

GM 67015

THE MINING INDUSTRY OF THE PROVINCE OF QUEBEC IN 1960

Documents complémentaires

Additional Files



Licence



License

Cette première page a été ajoutée
au document et ne fait pas partie du
rapport tel que soumis par les auteurs.

Énergie et Ressources
naturelles

Québec 



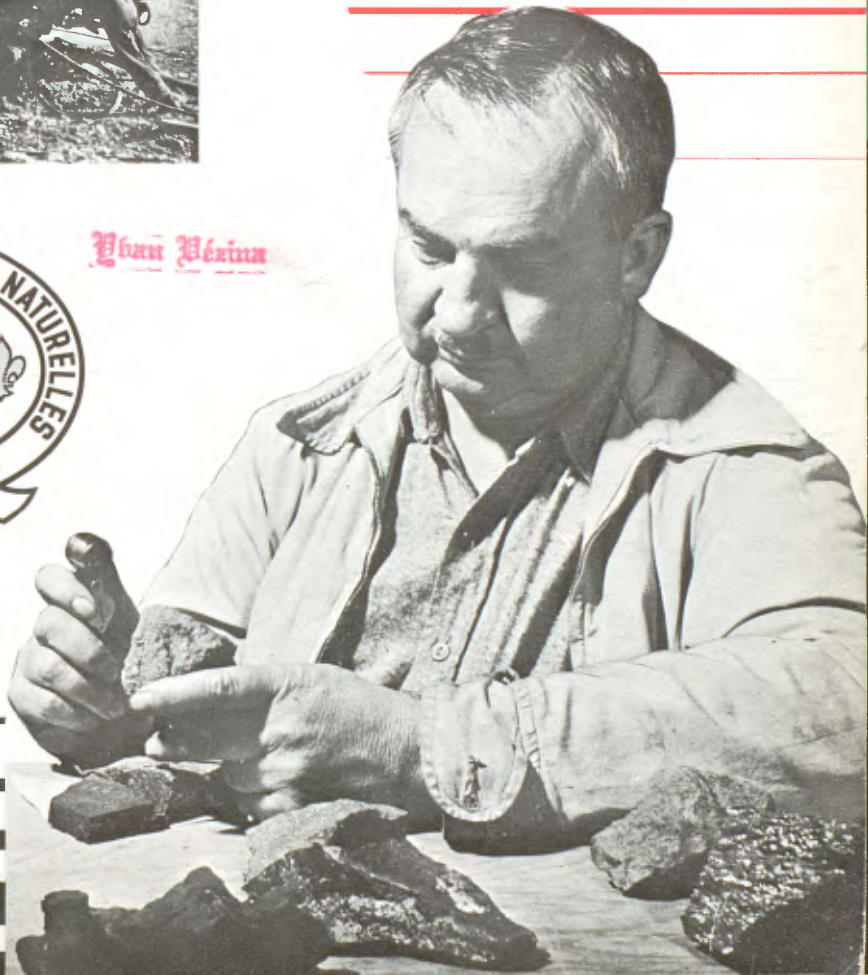
MINING INDUSTRY of the province of QUEBEC

1960



Plan Héroux

GM 67015



PROVINCE OF QUEBEC, CANADA

DEPARTMENT OF NATURAL RESOURCES

Honourable RENÉ LÉVESQUE, Minister

P.-E. AUGER, Deputy Minister

THE MINING INDUSTRY

OF THE

PROVINCE OF QUEBEC

IN

1960



QUEBEC

—
1962

GM 67015

To the Honourable René Lévesque,
Minister of Natural Resources,
Quebec, Que.

Sir:

I beg to submit herewith the report entitled "The Mining Industry of the Province of Quebec in 1960". This report contains a detailed account of mining operations and statistical data for the year 1960.

This report has been prepared by the technical staff of the Department.

The term "production", as used throughout this report, is synonymous with "quantity sold", "shipped" or "used", and does not necessarily represent "annual output".

Unless otherwise noted, the ton specified in the text and tables of this report is that of 2,000 pounds. Values are given in Canadian funds.

As it would be impractical to mention in this report all those who have contributed to the mineral production of the Province, a list of the "Principal Operators and Owners of Mines and Quarries in the Province of Quebec" is published separately and brought up to date when warranted by changes of names and addresses.

In addition to this annual report on the mining industry, the Department issues a "General Report of the Minister of Natural Resources" which deals mostly with administrative matters and covers the fiscal year ending on March 31st.

In order to acquaint the public, as soon as possible, with the state of the mining industry, the Department publishes at the beginning of each year an interim report summarizing the progress made by the industry during the year just ended. It also publishes "Geological Reports" with maps, to make public the results of the field work done by geologists of the Department.

Finally, the publication of "Preliminary Reports" often precedes that of the "Geological Reports". Prepared at the end of the field season, these "Preliminary Reports" are issued to render available to the public, within the shortest time possible, the results obtained by geological parties in the field.

Respectfully submitted,

PAUL-E. AUGER,
Deputy Minister.

Department of Natural Resources,
Quebec

December 1961

CONTENTS

	<u>Page</u>
General review	1
Table of annual value of mineral production since 1898	2
Table of mineral production, 1959 and 1960	3
Table of mineral production of the Province of Quebec, 1925 - 1960	4
Prospecting and staking of mining claims	5
Metallic substances in 1960	6
General review	6
Gold ore-dressing plants	7
Table of average Canadian prices of metals, 1955 - 1960	7
Base-metal ore-dressing plants	8
Capital expenditures of mining companies in Quebec in 1960	9
Dividends paid by Quebec metal mines, 1930 - 1960	10
Bismuth	11
Cadmium	11
Copper	12
Gold	13
Table of gold production in 1960	14
Table of gold production, 1951 - 1960	15
Table of gold production, 1926 - 1960	16
Iron and iron ore	18
Lead	19
Molybdenum	20
Selenium and tellurium	21
Silver	22
Titaniferous iron	23
Zinc	23
Non-metallic minerals	25
I. - Industrial minerals	25
General review	25
Asbestos	25
Table of world production of asbestos, 1956 - 1960	27
Table of asbestos production in the Province of Quebec, 1959 and 1960	28
Feldspar	31
Lime, limestone, marble (Industrial)	31
Lithium oxide	34
Marl (Industrial)	34
Magnesitic dolomite and brucite	34
Mica	35
Mineral pigments	36
Ochre	36
Titanium oxide	36

	<u>Page</u>
Peat	37
Petroleum and natural gas	37
Pyrite and sulphur	40
Quartz, silica and industrial sand	40
Soapstone and talc	42
II. - Building materials	42
General review	42
Cement	43
Clay and shale products and sand-lime brick	44
Crushed stone	46
Granite	46
Lime and limestone (Building)	48
Marble (Building).....	50
Sand and gravel	50
Sandstone, slate and clay	51
Exploration in the Province of Quebec in 1960	52
Development and mining operations in the Province of Quebec in 1960	65
Metallic substances	65
Non-metallic industrial minerals	108
Building materials	121
Table of exploratory diamond drilling in the Province of Quebec in 1960	135
Employment, wages and accidents in mines and quarries in 1960	147
Alphabetical index	162

PLATES

- I - Diesel and railroad equipment repair shop at
Port-Cartier
 - II - Slag returned to reverbatory furnace
 - III - Gas well head, Bald Mountain Oil Co.
 - IV - Trackless mining equipment
-

T H E M I N I N G I N D U S T R Y

of the

PROVINCE OF QUEBEC

IN 1960

General Review

In 1960, the mining industry of the Province of Quebec delivered to local and world markets thirty-seven different mineral substances or products, valued, as a whole, at \$446,637,201.

