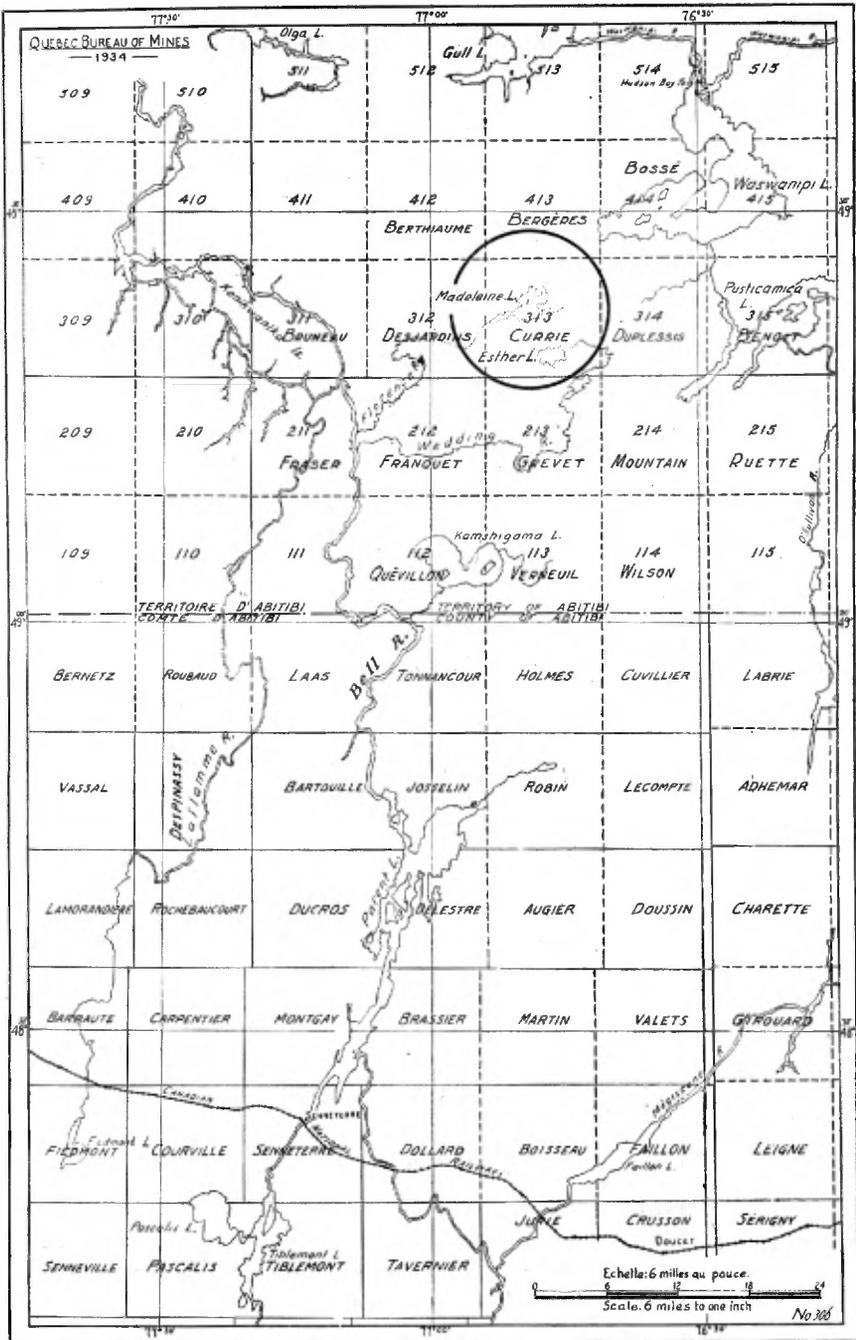


FIGURE 1.—Sketch-map showing location of Madeleine lake, and water route from Senneterre.

faulting. At one point, the volcanics are intruded by a small body of quartz diorite, and in a number of places by dykes of feldspar porphyry, which also intrude the quartz diorite.

Many claims have been staked in the vicinity of the lake, but, at the time of the writer's visit, discoveries had been made and work done only on those held by Prospectors Airways and on the adjoining Bush claims.

PROSPECTORS AIRWAYS COMPANY CLAIMS

The main, or Wabanoni, discovery on the Prospectors Airways Company claims is about 800 feet south of the eastern bay of the lake, on the south side of one of the series of hills referred to above. Immediately to the west and northwest of this, within an area measuring about 600 feet east-west by 300 feet north-south, several quartz veins have since been discovered, and some of these had been partly uncovered by trenching at the time of the writer's visit. Since that time, a considerable amount of additional trenching has been completed, and the Company has kindly supplied the information obtained as a result of this work up to the middle of January, 1935. This new information is incorporated in the following description and on Figure 2.

About in the centre of the area as delimited above, a body of quartz diorite, 175 feet long in a north-south direction and 125 feet wide at its north end, intrudes volcanics of andesitic and more acid composition. Four dykes of feldspar porphyry, one on the east side of the quartz diorite body and three on the west side, also intrude the volcanics, and one of them was noted to intrude the quartz diorite as well. These dykes have irregular directions, varying between N.70°W. and nearly due north. They range in width from less than a foot to four feet and more.

The quartz diorite is a grey, medium-grained rock, mostly massive, but sheared in places. Only occasional grains of quartz are apparent in the hand specimen. A thin section shows the feldspar to be plagioclase ranging in composition from albite to andesine. The feldspar grains are fractured and partially saussuritized. There is an abundance of pale greenish-brown hornblende, which is par-

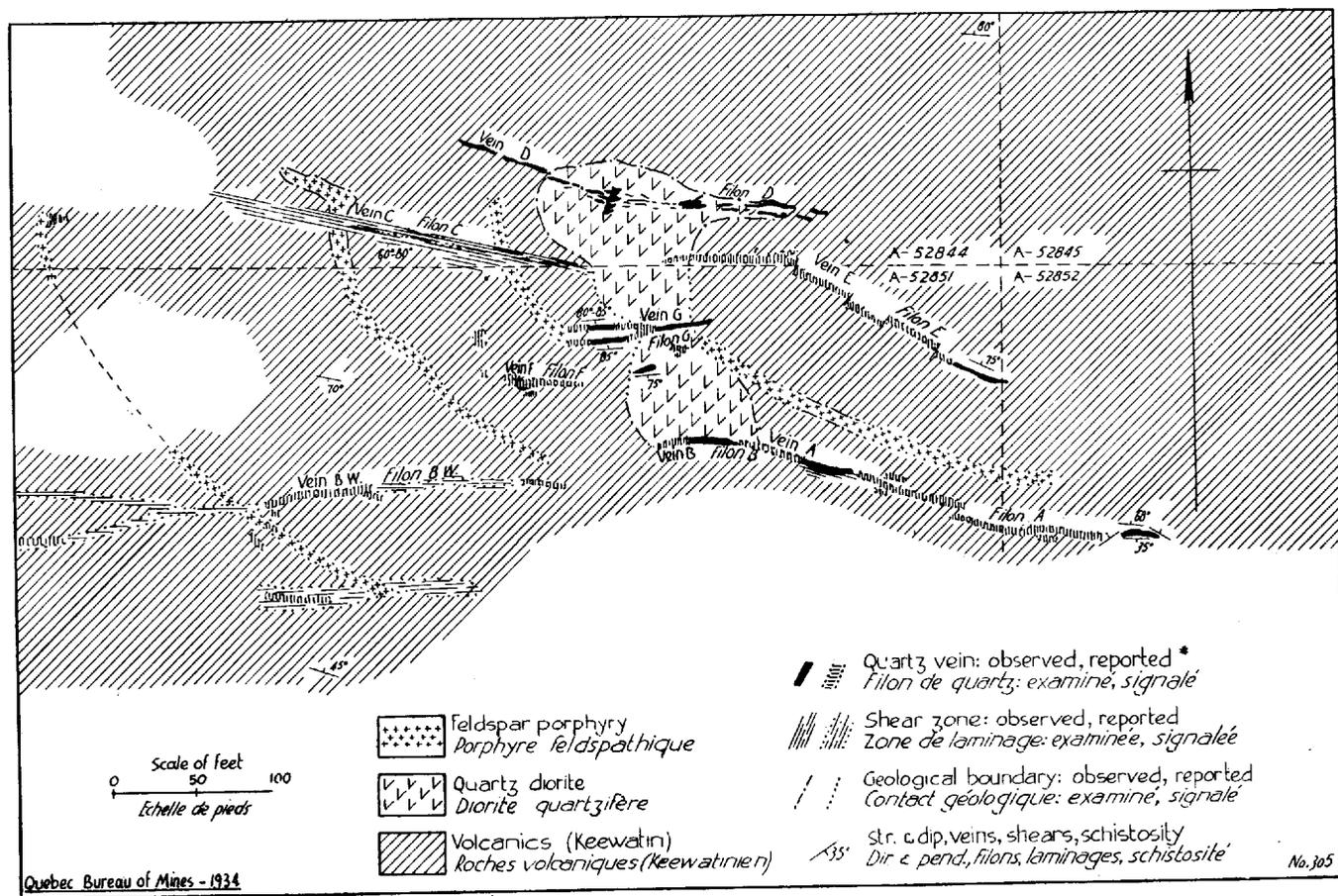


FIGURE 2.—Geological sketch-map, Prospectors Airways property, Madeleine lake, Abitibi.

tially uralitized and deformed. Considerable quartz is present in small grains. Pyrite and pyrrhotite are accessory minerals and may, in part, be a later introduction, along with some of the quartz.

The feldspar porphyry is a coarse-grained rock composed largely of greyish feldspar. The dykes in the vicinity of the quartz veins are markedly sheared. A thin section of a specimen from a similar, but less sheared, dyke from the adjoining Bush claims showed the feldspar to be mainly albite, with some soda-lime feldspar. Some quartz is also present. The only evidence of ferromagnesian minerals is a little greenish chloritic material. A veinlet of pectolite crosses the section. The presence of this mineral implies hydrothermal alteration.

In general, the trend of the quartz veins is parallel to the directions of folding, shearing, or schistosity in the wall-rocks. Thus, most of the veins strike about N.70° W., a few east-west, and some a few degrees south of west. In places, there appears to have been some north-south and northeast-southwest faulting before, and possibly after, the injection of the quartz. Most of the larger veins, designated by letters on the map (Figure 2), are really a series of veins or lenses. Some of them occur along zones of shearing, though others do not. As indicated in the descriptions below, there is considerable variation in the character of the quartz and in the type and degree of mineralization, even between closely located veins.

The original (Wabanoni) find was made at the east end of the A vein, on what appears to be a lens separate from the remaining more or less continuous portion of the vein. This lens occurs along the north limb of a small anticlinal fold in the volcanics. It is about one foot wide along its middle portion and tapers down to half a foot at its extremities, where it disappears beneath the drift. The quartz is grey to white, very finely crystalline, and with a dull lustre. It is rudely banded parallel to the walls and is crossed by fractures transverse to them. Free gold can be seen both along the fractures and within the mass of the quartz. Other minerals present are pyrite, pyrrhotite, chalcopyrite, and sphalerite. There are also some specks of a soft, dark grey mineral which may be a gold telluride, but which are too minute to be positively identified. Little mineraliza-

tion is apparent in the wall-rocks. Most of the *A* vein to the west of this lens has been uncovered since the writer's visit. Such exposures as existed at that time showed a vein of glassy, white quartz, one to three feet wide, in sheared volcanics. The quartz and wall-rock were mineralized with pyrite, but no other minerals were noted. The Company reports that gold values of about 1.25 ounces to the ton have been obtained across an average width of 25½ inches along the 265 feet for which the *A* vein has been traced.

The *E* vein, 100 feet to the north of the *A* vein and roughly parallel to it and to a dyke of feldspar porphyry which occurs between them, has been traced for 135 feet. Gold values of about 0.60 ounces to the ton are reported across an average width of 25½ inches. Only about 25 feet of this vein was uncovered at the time of the writer's visit. It consisted of glassy quartz, stained red in places by iron oxide, with no visible sulphide mineralization, though specks of free gold could be seen.

The *D* vein, which crosses the quartz diorite body near its north end and extends beyond it into the volcanics to the east and west, consists of a series of parallel and successive quartz lenses and small veinlets. Some of the lenses are 3 feet in width, and in one place there is 50 per cent of quartz over a width of 15 feet; but in other places the quartz pinches out entirely. The quartz is white and dull to glassy in appearance. It is only slightly mineralized with a few grains of pyrite. Free gold was reported to occur in the vein, but the results of sampling are not yet available.

The *C* vein occurs along a shear-zone which, starting from about one-third of the way down the western side of the quartz diorite body, extends westward into the volcanics and crosses two dykes of feldspar porphyry. The shear-zone has been traced for 240 feet, and the shearing extends over widths of 5 to 20 feet. It has a direction N.77° W. and a dip of 60 to 80 degrees to the south. In the short section of the zone uncovered at the time the writer examined it, quartz was observed to occur in separate lenses over a width of five feet, some of the individual lenses being one foot in width. The quartz is white and finely crystalline, and was seen to contain free gold, telluride, and pyrite. The sheared rock is silicified and mineralized with a little pyrite. Subsequent work has shown that two parallel veins occur along the zone, and to date they have been traced for lengths of 150 feet and 100 feet, respectively.

The parts of the *B* and *G* veins exposed when examined by the writer consisted of glassy quartz, apparently not mineralized. Veins *BW*, *F*, and several smaller quartz lenses and mineralized shear-zones were uncovered during the winter; at present writing, it is not known whether or not they carry values.

The area within which the veins occur is not yet fully explored; moreover, to the south, east, and west of it there is a heavy covering of drift, beneath which some of the known veins may extend, and which may conceal other veins that remain to be discovered.

Quartz veins have been found in other sections of the property. One of these is on the shore of the lake, north of the Wabanoni discovery. The vein occurs in drag-folded banded tuff and graphite schist. It has been followed for more than 400 feet and is 40 feet wide in places. The quartz is white and glassy, with no visible mineralization. Preliminary sampling did not indicate gold values.

Another vein is located 4,500 feet west of the original find, on the central bay of the south shore of the lake. It has been followed for 200 feet from the lake shore in a direction of S.45°E., and is from 8 to 10 feet wide. The quartz is glassy, and it and the adjacent silicified volcanics are mineralized with pyrite. A sample from this vein was reported to carry values in gold.

BUSH CLAIMS

The Bush claims are to the west of those held by Prospectors Airways, and are immediately south of the entrance to the southwestern bay of the lake. They were staked by Mr. and Mrs. H. Bush, of Senneterre.

The volcanics along the lake shore here are cut by a number of large dykes of feldspar porphyry. About 200 feet east of the location of the camp, one of the dykes has been stripped over an area of 50 square feet, within which are two short veins of white glassy quartz, a few inches in width. No mineralization is apparent, but it is reported that some free gold was found in them. A trail leads southwest and south from the camp over a prominent hill, on which pillow andesite with interbedded tuff, and graphitic schist, are exposed. At a point 400 feet along this trail, southwest of the camp, a stripping

over a length of 150 feet in a direction N.75°W. reveals an irregular quartz vein up to 25 feet in width. The quartz is white and glassy, and unmineralized, except for a little pyrite and chalcopyrite around inclusions of the wall-rocks, which are chloritic and graphitic schist.

About 1,500 feet south of the lake, on the south side of the hill, another vein has been uncovered in a series of pits over a length of 200 feet. It occurs along a sheared zone which strikes in a northwest-southeast direction. The shearing extends over widths of ten feet, and the quartz is up to three feet wide in one or two distinct veins. The quartz and sheared rock are slightly mineralized with pyrite and a little chalcopyrite. Low gold values are reported.

MINING PROPERTIES OF THE CHIBOUGAMAU OPEMISCA REGION

by G. S. MacKenzie

INTRODUCTION

In the fall of 1934 the writer made an examination of most of the properties in the Chibougamau region in which development work had been done since 1929. With a few exceptions, notably the Opemiska, in Levy township, the properties concerned are in McKenzie township. Most of the work since 1929 was done during the summer of 1934. The outstanding, entirely new, discovery in the region was that made by Messrs. Gilligan and Mahoney on Bourbeau lake, the property being later optioned by Noranda Mines, Limited. Interesting new discoveries were also made in the vicinity of showings known before 1930 on the properties of the Consolidated Chibougamau Goldfields, Limited, and Opemiska Copper Mines, Limited. The earlier discoveries on these and other properties in the region are described in reports by Mawdsley ①, Retty ②, and Tolman ③. On many of these older properties, there has been no further activity since the time the reports referred to were published, and the same is true of many of the properties or discoveries described in the report of the Chibougamau Mining Commission ④ in 1911 and in reports by earlier workers in the region ⑤.

There was considerable prospecting in the region during the summer of 1934, in addition to the development work on new and old discoveries. For the most part, both men and supplies were taken in by aeroplane, either from Oskalaneo on the Quebec-Cochrane branch of the Canadian National railway, or from Saint-Félicien in the Lac-Saint-Jean region.

- ① Geol. Surv. Can., Summ. Rept., Part C, 1927, pp. 14-22.
- ② Que. Bur. Mines, Ann. Rept., Part A, 1929, pp. 58-60; Part D, pp. 60-72.
- ③ Geol. Surv. Can., Summ. Rept., Part D, 1930, pp. 36-48.
- ④ *Report on the Geology and Mineral Resources of the Chibougamau Region*; Department of Colonization, Mines, and Fisheries, Quebec, 1911.
- ⑤ Obalski, J., Que. Bur. Mines, Ann. Rept., 1904, pp. 1-21.
Low, A. P., Geol. Surv. Can., Pub. No. 923, 1906.
Dulieux, E., Que. Bur. Mines, Ann. Rept., 1908, pp. 50-82.

McKENZIE TOWNSHIP

COFFIN GILLIGAN PROPERTY:

This property, consisting of 20 claims, is on the south shore of Bourbeau lake, near its west end. Gold was discovered here in the autumn of 1931, by C. E. Gilligan and W. Mahoney. L. Coffin, of Amos, assisted in the early development of the property. In the summer of 1933, it was optioned by Noranda Mines, Limited, who, between then and the summer of 1934, explored the mineralized zone by 45 diamond-drill holes, some of which reached a vertical depth of 500 feet.

The main showing, or No. 1 vein, occurs along a sheared zone which crosses claim Q.10460 in a direction of N.30° E. Most of the zone is in diorite and quartz diorite, which, a short distance to the south, grades into gabbro, but at its southwestern end the zone crosses chloritic and graphitic schists and serpentinized rock. The zone has been traced for 2,000 feet, and along 1,500 feet of this distance it has been explored by a series of 31 surface trenches. The northeasterly part, towards the shore of the lake, is under heavy drift. A continuous quartz vein is present only along the northeastern 1,400 feet of the zone. For 800 feet of this distance there is an ore-shoot, known to extend to a depth of 500 feet, in which the vein has an average width of 4.5 feet. The ore-shoot is at that part of the vein where its direction is most sinuous and its dip most irregular and flat, averaging about 45 degrees to the south. Northeast and southwest of the ore-shoot, the dip steepens to about 60 degrees to the south. The quartz is grey to white in colour and irregularly fractured. In some places little mineralization is apparent; in others, pyrite, arsenopyrite, and a little chalcopyrite occur in the quartz and wall-rock. Occasional specks of free gold have been observed in the quartz. The footwall is more sheared, fractured, and mineralized than the hanging-wall. The Company reports that the gold values are largely confined to the quartz. They are variable, ranging mostly from 0.02 ounces to one ounce to the ton over the width of the quartz, though in one core a value of 5.86 ounces was obtained over a width of 7.4 feet. The weighted average for the whole ore-shoot, as reported by the Company, is 0.35 ounces to the ton. Black, glassy quartz occurs along the southwest part of the shear-zone, but was not found to carry gold values. However, veinlets of iron oxide in the wall-rocks of decomposed schist yielded free gold on panning.

The No. 2 vein, in the southeast corner of claim Q.10461, is exposed in four trenches within a distance of 150 feet. The quartz varies from six inches to three feet in width. Gold values are reported to be erratic, but with some as high as 0.35 ounces to the ton. In other trenches along the strike of the vein (N.60° W.), some mineralized sheared diorite is present, but no quartz.

CONSOLIDATED CHIBOUGAMAU GOLDFIELDS, LIMITED:

This Company, incorporated in February, 1934, holds four large groups of claims in the Chibougamau region, besides claims elsewhere in Quebec and Ontario. The Chibougamau claims were acquired in part by purchase of the assets of Chibougamau Prospectors, Limited, in part by purchase from the McKay interests, and the remainder by new staking. The Company also holds an option on the twelve claims of Chibougamau-McKenzie Mines, Limited. In September, 1934, the Consolidated Mining and Smelting Company of Canada, Limited, took an option on a controlling stock interest in the Company.

The chief work of the Company has been centred on mineralized shear-zones in claim Q.581 of the Chibougamau-McKenzie option, on a prominent point at the southwest end of Cedar bay, Doré lake. Some mineralization had been discovered on the property prior to 1934 ^①, but the more important finds have been made since the Company started diamond drilling in April of that year. Up to March 15th, 1935, 34 holes, representing a core length of 10,500 feet, had been drilled. A shaft, commenced in the fall of 1934 for exploratory purposes, was down to 193 feet on January 31st, 1935.

The mineralization occurs along a number of closely spaced shear-zones in oligoclase anorthosite, which, along such zones, is highly chloritized. A pronounced shear-zone, diagonally crossing the claim in a northwest direction, has been traced for 1,300 feet. At its south end, the shearing is quite intense for a width of 45 feet. Irregular quartz lenses and veins, some up to 7 feet wide, occur across this width. The quartz and sheared rock are well mineralized with pyrite and a lesser amount of chalcopyrite. The northwest part of the zone is largely under drift and water, but the drilling showed shearing and mineralization at intervals across horizontal widths up to 100 feet.

^① Geol. Surv. Can., Summ. Rept., Pt. C. 1927, pp. 15-17
Que. Bur. Mines, Ann. Rept., Pt. D. 1929, pp. 65-67.

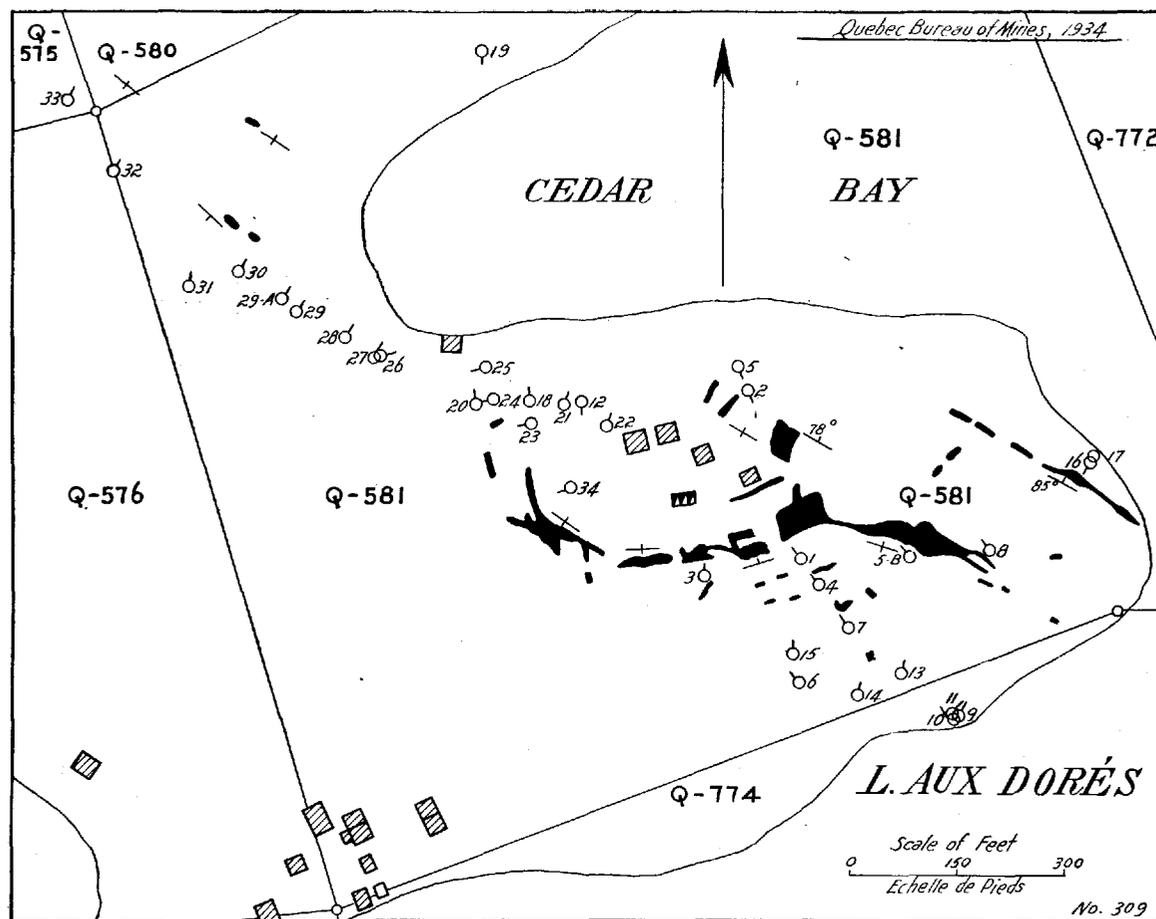


FIGURE 3.—Sketch-map of Cedar Bay property, Consolidated Chibougamau Goldfields, Ltd., showing mineralization (heavy black), as uncovered by trenching. Country rock mostly anorthosite, massive or sheared.