This value of the mineral production of the Province was \$5,337,540 or 1.2 per cent greater in 1960 than that for the year 1959, despite some serious upheavals in the North American economy. This gain, though quite small, must be credited entirely to the income received by the producers of the industrial minerals as a group.

For example, the value of \$224,355,382 received for all the metallic substances, in 1960, was 3.5 per cent lower than the similar total aggregated in 1959. However, bearing in mind that the iron ore industry saw its sales diminish by more than \$30,000,000, it must be agreed that 1960 was a good year financially for the majority of the producers of other metallic substances.

The combined value of the production of building materials, in 1960, also declined by 3.5 per cent with respect to the value for 1959. This loss of \$3,047,103 is distributed among almost all the producers in this group, but no one group recorded a loss comparable to that suffered by the iron ore producers.

Table 1. - Annual Value of the Mineral Production of
the Province of Quebec since 1898

Year	Value	Year	Value	Year	Value
1898	\$ 1,673,337	1919	\$ 20,813,670	1940	\$ 86,418,853
1899	2,083,272	1920	28,392,939	1941	99,700,027
1900	2,546,076	1921	15,522,988	1942	104,404,146
1901	2,987,731	1922	18,335,153	1943	101,840,299
1902	2,985,463	1923	21,326,314	1944	90,198,739
1903	2,772,762	1924	18,952,896	1945	91,570,982
1904	3,023,568	1925	23,824,912	1946	92,213,656
1905	3,750,300	1926	25,740,002	1947	116,042,000
1906	5,019,932	1927	29,124,110	1948	152,285,045
1907	5,391,368	1928	37,325,237	1949	165,168,603
1908	5,458,598	1929	46,454,820	1950	220,665,103
1909	5,552,062	1930	41,158,740	1951	255,931,822
1910	7,323,281	1931	36,051,366	1952	270,739,552
1911	8,679,786	1932	25,683,066	1953	252,354,181
1912	11,187,110	1933	28,164,540	1954	278,932,718
1913	13,119,811	1934	31,310,752	1955	357,562,029
1914	11,732,783	1935	39,141,734	1956	423,003,917
1915	11,465,873	1936	49,755,985	1957	406,488,734
1916	13,287,024	1937	65,203,976	1958	366,001,902
1917	16,189,179	1938	68,877,345	1959	441,299,661
1918	18,707,762	1939	77,312,141	1960	446,637,201

Table 2. - Mineral Production of the Province of Quebec in 1959 and 1960

Substance	1960		1959		
	Quantity	Value	Quantity	Value	
METALLICS					
Bismuth	pounds	172,983	\$ 297,018	151,576	\$ 264,228
Cadmium	pounds	66,499	94,429	-	-
Copper	pounds	314,939,446	95,395,158	269,823,777	79,894,820
Gold	ounces	1,033,072	(a) 35,072,794	997,094	(a) 33,472,446
Iron		-	10,972,979	-	7,187,434
Iron ore (b)	tons	7,457,971	61,752,485	11,515,169	92,497,012
Lead	pounds	5,338,901	570,195	5,819,148	617,412
Magnesium	pounds	-	-	4,059,508	977,123
Molybdenum	pounds	762,207	1,005,880	748,566	940,596
Selenium	pounds	279,759	1,958,313	194,233	1,359,631
Silver	ounces	4,114,993	3,658,640	4,109,772	3,607,558
Tellurium	pounds	29,925	104,738	1,662	3,573
Titaniferous iron ore	tons	20,519	174,151	36,210	214,367
Zinc	pounds	99,614,995	13,298,602	94,115,963	11,519,794
Sub-totals .		-	\$ 224,355,382	-	\$ 232,555,994
NON-METALLICS					
I.-Industrial Minerals					
Asbestos	tons	1,054,424	\$ 107,788,171	992,196	\$ 95,226,769
Feldspar	tons	13,862	239,273	17,953	301,372
Industrial lime	tons	368,190	4,053,221	361,854	4,040,274
Industrial limestone and marble ..	tons	727,149	2,018,572	534,743	1,606,342
Lithium	pounds	204,666	84,135	2,756,280	1,422,153
Magnesitic dolomite and brucite ..		-	3,279,021	-	3,050,779
Marl	tons	127,000	190,500	130,375	195,563
Mica	pounds	1,234,828	85,272	778,076	62,045
Mineral water	gallons	372,799	199,874	366,088	201,033
Ochre and iron oxide	tons	909	76,780	1,235	108,286
Peat (moss and humus)	tons	56,731	1,342,338	50,578	1,282,081
Quartz and industrial sand	tons	357,165	1,835,960	301,706	1,533,206
Soapstone and talc	tons	14,222	157,611	15,937	185,951
Sulphur	tons	290,555	1,937,639	328,252	1,927,109
Titanium dioxide and other titanium products		-	12,947,000	-	8,507,149
Sub-totals .		-	\$ 136,235,367	-	\$ 119,650,112
II.-Building Materials					
Building marble	tons	15,988	\$ 135,570	23,560	\$ 167,789
Building lime	tons	27,374	345,573	38,246	486,615
Building limestone	tons	16,914,843	19,580,487	17,479,834	20,660,191
Cement	tons	1,875,997	28,315,159	1,975,452	29,520,710
Clay products {Brick	M	142,113	6,136,723	185,175	8,135,595
{Other products ...		-	1,956,315	-	2,238,567
Granite	tons	1,581,440	5,215,312	1,419,317	5,056,980
Sand and gravel	tons	46,255,963	22,620,093	42,449,734	21,269,248
Sand-lime products {Brick	M	22,590	563,675	19,570	489,281
{Blocks	No.	92,543	17,757	160,213	30,664
Sandstone	tons	895,042	1,070,547	783,635	980,324
Slate and shale	tons	115,475	89,241	56,346	57,591
Sub-totals .		-	\$ 86,046,452	-	\$ 89,093,555
TOTALS ...		-	\$ 446,637,201	-	\$ 441,299,661

(a) Value in Canadian funds. The standard value at the rate of \$20.671834 per ounce troy is \$21,355,493 for 1960 and \$20,611,762 for 1959.

(b) In view of the uncertainty as to the boundary line between Quebec and Newfoundland, it is possible that this does not represent all the production of the Province of Quebec.

Table 3. - Mineral Production of the Province of Quebec, 1925-1960 (a)

Year	Metals		Industrial Minerals		Building Materials		Total
	Value	%	Value	%	Value	%	
1925	\$ 1,034,188	5	\$ 10,915,663	46	\$11,875,061	49	\$ 23,824,912
1926	1,897,528	8	10,837,745	42	13,004,929	50	25,740,202
1927	2,412,268	8	11,328,885	39	15,382,957	53	29,124,110
1928	8,127,152	22	12,058,974	32	17,139,161	46	37,325,287
1929	13,671,009	29	14,249,646	31	18,534,165	40	46,454,820
1930	13,926,682	35	9,322,151	22	17,909,907	43	41,158,740
1931	12,367,932	34	5,516,899	15	18,166,535	51	36,051,366
1932	13,914,089	54	3,671,634	14	8,097,343	32	25,683,066
1933	16,360,011	58	6,043,308	22	5,761,221	20	28,164,540
1934	19,258,094	61	6,579,453	21	5,473,205	18	31,310,752
1935	23,804,792	61	8,824,178	22	6,512,764	17	39,141,734
1936	30,643,787	62	12,388,178	25	6,724,020	13	49,755,985
1937	38,615,175	59	17,232,860	27	9,355,941	14	65,203,976
1938	43,199,795	63	14,931,649	22	10,745,901	15	68,877,345
1939	47,650,509	61	18,360,017	24	11,301,615	15	77,312,141
1940	54,235,364	63	19,229,099	22	12,954,390	15	86,418,853
1941	59,126,794	59	26,562,446	27	14,010,787	14	99,700,027
1942	61,083,964	59	28,625,041	27	14,695,141	14	104,404,146
1943	59,727,333	59	29,637,056	29	12,475,910	12	101,840,299
1944	51,520,713	57	26,763,353	30	11,914,673	13	90,198,739
1945	48,082,817	52	29,045,463	32	14,442,702	16	91,570,982
1946	40,602,170	44	31,573,378	34	20,038,108	22	92,213,656
1947	50,159,626	43	39,792,717	34	26,089,657	23	116,042,000
1948	66,103,854	44	50,749,672	33	35,431,519	23	152,285,045
1949	82,728,089	50	47,173,969	29	35,266,545	21	165,168,603
1950	108,897,715	49	73,128,980	33	38,638,408	18	220,665,103
1951	120,257,513	47	89,010,161	35	46,664,148	18	255,931,822
1952	120,283,133	44	97,233,834	36	53,222,585	20	270,739,552
1953	103,278,622	41	96,392,456	38	52,683,103	21	252,354,181
1954	128,582,455	46	94,092,032	34	56,475,399	20	278,932,718
1955	184,680,850	52	105,890,962	29	66,990,217	19	357,562,029
1956	237,763,816	56	114,939,075	27	70,301,026	17	423,003,917
1957	200,853,044	49	120,606,214	30	85,029,476	21	406,488,734
1958	176,695,307	48	104,372,724	29	84,933,871	23	366,001,902
1959	232,555,994	53	119,650,112	27	89,093,555	20	441,299,661
1960	224,355,382	50	136,235,367	31	86,046,452	19	446,637,201

(a) Mineral production figures for the years 1910 to 1924 will be found in "Mining Industry of the Province of Quebec in 1956".

PROSPECTING AND STAKING OF MINING CLAIMS

Prospecting activities in the Province of Quebec were at a low ebb in 1960. These activities are represented by various mining titles each of which covers a necessary phase preliminary to mining operations.

Reference to Table 4 shows that the increase in activities was centered on two phases only, represented by development permits issued and mining concessions granted. The greatest loss was recorded under the heading of development licenses renewed, an indication of the little success obtained through the performance of statutory work.

This work, summarized in Table 5, is required by the Quebec Mining Act of all those who wish to obtain and to hold mining rights.

Table 4. - Mining Titles Issued, or Renewed,
from 1951 to 1960

Year	Miner's Certificates Issued	Claims Recorded	Development Licenses Issued	Development Licenses Renewed	Mining Concessions Granted
1951	7,435	21,094	1,494	4,413	7
1952	7,337	22,649	1,484	5,147	8
1953	8,866	22,352	1,232	5,367	11
1954	11,571	30,745	2,036	5,339	2
1955	17,781	49,000	2,872	5,890	11
1956	16,746	55,523	3,869	6,552	8
1957	14,770	49,084	2,939	6,868	6
1958	16,225	52,550	3,560	6,222	11
1959	11,361	42,777	3,539	6,349	9
1960	8,413	25,916	6,785	1,595	13

Table 5. - Exploratory Work on Claims and Lands under License,
Reported for the Years 1951 to 1960

Year	Number of Working Days	Number of Feet of Drilling
1951	956,451	705,570
1952	871,307	590,788
1953	672,900	394,194
1954	664,447	295,221
1955	1,107,712	417,144
1956	2,338,452	1,321,429
1957	2,298,128	1,511,580
1958	1,335,888	624,104
1959	1,599,072	741,907
1960	1,251,048	730,225

M E T A L L I C S U B S T A N C E S

IN 1960

General Review

The general table showing the mineral production of the Province of Quebec lists fourteen metals or metallic substances. No magnesium was produced in Quebec in 1960. On the other hand, the list includes a new item: cadmium. Of the twelve remaining products, eight show a gain and four, a loss, compared with the amounts of sales recorded in 1959.

The increase in revenues was due to an increase in production. It is true, however, that most metals were sold at slightly higher prices than those prevailing in 1959, but this up-grading of unit prices was, in most cases, too small to account for the larger amounts received.

The year 1960 was also one of progress in the development of new deposits of metallic ores. Quebec Cartier Mining began tuning-up its Lac Jeannine concentrating plant; Anglo-American Molybdenite Mining Corporation, The Coniagas Mines Limited, Consolidated

Vauze Mines Limited, Lamaque Mining Company, Marban Gold Mines Limited, Marbridge Mines Limited, Mattagami Lake Mines Limited, Preissac Molybdenite Mines Limited, Solbec Copper Mines Limited, and St. Lawrence Columbian and Metals Corporation were engaged in large-scale development programmes such as shaft sinking and construction of buildings and concentrating plants. Some of these companies will be in production in 1961; others, in 1962.

Table 6. - Gold Ore-dressing Plants*

Plant	Township	Maximum Daily Capacity (Tons)
Barnat Mines Limited	Fournière	600
Bevcon Mines Limited	Louvicourt	800
Canadian Malartic Gold Mines Limited	Fournière	1,300
East Malartic Mines Limited	Fournière	1,500
Lamaque Gold Mines Limited	Bourlamaque	2,000
Malartic Gold Fields Limited ...	Fournière	1,800
Sigma Mines (Quebec) Limited ...	Bourlamaque	1,100
Sullivan Consolidated Mines Limited	Dubuisson	500
Total capacity (January 1960)		9,600
Total capacity (December 1960)		9,600

*These plants also produce silver.

Table 7. - Average Price of Some Metals in Canada
from 1955 to 1960

	1955	1956	1957	1958	1959	1960
Gold, dollars per ounce troy	34.52	34.45	33.55	33.98	33.57	33.95
Silver, cents per ounce troy	88.18	89.68	87.37	86.81	87.78	88.91
Copper, cents per pound	36.88	41.41	28.95	25.42	29.61	30.29
Lead, cents per pound	14.38	15.51	13.96	11.36	10.61	10.68
Zinc, cents per pound	13.65	14.84	12.09	10.88	12.24	13.35
Selenium, dollars per pound	7.50	13.50	11.00	7.50	7.00	7.00
Tellurium, dollars per pound	1.75	1.75	1.75	1.70	2.15	3.50

Table 8. - Base-metal Ore-dressing Plants

Plant	Township	Daily Capacity (Tons)	Metals Produced (a)										
			Cu	Fe	Pb	Zn	Mo	Bi	Li	Py	Au	Ag	
Anacon Lead Mines Limited (b)	La Dauver-sière	500	x									x	x
Campbell Chibougamau Mines Limited	Obalski	2,000	x									x	x
Copper Rand Chibougamau Mines Limited	McKenzie	1,500	x									x	x
East Sullivan Mines Limited	Bourlamaque	2,500	x			x					x	x	x
Gaspé Copper Mines Ltd..	Holland	6,500	x						x			x	x
Hilton Mines, The	Bristol	3,000		x									
Manitou-Barvue Mines Limited	Bourlamaque	1,300	x		x	x						x	x
Merrill Island Mining Corporation Limited ..	Obalski	500	x									x	x
Molybdenite Corporation of Canada Limited	Lacorne	650					x	x					
New Calumet Mines Limited	Grand-Calumet	750			x	x						x	x
Noranda Mines Limited ..	Rouyn	4,000	x								x	x	x
Normetal Mining Corporation Limited ..	Desmeloizes	1,000	x			x					x	x	x
Opemiska Copper Mines (Quebec) Limited	Lévy	2,000	x									x	x
Quebec Lithium Corpora-tion	Lacorne	1,800								x			
Quemont Mining Corp.	Rouyn	2,300	x			x						x	x
Waite Amulet Mines Limited	Dufresnoy	2,000	x			x					x	x	x
Total capacity (January 1960)		32,300											
Total capacity (December 1960)		31,800											

(a) Symbols used mean : Cu, copper; Fe, iron; Pb, lead; Zn, zinc; Mo, molybdenum; Bi, bismuth; Li, lithium; Py, pyrite; Au, gold; Ag, silver.