The widths of the individual and successive shearings range from a few inches to 15 feet, with massive rock between them. The shears are mineralized mainly with pyrite, though some quartz and chalcopyrite are present in places.

A second zone of less intense shearing but heavier mineralization extends for 700 feet westward from the southeast end of the zone described above. The shearing varies in strike from a few degrees south of west to northwest, and in places is slightly offset along pre-mineralization cross-faults. The mineralization is nearly 40 feet wide at some points, but at others it almost pinches out and is interrupted by blocks of barren anorthosite. It is most persistent and regular along the eastern 200 feet of the zone, where it merges into the first shear-zone. In places, nearly 50 per cent of grey quartz occurs across the zone, and, together with the sheared rock, is heavily mineralized with chalcopyrite and pyrite. Much of the quartz is replaced by massive chalcopyrite, and at some points along the zone disseminated chalcopyrite occurs in the sheared rock, accompanied by little or no pyrite.

A third zone, mostly revealed by diamond drilling, extends for about 700 feet north and northwest from the west end of the second zone. Along its northern portion it is within 100 feet of, and parallel to, the main northwest shear-zone first described. Mineralization is persistent from hole to hole and occurs at intervals over horizontal widths up to 40 feet. In some of the holes it is continuous for more than 20 feet. The mineralization is mostly pyrite, but in some of the drill-cores quartz and abundant chalcopyrite are also reported.

Several other, but smaller, shear-zones, roughly parallel to the three described and with similar mineralization, have been found on the property, both at the surface and in drilling.

In the present stage of development of the property, largely by diamond drilling, there is but little detailed information available regarding the width or value of the ore in the several shear-zones. Assay results furnished by the Company show very favourable gold values across certain sections of the mineralized zones. Copper is usually low, but some of the assays show a relatively high percentage of this metal. The distribution of the gold is evidently not directly related to the distribution of the chalcopyrite. Some silver usually accompanies the gold and may amount to several ounces to the ton.

During 1934, the Company also did some work on an older discovery ①, known as the Lake Dufault group, on claim Q.13979, a few hundred feet north of the middle part of Bourbeau lake. Pyrite and pyrrhotite, with a little chalcopyrite in places, occur here replacing Keewatin volcanics in a shear-zone which strikes N.60° E. to N.70° E. The zone was traced for 1,200 feet. A short distance to the north, the volcanics are intruded by gabbro. In places, the sulphides are nearly massive over widths of 10 feet or more and, in a more disseminated form, they are distributed over widths up to 80 feet. The Company reports that assays of a few grab samples showed indecisive results.

Several small quartz veins and shear-zones mineralized with pyrite, chalcopyrite, sphalerite, and galena were uncovered on claim Q.14009, south of the west end of Bourbeau lake. The veins were mostly less than a foot wide and individually they do not appear to exceed 50 feet in length. They occur in pyroxenite just north of an intrusive band of albite-oligoclase granite.

During the summer of 1934, the Company also did exploratory stripping and trenching on their claims around Bear bay, Chibougamau lake, in which vicinity diamond drilling had been done by Dome Mines, Limited, in 1929. In February, 1935, the Company reported that they had commenced diamond drilling in their water claims northeast of the Blake showing ② on Merrill island.

NORTHERN CHIBOUGAMAU MINES, LIMITED:

This Company, 60 per cent of whose shares are under option to the International Mining Company, Limited, of Montreal, has two groups of claims in the region. During the summer of 1934 some work was done on the Sharpe discovery on claim Q.14018, one of a group of five claims on the south shore (near the east end) of Bourbeau lake. Here, a discontinuous quartz vein, in a sheared zone in diorite and quartz diorite, has been traced for 700 feet in an east-west direction by a series of 25 trenches. As exposed in some of the trenches, the quartz is in a distinct vein up to six feet wide; in others, there are several vertical and horizontal veins, some up to a foot wide, over a

① Que. Bur. Mines, Ann. Rept., Pt. D, 1929, p. 70.

② *Ibid.*, p. 63.

width of 15 feet; and in three trenches no quartz is exposed. In some places the quartz and sheared rock are heavily mineralized with pyrite and considerable arsenopyrite; in others, no mineralization is apparent. The Company reports that varying gold values, some of them high, were obtained at intervals across the vein.

Some further blasting was done during 1934 on a small lens of massive pyrrhotite, containing a little sphalerite and chalcopyrite, in serpentinized rock on claim Q.14015, one of a group of 24 claims at the west end of Bourbeau lake ①. The Company reports very high values in gold from assays of this material.

BOURBEAU LAKE CHIBOUGAMAU MINES, LIMITED (Haileybury, Ontario):

This Company holds 44 claims around the east end of Bourbeau lake. During the summer of 1934 the claims were prospected, and in the course of this work two mineralized zones were discovered. Across claims Q.14239 and Q.14240, massive and disseminated pyrite and pyrrhotite occur over widths from 10 to 100 feet along a shear-zone in andesite, rhyolite, and rhyolite breccia, at their contact with gabbro. The zone has been traced for 1,700 feet in a direction of N.70°E. Within the zone, near its east end, is a little cherty quartz and chalcopyrite. Assay of a sample from this point is reported by the Company to have yielded a value of \$5.60 to the ton in gold (at \$35 an ounce). At a point about 2,000 feet south of the lake, a similar, but smaller, zone was traced for 100 feet in a direction of N.50°E. At present, the Company are engaged in diamond drilling on their water claims in the strike of the Sharpe vein on the property of Northern Chibougamau Mines, Limited, already described.

FLEURY CLAIMS:

Gabriel Fleury holds 25 claims located between Proulx bay of Doré lake, and Bourbeau lake. Seven of the claims were formerly held by the Steele-Fortune Mining Syndicate ②. During 1934, the prospect pits of the latter Company were cleaned out, and three new discoveries were made, all of them on claim Q.14222, south of the

① Que. Bur. Mines, Ann. Rept., Pt. D, 1929, p. 71.

② Geol. Surv. Can., Summ. Rept., Pt. C, 1927, pp. 14-15.
Que. Bur. Mines, Ann. Rept., Pt. D, 1929, pp. 67-69.

small un-named lake at the south boundary of the Noranda claims on Bourbeau lake. The first is on the shore of this lake, where, in one pit, quartz veins and sheared sericitic schist are exposed over a width of four feet and are mineralized with pyrite, and a little chalcopyrite and arsenopyrite. Mr. Fleury reports that an assay of a sample of the quartz gave a gold value of \$0.78 to the ton (gold at \$20 an ounce). A stripping 180 feet northeast of this pit shows quartz and some calcite, in chloritic schist heavily mineralized with pyrite, magnetite, and chalcopyrite. The second discovery is 300 feet to the south and consists of a quartz vein three to ten feet wide, uncovered for 40 feet, only sparingly mineralized with pyrite at one point. The third, 300 feet south of the second, is a pyrite-pyrrhotite zone, traceable for only 100 feet.

BREIVE CLAIMS:

Olaf Breive holds four claims (Q.14216-14219) just north of Proulx bay, Doré lake, which were formerly owned by the Steele-Fortune Mining Syndicate. A small mineralized zone was uncovered during 1934, 700 feet west of the No. 1 zone, and a similar distance south of the No. 2 zone, which are described in the report of the Bureau for 1929 ^①. In three trenches within a distance of 50 feet, grey quartz mineralized with pyrite, pyrrhotite, and chalcopyrite, occurs across widths of three to eight feet in sheared volcanics. Mr. Breive reports that only low gold values were obtained on sampling.

PROSPECTORS AIRWAYS COMPANY, LIMITED:

This Company carried on prospecting at a number of localities in and around the region during the summer of 1934. Systematic exploration was done on their five groups of claims. Much trenching was done on claim Q.14321, one of a group of 26 claims west of Bourbeau lake, across a series of small quartz veins and shear-zones in altered acidic to basic volcanics near intrusive contacts with gneissic granite and massive gabbro. The veins and sheared rock are mineralized with pyrite, pyrrhotite, and a little chalcopyrite. The Company reported that gold values were not found to be encouraging.

^① Que. Bur. Mines, Ann. Rept., Pt. D, 1929, p. 67.

Extensive trenching was also done on a group of 8 claims (Q.13927-13934) lying north of block B, on which the Kokko Creek showing ① is located, in an endeavour to pick up a northwestward extension of that mineralized zone. At a point half a mile northwest of it, a shear-zone in anorthosite along a dyke of altered albite-oligoclase granite was uncovered for 60 feet in a direction N.40° W. Pyrrhotite occurs across the zone over widths up to five feet. In nearby trenches, smaller, parallel shears, injected with quartz and some calcite, are mineralized with pyrite and chalcopyrite. Farther west, on claim Q.13930, an east-west zone, discovered some years previously ②, was further explored by trenching. It was traced for 300 feet in a nearly east-west direction. White and black, glassy quartz occurs along the zone over widths up to 15 feet in the central trenches. The quartz is heavily mineralized with pyrite, and more disseminated mineralization extends into the sheared anorthosite, quartz diorite, and altered volcanic wall-rocks. Encouraging gold assays are reported by the Company to have been obtained from this zone.

TAYLOR CLAIMS:

T. H. Taylor holds a group of 15 claims (Q.15635-44 and Q.15672-76) lying immediately north of the Prospectors Airways group and extending northward to Gilman lake. Quartz-chalcopyrite, and pyrite-pyrrhotite, mineralization has been uncovered at a number of points, particularly on claim Q.15673. Some of the outcrops are aligned so as to suggest fairly extensive east-west and northwest-southeast zones of mineralization, but none of the showings have been sufficiently uncovered or tested to determine their continuity or importance.

LEVY TOWNSHIP

OPEMISKA COPPER MINES, LIMITED:

During 1934, some further stripping, trenching, and sampling was done on the three ore-zones discovered in 1929 on this property ③. At the same time, the Company made a general surface exploration of the property.

① Que. Bur. Mines, Ann. Rept., Pt. D, 1929, p. 64.

② Geol. Surv. Can., Summ. Rept., Pt. C, 1927, p. 19.

③ Que. Bur. Mines, Ann. Rept., Pt. A, 1929, pp. 58-60.
Geol. Surv. Can., Summ. Rept., Pt. D, 1930, pp. 37-46.

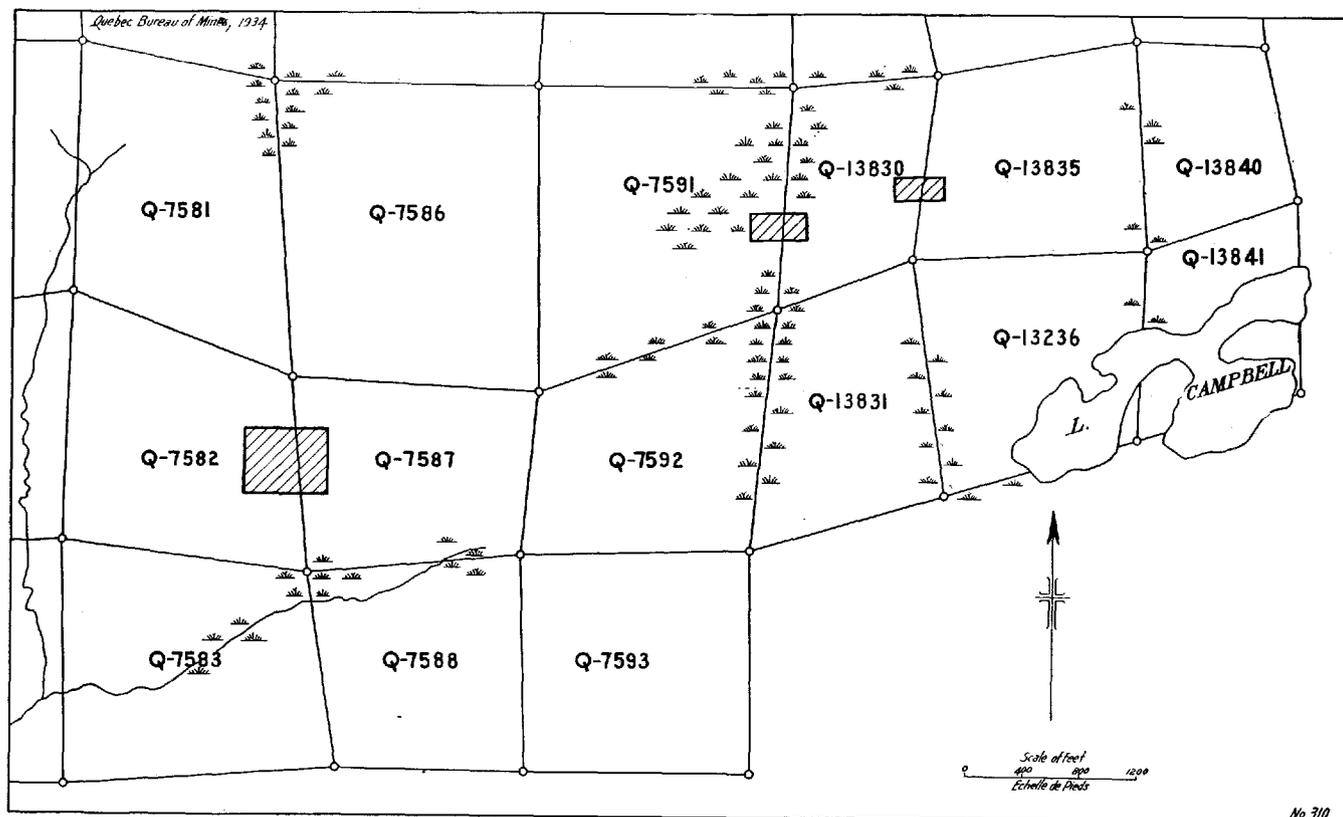


FIGURE 4.—Part of group of claims of Opemiska Copper Mines, Ltd., Levy township, showing location of original discoveries.

The sampling up to the fall of 1933, as reported by the Company, and the results of the diamond drilling in 1929, indicate three ore-shoots on zone No. 1. The first has a length of 200 feet and an average width of 9.45 feet; the second a length of 23 feet and average width of 5.2 feet; and the third a length of 220 feet and average width of 8.7 feet. Two ore-shoots are indicated on zone No. 2: one 90 feet in length with an average width of 3.1 feet, the other 570 feet long and averaging 5.1 feet in width. On zone No. 3 there would seem to be at least two shoots, one 400 feet long with an average width of 2.1 feet and the other 140 feet long with an average width of 2 feet. Zone No. 1 was intersected by the drill holes at a depth of 100 feet, and zone No. 2 at a depth of 300 feet. Zone No. 3 has been only partially explored. Average values for all the shoots are reported as 8.46 per cent copper, \$2.03 gold per ton (gold at \$20.67 an ounce), and one ounce per ton in silver.

It was found during the summer that the quartz and sheared gabbro along a northwest-southeast cross-fault between zones No. 1 and No. 2 is heavily mineralized with arsenopyrite, accompanied by only a little chalcopyrite and pyrite. The Company reports that sampling at intervals along 200 feet of this cross-fracture showed gold values ranging from \$8.40 to \$52.50 (gold at \$35 an ounce) across widths of 1.3 to 2.8 feet. Silver ranged from 0.2 to 6.02 ounces to the ton. Similar mineralization was also found 100 feet south of zone No. 2, roughly in the strike of the cross-fault. Over a length of 25 feet, gold and silver values of the same order as those mentioned above were obtained. To the north of zone No. 1, arsenopyrite with high gold values had previously been encountered in a drill hole which is aligned with the cross-fault.

The Company also reports that a new and fourth east-west chalcopyrite zone was discovered after the writer's visit to the property. It is 350 feet north of zone No. 1. To date, it has been traced for 200 feet, within which distance mineralization extends across widths of 5 to 12 feet. Sampling at frequent intervals across the zone yielded copper values up to 25 per cent over widths up to 4 feet, and up to 15 per cent over greater widths. Values in gold range from less than \$1.00 to \$38.00 per ton (gold at \$35 an ounce), and silver averages about one ounce per ton.

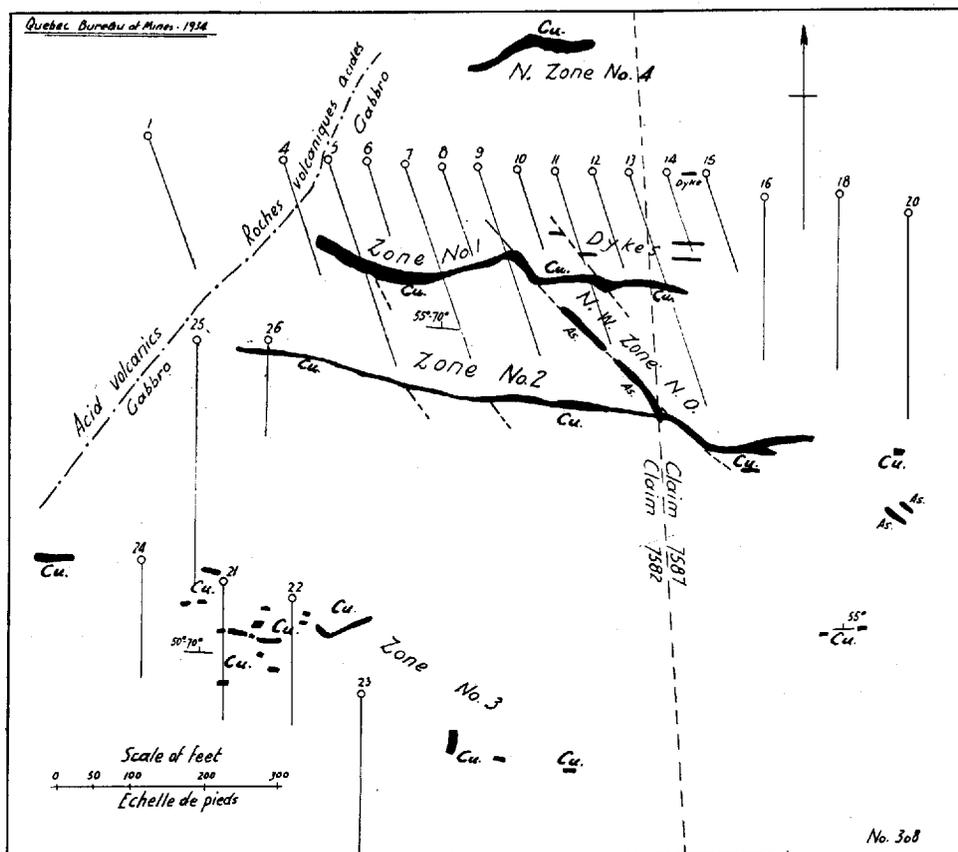


FIGURE 5.—Sketch-map showing location of diamond-drill holes, and mineralization (heavy black) as uncovered by trenching, on property of Opemiska Copper Mines, Ltd., Levy township.

Cu—Chalcopyrite mineralization: As—Arsenopyrite mineralization.

East of the above, mineralization was discovered at the south part of the boundary between claims Q.13830 and 13835 of the Campbell group, which point is about 4,500 feet east and 1,500 feet north of the main zones. The mineralized zone here has been traced for 375 feet in heavy drift, in a nearly east-west direction. Massive and disseminated chalcopyrite, with some pyrite and pyrrhotite, occur along a sheared and fractured zone in massive pyroxenite, and along

the contact between pyroxenite and peridotite. The zone dips at 45° to 70° north. The mineralization is mostly confined to widths of 3 to 4 feet, but in some places extends into the fractured pyroxenite wall-rock for several feet, and in other places almost pinches out. Little quartz is present, and no magnetite or arsenopyrite were noted. Results of sampling along the western part of the zone show values in copper of 3 to 25 per cent over widths of 2 to 8 feet. Gold values range from a few cents to \$8.40 per ton (gold at \$35 an ounce). Silver values are from 2 to 8 ounces to the ton and are generally higher than in the zones of the original discovery.

At points about 900 feet east of the above zone, and 800 feet west, similar, but smaller, mineralized zones have been discovered. Around and between these zones and those of the original discovery, the ground is almost entirely drift and swamp covered. Farther north of the Campbell group, a number of large and small quartz veins have been discovered at various places, both in the Ventures gabbro and related intrusives, and in the volcanics. Some of these veins are barren, but others are mineralized with pyrite and a little chalcopyrite and are reported to carry values in gold, in places up to \$2.80 to the ton (gold at \$35 an ounce).

**EMPLOYMENT, WAGES, AND ACCIDENTS IN MINES
AND QUARRIES DURING THE YEAR 1934***

EMPLOYMENT AND WAGES

Employment in the mining industry of the Province showed marked improvement during 1934. This is the second year in succession that figures for employment have increased, following a series of decreases which commenced in 1928 and continued until 1932. The number of men employed in 1934 was about the same as in 1931. Reports received from 248 mines and 346 quarries, and also from numerous claim holders who completed the required amount of assessment work, give a total of 13,180 men employed in the entire industry. Details of employment in the several branches of the industry are given in the main table of mineral production on page 7 and in Table II below.

Men employed performed 2,868,299 man-days of labour, equivalent to the work of 9,561 men, each employed for 300 days.

TABLE I
WORKMEN EMPLOYED IN MINES AND QUARRIES IN THE PROVINCE
OF QUEBEC, 1931 TO 1934

	1934	1933	1932	1931
Number of men employed.....	13,180	10,737	9,821	13,185
Number of men on a 300-day basis....	9,561	7,431	6,855	9,116

* Compilation by Henri Girard, from reports of Inspectors of Mines.

The increase over 1933 in the total number of employees, amounting to 23 per cent, was due in the main to greatly increased activity in the mines group, although in the quarries, also, there was an appreciable gain.

Reference to Table II will show that, in the mines group, an increase in the number of men employed, calculated on a 300-day basis, is recorded in every item listed (with the exception of phosphate and peat), thus reflecting the improvement during the year in practically every branch of mining, which is illustrated, also, in the general table of production on page 7. Gold mining and assessment work on claims showed the most pronounced employment gains, continuing the upward trend of the two preceding years; but there was also a large increase in the numbers employed in copper and pyrite mines, and in asbestos mines. Although not so important numerically, percentage gains were even more encouraging in many of the lesser branches of non-metallic mining, as may be noted in the table.

The search for gold was more intensive than ever before, and the number of men engaged in assessment work on claims rose from 1,033 in 1933 to 1,450 last year. There was a gain of nearly one thousand in the number of men employed in producing mines, mainly due to new mines which came into production during the year. Employment was also considerably higher in mines which had not yet reached the production stage.