(b) Closed indefinitely in November 1960.

Table 9. - Capital Expenditures of the Principal Mine Operators
in the Province of Quebec in 1960

- (a) Total cost of all work performed by operators of non-producing mining properties.
- (b) Capital expenditures of operators of producing mines.

Substances	Non-producing Mines (a)	Producing Mines (b)	Total Capital Expenditures
Asbestos	\$ 486,853	\$ 6,270,235	\$ 6,757,088
Columbium	445,310	-	445,310
Copper	7,855,467	4,844,481	12,699,948
Feldspar and quartz ...	-	177,549	177,549
Iron	45,751,550	5,835,079	51,586,629
Titaniferous iron	118,467	3,938,897	4,057,364
Lithium	9,660	835,355	845,015
Magnesite and brucite .	-	961,756	961,756
Molybdenite	331,267	88,556	419,823
Nickel	405,609	-	405,609
Gold	1,254,959	1,393,726	2,648,685
Petroleum	150,401	-	150,401
Peat	-	66,203	66,203
Zinc and lead	2,830,861	98,668	2,929,529
Others	126,068	3,075	129,143
Total 1960	\$ 59,766,472	\$ 24,513,580	\$ 84,280,052
Total 1959	\$ 50,081,772	\$ 21,899,347	\$ 71,981,119
Total 1958	\$ 25,443,631	\$ 36,255,597	\$ 61,699,228
Total 1957	\$ 65,152,480	\$ 37,779,380	\$ 102,931,860
Total 1956	\$ 36,806,688	\$ 22,558,379	\$ 59,365,067
Total 1955	\$ 23,102,904	\$ 38,147,556	\$ 61,250,460
Total 1954	\$ 31,734,836	\$ 37,908,892	\$ 69,643,728
Total 1953	\$ 24,532,595	\$ 23,668,780	\$ 48,201,375
Total 1952	\$ 20,982,184	\$ 27,665,732	\$ 48,647,916
Total 1951	\$ 12,263,402	\$ 19,708,780	\$ 31,972,182

Table 10. - Dividends Paid by Companies Operating Metal Mines
in the Province of Quebec, from 1930 to 1960, Inclusive

Company	Authorized Capital (shares)	Date of first Dividend	Dividends in 1960		Total Dividends (to end of 1960)
			Total	Rate per share	
Anacon Lead Mines Limited	6,500,000	Jan.29th, 1952	\$ -	\$ -	\$ 1,050,000.00
Beattie Gold Mines Limited ...	5,000,000	June 1st, 1936	-	-	1,438,481.20
Beattie Gold Mines (Quebec) Limited	5,000,000	Aug.15th, 1939	-	-	2,996,541.44
Belleterre Quebec Mines Ltd...	1,500,000	Sept.15th,1945	-	-	6,375,000.00
Canadian Malartic Gold Mines Limited	4,000,000	Sept. 8th,1937	-	-	3,120,683.55
East Malartic Mines Limited ..	4,000,000	June 1st, 1940	-	-	3,440,000.00
East Sullivan Mines Limited ..	4,500,000	May 25th, 1950	425,000.00	0.10	19,066,750.00
Elder Mines Limited	3,000,000	June 15th,1951	-	-	219,524.40
Francoeur Mines Limited	6,000,000	Dec.20th, 1940	-	-	208,833.31
Golden Manitou Mines Limited .	3,500,000	Oct. 1st, 1948	-	-	2,550,006.95
Hollinger North Shore Exploration Co. Limited	3,000,000	Dec.28th, 1959	2,426,375.00	1.00	4,852,750.00
Lake Dufault Mines Limited ...	5,000,000	Jan.20th, 1942	-	-	1,310,556.00
Lamaque Gold Mines Limited ...	3,000,000	Jan. 2nd, 1939	600,000.00	0.20	18,915,000.00
McWatters Gold Mines Limited .	5,000,000	Dec.18th, 1935	-	-	653,577.10
Malartic Gold Fields Limited .	4,000,000	Aug. 1st, 1941	-	-	2,000,000.00
New Calumet Mines Limited	5,000,000	Jan.14th, 1949	-	-	3,259,888.97
New Senator-Rouyn Limited	5,000,000	Feb.20th, 1943	-	-	102,249.99
Noranda Mines Limited	6,000,000	Jan. 2nd, 1930	8,959,263.00	2.00	234,199,205.13
Normetal Mining Corporation Limited	4,000,000	June 24th,1946	1,014,393.24	0.27	21,039,267.20
O'Brien Gold Mines Limited ...	4,000,000	Feb. 1st, 1939	-	-	2,925,000.00
Opemiska Copper Mines (Quebec) Limited	6,000,000	Dec.30th, 1960	551,500.00	0.10	551,500.00
Perron Gold Mines Limited	5,000,000	Dec.21st, 1938	-	-	2,820,000.00
Powell Rouyn Gold Mines Limited	3,000,000	Oct.16th, 1939	-	-	425,000.00
Quemont Mining Corporation Limited	2,500,000	Dec.28th, 1951	1,891,951.20	0.90	29,009,918.40
Sigma Mines Limited	3,000,000	Sept.1st, 1937	-	-	30,000.00
Sigma Mines (Quebec) Limited .	1,000,000	July 27th,1940	200,000.00	0.20	9,600,000.00
Siscoe Mines Limited	5,000,000	Mar.31st, 1932	-	-	8,650,408.86
Stadacona Mines (1944) Limited	5,000,000	Feb.16th, 1948	-	-	1,075,293.48
Sullivan Consolidated Mines Limited	4,000,000	Jun.15th, 1937	-	-	9,600,000.00
Waite-Amulet Mines Limited ...	3,500,000	Jul.15th, 1940	2,640,000.00	0.80	65,835,000.00
Total			\$18,708,482.44	-	\$457,320,434.98

(a) Noranda Mines Limited received the following amounts in dividends and interest on investment: \$4,721,316 in 1960 and \$76,019,183 from 1946 to 1960 inclusive.

(b) Siscoe Mine closed in 1949. From the end of 1951 dividends are no longer considered as derived from direct mining operations.

BISMUTH

Molybdenite Corporation of Canada Limited and Gaspé Copper Mines Limited are the sole producers of bismuth in the Province. The metal, marketed in the shape of ingots of high purity, is a by-product of the treatment of the ore mined by these companies.

The 1960 production, 172,983 pounds valued at \$297,108, surpasses the output of 1959 by 14 per cent in quantity and 12 per cent in value.

More than 70 per cent of the bismuth used is alloyed with other metals such as zinc, tin and lead. The remainder is employed in the manufacture of pharmaceutical products, cosmetics and pigments.

Table 11. - Production of Bismuth in the Province of Quebec
1953 to 1960

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1953	46,068	\$ 49,136	1957	160,093	\$ 267,903
1954	33,324	65,143	1958	240,177	436,420
1955	105,129	210,636	1959	151,576	264,228
1956	122,128	230,213	1960	172,983	297,108

CADMIUM

Cadmium is the latest addition to the list of metallic substances extracted from the ores of the Province. The 66,490 pounds of metal sold in 1960 was contained in the zinc concentrates produced at the East Sullivan mine of Sullico Mines Limited.

Cadmium is a soft blue-white metal with a low fusion point (320°C.). The main physical characteristic of this metal is its exceptional resistance to all forms of corrosion; this property is of great value to industry.

The electroplating industry uses most of the metal produced. Cadmium is used as an alloy in silver soldering compounds and with bismuth in low-temperature fusion alloys. It is also used in alkaline batteries.

COPPER

In 1960, the average price of copper was 30.29 cents per pound. Producers benefited from an increase averaging 0.68 cent per pound with respect to the 1959 price.

For the third consecutive year, copper production in the Province reached a new high. The copper concentrates produced by the various Quebec mines contained 314,939,446 pounds of metal, surpassing by 45,115,669 pounds or 16.7 per cent the 1959 record production of 269,823,777 pounds. This increase in production, plus the higher unit price received, brought to our producers the imposing total of \$95,395,158. This gross value was only surpassed in 1956 when the average price of copper climbed to 41.41 cents per pound.

This surge in copper production may be attributed to the following factors:

Copper Rand Chibougamau Mines Limited entered into production; and

Campbell Chibougamau Mines Limited, Gaspé Copper Mines Limited and Opemiska Copper Mines (Quebec) Limited increased their ore treatment rate.

In the chapter entitled "Development and Mining Operations in the Province of Quebec in 1960" will be found a summary of the work performed by the following producers:

<u>Company</u>	<u>Township</u>
Anacon Lead Mines Limited	La Dauversière
Campbell Chibougamau Mines Limited	Obalski
Copper Rand Chibougamau Mines Limited	McKenzie
East Sullivan Mines Limited	Bourlamaque
Gaspé Copper Mines Limited	Holland
Manitou-Barvue Mines Limited	Bourlamaque
Merrill Island Mining Corporation Limited	Obalski
Noranda Mines Limited	Rouyn
Normetal Mining Corporation Limited	Desmeloizes
Opemiska Copper Mines (Quebec) Limited	Lévy
Quemont Mining Corporation	Rouyn
Waite-Amulet Mines Limited	Dufresnoy

Table 12. - Production of Copper in the Province of Quebec
from 1951 to 1960

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1951	137,731,906	\$ 38,151,738	1956	244,599,468	\$ 101,288,640
1952	137,691,702	39,297,212	1957	224,818,449	65,084,491
1953	109,839,871	32,886,057	1958	262,890,590	66,826,788
1954	167,860,775	48,948,202	1959	269,823,777	79,894,820
1955	202,041,072	74,502,645	1960	314,939,446	95,395,158

GOLD

In 1960, a total of 1,033,072 ounces (troy) of gold, worth \$35,072,794, was produced in the Province of Quebec. By comparison with the totals for 1959, the above figures represent an increase of 3.6 per cent in quantity and of 4.8 per cent in value.

In 1960, there were twelve gold-quartz mines and fifteen base-metal mines in operation in the Province. The total for each group is the same as in 1959, Akasaba Gold Mines Limited having replaced Belleterre Quebec Mines Limited in the first group and Copper Rand Chibougamau Mines Limited taking the place of West MacDonald Mines Limited in the second.

The price of gold is fixed at \$35.00 per ounce troy, in American currency. In November 1960, the Canadian dollar lost its premium over its American counterpart and went below par. Although this reversal was in effect during only two months of the year, it allowed our gold-quartz mines to receive a slightly higher price for the product. The gold-quartz mine operators sell their gold to the Canadian Mint, and receive for it a fixed price that is below the open market price where most of the gold produced by the base-metal mines is sold. Needless to say, that the latter also benefited from the reversal in the parity of the dollars.

Table 13. - Gold Production of Mines of the Province of Quebec
in 1960

Property	Year of first production	Ore Raised (Tons)	Ore Treated (Tons)	Gold (fine) Shipped (Ounces)	See Foot-note
<u>Gold Mines</u>					
Akasaba	1960	63,640	72,472	8,010	(b)
Barnat	1938	444,905	445,586	66,076	(b)
Bevcon	1947	234,160	233,910	27,359	(b)
Canadian Malartic	1935	468,694	468,694	40,535	(b)
East Malartic	1938	544,939	544,939	107,289	(b)
Elder	1946	150,077	146,505	19,074	(c)
Eldrich	1956	126,503	124,078	15,511	(c)
Lamaque	1935	761,800	761,800	131,438	(b)
Malartic Gold Fields ..	1939	404,186	404,185	63,236	(b)
Norlartic	1959	132,284	132,284	17,799	(b)
Sigma	1937	430,136	430,136	77,432	(b)
Sullivan Consolidated .	1934	264,566	233,438	42,929	(b)
Other mines				917	
Sub-total ...		4,025,890	3,998,027	617,605	
<u>Base Metal Mines (1)</u>					
Amulet Dufault	1941	143,862	143,862	3,446	(c)
Anacon Lead	1956	119,082	114,223	19,559	(a)(b)(c)
Campbell Chibougamau ..	1955	816,718	816,718	37,445	(c)
Copper Rand	1959	351,343	550,569	17,267	(c)
East Sullivan	1949	974,532	974,532	7,373	(c)
Gaspé Copper	1955	2,545,764	2,545,964	5,433	(c)
Manitou-Barvue	1942	456,755	456,755	9,692	(b)(c)
Merrill Island	1958	158,899	158,899	1,314	(c)
New Calumet	1943	100,346	100,445	852	(c)
Noranda	1927	1,527,274	1,527,274	183,999	(c)
Normetal	1937	347,164	347,164	6,182	(c)
Opemiska	1954	750,363	751,453	17,085	(c)
Quemont	1949	856,530	856,632	100,514	(b)(c)
Waite-Amulet (Waite) ..	1930	131,618	132,057	4,358	
(Amulet) .	1928	21,143	21,143	294	(c)
Other mines		10,477	10,477	654	
Sub-total ...		9,311,870	9,508,167	415,467	
GRAND TOTAL ...		13,337,760	13,506,194	1,033,072	

(a) Amalgamation; (b) Cyanidation; (c) Smelter.

(1) Ores of these mines are complex, and base metals and silver also are produced.

Table 14. - Production of Gold in the Province of Quebec, 1951 to 1960

Year	Gold-bearing Quartz Mines			Complex-ore Mines*		Total Gold Shipped	
	Ore Treated (Tons)	Gold Shipped		Gold Shipped			
		Quantity (Ounces)	Value	Quantity (Ounces)	Value	Quantity (Ounces)	Value
1951	4,471,095	724,008	\$ 26,679,695	343,627	\$ 12,662,655	1,067,635	\$ 39,342,350
1952	4,724,662	770,397	26,401,505	342,638	11,742,204	1,113,035	38,143,709
1953	4,806,723	766,454	26,381,347	257,820	8,874,164	1,024,274	35,255,511
1954	4,926,359	790,520	26,933,016	307,315	10,470,222	1,097,835	37,403,238
1955	4,803,810	770,604	26,601,250	385,814	13,318,299	1,156,418	39,919,549
1956	3,931,831	628,699	21,658,681	408,361	14,068,036	1,037,060	35,726,717
1957	3,703,231	613,080	20,568,834	397,192	13,325,792	1,010,272	33,894,626
1958	3,872,805	625,258	21,246,267	419,025	14,238,469	1,044,283	35,484,736
1959	3,750,990	599,574	20,127,170	397,520	13,345,276	997,094	33,472,446
1960	3,998,027	617,605	20,967,690	415,467	14,105,104	1,033,072	35,072,794

* Complex-ore mines also producing base metals.