Increased activity in the limestone and sandstone quarries, in the sand and gravel pits, and in the brick industry, were responsible for a betterment in the total number of men employed in the quarries group, thus bringing to an end the decline which had been continuous since 1931.

TABLE II

DISTRIBUTION OF WORKMEN IN THE VARIOUS MINES AND QUARRIES

	Number of men employed	Number of men calculated on 300-day basis	
	1934	1934	1933
MINES:			
Asbestos.....	1,749	1,691	1,423
Copper and pyrite.....	1,646	1,708	1,596
Chrome, titaniferous iron ore, zinc, and lead.....	42	25	4
Feldspar.....	76	44	20
Gold, silver.....	1,949	1,744	1,146
Magnesite and dolomite.....	176	149	86
Marl.....	10	2	1
Mica, phosphate.....	111	73	23
Mineral paints, ochres.....	36	27	16
Mineral water.....	16	6	1
Molybdenite.....	7	2	1
Natural gas.....	13	13	10
Peat.....	.....	.....	1
Quartz, silica rock, garnet.....	173	102	46
Talc, soapstone.....	56	34	32
Assessment work on claims.....	1,450	1,450	814
Sub-totals.....	7,510	7,070	5,220
QUARRIES:			
Brick, pottery.....	561	259	161
Cement.....	320	280	291
Granite.....	523	231	324
Lime.....	258	194	174
Limestone.....	1,287	559	511
Marble, slate, sandstone.....	273	111	45
Sand and gravel.....	2,448	857	705
Sub-totals.....	5,670	2,491	2,211
TOTALS.....	13,180	9,561	7,431

Wages paid to workmen in the mines and quarries of the Province amounted to \$9,445,532, as compared with \$7,403,560 in 1933. Details of the wages in the several branches of the industry are given in the table of mineral production on page 7. Of the total, workmen in mines received \$7,608,829 and those in quarries \$1,836,703, which figures compare, respectively, with \$5,840,436 and \$1,563,124 in 1933.

Wages in mines were substantially the same as in previous years, the average being \$3.60 per day. In quarries, the rate continued much below that prevailing in 1931, but, with an average of \$2.45 per day, was slightly higher than in 1933. With the object of maintaining wages at a reasonable level and preventing price-cutting such as had been common in the past few years, quarrymen and cut-stone workers throughout the Province made a request, during the year, for an agreement under the Collective Labour Agreements Extension Act of Quebec. The agreement having been drawn up and approved, was given effect recently by an Order-in-Council. It aims at establishing a reasonable minimum for wages in these occupations.

Early in June, miners employed by Noranda Mines, Limited, were involved in a dispute with the management, the men demanding an increase in the scale of wages and recognition of the Union. Within a week, however, the strike was called off. Apparently, the majority of the employees were not in sympathy with the movement, which was incited by a fomenting element.

TABLE III

WORKMEN EMPLOYED IN PRODUCING AND NON-PRODUCING MINES
IN 1934

	Number of workmen	Wages	Number of days' work	Number of 300-day workers
Producing mines.....	5,107	\$ 5,400,353	1,471,666	4,906
Non-producing mines.....	953	850,802	214,104	714
Assessment work on claims..	1,450	1,357,674	435,152	1,450
Total.....	7,510	\$ 7,608,829	2,120,922	7,070

ACCIDENTS

Accidents to employees in all mines and quarries (with their annexed plants) in the Province resulted in 13 deaths and 423 injuries. The total number of accidents was higher in 1934 than in 1933, but on a per-thousand, 300-day-year basis, the rate was lower, being 45.6 as against 48.0.

TABLE IV

SUMMARY OF ACCIDENTS IN MINES, QUARRIES, AND ANNEXED PLANTS
IN 1934

	Number 300-day workers	Accidents		Total	Per 1,000 300-day workers
		Fatal	Non-fatal		
Mines.....	7,070	10	324	334	47.2
Quarries.....	2,491	3	99	102	40.9
Total.....	9,561	13	423	436	45.6

The accident statistics given in Tables IV, V, VI, and VII are compiled from accident reports furnished by the operating companies, who are required by law to report to the Bureau of Mines every accident in which an employee is disabled for more than seven days. Notices of all mine and quarry accidents were also received during the year through the Workmen's Compensation Commission. As a result, it has been possible to compile more complete accident returns this year than heretofore, particularly in small operations, and this probably accounts for the unusually large number of non-fatal accidents recorded in the quarries.

The distribution of accidents, fatal and non-fatal, in mines, quarries, and annexed plants is shown in Table V.

TABLE V

ACCIDENTS IN MINES, QUARRIES, AND ANNEXED PLANTS IN THE
PROVINCE OF QUEBEC DURING 1934

	Fatal		Non-fatal		Totals	
	No.	%	No.	%	No.	%
MINES:						
Underground.....	7	1.6	172	39.4	179	41.0
Open pits.....	0	.....	38	8.7	38	8.7
Surface.....	1	0.2	51	11.8	52	12.0
	8	1.8	261	59.9	269	61.7
QUARRIES:						
In pits.....	2	0.5	85	19.5	87	20.0
Surface.....	0	.....	6	1.3	6	1.3
	2	0.5	91	20.8	93	21.3
ANNEXED PLANTS:						
Concentrators.....	2	0.5	38	8.7	40	9.2
Smelters.....	1	0.2	19	4.4	20	4.6
Shops.....	0	.....	6	1.3	6	1.3
Warehouses.....	0	.....	5	1.2	5	1.2
Power plants.....	0	.....	3	0.7	3	0.7
	3	0.7	71	16.3	74	17.0
TOTALS.....	13	3.0	423	97.0	436	100.0

FATAL ACCIDENTS:

As previously stated, 13 deaths resulted from accidents during the year. Ten of these occurred in mines and three in quarries. Fatalities were 1.36 per thousand full-year workers, as compared with 1.08 in 1933.

As shown in Table VI, which gives an analysis of the fatal accidents, handling of explosives was the leading cause of fatalities, accounting for four. Slides of ground, hoisting and shaft, and falls of persons, were each responsible for two deaths.

All the accidents in which explosives were concerned occurred underground and were the result of premature blasts, where the shooting involved the use of fuse and detonators.

TABLE VI

ANALYSIS OF FATAL ACCIDENTS IN MINES, QUARRIES, AND ANNEXED PLANTS IN THE PROVINCE OF QUEBEC DURING 1934

Cause of Accident	Under-ground	Open pits	Surface	Annexed plants	Totals	
					No.	%
MINES:						
Explosives.....	4	0	0	0	4	40.0
Hoisting and shaft.	2	0	0	0	2	20.0
Fall of person.....	1	0	0	0	1	10.0
Machinery & tools.	0	0	0	1	1	10.0
Handling objects...	0	0	1	0	1	10.0
Gearing, shafting, belting.....	0	0	0	1	1	10.0
Totals.....	7	0	1	2	10	100.0
QUARRIES:						
Slides of ground...	0	2	0	0	2	66.6
Fall of person.....	0	0	0	1	1	33.4
Totals.....	0	2	0	1	3	100.0

NON-FATAL ACCIDENTS:

Table VII shows the number of non-fatal accidents in mines and quarries in 1934, classified according to cause.

Mines.—'Haulage' was responsible for 38 accidents, or 14.5 per cent of the total, as compared with 6.8 per cent in 1933. Improper maintenance of way, and poor state of haulage track, contributed to some of the accidents included under this classification. 'Handling rocks or objects' ranked second as a cause of injuries, many of which happened in connection with loading operations and with the handling of drill-steel underground. 'Fall of rock' accounted for 28 accidents, or nearly 11 per cent of the total, and under the somewhat similar classification of 'rock rolling down incline', *i.e.*, rock dislodged from a slope or an inclined raise, are included 19 accidents, representing 7.3 per cent. 'Fall of person' was responsible for 27 accidents, or 10.3 per cent of the total, the hazard of slippery rock being the dominant cause. Twenty-two persons were hurt in 'loading cars and boxes', these being mostly hand injuries.

Quarries.—Two causes stand out prominently as accountable for 60 per cent of all the accidents in quarries. They are 'loading boxes' and 'handling stone or objects'. Most of these accidents result from careless practice on the part of employees in the handling of stone.

Annexed Plants.—'Machinery and tools' were responsible for 18 accidents, or about 25 per cent of the total. This is a considerable improvement over the previous year, when there were 27 accidents under this classification, representing 32 per cent of the total. 'Handling objects and stone' and 'fall of person' were also frequent causes of accidents in plants connected with mines and quarries.

TABLE VII

ANALYSIS OF NON-FATAL ACCIDENTS IN MINES, QUARRIES, AND ANNEXED PLANTS IN THE PROVINCE OF QUEBEC DURING 1934

Cause of Accident	Under-ground	Open pits	Surface	Total	
				No.	%
MINES:					
Haulage.....	21	2	15	38	14.5
Handling rocks or objects...	14	7	11	32	12.2
Fall of rock.....	27	1	.....	28	10.8
Fall of person.....	15	3	9	27	10.3
Loading cars and boxes.....	15	6	1	22	8.4
Rock rolling down incline...	19	.....	.....	19	7.3
Drilling.....	16	1	.....	17	6.5
Machinery and tools.....	6	2	7	15	6.0
Slides of rocks and ground..	4	5	.....	9	3.5
Explosives.....	9	.....	.....	9	3.5
Lifting heavy object.....	4	2	3	9	3.5
Fall of objects.....	7	.....	1	8	3.0
Hammering stone and cobbing.....	2	4	.....	6	2.3
Sealing.....	2	3	.....	5	1.9
Scaffolding and ladder.....	4	.....	.....	4	1.5
Hoisting and shaft.....	3	.....	.....	3	1.1
Cable-derrick.....	.....	2	.....	2	0.7
Nails.....	.....	.....	2	2	0.7
Shovelling.....	1	.....	1	2	0.7
Burns.....	1	.....	.....	1	0.4
Miscellaneous.....	1	.....	.....	1	0.4
Dust.....	.....	.....	1	1	0.4
Timbering.....	1	.....	.....	1	0.4
Totals.....	172	38	51	261	100.0

TABLE VII—(Continued)

QUARRIES:					
Loading boxes.....	.....	27	.....	27	29.9
Handling stone or objects...	.....	25	2	27	29.9
Haulage.....	.....	6	2	8	8.7
Hammering stones.....	.....	6	.....	6	6.5
Fall of person.....	.....	4	1	5	5.5
Machinery and tools.....	.....	3	1	4	4.3
Slides of rocks and ground..	.....	3	.....	3	3.2
Scaling.....	.....	3	.....	3	3.2
Fall of rocks.....	.....	2	.....	2	2.2
Derrick.....	.....	2	.....	2	2.2
Drilling.....	.....	2	.....	2	2.2
Fall of objects.....	.....	1	.....	1	1.1
Explosives.....	.....	1	.....	1	1.1
Totals.....	.....	85	6	91	100.0

Cause of Accident	Concen- trators	Smelt- ers	Repair shops	Ware- houses	Power plants	Total	
						No.	%
ANNEXED PLANTS:							
Machinery and tools.....	10	4	3	..	1	18	25.3
Fall of person.....	8	1	..	2	..	11	15.5
Handling objects and stone.....	5	3	2	..	..	10	14.1
Falls of objects or rocks..	5	3	..	..	..	8	11.2
Burns.....	3	4	..	..	1	8	11.2
Bagging and handling bags.....	2	..	..	3	..	5	7.0
Gearing, shafting, belt'g..	3	..	..	..	..	3	4.2
Haulage.....	1	1	..	..	..	2	2.9
Crane.....	..	2	..	..	..	2	2.9
Scaffolding and ladder....	1	..	..	..	1	2	2.9
Lifting heavy objects.....	..	..	1	..	..	1	1.4
Dust.....	..	1	..	..	..	1	1.4
Totals.....	38	19	6	5	3	71	100.0

PREVENTION OF ACCIDENTS

The earnest interest taken by operators in the prevention of accidents is very encouraging. In previous reports, we have included accounts of the safety organization established by some of the larger mining companies. Continuing this practice, we give this year a brief description of the safety work carried on at a small plant. Very often, in the smaller plants, insufficient recognition is given to the

importance of safety work. However, regardless of the size of the plant, the willingness of the management to do its part in providing safe working conditions tends to prevent accidents and at the same time encourages employees to adopt safe practice.

At our request, Mr. John P. Oman, superintendent at the quarry of Shawinigan Chemicals, Limited, situated at Bedford, summarizes in the following paragraphs the safe working conditions provided for employees on their property.

SAFETY ACTIVITIES AT THE BEDFORD QUARRY OF
SHAWINIGAN CHEMICALS, LIMITED *

The quarry and crushed-stone plant of Shawinigan Chemicals, Limited, at Bedford, are operated by an average of 22 men, working one 8-hour shift daily. The plant was completely renewed and modernized in 1930, and the workers are protected from machine hazards by well constructed and adequate guards.

We have had only one lost-time accident in almost four years of operation, and even this would not have occurred had the victim obeyed orders as posted on our bulletin boards.

Bulletin boards are utilized for the display of safety posters. Whenever we see an employee doing anything which appears hazardous or likely to lead to an accident, where a little information might help matters, we post a bulletin calling attention to the danger of the practice and to the remedy. Also, lectures are given to the employees on safety methods and practices applicable to their work.

In the service building, guards are provided around the air compressor, and similarly, in the machine shop, around the belts of drilling machines and on emery wheels. Goggles are worn by the men whenever they do any grinding.

At the crushing plant, two men are employed to feed a Telsmith gyratory crusher. These men always wear goggles and also have felt shin-pads, 12 in. by 5 in. by $\frac{1}{2}$ in. thick, to protect their shins when sledging, should a piece of stone rebound when broken and strike them.

* By J. P. Oman, superintendent of quarry.

As the stone comes out of the primary crusher it passes onto a belt, which conveys it to a scalping screen. Both the bottom and the top end of the belt are bridged over with a stairway, so as to prevent men from clambering over the belt. Also, a guard is placed at the side of the scalping screen to prevent any stone from falling to the floor below.

Preventive guards are installed around the motor drive, at the end of the counter-shaft of the crusher, and on the crusher pulley, as revolving parts of machinery are a source of danger to the workman who comes near them. There is always the possibility that his clothes may be caught in some projecting part of the running machinery and, perhaps, a very serious accident result.

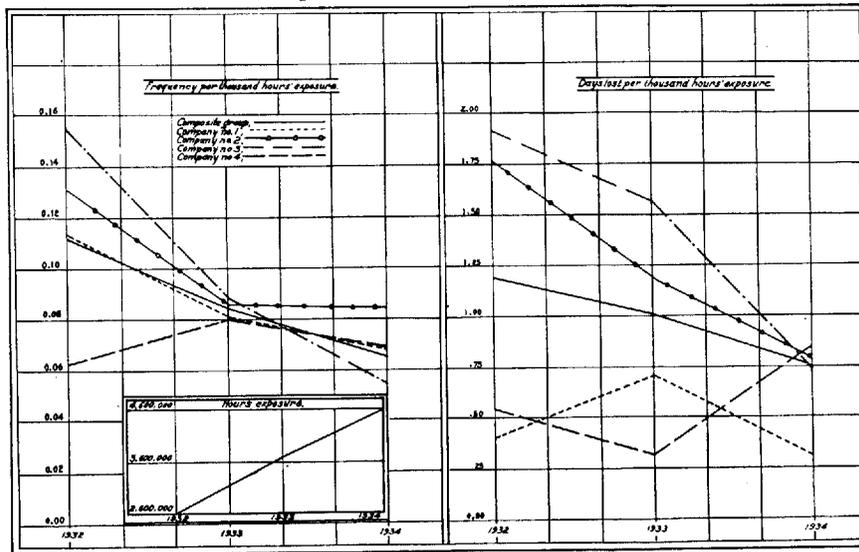
The stairway leading down from the top of the bin is as well protected as it can be with railings.

There is, on the property, a magazine which is used exclusively for the safe keeping of dynamite. The only men who have access to it are the store keeper and the quarry foreman. No blasting caps, detonators, or fuses are stored with the dynamite; they are kept in a small separate building. We have still another building where the fuse is cut and fitted to the detonator.

In the quarry, when a shot is to be fired, the foreman blows an air whistle three times, while at the office a whistle is blown electrically and continues until the shot is fired. These whistles are to warn the men to get under cover immediately and not to come out until the foreman has signalled clearance by blowing his air whistle again.

Instructions are given to all employees forbidding them to do anything which may endanger their own safety or the safety of their fellow-workmen, and requiring them always to see their foreman before doing anything beyond what they have been instructed to do.

To sum up, we take every precaution possible to make working conditions safe, and at the same time we strive to inculcate in our employees a sense of safety consciousness. Our fine accident record is evidence of the loyal co-operation we have received from our workmen in these effective safety activities.



(Safety Association of Quebec Asbestos Producers)

FIGURE 6.—Quebec Asbestos Producers Association. Graphs of accident frequency and days lost through accidents in asbestos mining and milling.

SAFETY ASSOCIATION OF THE QUEBEC ASBESTOS PRODUCERS

The *Safety Association of the Quebec Asbestos Producers*, organized in 1932, continued to function with efficiency, as is shown by the accompanying graph, which indicates a gratifying trend downward in the frequency of accidents in the asbestos mines.

Every accident, whether it involves lost time or not, is analysed and tabulated as to place, cause, and injury. The safety engineer of the Association visits the scenes of accidents and formulates recommendations to prevent a re-occurrence.

The hours of work in the asbestos field have increased 75 per cent in the three years since the organization of the Safety Association. An interesting point brought out by the analysis of accidents is that the increase necessitated the hiring of many 'green' hands, or re-employing 'soft' hands, and statistics show that 75 per cent of the total accidents occur in these two classifications.

First-aid classes are being conducted at three of the mines and a total of sixty men are now under instruction. The officers of the Quebec Bureau of Mines are co-operating fully in this work and will issue certificates upon the completion of the course.

All underground men at the King mine of the Asbestos Corporation are equipped with 'hard hats', electric cap-lamps, and safety boots. Other mines in the group are fast adopting safety boots for surface, pit, and shop workers. It is interesting to note that the Canadian Johns-Manville Company have files relating to trial and adoption of safety boots back in 1929.

The Association is a member of various safety associations which supply valuable accident-prevention information. To date, several hundred 'safety' posters in both English and French have been used by the various companies.

Monthly safety meetings are held by two members of the group to facilitate the notation and elimination of hazards. One member maintains an Accident Scoreboard which gives a daily indication of accidents and the department to which they are charged.

The co-operation of the members of staff, foremen, and workmen of all companies contributes to the improvement of the accident record, and saving in compensation costs.

DESCRIPTION OF FATAL ACCIDENTS

January 9th.—Andrew Polic, 27 years of age, employed as a labourer at the quarry operated by the R. H. Miner Company, Limited, was fatally injured when he fell off a ladder. Death followed in a few minutes.

Polic, with a companion, had been building a scaffold above a storage bin filled with stone. The victim was preparing to leave, by going up a ladder, when he lost his balance and fell from a height of eight feet into the stone pile at the bottom of the bin. He suffered a fracture of the skull.

Verdict: Accidental death.

January 16th.—Nikolio Zuchoski, 50 years of age, employed as driller at the Jeffrey mine of the Canadian Johns-Manville Company, Limited, was killed by the fall of a derrick-drill, which tipped over, crushing him beneath it. The accident occurred in the mine, between 10.00 p.m. and 11 p.m.

The method of drilling quarry faces at the Jeffrey mine is by 'down' holes. A heavy type of air-operated hammer drill is mounted on a portable derrick, so that holes may be drilled at a slight angle to the vertical.

Zuchoski and his partner, Alfred Ducharme, had finished drilling one hole. They were moving their derrick, when it suddenly fell over Zuchoski, who was trapped under it. There was a very strong wind blowing that night. Ducharme saw the back leg of the derrick start to move, and he called to his companion to watch out. Instead of jumping to safety, Zuchoski, who had the reputation of being a very strong man, tried to hold the derrick with his hands, but was unable to do so as it was too heavy for one man. The derrick was immediately moved off the victim, but he died a few minutes later.

Verdict: Accidental death.

January 17th.—A premature blast in the north cross-cut on the 500-foot level of the Arntfield mine resulted in the instant death of Patrick W. Thériault and his brother, Téléspore Thériault, aged 32 and 24 years, respectively.

At about 4 p.m. on the afternoon of January 17th, the Thériault brothers finished the drilling of twenty-one holes in the face of the north cross-cut on the 500-foot level of the mine. Patrick Thériault, who was in charge of the work, accompanied by his brother, loaded the twenty-one holes in the face just drilled and, in addition, four missed holes from a previous round in the face of a nearby west drift. Seven-foot fuses were used, but small lengths were probably cut from most of these fuses to give the necessary time interval between shots. Shortly after four o'clock, preparations were made to light the rounds. John Christo, skip-tender, saw Thériault commence lighting his round. A few moments later, a blast occurred in the face of the north cross-cut. Believing that the men were safely in the skip, Christo rang to hoist to surface. As the skip arrived within thirty feet of the surface, another shot went off, and then a number of shots followed.

The mine captain, Thomas Evely, was at the collar of the shaft waiting for the men to come off shift. He descended immediately, and, in spite of the gas, turned on the air-line in the 500-foot level station. After an hour, he descended again, and found the two bodies at the face of the north cross-cut.

Both deceased were terribly mutilated. On suspicion that 'fast' fuse was responsible for the accident, tests of burning speed were carried out by the inspector of mines. Twelve seven-foot fuses were taken from the nail where Thériault had taken his fuses. The rate of burning of all twelve fuses tested was found to be astonishingly accurate, the speed in each case being within half a second per foot, plus or minus, of the 40-second per foot specification.

Verdict: Accidental death.

January 18th.—Joseph Ferland, aged 66, was fatally injured by the fall of a large lump of frozen sand in Aurèle Auger's sand pit, situated in the 11th range of the parish of Sainte-Françoise Romaine de Deschailions.

This sand deposit was operated by the municipality for supplying material for road making, an unemployment relief measure. On the morning of January 18th, Ferland and a companion started to load a sledge at a point where the working face was about ten feet high. The face was undercut, with the upper portion overhanging about six feet. A large block of frozen sand suddenly fell from the overhang, striking Ferland on the legs, and a smaller piece hit him on the head. From complications of injuries received, he died one hour later.

Verdict: Accidental death.

March 17th.—David N. Galt, 29 years of age, employed in the Noranda smelter of Noranda Mines, Limited, was instantly killed when a blister-copper ladle, weighing about five tons, fell on him. Details are as follows:

At the time of the accident, Galt was employed in charging a ladle of blister copper to the anode furnace. The charging equipment consists of a tilting machine operated by an electric motor. The converter foreman, William Van Allen, left Galt as he commenced to

do this work. A minute afterwards, Van Allen heard a crash and ran to the place. He found that the motor was running and the ladle was down on its stand. One of Galt's feet was seen protruding from under the ladle. Van Allen shut off the motor and summoned assistance. The body was terribly mutilated and was beyond recognition.

From the evidence it would appear that, as Galt commenced to pour the blister copper into the launder of the anode furnace, some of the material dripped down the lip of the ladle and froze there. Leaving his motor control, Galt took a wooden board, and jumped up on the ladle stand. He tried to break off the frozen copper, with the aid of the board, by prying from below. When the apparatus reached the limit of its travel, a connection between the motor and the apparatus was broken, and the ladle descended in its cradle to the stand. Galt had no chance to escape, and he was instantly killed.

Verdict: Accidental death.

May 9th.—Omer Paradis, employed as a grizzly-tender at the King mine of the Asbestos Corporation, Limited, was instantly killed by a premature blast. His companion, Linière Rouleau, was seriously injured.

On May 9th, both men were working in the grizzlies-tunnel No. 2 of Block 501, where they were in charge of operations at grizzly No. 12. Broken ore was hanging-up in the raise above, and it was necessary to blast it down. At about 3.30 p.m., Paradis went to the storage for dynamite and returned with ten sticks. He placed a cap in one stick, and then tied them all solidly together.

As a safety measure, when ore is hung-up far from the grizzly, a blasting pole is used for handling dynamite. A few minutes before the blast, the companions of the victim, working at separate grizzlies within 20 feet distance, saw him engaged in placing his bundle of dynamite sticks at the end of his pole, when suddenly an explosion took place. As no blasting signal had been given, they sensed something was wrong and ran to his assistance. They found Paradis dead, with his clothes burning. His companion, Rouleau, standing a few feet away, had numerous puncture wounds on the forehead. Accord-

ing to Rouleau, the victim had his carbide lamp attached to his overalls, and in all likelihood the flame ignited the dynamite. That this was the cause of the accident seems the more probable as his lamp was found all shattered after the explosion.

Verdict: Accidental death.

July 9th.—Adolphe Baillargeon, aged 42 years, engaged as an oiler at the King mine of the Asbestos Corporation, Limited, was fatally injured when he was struck by a belt in the mill on July 9th. He died in the hospital on July 11th.

From evidence obtained at the inquest, it would seem that he met his death in the following manner:

The foreman in charge of the collector bin on the fourth floor of the mill noticed that one of the conveyor belts was near its breaking point. He told Baillargeon and two other men to make the necessary repairs. For this purpose, these men cut the belt and placed it on the driving-shaft stand. Meanwhile the motor was left running, with the shaft turning at 700 revolutions per minute. Baillargeon was holding one end of the belt as it was being laced, when suddenly the belt fell between a pulley and a coupling. Being caught in the rotating shaft, it started to move and lashed Baillargeon on the body.

The motor was stopped immediately and the victim, who was very severely injured, was taken to the hospital, where he died two days later.

It is apparent that, in attempting to repair the belt while standing so close to the driving shaft, with the motor still running, these men were guilty of great carelessness.

Verdict: Accidental death.

July 20th.—Mansell Meredith, 32 years old, was instantly killed in an explosion of dynamite that occurred at the 3,000-foot level of the Noranda mine. Details of the accident appear to be as follows:

A round had been blasted on the 3,000-foot level of the No. 4 shaft. The square-up had failed to pull properly, and it had to be re-blasted. Meredith and his partner, McKinnon, came on shift at 3.00 p.m. They had to muck back the broken rock from the defective blast, and drill four more holes. Twenty-eight holes in all had to be blasted. At the end of the shift, these holes were loaded.

From this point on it is difficult to obtain a clear picture of events. McKinnon has stated that he, with Meredith, was lighting the round when a shot went off. He does not remember what happened after that. The accident occurred at about 11 p.m., and the night shift had descended to the No. 4 shaft station. They waited for the round to go off, and, when no one appeared, they went in to investigate. The air was very gassy from powder and sulphur fumes. McKinnon was found lying about 150 feet from the face, with a number of small puncture wounds in the back. It was necessary to obtain respirators before the body of Meredith, who had fallen at the face of the drift, could be recovered. The deceased suffered multiple fractures, hemorrhage, and shock.

Verdict: Accidental death.

August 15th.—John E. McInnis, age 34, employed as a shaft leader, was instantly killed in falling from a bucket to the bottom of the No. 1 shaft at the Beattie mine. Details of the accident are as follows:

At midnight of August 14th-15th, McInnis' shift came on duty in the No. 1 shaft, which had reached a depth of about 955 feet. Some trouble was experienced at the time with the pump, and McInnis ascended to surface to get the mine pipe-fitter, Arthur Boulanger.

At about 1.30 a.m., some forty pieces of dull steel were loaded into the bucket of the north compartment, tied up to the cable with a chain, and taken to the surface, where the deckman dumped the bucket of steel into the chute. McInnis and Boulanger then mounted the bucket, and the signal was given to lower. At a depth of about 60 feet, the bucket struck an obstruction, which later was found to be a piece of drill steel. McInnis lost his balance and fell down the shaft. Boulanger was thrown into the bucket. The men at the bottom of the shaft heard the noise and were able to get out of the way before McInnis' body struck the bottom. Death was instantaneous.

Verdict: Accidental death.

August 20th.—Hormidas Blais, aged 27, was fatally injured by a fall of overhanging material in a gravel pit operated by the Municipality of Saint-Georges de Leeds.

This pit is located on the farm of John C. Scallon, range 12, of Leeds township. On the day of the accident, the face of the pit ranged in height from eight to twelve feet, and in places was undercut. Blais, engaged in loading his waggon, was in a stooping position, when the overhang collapsed on top of him. The full load fell on his back, crushing him severely. He died a few minutes later.

Verdict: Accidental death.

August 21st.—R. Linska, machine-man, age 32, was seriously injured in falling a distance of 57 feet down a raise at the Siscoe mine. He died in the hospital at Noranda on the morning of August 27th.

From the evidence of witnesses, the accident appears to have happened in the following way:

Above and below the 300-foot level on the 'Siscoe' vein, stoping was in progress. One raise had been holed-through to the 300-foot level drift. This raise is inclined to within a distance of 57 feet from the upper level, and from this point it is vertical. The top opening is on the east side of the drift, opposite a chute, and at a point where the drift takes a rather sharp turn. This opening measured six feet in length and two feet in width. It was covered with pieces of board and sprags.

Fifty feet to the south of the raise, a manway leads to the stope above the 300-foot level. Mike Lubarda, miner, age 33, stated that on the night of the accident he was working with Linska in the stope above the 300-foot level. While they were preparing to blast, they heard a shot go off, which they knew was in the sub-level drift connecting with the raise to the drift below. About fifteen minutes later, they lit the fuses of eighteen holes, and descended the manway to the drift. To get out to the shaft, they had to pass very close to the raise opening. The smoke and gas from the sub-level blast had risen through the raise, making it very difficult for the men to see their way. Lubarda was several yards ahead of Linska. He knew the raise was open, and he was following the track with his hand. Suddenly, he heard a noise behind him, and heard Linska's lunch-pail fall. He realized that Linska had walked into the open raise, but he could not immediately return to investigate, as the shots in the stope

above had not yet gone off. He therefore went to the shaft and obtained help, and then returned and descended the raise. He found Linska lying on the inclined part of the raise, above the stope. The victim had fallen a distance of 57 feet vertically, and had rolled a distance of 32 feet on the incline.

Verdict: Accidental death.

October 20th.—Emilien Bibeau, age 27, employed at the Noranda mine as a chute loader, was instantly killed in the No. 1 compartment of No. 3 shaft, by being caught between the cage and the shaft timbers.

The cages used in the No. 3 shaft consist of a steel frame-work enclosed in heavy wire-mesh. The doors are of similar construction and are made in two sections. The hinged section, when closed, covers half the opening, and the top plate of this section extends across to the other side of the cage, where it is blocked, so that it cannot move further outwards. The sliding section of the door hangs on rollers which traverse the top plate of the hinged section. It is equipped with a steel latch which engages a slot in the steel frame of the cage opening.

At the Coroner's inquest, held in Rouyn, the following evidence was presented by workmen who were on the cage at the time of the accident. They stated that the cage was well-filled, there being from 16 to 19 men aboard. The first unusual thing they noticed was the sound of fine material, mud or rock, falling on the roof of the cage. All expressed the belief that this was somewhere about the 600-foot level. This was followed by a tearing sound and a pronounced vibration of the cage. On reaching the 975-foot level, the cage stopped according to signal, and the men got out. It was found that the north door had been torn off. Bibeau's body was on the roof of the cage. A small piece of the sliding door was on the floor of the cage, and the other part was on the roof. The hinged section of the door was nowhere around. No one, apparently, saw Bibeau leave the cage, as it was in darkness. His injuries consisted of a crushed skull, compound fracture of both legs, and other wounds.

Verdict: Accidental death.

**LIST OF THE PRINCIPAL OPERATORS AND OWNERS OF MINES
AND QUARRIES IN THE PROVINCE OF QUEBEC**

I.—METALLIC ORES AND MINERAL PRODUCTS

ASBESTOS

Name of Operator	Address	Location of Mine (Township)
Asbestos Corporation, Limited.....	Canada Cement Building, Montreal...	Thetford, Coleraine, and Broughton
Canadian Johns-Manville Co., Limited.....	Asbestos.....	Shipton
Compagnie d'Amiante de Thetford, Ltée, (La)	Thetford Mines.....	
Cyr, L. R.....	Broughton Station.....	
Johnson's Company.....	Thetford Mines.....	Coleraine and Thetford
Keasbey & Mattison Company.....	Thetford Mines.....	Thetford
Nicolet Asbestos Mines, Limited.....	c-o Greenshields & Greenshields, 820 Transportation Building, Montreal...	Tingwick
Northern Asbestos Co., Ltd.....	Black Lake.....	
Quebec Asbestos Corporation.....	East Broughton.....	Broughton
Queen Asbestos, Limited.....	c-o A. Manseau, Vice-Pres., Drummond- ville.....	Cleveland
Roberge, L. I.....	Coleraine.....	Garthby

CHROME

Name of Operator	Address	Location of Mine (Township)
Asbestos Corporation, Limited.....	Canada Cement Building, Montreal...	Coleraine
Brousseau, Nap.....	Courcelles.....	Garthby
Colonial Chrome Co., Ltd.....	120 Broadway, New York, N.Y., U.S.A.	Coleraine
Dominion Mines & Quarries, Ltd.....	Canada Life Building, 40 University Avenue, Toronto 2, Ont.....	Coleraine
Gray, Ernest.....	Thetford Mines.....	Coleraine
Laroche, J. A.....	Black Lake.....	Coleraine
Reed Realities, Limited.....	c-o H. A. Peverley, 1536 St. Mark St., Montreal.....	Coleraine
Ross, Frank W.....	67 St. Peter St., Quebec.....	Coleraine
Victory Chrome Mines, Limited.....	c-o General Trust of Canada, 112 St. James Street, Montreal.....	Garthby

COPPER

Name of Operator	Address	Location of Mine (Township)
Abitibi Copper Mining Syndicate, Ltd.	Villemontel, Abitibi	Trcession
Adsit Mining Corporation (The)	c-o Noranda Mines, Limited, 2-8 King St. East, Toronto 2, Ont.	Rouyn
Alamac Mines, Limited	1811 Royal Bank Building, Montreal	Desmeloizes
Aldermac Mines, Limited	500 Dominion Square Building, Montreal	Beauchastel
Alderson & MacKay, Inc.	500 Dominion Square Bldg., Montreal	Beauchastel
Alliance Mining & Securities, Ltd.	c-o L. A. McKinley, Sec-Treas., Room 111, Blackburn Bldg., Ottawa, Ont.	Dufresnoy
Area Mines, Limited	c-o Chauvin, Walker, Stuart & Martineau, 414 St. James St. W., Montreal	Duprat, Dufresnoy and Rouyn
Astoria Rouyn Mines, Limited	70 St. Paul St., Quebec	Louvicourt and Rouyn
Aura Mines, Limited	Lorrainville	Laverlochère
Bagamac Rouyn Mines, Limited	Bank of Nova Scotia Building, Haileybury, Ont.	Rouyn
Blake-Chibougamau Mining Corporation	c-o Bernard Devlin, 65 St. Anne Street, Quebec	Chibougamau and Obalski
Calbec Copper Nickel Syndicate, Ltd.	26-7 Fraser Building, Ottawa, Ont.	Calumet Island
Carson Copper Syndicate	New Liskeard, Ont.	Dufay
Centre Boischatel Copper Co., Ltd.	c-o E. D. Ranck, The Coleman Lamp & Stove, Queen St. East & Davies Ave., Toronto, Ont.	Beauchastel
Chibougamau McKenzie Mines, Ltd.	Room 336, Board of Trade Building, Montreal	Chibougamau and McKenzie
Cie Minière Ville-Marie-Rouyn (La)	Ville-Marie	Rouyn
Clérycy Consolidated Mines, Ltd.	11-12 Carleton Chambers, 74 Sparks St., Ottawa, Ont.	Clérycy
Coniagas Mines, Limited	1514 Canada Permanent Building, Toronto, Ont.	Montbray and Duprat
Consolidated Copper & Sulphur Co.	Eustis	Ascot
Consolidated Mining & Smelting Co. of Canada, Limited	840 Dominion Square Building, Montreal	Launay and Tiblemont
Cosmos Copper Mining Corp'n, Limited	c-o Alex. Livventaal de Livi, Sienne	Weir
Dufault Lake Mines, Limited	755 Marie-Anne St. East, Montreal	Dufresnoy
Frontenac Copper Mines, Limited	c-o J. J. Harold, 204 Notre-Dame St. West, Montreal	Clérycy
Glenwood Mining Co., Limited	c-o Albert MacDonald, Manager, Box 164, Rouyn	Rouyn
Greene-Stabell Mines, Limited	1402-6 Concourse Building, 100 Adelaide St. West, Toronto, Ont.	Dubuisson
Jouannès Mine Corporation, Limited	276 St. James St. West, Montreal	Joannès
Lakeside Mines, Limited	1610 Concourse Building, 100 Adelaide St. West, Toronto, Ont.	Rouyn
Memphremagog Mining Company	c-o Geo. E. Smith, R.M.D. No. 2, Mansonville	Potton
Montbray Rouyn Mines, Limited	112 Yonge Street, Toronto, Ont.	Montbray
Newbec Mines, Limited	603 Royal Bank Building, Toronto 2, Ont.	Dufresnoy
Noranda Mines, Limited	804 Royal Bank Building, 2-8 King St. East, Toronto 2, Ont.	Rouyn
Normac Mining Syndicate	411-13 Pigott Building, Hamilton, Ont.	Beauchastel
Normetal Mining Corporation, Limited	350 Bay Street, Toronto, Ont.	Desmeloizes
Northern Investment and Mining Co.	c-o J. F. Grenon, C.E., Chicoutimi	Obalski
Northwaite Mining Company, Limited	372 Bay Street, Toronto, Ont.	Duprat and Dufresnoy
Obalski Mining Corporation	Suite 205, 25 St. James St. East, Montreal	
Opemiska Copper Mines, Limited	25 King Street West, Toronto, Ont.	Levy
Prospectors Airways Company, Limited	12th Floor, 80 King Street West, Toronto, Ont.	
Quebec Copper Corporation	c-o E. D. Ranck, The Coleman Lamp & Stove Co., Limited, Queen St. East & Davies Avenue, Toronto, Ont.	Duprat
Queumont Mining Corporation, Limited	350 Bay Street, Toronto, Ont.	Rouyn
Renown Mining Company, Limited	c-o Thos. G. Stratton, Sec'y, 212 Jackson Building, Ottawa, Ont.	Beauchastel
Rhyolite Rouyn Mines, Limited	1004 Bank of Hamilton Building, Toronto 2, Ont.	Duprat
Ribago Copper Corporation, Limited	1401 Sterling Tower, Toronto, Ont.	Beauchastel and Rouyn

COPPER—Continued

Name of Operator	Address	Location of Mine (Township)
Robb-Montbray Mines, Limited.....	Room 1007, Excelsior Life Building, Toronto, Ont.....	Montbray
Suzor Mining Syndicate.....	Box 99, Noranda.....	Suzor
Syndicat d'Exploration Minière de la Rivière Mistassini, Enrg.....	c-o Pierre Doucet, Girardville.....	Gaboury
Syndicat Minier de Gaboury.....	Guigues.....	Dufay
Turtle Lake Mining Company.....	c-o J. A. Parent, 193 Main Street, Hull.....	Beauchastel
United Copper Syndicate, Limited.....	130 Coristine Building, Montreal.....	Duprat
Ventures, Limited.....	Canadian Bank of Commerce Building, 25 King Street West, Toronto, Ont.....	Duprat and Dufresnoy
Waite-Amulet Mines, Limited.....	804 Royal Bank Building, 2-8 King St. East, Toronto, Ont.....	Beauchastel
Wasamac Mines, Limited.....	755 Marie-Anne St. East, Montreal.....	La Sarre
Windsor Mines, Limited.....	c-o J. L. Alain, 170 Boulevard Langelier, Quebec.....	

FELDSPAR

Name of Operator	Address	Location of Mine (Township)
Bertrand, Wilfrid.....	Buckingham.....	Derry
Blais (Nap.) & Phrase Arbic.....	c-o Phrase Arbic, Mont-Laurier.....	Aylwin
Bon Ami, Limited.....	c-o Orford Soap Co., Inc., Manchester, Conn., U. S. A.....	Portland West
Brazeau, Maurice A.....	Buckingham.....	Derry
Buckingham Feldspar Company (The).....	c-o E. S. Higginson, P. O. Box 54, Buckingham.....	Buckingham
Buckingham Mining Co., Ltd.....	1400 Dorchester Street West, Montreal.....	Derry
Cameron, Wm. & J. J.....	Buckingham.....	Portland West
Canadian Amber Mica Company.....	c-o A. D. MacPherson, Manager, 3542 Vendome Avenue, Montreal.....	Derry
Canadian Flint & Spar Co., Ltd.....	900 Victoria Building, Ottawa, Ont.....	Hull and Templeton
Côté, P. M., Estate.....	190 Wilbrod Street, Ottawa, Ont.....	Derry
Derry Mining Company.....	Buckingham.....	Buckingham
Donaldson, Robert J.....	Buckingham.....	Buckingham
Evans, W. E.....	Buckingham.....	Hull
Gatineau Spar Milling Co., Ltd (The).....	197 Wilbrod Street, Ottawa, Ont.....	Buckingham
Gauthier, J. B.....	Buckingham.....	Buckingham
Laneville, John.....	Buckingham.....	Arundel
Larose, Antoine.....	Weir.....	Derry
McDonell, B. A.....	Buckingham.....	Buckingham
McMillan, A. J.....	P. O. Box 84, Buckingham.....	
Melkman (Saul C. E.) & Frances Marie Neubauer.....	5165 Côte St. Antoine Road, Montreal.....	Thelmina, Thelma Bay (Saguenay Co.)
O'Brien & Fowler, Limited.....	900 Victoria Building, Ottawa, Ont.....	Derry
Parcher, Alfred.....	Glen Almond.....	Derry
Pedneaud, Gonzague.....	Buckingham.....	Buckingham
St. Amour, Orphila.....	Notre-Dame de la Salette.....	Villeneuve
St. Lawrence Feldspar Company, Ltd.....	c-o S. E. Melkman, 765 Côte St. Antoine Road, Montreal.....	Thelmina, Quetachoom, Manicouagan Bay (Saguenay Co.)
Toutloff, Frank.....	Pointe Gatineau.....	Portland East
Toutloff (Frank) & Arthur Wallingford.....	Pointe Gatineau.....	Portland East
Toutloff, W.....	Buckingham.....	Buckingham
Whitfield, T.....	Buckingham.....	Derry
Whittemore, A. R. (Mrs.).....	475 Kent Street, Ottawa, Ont.....	Buckingham
Winning & Downing.....	Notre-Dame de la Salette.....	

GARNET

Name of Operator	Address	Location of Mine (Township)
La Belle Mining, Incorporated.....	c-o Victor Levesque, 4203 Brebeuf, Montreal.....	Beaudin and Trévet Joly
Langlade Garnet, Limited.....	80 St. Peter Street, Quebec.....	
McLean-McNicoll, Limited.....	609 Confederation Building, Montreal.....	
Montreal Garnet Products, Reg'd.....	2000 McGill College Avenue, Montreal.....	

GAS and OIL

Name of Operator	Address	Location of Holdings
Alberta Gas & Fuel Co., Limited.....	c-o Henry L. Doherty & Co., Sixty Wall Street, New York City, N. Y., U.S.A.....	St. Pie de Guir
Brochu, Louis.....	Room 809, Lewis Building, 465 St. John Street, Montreal.....	
Canadian Seaboard Oil and Gas, Limited.....	507 Place d'Armes, Montreal.....	Gaspé South
Cartier Natural Gas Co., Limited.....	167 Main Street, Hull.....	
Gaspesian Oil Company, Limited, The.....	c-o Joseph Têtu, Rivière-du-Loup.....	
Mohr, Carl M., Limited.....	706 Insurance Exchange Building, Mont- real.....	
Scott, Hope.....	14 de la Fabrique St., Quebec.....	
Syndicat Monicel, Enrg. (Le).....	Room 508-14, 31 St. James Street West, Montreal.....	
Trinidad Mines, Gas & Oil, Limited.....	116 Côte de la Montagne, Quebec.....	
Twin Cities Gas & Oil Company, Limited.....	Room 614, 276 St. James St., Montreal.....	