Table 15. - Gold Production of Mines of the Province of Quebec
from 1926 to 1960 Inclusive

Mine	Year of first production	Mine closed since	Ore treated or shipped (Tons)	Gold Shipped (Ounces)
<u>Gold Mines</u>				
Akasaba	1960	-	72,472	8,010
Anglo-Rouyn	1948	1951	147,377	33,193
Arntfield	1935	1942	529,480	55,662
Barnat(1)	1938	-	4,995,901	732,825
Beattie-Duquesne(2)	1933	1956	10,693,756	1,138,719
Belleterre	1936	1959	2,411,006	737,865
Bevcon	1947	-	2,185,873	275,375
Canadian Malartic	1935	-	9,406,130	944,714
Consolidated Central Cadillac(3)	1939	1949	638,338	89,936
Cournor(4)	1932	1942	426,925	78,715
Donalda	1948	1956	695,212	114,075
East Malartic	1938	-	9,641,126	1,591,411
Elder	1946	-	1,810,368	275,618
Eldrich	1955	-	488,091	69,988
Francoeur	1938	1947	585,040	94,326
Granada	1930	1935	181,744	51,477
Greene-Stabell	1933	1937	71,504	15,159
Heva-Gold	1951	1952	39,379	7,953
Hosco	1948	1949	50,567	7,373
Lake-Rose	1938	1939	5,375	3,421
Lake-Wasa	1951	1951	10,230	1,029
Lamaque	1935	-	12,192,301	2,638,947
Lapa-Cadillac	1938	1943	383,430	47,263
Louvicourt Goldfield	1947	1949	263,850	32,201
McWatters	1934	1944	351,324	108,403
Malartic Gold Fields	1939	-	9,159,664	1,592,870
Mic-Mac(5)	1942	1947	798,779	107,606
New Marlon	1947	1949	108,188	19,511
New Rouyn Merger	1948	1949	32,198	3,895
New Senator Rouyn	1940	1955	1,839,456	235,969
Norlartic	1959	-	199,019	25,387
O'Brien	1926	1956	1,310,356	589,064
Pandora(6)	1938	1942	196,506	27,003
Perron	1933	1951	1,775,711	438,779
Powell Rouyn	1937	1956	3,141,001	380,729
Quesabe	1949	1952	113,614	28,252
Shawkey	1936	1938	137,978	25,414
Sigma	1937	-	8,656,018	1,598,531
Siscoe	1929	1949	3,258,306	881,858
Stadacona	1936	1958	3,023,420	467,180
Sullivan	1934	-	3,375,594	827,281
Thomson Cadillac	1936	1939	175,816	16,466
West Malartic	1942	1946	308,332	35,631
Other mines				24,491
Sub-total				16,479,575

Table 15. - Gold Production of Mines of the Province of Quebec
from 1926 to 1960 Inclusive (Cont'd.)

Mine	Year of first production	Mine closed since	Ore treated or shipped (Tons)	Gold shipped (Ounces)
<u>Base Metal Mines</u>				
Aldermac	1930	1943	2,070,497	10,757
Anacon Lead (Chibougamau) .	1956	1960	685,864	135,048
Anacon Lead (Montauban) (7)	1913	1955	2,390,938	44,308
Ascot Metals(8)	1944	1956	1,006,372	16,982
Campbell Chibougamau	1955	-	3,737,140	204,932
Copper Rand	1958	-	563,197	17,477
East Sullivan	1949	-	10,853,390	92,881
Gaspé Copper	1955	-	10,026,690	21,074
Golden Manitou	1942	-	6,630,002	192,179
Harrison Drilling(9)	1950	1952	90,586	13,282
Merrill Island	1958	-	461,955	3,446
New Calumet	1943	-	3,006,232	44,928
Noranda	1927	-	45,877,803	6,721,219
Normetal	1937	-	6,326,546	99,630
Opemiska Copper	1954	-	2,327,209	67,687
Quebec Copper	1954	1958	1,206,294	3,935
Quemont	1949	-	9,090,830	1,175,891
Rainville	1956	1958	280,768	1,442
United Montauban	1953	1954	113,009	205
Waite-Amulet(10)	1928	-	9,287,249	253,975
Weedon(11)	1952	1959	708,031	1,172
West Macdonald	1955	1959	962,030	1,976
Other mines				1,780
Sub-total ..			-	9,126,206
GRAND TOTAL			-	25,605,781

- (1) Former Sladen Malartic and National Malartic Mines.
- (2) Former Beattie and Duquesne mines.
- (3) Including former Wood Cadillac mine.
- (4) Formerly Bussièrès mine.
- (5) Also produced copper.
- (6) Including former Amm Gold mine.
- (7) Tétreault mine. Figures given are for years 1926 to 1955 inclusive only.
- (8) Moulton Hill and Suffield mines.
- (9) D'Eldona mine.
- (10) Waite, Amulet and Amulet-Dufault mines.
- (11) This mine had already been operated prior to 1921.

IRON AND IRON OREIron

Quebec Iron and Titanium Corporation is the sole producer of iron in the Province. The company extracts the metal, as a by-product, during the treatment of ilmenite at its Sorel smelter.

Continuing its policy of marketing various grades of cast iron, the company enjoyed its most successful year of operations during 1960. Its sales reached a record high of \$10,972,979, 53 per cent above the 1959 figure of \$7,187,434.

Iron Ore

The two producers of iron ore operating in the Province delivered 7,457,971 tons of ore valued at \$61,752,485. The steel industry in the United States absorbs the largest portion of the iron ore mined in the Province; fluctuations in the American economy are usually deeply felt by our producers. The 1960 recession was responsible for the 54 per cent decrease recorded in the shipments of iron ore, although, by contract; the metallic iron production of the Province increased substantially.

The Hilton Mines, in Bristol township, operated its mine at a slightly higher rate of extraction than in 1959. A large part of the company's output is shipped to Steel Company of Canada.

Iron Ore Company of Canada, with mines at Scheffer-ville, New Quebec, shipped 33 per cent less iron ore in 1960; in 1959, its sales attained the record high of 10,860,215 tons.

In the field of mine development, Quebec Cartier Mining Company completed, in 1960, a few phases of its project of bringing into production its immense ore deposits located in the northeast sector of Saguenay county. On September 18th, power from the Hart-Jaune River hydroelectric plant reached the mine and its surroundings for the first time. The railroad was inaugurated on December 8th and the first regularly scheduled train entered the mine yard on December 15th. A few sections of the concentrating plant were placed in operation on a trial and tune-up basis at year end.

During the 1960 field season, Great Whale Iron Mines Limited continued exploring its property located 75 miles east of Great Whale. Details of this work will be found in the chapter entitled "Exploration in the Province of Quebec in 1960".

Table 16. - Production of Iron Ore in the Province of Quebec
from 1954 to 1960*

Year	Quantity (Tons)	Value
1954	650,415	\$ 3,818,309
1955	4,103,173	27,164,396
1956	7,956,549	58,373,270
1957	8,872,948	65,805,057
1958	6,060,325	46,859,490
1959	11,515,169	92,497,012
1960	7,457,971	61,752,485

* In view of the uncertainty concerning the boundary between Quebec and Newfoundland, it is possible that these figures do not represent all the production of the Province of Quebec.