GOLD

Name of Operator	Address	Location of Mine (Township)
Adanac Gold Mines, Limited.....	330 Bay Street, Toronto, Ont.....	Rouyn
Adanac Gold Syndicate.....	c-o Wm. E. Smith, 601 Northern On- tario Building, Toronto 2, Ont.....	Rouyn
Aldermac Mines, Limited.....	500 Dominion Square Building, Mont- real.....	Beauchastel Beauchastel
Algray Mines, Limited.....	68 Yonge Street, Toronto 2, Ont.....	Louvicourt and Bourlamaque
American Venture Corporation.....	714 Canada Permanent Building, To- ronto, Ont.....	Dubuisson and Bourlamaque Duparquet
Amity Gold Mines, Limited.....	306 C.P.R. Building, Toronto, Ont.....	Fournière
Anglo-Canada Mineral Explorers.....	276 St. James Street, Montreal.....	Rouyn
Anglo-Huronian, Limited.....	Suite 1206, Star Building, 80 King St. West, Toronto 2, Ont.....	Rouyn Beauchastel Beauchastel
Arcadian Rouyn Gold Mines Syndicate, Ltd.	105 Côte de la Montagne, Quebec.....	Joannes
Arno Mines, Limited.....	63 Sparks Street, Ottawa, Ont.....	Rouyn
Arntfield Gold Mines, Limited.....	159 Bay Street, Toronto, Ont.....	Rouyn
Arntfield Mining Syndicate, Limited.....	159 Bay Street, Toronto, Ont.....	Beauchastel Beauchastel
Arrowhead Gold Mines, Limited.....	1117 St. Catherine St. West, Montreal.....	Joannes
Austin Rouyn Gold Mines, Ltd.....	21 King Street East, Toronto, Ont.....	Rouyn
Avocalon Extension Syndicate, Ltd.....	719 Dominion Bank Building, Toronto, Ont.....	Vauquelin Dubuisson
Basin Gold Mines, Limited.....	Suite 619, 159 Craig St. West, Montreal.....	Dubuisson
Beattie Gold Mines, Limited.....	Canadian Bank of Commerce Building, 25 King Street West, Toronto, Ont.....	Duparquet
Beaufor Gold Mines, Limited.....	507 Place d'Armes, Montreal.....	Louvicourt Cadillac
Bell River Gold Mines, Limited.....	204 Hospital Street, Montreal.....	Cadillac
Biddamaque Gold Mines, Limited.....	713 Canada Permanent Building, 320 Bay Street, Toronto, Ont.....	Bourlamaque

GOLD—Continued

Name of Operator	Address	Location of Mine (Township)
Birrell Gold Mines, Limited.....	1609 Sterling Tower Building, Toronto, Ont.....	Duprat
Blairmont Mining Company, Limited.....	c-o Messrs. Jenner & Brunt, 171 Yonge Street, Toronto, Ont.....	Tiblemont
Blake River Gold Mines, Limited.....	Room 317, Transportation Building, Montreal.....	Cadillac
Blouin Lake Gold Mines, Limited.....	3-4 Carleton Chambers, Ottawa, Ont.....	Bourlamaque
Boischatel-Quebec Mines, Limited.....	2000 McGill College Avenue, Montreal.....	Cadillac
Bourbeau Lake Chibougamau Mines, Ltd.....	New Liskeard, Ont.....	McKenzie
Brown Bousquet Mines, Limited.....	212 Keefer Building, 1440 St. Catherine St. West, Montreal.....	Cadillac
Brownlee Mines, Limited.....	Noranda.....	Rouyn
Buffalo Canadian Gold Mines, Limited.....	Suite 603-4, Royal Bank Building, 2-8 King Street East, Toronto 2, Ont.....	Beauchastel and Rouyn
Bussières Mining Company, Limited.....	221 Notre-Dame Street West, Montreal.....	Bourlamaque
Cadillac Exploration, Limited.....	Amos.....	Cadillac
Canadian Enterprises, Limited.....	212 Keefer Building, Montreal.....	Cadillac
Canadian Exploration Limited.....	c-o Louis Brochu, Amos.....	Dubuisson
Canadian Gold Operators, Limited.....	c-o Emilian Gadbois, 84 Notre-Dame St. West, Montreal.....	Cadillac
Canadian Malartic Gold Mines, Limited.....	25 King Street West, Toronto, Ont.....	Fournière
Canadian Pandora Gold Mines, Limited.....	P. O. Block, New Liskeard, Ont.....	Cadillac
Central Gold Mines, Limited.....	Picton, Ont.....	
Central Malartic Mines, Limited.....	350 Bay Street, Toronto, Ont.....	Malartic
Chanore Louvicourt Gold Mines Synd.....	2144 Centre Street, Montreal.....	Louvicourt
Chaudière Gold Placers, Limited.....	c-o L. K. Lloyd, St. Simon les Mines, Beauce County.....	Spalding and Gayhurst
Chieftain Gold Mines, Limited.....	810 Federal Building, 85 Richmond St. West, Toronto, Ont.....	Tiblemont
Churchill Mining & Milling Co., Limited.....	1105 Atlas Building, Toronto, Ont.....	Cadillac
Coffin Mining Company, Limited.....	15 King Street West, Toronto, Ont.....	Senneterre
Consolidated Chibougamau Goldfields, Ltd.....	Suite 702, Insurance Exchange Bldg., 276 St. James Street, Montreal.....	Obalski, McKenzie, and Louvicourt
Contact Gold Mines, Limited.....	713 Canada Permanent Building, 320 Bay Street, Toronto, Ont.....	Bourlamaque
Cooke & Lloyd.....	St. Simon les Mines, Beauce County.....	
Cummings-Trudel Mining & Development Company, Limited.....	Room 300, Victoria Building, Ottawa, Ont.....	Barraute
Dalton, John.....	Timmins, Ont.....	Dubuisson
Dasserat Rouyn Goldfields, Limited.....	c-o Smellie & Lewis, 47-48 Sparks St., Ottawa, Ont.....	Rouyn
Del Rio Mining Company, Limited.....	56 Sparks Street, Ottawa, Ont.....	Destor
Dion, Georges A.....	19 St-Etienne Street, Levis.....	Wattford
Ditton River Gold Mining Co., Ltd.....	Room 503, 1411 Crescent Street, Montreal.....	Ditton
Don Rouyn Gold Mines, Limited.....	710 Blackburn Building, Ottawa, Ont.....	Rouyn
Donchester Mines, Limited.....	c-o Ventures Limited, 25 King Street West, Toronto, Ont.....	Duparquet
Dorrington Mining Syndicate.....	2177 Dawlish Avenue, Niagara Falls, Ont.....	Beauchastel
Dorval-Siscoe Gold Mines, Limited.....	Suite 504, General Assurance Building, Cor. Bay & Temperance Sts., Toronto 2, Ont.....	Varsan
Dubec Mining Company, Limited.....	345 Dominion Square Building, Montreal.....	
Dubuisson Gold Mining Co., Ltd.....	Pine Street, Timmins, Ont.....	Dubuisson
Dugoss Mines, Limited.....	168 Pitt Street, Cornwall, Ont.....	Duparquet
Dunlop Consolidated Mines, Limited.....	503, General Assurance Building, 357 Bay Street, Toronto 2, Ont.....	Louvicourt and Tiblemont
Dupark Syndicate, Limited.....	Room 412, 276 St. James Street, Montreal.....	Duparquet
Duparquet Mining Co., Limited.....	c-o James McWilliam, 204 Hospital St., Montreal.....	Duparquet
East Bay Gold, Limited.....	P. O. Box 456, Noranda.....	
East Lamaque Gold Mines, Limited.....	504 General Assurance Building, Bay & Temperance Streets, Toronto, Ont.....	Bourlamaque
East Malartic Mines, Limited.....	913 Royal Bank Building, Montreal.....	Fournière

GOLD—Continued

Name of Operator	Address	Location of Mine (Township)
East Rouyn Gold Mines, Limited.....	c-o Holden, Murdock, Walton & Beatty, 2-8 King Street East, Toronto 2, Ont.	Rouyn
Eastwest Exploration Company, Limited.....	Room 809, Lewis Building, 465 St. John Street, Montreal.....	Bourlamaque
Eclipse Gold Mining Company, Limited.....	6th Floor, 201 Notre-Dame Street West, Montreal.....	Destor
Engineers Exploration Co., Limited.....	P. O. Box 310, Noranda.....	Destor
Erie Canadian Mines, Limited.....	Kirkland Lake, Ont.....	Bourlamaque and Rouyn
Etoile d'Or, Limitée (L.).....	96 St. Joseph Street, Quebec.....	Dalquier
Explorer Syndicate.....	c-o W. M. Goodwin, M.E., Ste-Anne de Bellevue.....	Rouyn
Farrell-Rouyn Mines, Limited.....	Canadian Bank of Commerce Bldg., 25 King Street West, Toronto, Ont.....	Rouyn
Fiske Gold Mines, Limited.....	P. O. Box 208, Ottawa, Ont.....	Beauchastel
Fleming Mines, Limited.....	Room 515, 215 St. James Street West, Montreal.....	Louvicourt
Fleming-Thompson Gold Mines, Limited.....	1305 Star Building, Toronto, Ont.....	Duparquet
Francœur Gold Mines, Limited.....	941 Dominion Square Building, Mont- real.....	Beauchastel
Galatea Gold Mines, Limited.....	1305 Star Building, 80 King St. West, Toronto, Ont.....	Duparquet and Destor
Gilbec Mines, Limited.....	200 Bay Street, Toronto 2, Ont.....	Pascalis
Gold Bar Mines, Limited.....	204 Royal Bank Building, Toronto 2, Ont.....	Rouyn and Beauchastel
Gold River Mining Company, Limited.....	956 New Birks Building, Montreal.....	Ditton
Golden Quebec Mines, Limited.....	300-301 Sterling Tower, 372 Bay Street, Toronto, Ont.....	Bousquet and Clérycy
Goldstrike Syndicate.....	206 Reford Building, 217 Bay St., To- ronto, Ont.....	Rouyn
Graham-Bousquet Gold Mines, Limited.....	603 Royal Bank Building, 2-8 King St. East, Toronto, Ont.....	Bousquet
Granada Gold Mines, Limited.....	1108 Federal Building, Toronto, Ont.....	Rouyn
Greene Stabell Mines, Limited.....	1402-6 Concourse Building, 100 Ade- laïde Street West, Toronto, Ont.....	Dubuisson
Halliwell Gold Mines, Limited.....	132 St. James Street West, Montreal.....	Beauchastel
Harricana Amalgamated Mines, Inc.....	15 Congress St., Boston, Mass., U.S.A.....	Dubuisson and Bourlamaque
Herbin Lake Gold Syndicate, Limited.....	Room 504, 357 Bay Street, Toronto, Ont.....	Bourlamaque
Hosking Mining Company, Limited.....	221 Notre-Dame Street West, Montreal.....	Louvicourt
Key Properties, Limited.....	428 Bank of Hamilton Bldg., 67 Yonge Street, Toronto, Ont.....	Dubuisson and Vauquelin
Keyroc Gold Mining Company, Limited.....	Suite 605, 244 Bay Street, Toronto 2, Ont.....	Rouyn
Keyroc Gold Syndicate.....	Suite 605, 244 Bay Street, Toronto 2, Ont.....	Rouyn
Kindale Mines, Limited.....	217 University Tower, Montreal.....	Rouyn
Kinghorn Sturgeon Mines, Limited.....	357 Bay Street, Toronto, Ont.....	Bourlamaque
Kinojevis Mining Company, Limited.....	c-o R. J. Driscoll, Témiscamingue.....	Rouyn
Kippen & Company, Inc.....	204 Hospital Street, Montreal.....	Rouyn
Kirkland-Crest Gold Mining Syndicate.....	c-o Kenneth J. Matheson, 56 Sparks St Ottawa, Ont.....	Tiblemont
L. B. United Mines, Limited.....	767 Yonge Street, Toronto, Ont.....	Tiblemont
La Mine du Lac, Limitée.....	Notre-Dame du Lac.....	Notre-Dame du Lac
La Rose-Rouyn Mines, Limited.....	112 Yonge Street, Toronto, Ont.....	Rouyn
Lacoma Gold Mines, Limited.....	c-o R. L. Lang, Swastika, Ont.....	Tavernier
Lake Expanse Mines, Limited.....	Room 701, 407 McGill Street, Montreal.....	Guillet
Lake Fortune Gold Mines, Limited.....	c-o Godin & Smith, N.P., 231 St. James Street West, Montreal.....	Dasserat
Lake Malartic Development Co., Ltd.....	Sterling Tower, Toronto, Ont.....	Malartic
Lake Maron Gold Mines, Limited.....	1001 Northern Ontario Building, To- ronto, Ont.....	Dasserat
Lake Shore Prospecting Syndicate.....	Suite 504, General Assurance Building, Cor. Bay and Temperance Sts., To- ronto, Ont.....	Varsan
Lamaque Contact Gold Mines, Ltd.....	357 Bay Street, Toronto, Ont.....	Bourlamaque
Lamaque Gold Mines, Limited.....	Amos.....	Bourlamaque
Lartic Mines, Limited.....	c-o Holden & Murdoch, Suite 603-4, 2-8 King Street, Toronto 2, Ont.....	Malartic
Leader Gold Mines, Limited.....	405 Concourse Building, Toronto, Ont.....	Tiblemont
Legault Gold Mines, Limited.....	c-o Adélarde Beauchemin, Amos.....	Dubuisson

GOLD—Continued

Name of Operator	Address	Location of Mine (Township)
Locarno Gold Mines, Limited.....	34 Murray Street, Ottawa, Ont.....	Cléricy
Louvicourt Mines, Limited.....	Room 1610, 100 Adelaide Street West, Toronto, Ont.....	Louvicourt
Louvre Gold Mines, Limited.....	407 McGill Street, Montreal.....	Louvicourt
McDonald Gold Mines, Limited.....	P. O. Box 247, Elmira, Ont.....	Duparquet
McDonough Mining Syndicate, Ltd.....	Room 712, 63 Sparks Street, Ottawa, Ont.....	Senneterre
McWatters Gold Mines, Limited.....	Box 689, Rouyn.....	Rouyn
Magog Gold Mines Corporation.....	424 Sherbrooke Street West, Montreal.....	Ascot
Malartic Gold Fields, Limited.....	824-25 Royal Bank Building, Montreal.....	Malartic
Malartic Mines, Limited.....	36 Toronto Street, Toronto 2, Ont.....	Malartic
Manley Quebec Gold Mines, Limited.....	703, 357 Bay Street, Toronto, Ont.....	La Reine
Marillac Mining Syndicate, Ltd.....	c-o Lloyd A. Bissell, 55 Ossington Avenue, Ottawa, Ont.....	Joannès
Maritime Cadillac Syndicate.....	c-o Jos. Legris, Amos.....	Cadillac
Mecca Gold Mines, Limited.....	Room 707, 217 Bay Street, Toronto, Ont.....	Tiblemont and Vauquelin
Mentor Exploration and Development Co., Ltd.....	Canadian Bank of Commerce Building, 25 King St. West, Toronto 2, Ont.....	Rouyn
Met-Mac Prospectors, Limited.....	Suite 701, 407 McGill Street, Montreal.....	Louvicourt
Mideour Prospectors, Limited.....	c-o J. J. Gray, 906 Central Building, Toronto 2, Ont.....	Louvicourt
Midland Mining Corporation, Limited.....	231 Notre-Dame Street West, Montreal.....	Desmeloizes
Minerals Exploration Trust.....	24 Milk Street, Boston, Mass., U.S.A.....	Cadillac
Minerals Syndicate of Canada, Limited.....	1434 St. Catherine St. West, Montreal.....	Hébécourt
Mine d'Or Vénus Consolidée (La) (Consolidated Venus Gold Mines).....	51 Colomb Street, Quebec.....	Barraute
Mines Development Corporation.....	189 St. John Street, Quebec.....	Landrienne
Mines d'Or Laverlochère, Ltée (Les).....	c-o Horace Bédard, St. Eugène de Guigues.....	
Mining Enterprises, Limited.....	Dominion Square Building, Montreal.....	Malartic
Minrand Gold, Limited.....	231 St. James Street West, Montreal.....	Dubuisson
Mission Gold Mines Syndicate, Limited.....	5325 Waverley St., Montreal.....	Dubuisson
Moffatt Hall Mines, Limited.....	Haileybury, Ont.....	Bourlamaque
Monarch Mines, Limited.....	14 King Street East, Toronto, Ont.....	Dasserat
Montreal Tiblemont Prospectors Syndicate, Inc.....	c-o Bertrand, Guérin, Goudrault & Garneau, 276 St. James St. W., Montreal.....	Tiblemont
Moosha Gold Mines, Limited.....	2529 Canadian Bank of Commerce Bldg, 25 King St. West, Toronto 2, Ont.....	Bousquet
Murwood Gold Mines, Limited.....	Concourse Building, 100 Adelaide St. West, Toronto, Ont.....	Tiblemont
Natagan Gold Mines Syndicate, Ltd.....	c-o A. P. Robitaille, Charlesbourg.....	Barraute
Newbec Mines, Limited.....	603 Royal Bank Building, Toronto, Ont.....	
NewRoy Gold Mines, Limited.....	465 Bay Street, Toronto, Ont.....	Louvicourt
Noranda Mines, Limited.....	804 Royal Bank Building, Toronto 2, Ont.....	Rouyn
Norgold Mines, Limited.....	2529 Canadian Bank of Commerce Building, 25 King Street West, Toronto 2, Ont.....	Bousquet
Norlake Mining Corporation.....	902 Castle Building, Montreal.....	Figury
Normont Gold Mines, Limited.....	905 Transportation Building, Montreal.....	Beauchastel
North Tiblemont Gold Mines, Limited.....	Insurance Exchange Building, 18 Toronto, St., Toronto, Ont.....	Tiblemont
Northern Aerial Canada Golds, Limited.....	1406 Concourse Building, Toronto, Ont.....	Dubuisson
Northern Chibougamau Mines, Limited.....	460 St. Francois-Xavier St., Montreal.....	McKenzie
Northern Exploration Syndicate, Ltd.....	P. O. Box 630, Montreal.....	Duparquet
Northern Quebec Gold Fields & Exploration Company (The).....	Trois-Rivières.....	Joannès and Duparquet
Northern Quebec Gold Mines, Limited.....	Room 341, Dominion Square Building, Montreal.....	Rouyn
Northwestern Quebec Prospectors, Ltd.....	P. O. Box 661, Rouyn.....	Bousquet
Nu Sigma Gold Syndicate, Limited.....	Room 809, Lewis Building, 465 St. John Street, Montreal.....	Bourlamaque
Nubell Gold Mines, Limited.....	Room 513, 215 St. James Street West, Montreal.....	Cléricy
O'Brien Gold Mines, Limited.....	Kewagama.....	Cadillac
O'Leary-Malartic Mines, Limited.....	Rouyn.....	Beauchastel

GOLD—Continued

Name of Operator	Address	Location of Mine (Township)
Oliver Severn Gold Mines, Limited.....	67 Yonge Street, Toronto, Ont.	Barraute
O'Neill-Thompson Syndicate.....	c-o E. B. Eddy Company, Hull.....	
Orebec Gold Exploration Co., Ltd.....	c-o D. G. Thomson, Manager, 35½ Palace Street, Eastview, Ont.....	Cléricy
Osisko Lake Mines, Limited.....	c-o H. Whittingham, 100 Adelaide St., Toronto, Ont.....	Rouyn
Osisko Rouyn Exploration Co., Limited.....	Room 710, Transportation Building, Montreal.....	Rouyn
Pan-Canadian Gold Mines, Limited.....	24 Milk Street, Boston, Mass., U.S.A.	Cadillac
Pascalis Gold Mines, Limited.....	Canadian Bank of Commerce Building, 25 King Street West, Toronto, Ont...	Louvicourt and Pascalis
Payore Gold Mines, Limited.....	504 General Assurance Building, Bay & Temperance Sts., Toronto, Ont.....	Bourlamaque
Perron Gold Mines, Limited.....	Pascalis, Abitibi.....	
Pontiac & Abitibi Gold Mines, Limited.....	c-o J. C. Lamothe, K.C., Suite 204, 25 St. James Street West, Montreal....	Beauchastel
Pontiac Rouyn Mines, Limited.....	c-o Millar & Hunter, 59 Yonge St., To- ronto 2, Ont.....	Rouyn
Powell-Rouyn Gold Mines, Limited.....	Room 440, Confederation Life Bldg., Toronto, Ont.....	Rouyn
Pre-Cambrian Holdings, Limited.....	212 Keefer Building, 1440 St. Catherine Street West, Montreal.....	Malartic
Quebec Consolidated Gold Mines, Limited....	Room 100, 45 St. James Street West, Montreal.....	Launay
Quebec Eureka Gold Mines, Limited.....	11 King Street West, Toronto, Ont.....	Tiblemont
Quebec Gold Belt Mines, Limited.....	P. O. Box 190, Fort Erie, Ont.....	Bourlamaque and Louvicourt
Quebec Gold Mining Corporation.....	221 Notre-Dame St. West, Montreal...	Rouyn
Quebec Gold Mining Syndicate, Limited.....	225 Notre-Dame Street West, Montreal	
Quebec Gold Research, Limited.....	Room 320, Castle Building, 1410 Stanley Street, Montreal.....	Dubuisson
Quebec Viking Gold Mines, Limited.....	Room 305, 330 Bay Street, Toronto, Ont	Beauchastel
Randall Mines Corporation.....	225 Notre-Dame St. West, Montreal...	
Ray-Lorr Gold Mines, Limited.....	132 Horne Avenue, Rouyn.....	Destor and Duparquet
Raymond-Tiblemont Syndicate.....	Room 207, 200 Bay Street, Toronto, Ont.	Tiblemont
Read-Authier Mines, Limited.....	Room 809, Lewis Building, 465 St. John St., Montreal.....	Malartic
Renault, Auguste.....	Ville-Marie, Pontiac.....	Dasserat
Rice Lake Gold Mines, Limited.....	200 Bay Street, Toronto, Ont.....	Beauchastel
Rocdor Gold Mines, Limited.....	11 Jordan Street, Toronto, Ont.....	Dubuisson
Rosco Development Company, Limited.....	210 St. James Street West, Montreal...	Rouyn
Rouyn Lake Gold Mines, Limited.....	c-o P. Bédard, Kapuskasing, Ont.....	Rouyn
Rouyn Reward Gold Mines, Limited.....	330 Bay Street, Toronto, Ont.....	Rouyn
Rubec Mines, Limited.....	130 Coristine Building, Montreal.....	Cadillac
Scott, Hope.....	14 Fabrique Street, Quebec.....	Compton and Clifton
Seguin Rouyn Gold Mines, Limited.....	714 Drummond Building, Montreal....	Rouyn
Sekyer, Carl.....	Beauceville.....	
Senator Mines, Limited.....	187 Main Street, Hull.....	
Senneterre Gold Syndicate.....	Suite 202, 53 King Street West, Toron- to, Ont.....	Senneterre
Shawkey Gold Mining Co., Limited.....	67 Yonge Street, Toronto, Ont.....	Dubuisson
Sigma Mines, Limited.....	Room 1007, Excelsior Building, Toron- to, Ont.....	Bourlamaque
Siscoe Gold Mines, Limited.....	Room 905, Dominion Square Building, St. Catherine Street, Montreal.....	Dubuisson and Varsan
Sladen Malartic Mines, Limited.....	Trust Building, Ottawa, Ont.....	Cadillac and Fournière
South Tiblemont Mines, Limited.....	Suite 202, 53 King Street West, Toronto, Ont.....	Tiblemont
Stadacona Rouyn Mines, Limited.....	719 Tramways Building, 159 Craig St. West, Montreal.....	Rouyn
Standard Gold Mines, Limited.....	c-o Pierre Beauchemin, Amos.....	Bourlamaque
Stanley-Siscoe Extension Gold Mines, Ltd...	710 New Star Building, Montreal.....	Dubuisson and Varsan
Stonetruer Gold Mine Company, Ltd.....	204 Hospital Street, Montreal.....	Cadillac
Sudbury Contact Mines, Limited.....	2529 Canadian Bank of Commerce Bldg., 25 King Street West, Toronto, Ont...	Cadillac
Sudbury Mines, Limited.....	1002 Atlas Building, Toronto, Ont.....	Joannès
Sulcoe Gold Mines, Limited.....	c-o Millar & Hunter, 59 Yonge Street, Toronto, Ont.....	Dubuisson
Sullivan Consolidated Mines, Ltd.....	1207 Aldred Building, Montreal.....	Dubuisson
Tavernier Gold Mining Syndicate.....	11 King Street West, Toronto, Ont....	Tavernier

GOLD—Continued

Name of Operator	Address	Location of Mine (Township)
Thompson Cadillac Mining Co., Ltd.	212 Keefer Building, Montreal.	Cadillac
Thompson Joanne Gold, Limited.	Rouyn.	Joannès
Tiblemont Contact Mining Syndicate.	Room 400, 34 King Street East, Toronto, Ont.	Tiblemont
Tiblemont Island Mining Co., Ltd.	Amos.	Tiblemont
Tonawanda Mines, Limited.	706 Canada Permanent Building, Toronto, Ont.	Cadillac
Towagmac Exploration Co., Limited.	941 Dominion Square Building, Montreal.	Beauchastel
Trinidad Mines, Gas & Oil, Limited.	116 Côte de la Montagne, Quebec.	Dufresnoy
Twin Lakes Mining Corporation.	59 St. James Street West Montreal.	Beauchastel
United Gold Exploration, Limited.	Room 605, 276 St. James Street West, Montreal.	Laverlochère
Valco Mines Company.	8 Sault-au-Matelot St., Quebec.	Cadillac and Malartic
Ventures Claims, Limited.	Canadian Bank of Commerce Building, 25 King Street West, Toronto, Ont.	Dufresnoy and Rouyn
Vicour Gold Mines, Limited.	12th Floor, 80 King St. West, Toronto, Ont.	Louvicourt
Vimy Gold & Metals, Limited.	c-o A. H. Tanner, K.C., 201 Notre-Dame St. West, Montreal.	Montauban
Waite-Amulet Mines, Limited.	804 Royal Bank Building, 2-8 King St. East, Toronto, Ont.	
West McWatters Syndicate, Limited.	1300 Concourse Building, 100 Adelaide Street West, Toronto, Ont.	Rouyn
West Shore Gold Mines, Limited.	1475 Mountain Street, Montreal.	Dubuisson
Wiltsey-Coghlan Mines, Limited.	20 King Street West, Toronto, Ont.	Rouyn
Wood Cadillac Mines, Limited.	212 Keefer Building, Montreal.	Cadillac

GRAPHITE

Name of Operator	Address	Location of Mine (Township)
Bertrand, E.	Gracefield.	Northfield
Cameron, R. J.	Buckingham.	Buckingham
Canadian Graphite Corporation.	1193 Phillips Place, Montreal.	Boyer
Crucible Graphite Co., Limited.	52 Spadina Avenue, Toronto, Ont.	Buckingham
North Quebec Mining Development Co., Ltd.	c-o Ged. Fréchette, St-Jean d'Iberville.	Amherst

IRON ORE

Name of Operator	Address	Location of Mine (Township)
Ungava Miners & Traders, Limited.	Room 713, 132 St. James Street, Montreal.	Nastapoka, Hudson Bay

KAOLIN

Name of Operator	Address	Location of Mine (Township)
Bryce, Robert A.	85 Richmond Street West, Toronto, Ont.	Amherst
Canadian Kaolin Silica Products, Limited.	1602 University Tower, Montreal.	Amherst