LEAD

In 1960, the production of lead in the Province of Quebec amounted to 5,338,901 pounds, contained in concentrates having a value of \$570,195. These totals are respectively 9 and 8 per cent lower than those recorded in 1959.

Lead is a by-product of the treatment of zinc ore. Like zinc, its entry into the United States is subject to import quotas. In addition, lead is a surplus commodity on the world markets; this tends to keep its price at a low level. These factors are mainly responsible for the decrease in production, which has been fairly constant since 1953.

Lead is used mainly in batteries, in the manufacture of lead tetraethyl, as oxides in paints, in welding, and in the manufacture of industrial electrical cables.

Table 17. - Production of Lead in the Province of Quebec
from 1951 to 1960

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1951	15,512,623	\$ 2,854,323	1956	5,745,615	\$ 891,143
1952	21,039,859	3,406,353	1957	5,417,795	756,324
1953	18,473,850	2,387,930	1958	6,299,475	715,620
1954	15,635,942	2,084,271	1959	5,819,148	617,412
1955	11,216,005	1,612,862	1960	5,388,901	570,195

MOLYBDENUM

Molybdenum oxide, molybdenite concentrates and very high purity molybdenite are the end products of the operations of Molybdenite Corporation of Canada Limited at its Lacorne township property, in Abitibi-East county.

Expressed as pounds of metal contained in these products, the molybdenum production of the Province of Quebec, in 1960, amounted to 762,207 pounds valued at \$1,005,880. These figures represent an increase of 1.8 per cent in quantity and 6.9 per cent in value, compared with those for 1959.

Molybdenum is indispensable in today's world of metals. The steel industry alone absorbs most of the molybdenum produced in the world. The addition of molybdenum to steel increases the latter's hardness and its resistance to the effects of the high temperature. Hard steels, high-speed cutting steels, and ferro-molybdenum are the products that account for the largest uses of the metal. Molybdenite is a soft mineral, greasy to the touch. Because of these properties, it is added to certain types of greases and lubricants; this use requires a very pure molybdenite.

Table 18. - Production of Molybdenum in the Province of Quebec
from 1957 to 1960

Year	Quantity (Pounds)	Value
1957	783,739	\$ 1,166,557
1958	888,264	1,152,838
1959	748,566	940,596
1960	762,207	1,005,880

SELENIUM AND TELLURIUM

There is no mining of selenium and tellurium ores in the Province of Quebec. Present in very small quantities in copper-gold ores, these metals are recovered during the treatment of the residues produced during the electrolytic refining of copper anodes at the plant of Canadian Copper Refiners Limited, in Montreal-East.

Selenium was first produced in Quebec in 1933. Since then, the only production that surpassed the 279,759 pounds recovered in 1960 was that of the year 1942, when 326,208 pounds of selenium was marketed. The value of \$1,958,313 obtained in 1960 is 44 per cent higher than that in 1959.

In 1960, the production of tellurium amounted to 29,925 pounds valued at \$104,738. Production of tellurium in the Province dates back to 1935. During the 25 intervening years, there are only ten during which sales of tellurium were recorded. One has to go back to 1938, when production reached 41,577 pounds, to find a more productive year than 1960 has been for this commodity.

Table 19. - Production of Selenium in the Province of Quebec
from 1951 to 1960

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1951	165,575	\$ 536,463	1956	117,555	\$ 1,586,993
1952	78,830	256,198	1957	168,290	1,851,190
1953	113,533	476,839	1958	179,397	1,345,478
1954	135,051	675,255	1959	194,233	1,359,631
1955	236,767	1,775,759	1960	279,759	1,958,313

SILVER

In 1960, the metal mines of the Province of Quebec produced 4,114,993 ounces (troy) of silver valued at \$3,658,640. These totals are only a small fraction above those of 1959. The increases were 5,221 ounces troy and \$51,082.

As there are no silver mines in the Province, this precious metal is obtained as a by-product in the treatment of gold and base-metal ores.

The end uses of silver remain unchanged from year to year. The minting of new coinage absorbs the largest percentage of the silver produced. The next largest market for the metal is the photographic arts, where it is used as a salt. Silver enters into the manufacture of luxury objects, silverware and jewelry. In industry, silver is also used in the manufacture of low-resistance conductors for electrical apparatus, in certain types of welding and soldering and in dentistry.

Table 20. - Production of Silver in the Province of Quebec
from 1951 to 1960

Year	Quantity (Ounces troy)	Value	Year	Quantity (Ounces troy)	Value
1951	4,154,498	\$ 3,928,078	1956	4,063,504	\$ 3,644,150
1952	4,536,190	3,788,626	1957	3,646,168	3,185,657
1953	4,571,756	3,840,732	1958	3,906,815	3,391,506
1954	4,908,203	4,086,423	1959	4,109,772	3,607,558
1955	4,786,889	4,221,079	1960	4,114,993	3,658,640

TITANIFEROUS IRON

The titaniferous iron or ilmenite mined in the Province of Quebec is used as a source of metallic iron and titanium oxide or is consumed as heavy aggregate without treatment.

The products derived from ilmenite are reviewed separately under the headings "Iron" and "Mineral Pigments (Titanium Oxide)".

When used as derived from mines, titaniferous iron enters into the preparation of special heavy concrete. Continental Titanium Corporation and Quebec Iron and Titanium Corporation were the sole producers of titaniferous iron in 1960. The operations of these two companies are reviewed in the chapter "Development and Mining Operations in the Province of Quebec in 1960".

Table 21. - Production of Titaniferous Iron in the Province of Quebec from 1951 to 1960

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1951	1,674	\$ 9,790	1956	2,310	\$ 16,561
1952	51	459	1957	26,570	264,904
1953	9,294	80,085	1958	234,496	1,608,324
1954	1,541	9,462	1959	32,210	214,367
1955	1,464	10,634	1960	20,519	174,151

ZINC

The 1960-production of zinc, contained in concentrates, was slightly greater than that of 1959. The totals for 1960 are 99,614,995 pounds of zinc worth \$13,298,602; those for 1959 were 94,115,963 pounds valued at \$11,519,794. On a percentage basis, the gains in 1960 were 6 per cent in quantity and 15 per cent in value more than the amounts recorded in 1959.

This increase in production occurred despite the fact that there were only six producing mines in 1960. West MacDonald Mines Limited and Weedon Mining Corporation suspended their operations; the first at the end of January 1959, and the second in November of the same year.

The mining operations of the following producers are summarized in the chapter "Development and Mining Operations in the Province of Quebec in 1960".

<u>Company</u>	<u>Township</u>
East Sullivan Mines Limited	Bourlamaque
Manitou-Barvue Mines Limited	Bourlamaque
New Calumet Mines Limited	Grand-Calumet
Normetal Mining Corporation	Desmeloizes
Quemont Mining Corporation Limited	Rouyn
Waite-Amulet Mines Limited	Dufresnoy

The development work undertaken by Mattagami Lake Mines Limited is worth mentioning. The company outlined such a large tonnage of ore reserves that it is studying the possibility of establishing a zinc refinery.

Approximately 90 per cent of the zinc produced is used in the galvanizing trade, in the die-casting industry, and in alloys such as bronze and brass. The remainder is used as oxides in the rubber and paint industries.