MAGNESITE and DOLOMITE

Name of Operator	Address	Location of Mine (Township)
Canadian Refractories, Limited.....	Canada Cement Building, Montreal...	Grenville
International Magnesite Company.....	Calumet.....	Harrington
Parker, N. S.....	Orford Lake.....	Bolton East

MARL

Name of Operator	Address	Location of Deposit
Arseneault, Chas. B.....	Thivierge, Bonaventure Co.....	
Arseneault, Philémon.....	Gravel, Bonaventure Co.....	
Arseneault, Samuel.....	Rivière Bonaventure.....	
Arseneault, Thomas L.....	Petit Bonaventure.....	
Audet, A.....	Maria, Bonaventure Co.....	
Babin, Elzéar.....	Ste. Hélène de la Croix.....	
Babin, Nap.....	New Carlisle.....	
Berger, Louis.....	Gascons West, Bonaventure Co.....	
Bérubé, Edmond.....	Ste. Florence de Beauvillage, Bonaventure Co.....	
Boucher, Alfred.....	Little Pabos, Gaspé Co.....	
Bourdage, Thomas.....	Bonaventure East.....	
Bourgeois, Samuel.....	Lac au Saumon.....	
Bujold, Joseph F.....	St. Siméon, Bonaventure Co.....	
Caron, Albert.....	St. Léandre, Matane Co.....	
Casey, Ephraim.....	Bonaventure East.....	
Castonguay, Chas.....	Causapsal.....	
Cayouette, Jean F.....	Thivierge, Bonaventure Co.....	
Cercle Agricole (Le).....	New Richmond.....	
Côté, Auguste.....	Val Brillant, Matapédia Co.....	
Couturier, Arthur.....	Amqui.....	
Cyr, Pierre.....	Ste-Adelaide, Gaspé Co.....	
Dégarie, Louis.....	Maria Capes, Bonaventure Co.....	
Derops, W.....	Lac au Saumon.....	
Didier, Ferdinand.....	Causapsal.....	
Dion, Francis (Mrs.).....	Maria Capes, Bonaventure Co.....	
Dow, James (Mrs.).....	Port Daniel West, Bonaventure Co.....	
Drapeau, Nap.....	Sayabec.....	
Edwards, Leslie.....	Escuminac, Bonaventure Co.....	
Fenderson (John) & Co., Inc.....	Sayabec.....	
Flowers, Pen.....	New Carlisle.....	
Gagné, Adonias.....	Lac au Saumon West, Matapédia Co.....	
Gagné, Benoit.....	Petit Cascapédia Nord.....	
Gallagher, J. Léonard.....	Maria East, Bonaventure Co.....	
Gauvreau, Isidore.....	Drapeau, Bonaventure Co.....	
Godet, Alfred.....	Lac au Saumon.....	
Henry, Alexis.....	Bonaventure East.....	
Henry, Barthélemi.....	Bonaventure East.....	
Horth, Simon.....	Paspébiac.....	
Huard, Jos.....	Hopetown, Bonaventure Co.....	
Landry, Calixte.....	Drapeau, Bonaventure Co.....	
Lapierre, David.....	Lac au Saumon.....	
Lapierre, Ernest.....	Lac au Saumon.....	
Laurel Chalk Corporation, Ltd.....	Room 901, 1410 Stanley Street, Montreal.....	
Lauzier, Léonard.....	Val Brillant, Matapédia Co.....	
Lavoie, Antoine.....	St-Léon le Grand, Matane Co.....	
Leblanc, Eusébe.....	Lac au Saumon.....	
Leblanc, Ferdinand.....	Allard, Bonaventure Co.....	
Lelièvre, Appollinaire.....	Petite Rivière Est, Gaspé Co.....	
Lavesque, Pierre.....	Val Brillant, Matapédia Co.....	
Loiselle, Nap.....	Hopetown, Bonaventure Co.....	
McEnnis, G.....	Port Daniel East, Bonaventure Co.....	
Malaisson, Auguste.....	Lac au Saumon, Matapédia Co.....	
Marcoux, Zénon.....	Grande Rivière, Gaspé Co.....	

MARL—Continued

Name of Operator	Address	Location of Deposit
Michaud, Albert.....	Val Brilliant.....	
Michel, Alfred.....	New Carlisle.....	
Ouellet, Lazare.....	St-Léon le Grand, Matane Co.....	
Ouellet, Théo.....	Amqui.....	
Papineauville Lumber Co., Ltd.....	Papineauville.....	
Philipp, Damase.....	Drapeau, Bonaventure Co.....	
Poirier, Elide.....	Cullen's Brook.....	
Poirier, Georges.....	Maria East, Bonaventure Co.....	
Poitras, Alphonse.....	Ste-Anne des Monts, Gaspé Co.....	
Richard, Aubin.....	Lac au Saumon.....	
St-Onge, Isidore.....	St-Alphonse de Caplan.....	
Soucy, Isidore.....	Allard, Bonaventure Co.....	
Tardif, Antoine.....	Chandler, Gaspé Co.....	
Turbide, R.....	Lac au Saumon.....	
Vaillancourt, Jos.....	Lac au Saumon.....	
Vignet, Paul.....	Gascons West, Bonaventure Co.....	
Wall, Martin.....	Chandler, Gaspé Co.....	

MICA

Name of Operator	Address	Location of Mine (Township)
Ahearn, Wm.....	538 McLaren Street, Ottawa, Ont.....	Hull
Blackburn, Bros., Limited.....	Blackburn Building, Ottawa, Ont.....	Portland East and Templeton
Brown Bros.....	Lucky Reserve, Cantley, Wright Co.....	Hull
Canadian Amber Mica Company.....	c-o A. D. MacPherson, 3542 Vendome Avenue, Montreal.....	Portland West
Carman, Osborn.....	Farm Point.....	Hull
Chartier, Albert.....	10 Franklin Street, Quebec.....	Bergeronnes
Chenier, Z. E.....	148 Laurier Street, Rockland, Ont.....	Grenville
Cheslock, Isidore.....	Poltimore.....	Portland West
Cleary, G., Morris, M., & Poirier, A.....	c-o George Cleary, Wilson's Corners.....	Hull
Cross, W. C.....	Cascades.....	Hull
Cross, S. H.....	90 Fifth Avenue, Ottawa, Ont.....	Wakefield
de Rainville, David.....	R.R. No. 1, Wilson's Corners.....	Alley
Ellard, Estate J.....	Wright.....	Hull and Wright
Flynn, H. T.....	33 Montcalm St., Hull.....	Buckingham
Gauthier, J. B.....	Box 226, Buckingham.....	
Gracefield Mica Mining Company.....	c-o J. A. C. Ethier, 4908 Adam Street, Montreal.....	Northfield
Hamilton, Percy.....	Perkins Mill.....	North Templeton
Kent Brothers.....	Kingston, Ont.....	Hull
Kilbourn, Kenneth.....	101 Murray Street, Montreal.....	Grenville
Lafortune (Silvio) Mining Company.....	Pointe Gatineau.....	Templeton
Lapointe, E. M.....	Buckingham.....	Derry
Laurentide Mica Company, Ltd.....	c-o John J. Jackson, Gulf Building, Pittsburg, Penn., U.S.A.....	Templeton
Martin, A. G.....	236 Besserer Street, Ottawa, Ont.....	Hull
McElroy, Geo. W.....	Davidson's Corners.....	Templeton
McGlashan (R. J.) & Co.....	190 Montcalm Street, Hull.....	Wakefield
McGlashan, Wm.....	Wilson's Corners.....	Wakefield
McLaurin, T. G.....	42 Stanley Avenue, Ottawa, Ont.....	Portland
McManiman, C.....	Rawdon.....	Rawdon
Mineral Products Co., Limited.....	901 Federal Building, Toronto, Ont.....	Wakefield
Morris, Jos.....	Wilson's Corners.....	Wakefield
Nellis, T. F., Estate.....	c-o Nellis, Thompson & Ellis, Royal Bank Chambers, Ottawa, Ont.....	Hull
O'Brien & Fowler.....	900 Victoria Building, Ottawa, Ont.....	Villeneuve
Perkins Mining Company.....	P. O. Box 63, Pointe Gatineau.....	Templeton
Poulin (Ernest) & Thos. Holmes.....	Cantley.....	Hull
Richard, Louis E.....	L'Ange Gardien.....	Petit Pré, Montmorency Co.
Saguenay Mica Co., Limited.....	c-o Germain Beaulieu, Advocate, P. O. Box 21, Quebec.....	

MICA—Continued

Name of Operator	Address	Location of Mine (Township)
Sparks, Wm. J.	Stevenson Place, P.O., Ont.	Hincks
Wallingford Bros., Limited	Banque Nationale Building, Ottawa, Ont.	Templeton
Wallingford (Geo. & Chas.) Company	495 Clarence Street, Ottawa, Ont.	Templeton
Wallingford, Jos. N.	Perkins Mill	Templeton
Wilson, S., Estate	Cascades	Thorne
Winning, Bush	Notre-Dame de la Salette	Portland

MINERAL WATER

Name of Operator	Address	Location of Spring
Abénakis Springs Company	Blondin	St. François du Lac
Cie d'Eau Minérale (La)	148 Concorde St., St-Hyacinthe	St. Hyacinthe le Confesseur
Coulombe, J.	L'Epiphanie, L'Assomption Co.	L'Epiphanie Parish
Eau Minérale Etoile	Ste-Geneviève de Batiscan	Ste-Geneviève de Batiscan
Eau Minérale Naturelle Fernet	R.R. No. 2, Berthierville	Bayonne River
Eau Minérale Richelieu	St-Joseph, Chambly Co.	
Eau Naturelle Purgative de Chambord, Ltée. (L')	c-o David Doré, Desbiens, Lac St. Jean Co.	Métabetchouan
Gurd (Chas.) & Co., Ltd.	1016 Bleury St., Montreal	Varenes
Lacerte, Adélar (Mrs.)	St. Sévère, St. Maurice Co.	
Lafrance, Noël	St. Hyacinthe	Abénakis Springs
Lamarre, Josaphat	St. Barnabé Nord, St. Maurice Co.	
Maska Mineral Water	c-o Philippe Nadeau, St. Hyacinthe	
Maski Rotting Works	Maskinongé	
Pellerin, Albert	St. Barnabé, Nord, St. Maurice Co.	
Radnor Mineral Water Springs	St. Maurice, Champlain Co.	
Richard, Gérard	St-Grégoire, Nicolet Co.	
St-Jean, Adélar	Ste. Hélène, Bagot Co.	
Thomson, R. G. O., & W. H. Moore	Room 26, 88 King St. East, Toronto 2, Ont.	St. Léon, Maskinongé Co.

MOLYBDENITE

Name of Operator	Address	Location of Mine (Township)
Bain, John, Estate	c-o Toronto General Trusts Corporation, Ottawa, Ont.	Masham
Height of Land Co. (The)	4327 Old Orchard Avenue, Montreal	Freissac
Lalonde, T. A., Ltée	Amos, Abitibi	Freissac
Lamotte Mines, Limited	445 St. François-Xavier St., Montreal	La Corne
Riley, James	Hodgins, Pontiac Co.	Thorne

OCHRE and IRON OXIDE

Name of Operator	Address	Location of Mine (Township)
Argall, Thos. H.....	Argall's Siding, Pointe du Lac.....	Pointe du Lac
Canadian Siennas.....	c-o Alex. L. de Livi, Siennas, Labelle Co.	Lynch
McNicoll, Eugène.....	354 St. Catherine Street, Montreal.....	Marchand
Montmorency Paint Products Co., Ltd.....	6684 St. Urbain Street, Montreal.....	Les Forges, Trois-Rivières
Paint River Oxide Company.....	P. O. Box 144, Station B, Quebec.....	Pte. Rivière Romaine
Sherwin-Williams Co. of Canada, Limited (The).....	2875 Centre Street, Montreal.....	Red Mill

PEAT

Name of Operator	Address	Location of Bog
Compagnie de Tourbe, Ltée (La).....	P. O. Box 2468, Montreal.....	
Hydropeat Company, Limited (The).....	c-o H. G. Acres, Niagara Falls, Ont.....	St. Hyacinthe

PHOSPHATE

Name of Operator	Address	Location of Mine (Township)
Blackburn Bros.....	711 Blackburn Building, Ottawa, Ont..	Templeton
Gauthier, J. B.....	P. O. Box 226, Buckingham.....	Buckingham
Kent Bros.....	Mica Dealers, Kingston, Ont.....	Hull
McGlashan, R. J.....	190 Montcalm Street, Hull.....	Wakefield
Majeau, Donat.....	Notre-Dame de la Salette.....	
St. Amour, A.....	Notre-Dame de la Salette.....	Portland East
Wallingford Bros., Limited.....	Banque Nationale Building, Ottawa, Ont.....	Templeton
Winning, Bush.....	Notre-Dame de la Salette.....	Portland

PYRITE

Name of Operator	Address	Location of Mine (Township)
Aldermac Mines, Limited.....	Room 500, Dominion Square Building, Montreal.....	Beauchastel
Consolidated Copper & Sulphur Co.....	Eustis.....	Ascot

SILICA (Rock and Sand)

Name of Operator	Address	Location of Mine (Township)
Bigelow, Earl.....	Glen Almond, Papineau Co.....	
Bigelow, Gordon.....	Glen Almond.....	Portland East
Bigelow, Robert.....	Buckingham.....	Buckingham
Bigelow, Venard.....	Notre-Dame de la Salette.....	
Buckingham Mining Co., Limited.....	1400 Dorchester St. West, Montreal.....	Buckingham
Cameron, Wm. & J. J.....	Buckingham.....	Buckingham

SILICA (Rock and Sand)—Continued

Name of Operator	Address	Location of Mine (Township)
Canadian Carborundum Company.....	Shawinigan Falls.....	St. Canut
Canadian Flint and Spar Co., Ltd.....	900 Victoria Building, Ottawa, Ont.....	Derry
Canadian Kaolin Silica Products, Ltd.....	1602 University Tower, Montreal.....	Amberst
Couture, Edmond.....	Glen Almond.....	
Donaldson, Robert J.....	Glen Almond.....	Buckingham
Flint Sands, Limited.....	24 King St. West, Toronto, Ont.....	Guigues
Gauthier, J. B.....	Buckingham.....	Buckingham
Hill, Nelson.....	Glen Almond.....	
McClements, Albert.....	Buckingham.....	
McDonell, Edmond.....	Buckingham.....	Derry
Mason (Jas. H.) Engineering Corp'n.....	1451 King St. West, Toronto, Ont.....	Melocheville
Montpetit, Euclide.....	Melocheville.....	Melocheville
Newton, Alfred.....	Glen Almond.....	
O'Brien & Fowler, Limited.....	900 Victoria Building, 140 Wellington St., Ottawa, Ont.....	Derry
Ottawa Silica and Sand Stone, Ltd.....	Plaza Building, Ottawa, Ont.....	Templeton
Parcher, Alfred.....	Glen Almond.....	Derry
Pedneaud, G.....	Buckingham.....	Buckingham
St-Amour, Orphila.....	Notre-Dame de la Salette.....	Villeneuve
Silica Products of Canada Ltd. (Les Produits Silica Canadiens, Ltée)	Chicoutimi.....	Dequen
Stewart, Wm.....	Box 19, Buckingham.....	Buckingham
Warwick, Wm.....	Buckingham.....	
Winning & Downing.....	Notre-Dame de la Salette.....	Buckingham
Winning, Bush.....	Glen Almond.....	

SILVER

Name of Operator	Address	Location of Mine (Township)
Aldermac Mines, Limited.....	500 Dominion Square Building, Mont- real.....	Beauchastel
Beattie Gold Mines, Limited.....	Canadian Bank of Commerce, 25 King St. West, Toronto, Ont.....	Duparquet
Bussières Mining Company, Limited.....	221 Notre-Dame Street West, Montreal.....	Bourlamaque
Consolidated Copper & Sulphur Co.....	Eustis.....	Ascot
Granada Gold Mines, Limited.....	1108 Federal Building, Toronto, Ont.....	Rouyn
Greene-Stabell Mines, Limited.....	1402-6 Concourse Building, 100 Ade- laide St. West, Toronto, Ont.....	Dubuisson
McWatters Gold Mines, Limited.....	Box 689, Rouyn.....	Rouyn
Newbec Mines, Limited.....	603 Royal Bank Building, Toronto 2, Ont.....	Dufresnoy
Noranda Mines, Limited.....	804 Royal Bank Building, 2-8 King St. East, Toronto 2, Ont.....	Rouyn
O'Brien Gold Mines, Limited.....	Kewagama.....	Cadillac
Perron Gold Mines, Limited.....	Pascalis.....	Pascalis
Siscoe Gold Mines, Limited.....	Room 905, Dominion Square Building, St. Catherine Street, Montreal.....	Varsan and Dubuisson
Sullivan Consolidated Mines, Limited.....	1207 Aldred Building, Montreal.....	Dubuisson
Waite-Amulet Mines, Limited.....	804 Royal Bank Building, 2-8 King St. East, Toronto, Ont.....	Duprat and Dufresnoy

SOAPSTONE and TALC

Name of Operator	Address	Location of Mine (Township)
Broughton Soapstone & Quarry Co., Ltd....	Broughton Station, Beauce Co.....	Broughton
Canadian Tale Rock Products, Limited.....	c-o E. P. Bélair, Cashier's Office, City Hall, Montreal.....	
Fortin, Charles.....	Robertsonville.....	Thetford
Megantic Mining Company, The.....	175 Spadina Road, Toronto, Ont.....	Ireland
Parker, N. S.....	Eastman.....	Bolton
Pharo, L. C.....	Thetford Mines.....	Broughton
Pibus, George R. (Mrs.).....	Knowlton.....	Bolton West
Reed Realities, Limited.....	c-o H. A. Peverley, 1536 St. Marc Street, Montreal.....	Thetford

TITANIC IRON

Name of Operator	Address	Location of Mine (Township)
Acme Titanic Iron Ore Co.	c-o J. O. Paré, N.P., Baie St-Paul	St. Urbain
American Titanic Iron Co., Ltd.	c-o J. H. Boisvert, 100 Salaberry St., Quebec	St. Urbain
Baie St. Paul Titanic Iron Ore	c-o J. O. Paré, N.P., Baie St. Paul	St. Urbain
Loughborough Mining Co., Ltd.	Sydenham, Ont.	St. Urbain
Titanium (Canada), Limited	384 St. Paul Street West, Montreal	Beresford
Titanium Products Corporation	c-o G. C. Piché, Pres., 43 Chemin Ste. Foy, Quebec	Bourget

ZINC and LEAD

Name of Operator	Address	Location of Mine (Township)
Alpha Mining Company	c-o Hollinger Consolidated Gold Mines, Limited, Timmins, Ont.	Duhamel
Clermont Mines, Limited	85 St. Peter Street, Quebec	Clermont
Federal Zinc & Lead Co., Limited	Room 608, 1117 St. Catherine St. West, Montreal	Lemieux
Gaspé Mines	c-o Hon. John Hall Kelly, New Carlisle	Lemieux
Lyall & Beidelman	Room 608, Drummond Building, 1117 St. Catherine St. West, Montreal	Lemieux
Marsouins Mines, Limited	Marsouins, Gaspé Co.	Christie
North American Mining Company	New Carlisle	Lemieux
Shawinigan Mining & Smelting Co., Limited	c-o W. T. Henderson, Sec'y, 116 Dal- housie Street, Brantford, Ont.	Montauban and Chavigny
Tétreault, P., Succession	70 Holyrood Avenue, Outremont	Montauban
Trinidad Mines, Gas & Oil, Limited	116 Côte de la Montagne, Quebec	Montauban and Chavigny
Waite-Amulet Mines, Limited	804 Royal Bank Building, 2-8 King St. East, Toronto, Ont.	Duprat and Dufresnoy

II.—STONE QUARRIES, CLAY AND SAND PITS

BRICK

Name of Operator	Address	Location of Plant
Ascot Tile & Brick Co., Limited	Ascot Corner	Ascot
Bourbeau, Georges	R.R. No. 1, Danville, Richmond Co.	
Brique Champlain, Limitée (La)	56 Laliberté Street, Quebec	Beauport
Brique de Chicoutimi, Ltée (La)	c-o Royal Bank, Chicoutimi	Chicoutimi
Brunelle, L. H.	Victoriaville	L'Islet
Cie de Brique Panet, Limitée (La)	L'Islet	L'Islet
Cie de Brique de Tuile de Scott, Ltée (La)	15 St. Joseph Street, Quebec	
Citadel Brick, Limited	14 St. Joseph Street, Quebec	Beauchastel
Duquette, Isidore	East Angus	Westbury
Hodgins, David T.	Shawville	Clarendon
Industrielle de St-Tite, Ltée (L')	St-Tite, Champlain Co.	
Laprairie Company, Inc. (The)	University Tower Building, Montreal	Laprairie and Delson
Loiselle, Nap. (Mrs.)	R.R. No. 4, Granby	Granby
Longpré, Emile	St-Félix de Valois	St. Félix de Valois
Oliver, Frank	Ormstown	Ormstown
Parrot, Michel H.	Deschaillons, Lotbinière Co.	Deschaillons
Potvin, Alphonse	Deschaillons	Deschaillons
Richmond Brick Company	P. O. Box 295, Richmond	Richmond
St. Lawrence Brick Co., Limited	935 Dominion Square Building, 1010 St. Catherine Street West, Montreal	Laprairie
Stone Bros	Brome, Brome Co.	
Suddard (E. P.) Brick Works	Gaspé, Gaspé Co.	Douglas West

CEMENT

Name of Operator	Address	Location of Plant
Canada Cement Company.....	Box 290, Station B, Montreal.....	Montreal East and Hull
National Cement Company.....	Box 170, Hochelaga Station, Montreal	Montreal East

GRANITE

Name of Operator	Address	Location of Quarry
Beebe White Granite Co., Limited.....	c-o M. A. Yetter, Beebe.....	Stanstead
Bernier, Auguste.....	Roberval, Lac-St-Jean Co.....	St. Dominique Range
Berry and Redicker Granite Quarry.....	Beebe, Stanstead Co.....	Stanstead
Bérubé, Lucien, & Fils.....	Brownsburg.....	Brownsburg
Bourbonnais, J. A.....	Vaudreuil Station, Vaudreuil Co.....	Rigaud
Brodie's Limited.....	1070 Bleury Street, Montreal.....	Graniteville, Guenette, and Mount Johnson
Brunet, Joseph.....	4411 Côte des Neiges, Montreal.....	Chatham
Bussièrès, Amédée.....	Ste. Cécile, Compton Co.....	Barston and Whitton
Chicoutimi, La Ville de.....	Chicoutimi.....	Chicoutimi
Cloutier (Ernest) & Lavers.....	Beebe.....	Stanstead
Cloutier, R. L.....	Beebe.....	Stanstead
Compagnie de Granit (La).....	88 St. Louis Road, Quebec.....	Rivière-à-Pierre
Compagnie Routière Lac-St-Jean Chicou- timi (La).....	Box 448, Roberval, Lac-St-Jean Co....	Jonquière West
Delwaide & Goffin.....	12-16 du Havre Street, Chicoutimi.....	St. Thomas Range
Denney (Robert) & Barrowman.....	Beebe.....	
Diamond Granite Company.....	Beebe.....	House Hill
Dontigny, Alphonse.....	112 de la Station Street, Shawinigan Falls.....	Glenada
Doyer, J. B.....	c-o Mrs. J. B. Doyer, Rousseau Mill...	Rousseau Mill
Dumas (Arthur) Cie., Enrg.....	Rivière-à-Pierre, Portneuf Co.....	Rivière-à-Pierre
Dumas, Auguste.....	Rivière-à-Pierre, Portneuf Co.....	Rivière-à-Pierre
Duncan, William.....	R.R. No. 1, Beebe.....	House Hill
Gingras & Frères, Ltée.....	St. Marc des Carrières, Portneuf, Co...	Stanhope
Gosselin, Oscar.....	Mégantic.....	
Grand'Mère, La Cité de.....	City Hall, Grand'Mère.....	Grand'Mère
Granit National, Ltée (Le).....	Box 276, Roberval.....	
Granit Noir Canadien, Enrg. (Le).....	c-o O. G. Tremblay, Sec'y, St. Joseph d'Alma.....	St. Joseph d'Alma
Grenier, Elie.....	Glenada.....	Glenada
Guenette Granite Company, Limited.....	Guenette, Labelle Co.....	Campbell
Hartley, A. C.....	Beebe.....	Stanstead
Haselton, Wm.....	Beebe.....	Stanstead
Hébert, O.....	Ville-Marie, Témiscamingue Co.....	Ville-Marie and Laverlochère
Jonquière, La Cité de.....	Jonquière.....	Jonquière
Lacasse & Boulais.....	P. O. Box 23, Beebe.....	Stanstead
Low, James.....	Brownsburg.....	Brownsburg
McIntosh, Robert.....	R.R. No. 1, Beebe.....	Stanstead
McKenzie (A. M.) & M. M. Morrison.....	Scotstown.....	
Montreal Construction Supply & Equipment, Limited.....	1460 Sherbrooke St. West, Montreal...	
Nett, Carl.....	R.R. No. 1, Beebe.....	Graniteville
Nolet, François.....	Rivière-à-Pierre.....	Rivière-à-Pierre
Perron, Arthur.....	Rivière-à-Pierre.....	Bois
Perron, Stanislas.....	Rivière-à-Pierre.....	Bois
Port Alfred, La Ville de.....	Port Alfred, Chicoutimi Co.....	
Provencher, Henri.....	Guenette.....	
Reynolds, M. C.....	Cedarville.....	Stanstead
Riverin & Riverin, Enrg.....	39 Montcalm Street, Chicoutimi.....	Rivière du Moulin
Rivière-à-Pierre Granite, Limited.....	Rivière-à-Pierre, Portneuf Co.....	Bois
Saint Bruno Quarry & Paving Co., Ltd.....	7420 Laroche Street, Montreal.....	St. Bruno
Scotstown Granite Co., Limited.....	Scotstown.....	Scotstown
Shawinigan Engineering Co., Ltd.....	c-o H. G. Budden, 107 Craig Street West, Montreal.....	St. Michel des Saints
Shawinigan Falls, La Ville de.....	Shawinigan Falls.....	Shawinigan Falls
Silver Granite Company.....	117 Côte d'Abraham, Quebec.....	St. Samuel

GRANITE—Continued

Name of Operator	Address	Location of Quarry
Stanstead Granite Quarries Co., Ltd.	Beebe	Stanstead
Thibaudeau & St-Pierre	Rivière-à-Pierre	Rivière-à-Pierre
Tremblay, Joseph	Baie St-Paul, Charlevoix Co.	Bois
Voirie, Département de la	Quebec	
Voyer (Fortunat) & Frère	Rivière-à-Pierre, Portneuf Co.	Bois
Wards, Joseph	359 Place d'Youville, Montreal	Brownsburg
Wilkinson, Frank	Beebe	Stanstead

LIME

Name of Operator	Address	Location of Kiln
Arnaud & Beaudry	16 Ste. Angélique Street, Joliette	Joliette
Boivin, Arthur	Pont Rouge, Portneuf Co.	Pont Rouge
Bouchard, Praxède	Ste. Anne de Chicoutimi	Tremblay
Canada Lime Products Company	7403 Drolet Street, Montreal	Cap St. Martin
Canada Lime & Stone, Limited	St. Marc des Carrières, Portneuf Co.	St. Marc des Carrières
Desfonds, Gaspard	St. Cuthbert, Berthier Co.	
Dominion Lime Company (The)	East Angus	Dudswell
Dontigny, Yvon	Ste-Thècle, Champlain Co.	
Drouin, Eva Cimon	Ste-Justine, Dorchester Co.	
Filion, Narcisse	St. Joachim, Montmorency Co.	
Gagné, Octave	St-Ulric, Matane Co.	
Giroux, Pierre Gédéon	Beauport East	
Héon & Héon	St. Louis de Champlain	
Lalumière, Joseph	St. Dominique de Bagot	St. Dominique de Bagot
Laurentian Stone Co., Ltd.	82 Crémazie Street, Hull	Hull
Limoges Fils & Cie.	552 Poupard Street, Montreal	St. Michel de Laval
Mercure, Camille	9 St. Denis Street, St-Hyacinthe	St. Dominique de Bagot
Montreal Lime Company, Limited	St-Marc des Carrières	
National Stone & Lime Co., Reg'd	386 Lemoyne Street, Montreal	
Shawinigan Chemicals, Limited	Room 611, 107 Craig St. West, Montreal	Shawinigan Falls
Standard Lime Co., Limited	Joliette	St. Paul de Joliette and St. Marc des Carrières
Stinson Reeb Builders Supply Co.	360 Dorchester St. West, Montreal	Côte St-Michel
Trottier, David	St-Marc des Carrières	St-Marc des Carrières

LIMESTONE

Name of Operator	Address	Location of Quarry
Arseneault, Honoré Z.	Drapeau, Bonaventure Co.	
Baillargeon & Faubert	62 Blvd Union, St-Lambert, Chambly Co.	
Baker, A. A.	Château-Richer	Château-Richer
Bathurst Power and Paper Co., Limited	Bathurst, N. B.	Port Daniel East
Beaudet & Bergeron	St. Antoine de Tilly, Lotbinière Co.	Orléans Island
Beaudry, Jos. Pitre	Box 209, Taché Street, Joliette	Joliette
Bégin, Joseph	176 de la Ronde St., Quebec	Beauport
Boivin, Ladislav	Baie St. Paul, Charlevoix Co.	
Bosca & Buraglia	East Bathurst, N. B.	
Boursier, François	Ste-Philomène, Chateauguay Co.	
Brisebois, O.	33 Windsor Street, Ville St-Pierre	
Canada Cement Company, Limited	Box 290, Station B, Montreal	Hull
Canadian Quarries, Limited	4740 Iberville Street, Montreal	

LIMESTONE—Continued

Name of Operator	Address	Location of Quarry
Canadian Rock Products, Limited.....	2020 Union Avenue, Montreal.....	
Carrière Cap St-Martin, Enrg. (La).....	636 Querbes Avenue, Montreal.....	Cap St. Martin
Carrière Gravel, Ltée (La).....	Château-Richer.....	Château-Richer
Carrière Marcil, Ltée (La).....	St. Michel Station, Napierville Co.....	
Carrière Montreal Est.....	c-o Cyrille Durocher, 11021 Notre-Dame St. East, Montreal.....	Montreal
Carrière St-Barthélemi.....	St. Barthélemi.....	
Carrière St-Louis.....	St-Louis de France, Champlain Co.....	
Carrière St-Maurice, Ltée.....	307 Alexandre Street, Trois-Rivières.....	St. Louis de France
Cercle Agricole de St-Godefroi (Le).....	c-o Edgar Nadeau, St-Godefroi, Bona- venture Co.....	St-Godefroi
Chenel, J. E. (Rev.).....	Port Daniel Centre, Bonaventure Co.....	
Côté & Gendreau.....	St. Pierre, Orleans Island.....	
DeLorimier & Rogers Quarries Co.....	c-o Paul Labrecque, 6618 Chambord St., Montreal.....	Montreal
Deschambault Quarry Corporation.....	52 St. Paul Street, Quebec.....	St. Marc des Carrières
Dominion Lime Company.....	East Angus.....	Lime Ridge
Drouin, Eva Cimon.....	St-Justine, Dorchester Co.....	
Dufresne Construction Co., Limited.....	1832 Pie IX Boulevard, Montreal.....	Rivière des Prairies
Faubert, Alphonse.....	Bellevue Station, Ville de Léry.....	Ville de Léry
Faubert, Donat.....	Ville de Léry, Chateauguay Co.....	Ville de Léry
Filion, Adélar.....	Lachute.....	Lachute
Fuger & Smith, Limited.....	Pointe Claire.....	Pointe Claire
Gagné, Octave.....	St-Ulric, Matane Co.....	
Gagnon, Emile.....	271 St-Dominique Street, Jonquière.....	Métabetchouan
Gaspesian Fertilizer Co., Reg'd.....	Port Daniel East.....	Port Daniel
Gauthier, J. Olivier.....	St-Marc des Carrières.....	St. Marc des Carrières
Gauthier, René.....	Bélanger Village, Laval Co.....	St. Martin
Gingras & Frère, Ltée.....	St. Marc des Carrières.....	St. Marc des Carrières
Giroux, F. X. R.....	St. Louis de Courville.....	St. Louis de Courville
Guilbault & Frère.....	St-Elizabeth, Joliette Co.....	
Kennedy Construction Co., Limited.....	310 Shaughnessy Building, 407 McGill St., Montreal.....	St. François de Sales and Acton Vale
Laberge & Marchand.....	Chateauguay.....	
Lacouline, Théodore.....	Château-Richer.....	Château-Richer
Lagacé Quarry, Limited.....	St. Martin, Laval Co.....	St. Martin
Lapointe, A. & E.....	12034 Lachapelle Street, Montreal.....	Cartierville
Lapointe, Emile.....	St. Dominique de Bagot.....	St. Dominique de Bagot
Laurentian Stone Co., Limited.....	82 Crémazie Street, Hull.....	Hull
Lavolette, D. O.....	166 Montcalm Street, Hull.....	
Leclerc & Robitaille, Enrg.....	Roberval.....	Roberval
Leclerc, Edouard.....	St-Joachim, Montmorency Co.....	St. Joachim
Leclerc, J. J.....	Rimouski.....	Nouvelle
Leclerc, Victor.....	8434 de Gaspé Street, Montreal.....	Cap St. Martin
Léger & Charlton.....	400 Notre-Dame Street, Lachine.....	
Levesque, Armand.....	Roberval.....	Roberval
Loiselle, Henri.....	St-Dominique de Bagot.....	St-Dominique de Bagot
Marcotte (Ulric) & Edmond Normand.....	c-o Ulric Marcotte, 5717 Second Ave- nue, Rosemount, Montreal.....	St-Alban
Martineau Fils, Ltée.....	517 Marie-Anne St. East, Montreal.....	St. Marc and Montreal
Matthew Devito Construction, Ltd.....	3138 Hamilton Street, Montreal.....	Pointe Claire
Mercure, Camille.....	9 St. Denis Street, St-Hyacinthe.....	St. Dominique de Bagot
Miner (R. H.) Co., Ltd.....	7411 de Lanauidière Street, Montreal.....	Montreal
Montreal Construction Supply & Equipment, Limited.....	1460 Sherbrooke St. West, Montreal.....	
Montreal Lime Company, Limited.....	St. Marc des Carrières.....	St. Marc des Carrières
Montreal Quarry, Limited.....	1340 Bellechasse Street, Montreal.....	Montreal
National Quarries, Limited.....	Park Avenue & Beaubien Street, Mont- real.....	Côte St. Michel
Naud, Oscar.....	Lacheyrotière, Portneuf Co.....	
Noel (Oscar) & Cie.....	44 Wright Street, Hull.....	Wrightville
Northern Quarry, Limited.....	Room 1401, 660 St. Catherine St. West, Montreal.....	
Pagé, Jos.....	Charlesbourg West.....	St. Michel de Laval Charlesbourg West
Paquette (Lévis) & Cie.....	Cap St. Martin, Laval Co.....	Cap St. Martin and St. Fran- çois de Sales
Pénitencier St. Vincent de Paul.....	St. Vincent de Paul.....	St. Vincent de Paul
Pères Trappistes de Mistassini (Les).....	Mistassini, Lac St. Jean.....	Pelletier

LIMESTONE—Continued

Name of Operator	Address	Location of Quarry
Peticjean, V. F.	4525 Chabot Street, Montreal	St. Martin
Quinlan Cut Stone, Limited	1165 Greene Avenue, Westmount	St. François de Sales
Rousseau, T. E.	48 2nd Avenue, Quebec	Val Brillant
St-Elzéar Quarry Co., Limited	c-o R. E. Dagenais, Laval des Rapides, Laval Co.	St. Elzéar
St. Francis Rock Products & Equipment, Limited	8050 Bloomfield Avenue, Montreal	Ville St-Laurent
St-Laurent Quarry, Limited	Bélanger Village, Laval Co.	Bélanger Village
St-Onge, O. F.	St-Dominique, Bagot Co.	
Salaberry de Valleyfield, Cité de	c-o Raphael Bélanger, City Engineer, Valleyfield	Valleyfield
Schetagne, W.	Pointe Claire, Jacques-Cartier Co.	Pointe Claire
Shawinigan Chemicals, Limited	Room 611, Power Building, 107 Craig St. West, Montreal	St. Damien de Stanbridge
Standard Clay Products, Limited	P. O. Box 819, Saint-Jean	St-Jean
Standard Lime Company, Limited	Joliette	St. Paul de Joliette and St- Marc des Carrières
Stinson-Reeb Builders Supply Company	360 Dorchester Street West, Montreal	Côte St-Michel de Laval
Stone & Quarry, Limited	1340 Bellechasse Street, Montreal	Montreal and St. François de Sales
Théorét, Magloire	Bellerive, Valleyfield	Nouveau-Salaberry-Valleyfield
Tremblay, Nap.	Joffre Avenue, Hull	Hull
Trust Général du Canada	112 St. James Street, Montreal	St. Vincent de Paul
Union Quarry, Limited	1340 Bellechasse Street, Montreal	Côté St. Michel
Verreault (Elzéar), Ltée.	194 du Pont Street, Quebec	Giffard
Villeneuve, François	Pointe au Pic, Charlevoix Co.	
Vinclette, Paul	St-Honoré, Chicoutimi Co.	St. Honoré
Voirie, Département de, Québec	Parliament Buildings, Quebec	
Wright Crushed Stone Company, Limited	Wrightville, Hull Co.	

MARBLE

Name of Operator	Address	Location of Quarry
Canada Marble and Lime Company	630 Cathcart Street, Montreal	L'Annonciation
Wallace Sandstone Quarries, Limited	Architects Building, 1135 Beaver Hall Hill, Montreal	Phillipsburg
White Grit Company	Hurdman Road, Ottawa, Ont.	Portage du Fort

POTTERY

Name of Operator	Address	Location of Plant
Bégin (Olivier) Enrg.	R.R. No. 1, Petite Rivière, Quebec Co.	Petite Rivière
Brique de Chicoutimi, Ltée (La)	c-o Royal Bank, Chicoutimi	Chicoutimi
Canada Fire Brick Company, Limited	4741 St-Ambroise Street, Montreal	Montreal
Canadian Poteries, Limited	140 Longueuil Street, St-Jean	St. Jean
Cie de Brique de Tuile de Scott, Ltée (La)	15 St. Joseph Street, Quebec	St. Maxime de Scott
Cie de Brique Panet, Ltée (La)	L'Islet	L'Islet
Citadel Brick, Limited	14 St. Joseph Street, Quebec	Beauchastel
Dominion Sanitary Pottery Company, Ltd.	189 St. James Street, St-jean	St-Jean
Duquette, Isidore	East Angus	East Angus
Hodgins, David T.	Shawville	Clarendon
Laprairie Company, Incorporated (The)	University Tower Building, Montreal	Delson and Laprairie
Montreal Terra Cotta Company, Ltd.	Room 923, 1010 St. Catherine Street West, Montreal	Lakeside
Standard Clay Products, Limited	P. O. Box 819, St-Jean	St-Jean

SAND and GRAVEL

Name of Operator	Address	Location of Pit
Alma and Jonquière Railway Co.	Isle Maligne	
April, Eugène (Mrs.)	Pouliot Post Office, Rivière-du-Loup	
Bachand, D. S.	Coaticook	
Baillargeon & Faubert	62 Union Boulevard, St. Lambert, Chambly Co.	Caughnawaga
Baillet, Alphonse	54 Amberst Street, Hull	
Ball, Clayton	Abbotsford	
Barbe, Alfred	Ste-Rose West, Laval Co.	
Barclay, R. & A.	Pointe Fortune, Vaudreuil Co.	
Beaubien, J.	Lac Beauport	Lac Beauport
Beauchamp, L.	Mascouche, Terrebonne Co.	
Beaudet, Joseph	Victoriaville	
Beaudry, Joseph Pierre	Taché Street, Joliette	Joliette
Beaubarnois, Light, Heat & Power Co.	Room 405, Power Building, Montreal	
Bédard, A.	Pont Rouge	Pont Rouge
Bédard, Achille	Parkhurst, Lotbinière Co.	
Beebe, La Municipalité de	c-o Secretary-Treasurer of Municipality, Beebe	Beebe
Bégin, Auguste	St-Samuel, Compton Co.	
Béland, Eusébe	St-Agapit Station, Lotbinière Co.	
Bélangier, Edouard	St-Thuribe, Portneuf Co.	
Bélangier, Joseph	Ascot Corner	Stoke
Bélangier, Louis	Montmagny	
Bélisle, Euclide	145 St. Paul Street, Coaticook	
Belley, Joseph Octave	22 St. Jean-Baptiste Street, Jonquière	Jonquière
Benjamin, Pierre	197 St. Pierre Street, St-Jean	Mont St. Grégoire
Bennett, Gertrude M.	Box 403, Lennoxville	
Benoit, J. A.	Mont St. Grégoire	Mont Johnson
Bergeron, Ursin	Jonquière	Jonquière
Bernier, Edmond	St-David, Lévis Co.	St-David
Berthiaume, Charles Ed.	Contrecoeur, Verchères Co.	
Bérubé, Edmond	Trois-Pistoles, Témiscouata Co.	Trois-Pistoles
Bérubé, Joseph	R. R. No. 1, Arthabaska	
Bigaouette, J. B.	Lac Beauport	Lac Beauport
Bigelow, John	Calumet	
Bigras, Honoré	St-Vincent de Paul, Laval Co.	
Bigras, Omer	Ste-Dorothée, Laval Co.	Ste. Rose West
Blais (Jos.), Engr.	10 Mont-Marie Avenue, Lévis	St. Romuald
Blanchette, Georges	Victoriaville	
Blouin, Cyrille	Ste-Anne de Beaupré	
Blue Ribbon Sand & Gravel Co. (The)	c-o Antoine Degraze, 6617 1st Avenue, Montreal	
Boisvert, J. A.	R. R. No. 2, St. Jérôme, Terrebonne Co.	
Bonner Sand & Ballast, Limited	Room 201, 1434 St. Catherine St. West, Montreal	South Durham
Bouchard, Noel	Ste-Anne de Beaupré	
Boucher, Trefflé	St-Stanislas, Champlain Co.	
Bourgeois, Edmond	St-Albert, Arthabaska Co.	St. Albert
Bourget, Hubert	R. R. No. 1, St. Joseph, Lévis Co.	
Braut, Delphis	St. Alexandre, Iberville Co.	Sabroerois
Braut, F. X.	St. Dominique de Bagot	
Braut, Wm.	16 First Avenue, Sherbrooke	Orford
Brodeur, Eugène	St. Hilaire Station, Rouville Co.	
Brosseau, Victor	Abbotsford	
Brouillet Sand & Gravel Co., Ltd.	Rawdon	Ste. Julienne
Brouillette, Lucien A.	St. Narcisse, Champlain Co.	St. Narcisse
Brousseau, Wilbrod	St. Claude Range, Loretteville	
Brunelle, Georges	Batiscan	
Cabana, Alphonse	Contrecoeur, Verchères Co.	
Canada & Gulf Terminal Ry Co. (The)	c-o T. J. Fouby, Superintendent, Mont- Joli	
Canadian Good Roads Construction Co., Ltd.	2020 Union Avenue, Montreal	Waterloo
Canadian Import Company	83 Dalhousie Street, Quebec	St. Lawrence River
Canadian National Railways	c-o E. G. Newson, Engineer Mainte- nance of Way, Union Station, Toronto 2, Ont.	
Canadian Pacific Railway Company	Chief Engineer's Office, Windsor Sta- tion, Montreal	

SAND and GRAVEL—Continued

Name of Operator	Address	Location of Pit
Canadian Rock Products, Limited.	c-o Thom. P. Spellane, Sec'y-Treas., 2020 Union Avenue, Montreal.	
Carrier, Médor.	St. David, Lévis Co.	
Chabot, Osiás.	St. Jean-Baptiste, Rouville Co.	
Chabot, Richard.	St. Jean-Baptiste, Rouville Co.	
Chabot, Stanislas (Mrs.).	St. Jean-Baptiste, Rouville Co.	
Chadwick, Thomas.	St. Gilles, Lotbinière Co.	
Chamberland, Jos.	St. Pierre de Charlesbourg, Notre-Dame des Laurentides.	
Champagne, Alfred.	Valley Junction, Beauce Co.	
Champagne, O. T.	Ste. Thècle, Champlain Co.	
Champagne, Xavier.	St. Stanislas, Champlain Co.	
Chaput, Azarias.	Granby.	
Charette, Léon.	Pointe Fortune, Vaudreuil Co.	
Chartrand, Pierre (Mrs.).	St. Vincent de Paul, Laval Co.	
Chateaufort, Joseph.	Proulxville.	
Coaticook, La Ville de.	P. O. Box 150, Coaticook.	Coaticook
Compagnie de Sable, Ltée (La).	3rd Avenue, Limoilou.	St. Charles River
Consolidated Oka Sand and Gravel Co., Ltd.	248 McCord Street, Montreal.	Lake of Two Mountains
Cossette, Maurice.	St. Tite, Laviolette Co.	
Cossette, Romuald.	St. Narcisse, Champlain Co.	
Côté, Hector.	R. R. No. 4, Sherbrooke West.	
Crawford, E. J.	R. R. No. 4, Lennoxville.	Ascot
Crawford, J. J.	Eastman.	
Cumming, H. F.	36 Second Street East, Cornwall, Ont.	Dundee
Dallaire, François.	St. Fulgence, Chicoutimi Co.	
Damphouse, Rodolphe.	St. Paulin, Maskinongé Co.	Montauban
Danis, Hormidas.	St. Jérôme, Terrebonne Co.	
Delage, Richard.	St. Gilles, Lotbinière Co.	
Demers, François.	274 Commercial Street, St. Romuald	
Demers, Joseph.	Katevale, Stanstead Co.	Hatley
Desforges, Alcide.	Grenville.	
Desfossés, Jos.	St. Laurent Boulevard, Cap de la Made- leine.	
Desgagné, Honorius.	St. Fulgence, Chicoutimi Co.	
Deslandes, Léonard.	St. Dominique, Bagot Co.	St. Dominique
Deslandes, Mastai.	St. Dominique, Bagot Co.	St. Dominique
Desrochers, Oscar.	Warwick, Arthabaska Co.	
Dominion Sand & Stone Co., Limited.	c-o Mr. Lacombe, 1472 Laurier Ave. East, Montreal.	South Durham
Dupont, Albini.	Magog.	
Duquette, Eugène.	St. Eustache, Deux-Montagnes Co.	
Dutrizac, Noël.	Plage Laval, Laval Co.	Ste. Dorothée
Eastern Township Paving Company.	Sherbrooke.	Stanstead
Emond, Arthur.	Richmond.	
Fay, Wm.	St. Séverin, Champlain Co.	
Fortier, Lauréat.	P. O. Box 268, Montmagny.	
Fournier, O.	St. Peter Street, Magog.	Magog
Fréchette, Mathias.	St. Emile, Quebec Co.	
Gagné, Adrien.	St. Côme, Joliette Co.	
Gagné, J. B. A. (Mrs.).	Boischatel.	Montmagny
Gagnon, Arthur.	St. Frs.-Xavier de la Petite Rivière.	
Gagnon, Ernest.	Hérouxville.	
Gagnon, L. P.	St. David, Lévis Co.	St. David
Gagnon, Lucien.	L'Acadie, St. Jean d'Iberville Co.	
Garand, Emile.	Victoriaville, Arthabaska Co.	
Gatien, Patrice.	St. Dominique de Bagot.	
Gauthier & Tremblay.	c-o William Gauthier, Racine St., Chi- coutimi.	Rivière Moulin
Gauthier, William.	Warwick.	
Gauvreault, Elz.	Post Office, Drapeau.	
Gélinas, Nap.	Rang des Hêtres, Grand'Mère.	
Germain, Frs.	Pont Rouge.	
Gervais, Eddy.	St. Narcisse, Champlain Co.	Champlain
Giguère, Léonce.	Valley Junction.	
Gordon, Alfred.	Brigham, Brome Co.	Farnham West
Gosselin & Gosselin.	Chicoutimi.	Chicoutimi
Goyer, Edouard.	St. Bruno, Chambly Co.	
Goyette, Ovila.	Mont St. Grégoire, Iberville Co.	

SAND and GRAVEL—Continued

Name of Operator	Address	Location of Pit
Granby, The City of	c-o Chief Engineer, City Hall, Granby	Granby
Grandmaître, Donat	19 Olmstead North, Eastview, Ont.	Mountain road
Granger, Hédège	Ste. Marie Salomé, Montcalm Co.	St. Sulpice
Grenier, Apollinaire	Beauport Est.	Beauport
Hayden, R. B.	Hemmingford, Huntingdon Co.	Hemmingford
Hemmingford Council	c-o Secretary-Treasurer, Hemmingford	Hemmingford
Hervy, Adjuitor	St. Joseph d'Alma, Lac-St-Jean Co.	Ile d'Alma
Houde, J. B. F. (Dr.)	8 du Platon Street, Trois-Rivières	Ste. Marguerite
Houle, Fernand	St-Rémi, Laprairie-Napierville Co.	
Independent Sand Company (The)	4207 Old Orchard Avenue, Montreal	Lake St. Pierre
Jacques, Joseph	St. Joseph de Beauce	
Jeanotte, Téléphore	St. Hiluire, Rouville Co.	Rouville
Jetté, Albert	Actonvale, Bagot Co.	Acton
Kelly, W. H.	Buckingham	Buckingham
Kemp, Walter	Ste. Thérèse, Terrebonne Co.	Ste. Thérèse
Kennedy, Wm.	Gaspé South Bay	Gaspé South
Laberge, J. B.	Ste. Foy	
Lacasse, Josephat	Brownsburg	
Lafond, Ismael	St. Emile, Quebec County	
Lafortune, Imilien	25 Plage Bourget, Joliette Co.	
Lagacé, A.	Box No. 1, Rang St. Joseph, Monument, Beauport	
Lalumière, Georges	Rang des Vingt-Cinq, St. Bruno, Chambly Co.	St. Bruno
Landry, Moïse	Hemmingford, Huntingdon Co.	Hemmingford
Langvin, J. A.	12380 Dion St., Cartierville	St. Félix de Valois
Langlais, Joseph	Victoriaville, Arthabaska Co.	Arthabaska
Langlois, Georges	Montmagny, Montmagny Co.	Montmagny
Lanoue, C. A.	St. Alphonse, Joliette Co.	
Laporte, Arthur	53 de Lanaudière, Joliette	Lavaltrie
Laporte, Jos.	Rang du Vieux Moulin, Joliette	Lavaltrie
Lafulippe, E.	St. Louis de Pintendre, Levis Co.	
Laurende, Jos.	St. Félix de Valois	Lanoraie
Lauzon, Jos. A.	Petite Mascouche, Assomption Co.	Lachenaie
Lavallée, Michel	Contreccour, Verchères Co.	
LeBeau, Adélard	St. Dominique de Bagot	St. Dominique de Bagot
Lebeau, Antoine (Mrs.)	222 Lebeau Street, St. Jérôme	St. Jérôme
Lefebvre, Patrick	St. Ubald, Portneuf Co.	
Lemay, René	St. Jérôme, Terrebonne Co.	St. Jérôme
Léonard, Hormidas	St. Vincent de Paul	St. Vincent de Paul
Lepage, Ambroise	St. Côme, Joliette Co.	
Lepage, Wilfrid	St. Côme, Joliette Co.	Cathcart
Lessard, Irénée	St. Joseph de Beauce	
Levesque (Trafflé) & Gonzague	Kénoigami	Jonquiére
L'Heureux, Emile	Warwick, Arthabaska Co.	Warwick
Lippé, Ernest	Ste. Emélie de l'Energie, Joliette Co.	
Loranger, Pierre	395 Notre-Dame, Cap de la Madeleine	
Lussier, Azarie	Mascouche, Assomption Co.	Mascouche
McDonald, Charles	Rivière Beaudet, Soulanges Co.	
McGibbon, A.	Brownsburg	Brownsburg
Magog, City of	c-o Secretary-Treasurer, City Hall, Magog	Hatley
Mahoney & Rich Quarries, Limited	88 Bank Street, Ottawa, Ont.	
Marceau, J.	Ste. Anne de la Pérade	St. Charles Range
Marchand, Euclide	Almaville, Champlain Co.	Sr. Louis Range
Martin, Marius	Ste. Anne de la Pocatière	Ste. Anne de la Pocatière
Masse, Aquila	Joliette	Lavaltrie
Mercier, Omer	St. Grégoire, Montmorency Co.	
Mercure, Camille	9 St. Denis Street, St. Hyacinthe	St. Dominique de Bagot
Métras, Esdras	Mont St. Grégoire	Grand Bois Range
Milette, Eugène	Carbonneau, Lavolette Co.	
Moisan, A.	Lyster, Mégantic Co.	Nelson
Monast, Jos. H.	Mont St. Grégoire	Loreau Range
Montreal and Southern Counties Railway Company	St. Lambert	Abbotsford
Montréal, Sablière Municipale de	500 Defleurimont Street, Montreal	St. Félix de Valois
Moody, J. Harry	St. Louis Avenue, Terrebonne	Terrebonne Parish
Morin, N.	236 Jarry St., Montreal	Mascouche

SAND and GRAVEL—Continued

Name of Operator	Address	Location of Pit
Napierville Junction R'y Company.....	Room 412, Keefer Building, 1440 St. Catherine St. West, Montreal.	
Neault, Octave.....	St. Jacques des Piles.....	Buckingham
Newton, Wellington.....	Buckingham.....	
Nolin, Eugène.....	Victoriaville, Arthabaska Co.....	Beebe
Ogden, Municipality of.....	Stanstead.....	
Ouellette, Damase.....	Ste. Foy Parish.....	
Faquin, Oliva.....	St. Thuribe, Portneuf Co.....	
Faquin, Samuel.....	Deschambault, Portneuf Co.....	
Paradis, Pierre.....	St. Augustin, Portneuf Co.....	Hébertville
Parent, Edouard.....	Hébertville, Lac-St-Jean Co.....	
Pariseau, R.....	St. Paul, Joliette Co.....	Coaticook
Pepin (Abias) Ltée.....	Coaticook.....	Ste. Philomène
Pepin, Joseph.....	240 St. Thomas Street, Longueuil.....	Warwick
Pepin, Polidore.....	Warwick.....	Cleveland
Pères Trappistes de Mistassini (Les).....	Richmond.....	
Perron, Euclide.....	Mistassini, Lac-St-Jean Co.....	Rivière du Moulin
Pitt, Aug.....	Chicoutimi.....	
Plante, Arthur.....	Valleyfield.....	
Point Calumet Sand & Gravel Co., Ltd.....	Stratford Centre, Wolfe Co.....	
Poirier, Alphonse.....	St. Eustache, Deux-Montagnes Co.....	
Poirier, Irénée.....	St. Polycarpe, Soulanges Co.....	
Poliquin, Nap.....	St. Thomas, Montmagny Co.....	Ascot
Portelance, Alfred.....	42 St. Henri Street, Sherbrooke.....	
Poulin, Liza (Miss).....	Grondines, Portneuf Co.....	
Pronovost, Henri.....	Grenville, Argenteuil Co.....	
Quebec, City of.....	St. Narcisse.....	St. Michel de Beauport
Quebec Central Railway Company.....	c-o Chief Engineer, City Hall, Quebec.....	Ascot
Quinn (B.) & Co., Reg'd.....	89 Wellington Street, Sherbrooke.....	
Renaud, Elzéar.....	Windsor.....	St. Ignace
Rhéaume, Georges.....	Lac St-Charles.....	Lac St. Charles
Richard, Gustave.....	Lac St-Charles, Quebec Co.....	
Rivest, J. C. L.....	Ste. Marie Salomé.....	Lanoraie
Rivest, Z.....	St. Charles Borromée de Joliette.....	
Robert, Georges.....	St. Sulpice, L'Assomption Co.....	Giffard
Robert, Oscar.....	Beauportville.....	
Robert, Pierre.....	St. Rémi, Laprairie-Napierville.....	Beauport
Roberval & Saguenay R'y Co. (The).....	Beauport.....	St. Alexis de la Grande Baie
Robichaud, Charles.....	Davis Street, Arvida.....	
Rodger, David J.....	Ste. Marie Salomé.....	
Roulier, Arsène.....	R. R. No. 1, Lachute.....	
Roy, Arthur.....	L'Acadie, St. Jean-d'Iberville Co.....	
St. Louis, Nap.....	St. Romuald, Lévis Co.....	Fontarabie
Saumure, Octave.....	Ste. Ursule, Maskinongé Co.....	
Savard, Cyrille.....	Bouchette, Wright Co.....	St. Claude Range
Savard, Eugène.....	Loretteville.....	
Sénécal, Stanislas.....	St. Alban, Portneuf Co.....	Rouville
Shawinigan Engineering Co., Ltd. (The).....	St. Jean-Baptiste de Rouville.....	
	c-o H. Budden, Power Building, 107 Craig Street West, Montreal.....	St. Michel des Saints
	c-o M. Thos. Tremblay, City Engineer, Sherbrooke.....	Broughton road, Sherbrooke
Simard, Oscar.....	Hébertville Village, Lac-St-Jean.....	
Simonsau, Albert.....	R. R. No. 3, Ayer's Cliff, Stanstead Co.....	
Société de Construction Ouvrière de Chicoutimi (La).....	7 Lafontaine Avenue, Chicoutimi.....	Chicoutimi
Sorel Sand Co., Limited.....	82 Montcalm Street, St. Joseph de Sorel.....	
Soulard, Edmond.....	St. Augustin.....	
Standard Lime Co., Limited.....	Joliette.....	Ste. Emélie and Ste. Epiphanie
Standard Sand & Gravel, Limited.....	St. Félix de Valois.....	St. Félix de Valois
Stratford, Municipality of.....	Stratford, Wolfe Co.....	
Tardif, Maurice.....	Carrier Junction, Lévis Co.....	
Tardif, Théophile.....	Kateville, Stanstead Co.....	
Tardif, Valère.....	St. Valère, Arthabaska Co.....	
Témiscouata Railway Co.....	c-o C. A. Stewart, Manager, Rivière-du-Loup.....	
Tétreault, Emile.....	Mont St. Grégoire.....	
Tétu, Philippe.....	Montmagny.....	
Thérien, G.....	Mascouche, L'Assomption Co.....	

SAND and GRAVEL—Continued

Name of Operator	Address	Location of Pit
Thibault, Donat.....	Howick, Chateauguay Co.....	Cap de la Madeleine
Thibault, Maurice.....	40 Fusey St., Cap de la Madeleine.....	
Thouin, J.....	Mascouche.....	St. Louis Range
Touchette, Albert.....	Ste. Rose de Lima.....	
Touchette, Arthur.....	Ste. Thérèse, Terrebonne Co.....	
Tremblay, Anatole.....	L'Acadie, St. Jean d'Iberville Co.....	
Tremblay, Emery.....	5633 Côte des Neiges, Montreal.....	
Tremblay, Henri.....	St. Fulgence, Chicoutimi Co.....	
Tremblay, John.....	Grande Baie, Chicoutimi Co.....	
Tremblay, Joseph.....	St. Marc de Shawinigan Falls.....	
Tremblay, Thomas Louis.....	St. Jérôme, Lac St-Jean Co.....	
Trottier, L. O.....	633 Bonaventure Street, Trois-Rivières.....	
Trudel, Alfred L.....	St. Narcisse, Champlain Co.....	Almaville
Turgeon, Sylvio.....	L'Assomption.....	
Vanier, A.....	Ste. Thérèse, Terrebonne Co.....	
Varette, Pierre.....	St. Emile, Quebec Co.....	
Venne, Oscar.....	Lachenaie.....	
Verret, Louis.....	Lac St. Charles, Notre-Dame des Laurentides.....	
Vézina, Edouard.....	St. Emile, Quebec Co.....	
Vézina, Edouard.....	St. Joseph de Lévis.....	
Voirie, Département de, Québec.....	Parliament Buildings, Quebec.....	
Wheeler, W. J.....	Eastman.....	

SAND-LIME BRICK

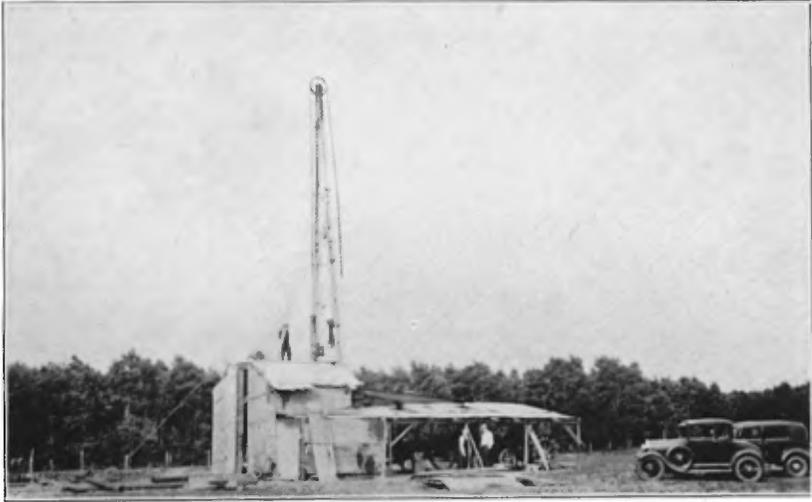
Name of Operator	Address	Location of Plant
Canadian Carborundum Company.....	Shawinigan Falls.....	St. Canut
Standard Lime Company, Limited.....	Joliette.....	Montreal

SANDSTONE

Name of Operator	Address	Location of Quarry
Beaubarnois Light, Heat & Power Co.....	Power Building, Montreal.....	St. Louis de Pintendre and St-Nicholas
Blais (Jos.), Enrg.....	10 Mont-Marie Avenue, Lévis.....	
Cloutier, Emile.....	L'Islet.....	Ste. Foy
Corrigan, Jos.....	St. Louis Road, Sillery.....	
Gagnon, Ls. Philippe.....	St. David, Lévis Co.....	New Carlisle
Montmagny, Carrière de la Ville de.....	Montmagny.....	
Rousseau, T. E.....	48 Second Avenue, Quebec.....	
Sherbrooke, City of.....	c-o Thos. Tremblay, City Engineer, Sherbrooke.....	Ascot
Sherbrooke Quarry, Limited.....	395 Bowen Street S., Sherbrooke.....	Parish of Ste. Foy
Vézina (Joseph) Enrg.....	Bergerville.....	

SLATE and SHALE

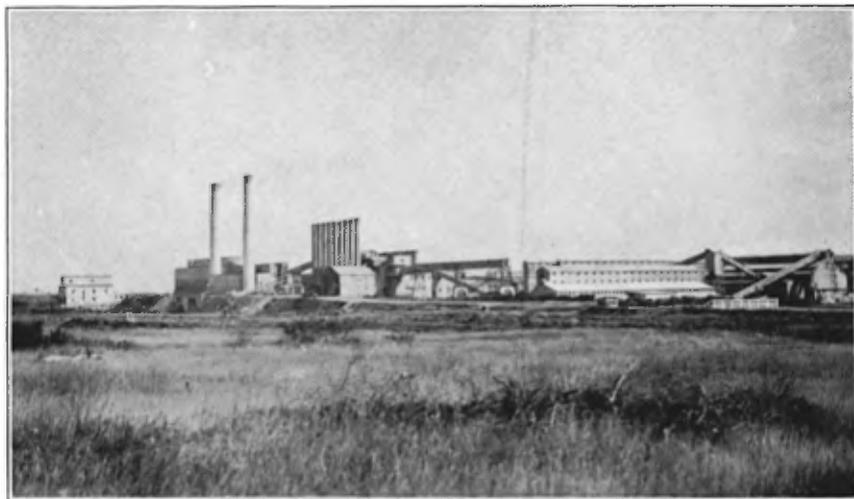
Name of Operator	Address	Location of Quarry
Brique Citadelle Ltée (La).....	14 St. Joseph Street, Quebec.....	Lauzon
Broughton Soapstone & Quarry Co., Ltd.....	Broughton Station.....	Ste. Hénédine
Davis Slate & Manufacturing Co. of Canada, Limited.....	131 Shaftesbury Avenue, Toronto, Ont.	
Mystic Slate Co., Limited (The).....	c-o David, Dugas & Webster, 507 Place d'Armes, Montreal.....	Stanbridge
Taylor, John.....	R.R. No. 4, Granby.....	



A.—Spire derrick of Cartier Natural Gas Company, cadastral lot 322, Saint-Joseph-de-Lanoraie, Berthier county.



B.—Domestic gas-tank at Pointe-du-Lac, supplying a house from a natural-gas well, 300 feet deep, on cadastral lot No. 396.



A.—Canada Cement Company plant, Montreal-East.



B.—Granite quarry of Stanstead Granite Quarries Company, Limited, in Stanstead township. The building stone piled in quarry was used in Salaberry-de-Valleyfield cathedral.

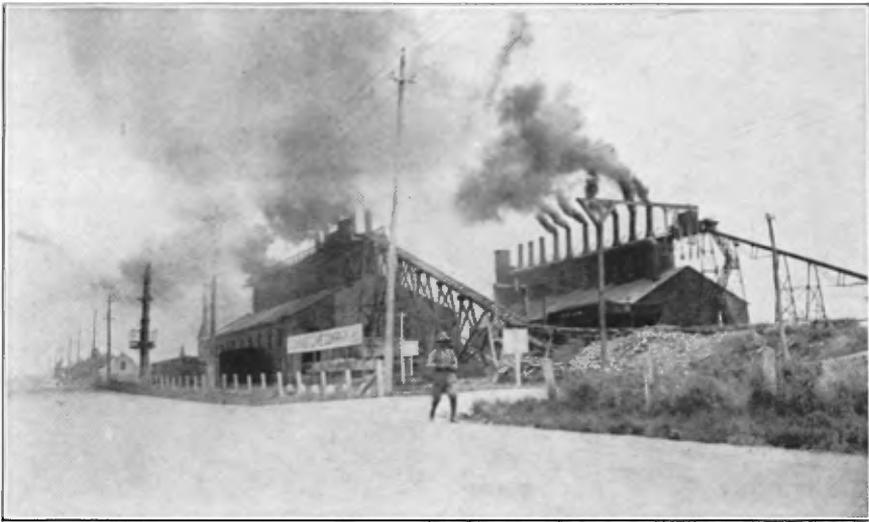


A.—Auguste Dumas granite quarry, Rivière-à-Pierre. On the flat car, the Jacques Cartier memorial, in a semi-finished state.



(Photo by A. Dumas)

B.—Jacques Cartier Memorial in course of erection at Gaspé.



A.—Lime kilns, Standard Lime Company, at Joliette.



B.—Caleite mine operated by Emile Gagnon, located on lot 2, range I, Métabetchouan township.



A.—No. 2 shaft of Arntfield mine, Beauchastel township, March, 1935.



B.—Lake Fortune mine, Beauchastel township. Fortune lake in background.
September, 1934.



A.—McWatters mine, Rouyn township, March, 1935.



B.—O'Brien Gold mine, Cadillac township, January, 1935.



A.—Siscoe Mine mill, Dubuison township, February, 1935.



B.—Main shaft and primary crushing plant of Siscoe mine, Dubuison township, February, 1935.



A.—No. 6 inclined shaft and mill of Lamaque mine, Bourlamaque township, February, 1935.



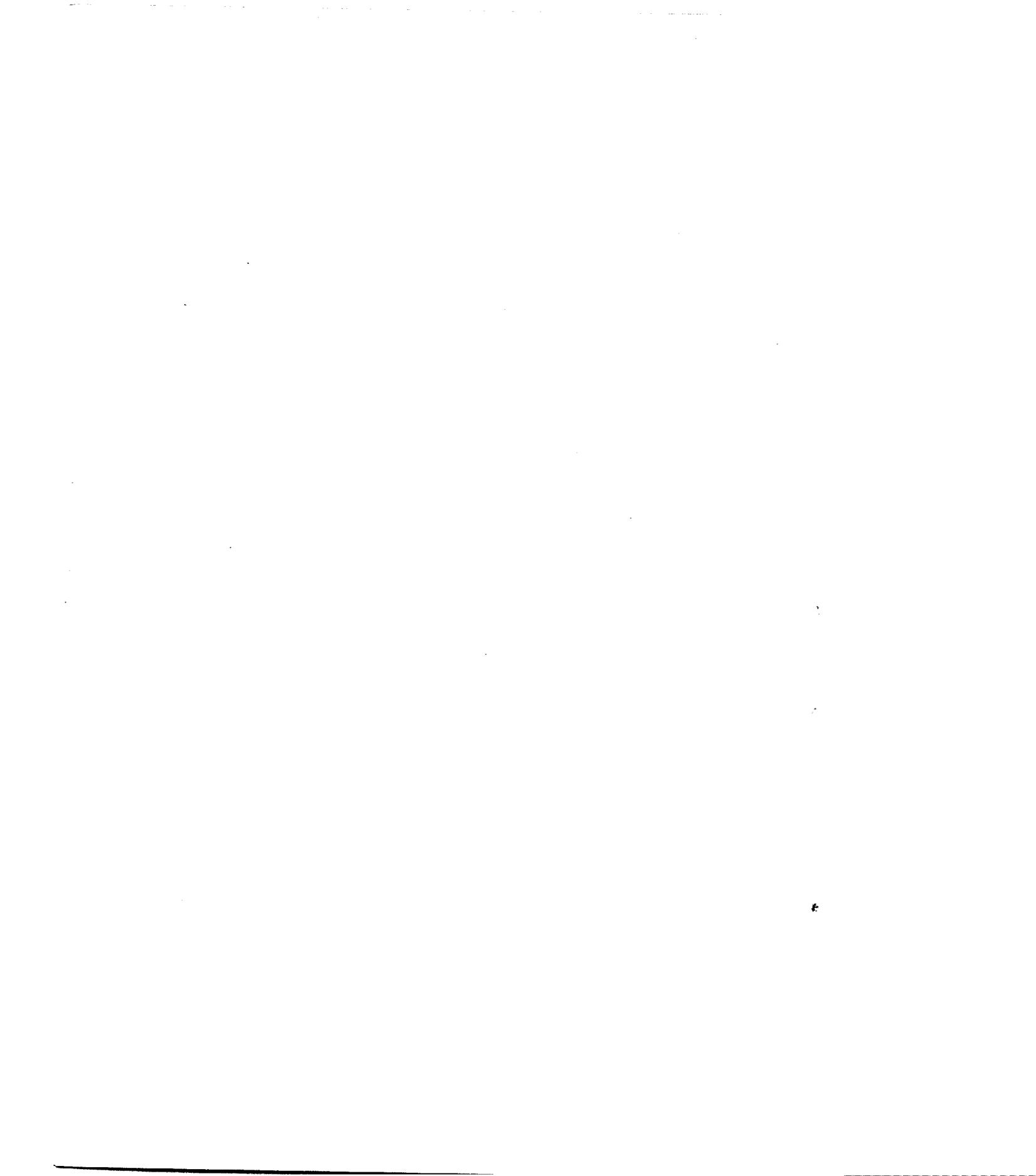
B.—Shawkey mine, Dubuisson township, February, 1935.



A.—Manley Quebec mine, La Reine township, February, 1935.



B.—Chibougamau Consolidated mine at Doré lake, McKenzie township, March, 1935.



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