Table 22. - Production of Zinc in the Province of Quebec
from 1951 to 1960

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1951	172,725,823	\$34,372,439	1956	171,945,511	\$ 25,516,714
1952	189,797,061	33,138,567	1957	148,589,484	17,964,469
1953	200,859,247	24,022,766	1958	113,845,036	12,386,340
1954	214,002,774	25,637,532	1959	94,115,963	11,519,794
1955	202,862,034	27,690,668	1960	99,614,995	13,298,602

NON - METALLIC MINERALSI - INDUSTRIAL MINERALSGeneral Review

The producers of nine of the fifteen substances classified as industrial minerals received larger sums for their products in 1960 than they did in 1959. Two of the substances, asbestos and titanium oxide, recorded a combined gain of \$17,001,253.

Lithium oxide shows a very marked decrease compared with the total for the previous year. However, the position of this commodity should improve shortly, as the producer of lithium oxide placed in operation, in December 1960, a refinery that will produce lithium carbonate.

Sales of most of the other industrial minerals reflect rather accurately the state of the Canadian economy, as these are absorbed by either the Quebec or the Canadian market.

ASBESTOS

Table 24 showing an estimation of the world production of asbestos, by country, was extracted from Mineral Trade Notes, Volume 52, No. 3, September 1961, a review published by the Bureau of Mines of the United States Department of Interior.

The Soviet Union, with an asbestos production estimated at 660,000 tons of fibres, is Canada's strongest competitor. Approximately 20 per cent of the fibres imported by West Germany come from U.S.S.R.

Based on the estimates of world production, the Province of Quebec supplied 43.6 per cent of the tonnage of asbestos fibres produced or used in 1960.

Asbestos is a mineral that can be put to a great many uses. A company engaged in the manufacture of asbestos products

lists in its catalogue more than 200 products containing asbestos in various amounts. Asbestos is one of the best insulators against heat, flames, electricity and acids. Experiments underway could lead to a greater consumption of short fibres. A paving material composed of asphalt and asbestos fibres is undergoing trials on some road sections. The addition of the fibres would give asphalt a greater resistance to temperature changes and would improve its anti-skid property.

The following companies reported sales of asbestos fibres in 1960. Their activities are summarized in the chapter "Development and Mining Operations in the Province of Quebec in 1960".

<u>Company</u>	<u>Township</u>
Asbestos Corporation Limited	Thetford
Bell Asbestos Mines Limited	Thetford
Canadian Johns-Manville Company Limited	Shipton
Carey Canadian Mines Limited	Broughton
Flintkote Mines Limited	Thetford
Johnson's Asbestos Company	Coleraine
Johnson's Company Limited	Thetford
Lake Asbestos of Quebec Limited	Ireland
National Asbestos Mines Limited	Thetford
Nicolet Asbestos Mines Limited	Tingwick

Table 23. - Comparative Statement of Asbestos Production
in the Province of Quebec, in Canada and in the World,
from 1956 to 1960

Year	P r o d u c t i o n (Tons)			P e r c e n t a g e o f	
	Quebec	Canada	World	Canada	World
1956	967,145	1,014,249	1,990,000	95.3	48.1
1957	993,424	1,046,086	2,080,000	94.9	48.0
1958	873,604	925,331	2,050,000	94.4	42.6
1959	992,196	1,050,429	2,260,000	94.4	43.9
1960	1,054,424	1,118,426	2,420,000	94.3	43.6

Table 24. - World Production of Asbestos, by Countries, from 1956 to 1960

(In tons) (a) (b) (Compiled by Helen L. Hunt)

Country (a)	1956	1957	1958	1959	1960
North America:					
Canada (sales) (c)	1,014,249	1,046,086	925,331	1,050,429	1,118,456
United States (sold or used by producers)	41,312	43,653	43,979	45,459	45,223
Total	1,055,561	1,069,739	969,310	1,095,888	1,163,679
South America:					
Argentina	238	319	285	(d) 275	(d) 275
Bolivia (exports)	62	121	-	168	66
Brazil	3,739	2,654	3,816	2,075	1,577
Venezuela	5,041	8,390	9,152	5,095	4,333
Total	9,080	11,484	13,253	7,613	6,251
Europe:					
Bulgaria	1,100	1,100	1,100	(d) 1,100	(d) 1,100
Finland (e)	8,282	10,031	7,977	9,420	10,534
France	13,357	16,008	20,503	23,096	27,558
Greece	6	9	-	-	-
Italy	39,446	40,361	39,921	49,778	56,654
Portugal	35	64	98	40	(d) 45
Spain	-	-	-	19	-
U.S.S.R. (d)	500,000	500,000	550,000	600,000	660,000
Yugoslavia	4,165	6,128	5,960	4,748	5,970
Total (d)	570,000	575,000	625,000	690,000	760,000
Asia:					
China (d)	26,000	33,000	66,000	88,000	88,000
Cyprus	15,375	15,028	16,494	14,424	(f) 17,167
India	1,378	1,925	1,302	1,464	1,886
Japan	9,914	13,192	11,187	13,633	17,073
Korea (Republic of)	54	96	22	88	740
Taiwan	118	268	47	150	485
Turkey	634	99	839	411	238
Total (d)	54,000	64,000	96,000	118,000	126,000
Africa:					
Bechuanaland	1,356	1,582	1,734	1,410	1,849
Kenya	170	109	120	43	117
Morocco: Southern zone	379	132	110	-	-
Mozambique	202	152	198	37	-
Rhodesia and Nyasaland Federation of:					
Southern Rhodesia	118,973	132,124	127,115	119,699	133,963
Swaziland	29,875	30,727	25,261	24,807	32,026
Union of South Africa	136,520	157,474	175,644	182,405	175,867
United Arab Republic (Egypt Region)	-	22	485	502	(d) 550
Total	287,475	322,322	330,667	328,903	344,372
Oceania:					
Australia	9,709	14,670	15,570	17,856	(d) 15,400
New Zealand	368	230	454	640	(d) 600
Total	10,077	14,900	16,024	18,496	(d) 16,000
World total (estimate (a)(b))	1,990,000	2,080,000	2,050,000	2,260,000	2,420,000

(a) Asbestos also is produced in Czechoslovakia, Eritrea, Iran, North Korea, Rumania and Uganda. No estimates for these countries are included in the total, as production is believed to be negligible.

(b) This table incorporates some revisions. Data do not add to totals shown because of rounding where estimated figures are included in the detail.

(c) Exclusive of sand, gravel and stone.

(d) Estimate.

(e) Includes asbestos flour.

(f) Exports.

Table 25. - Production of Asbestos in the Province of Quebec in 1959 and 1960

	1959 Shipments			1960 Shipments		
	Tons (2000 lb.)	Value without containers		Tons (2000 lb.)	Value without containers	
		Total	Per Ton		Total	Per Ton
Crude Asbestos						
Groups Nos. 1 and 2 (Crudes No. 1, No. 2 and others)	355	\$ 367,229	\$1,034.45	235	\$ 198,318	\$ 843.91
Milled Asbestos						
Group No. 3 (Spinning)	22,984	9,510,604	413.80	23,152	9,670,943	417.72
" No. 4 (Shingle)	193,819	35,198,554	181.61	247,570	45,752,443	184.81
" No. 5 (Paper)	129,060	16,508,410	127.91	148,524	18,798,495	126.57
" No. 6 (Waste, stucco or plaster)	166,346	13,534,015	81.36	179,361	14,589,795	81.34
" No. 7 (Refuse or shorts) .	465,052	19,811,492	42.60	445,509	18,572,870	41.69
" No. 8 (Sand)	14,580	296,465	20.33	10,073	205,307	20.38
Total	992,196	\$ 95,226,769	\$ 95.98	1,054,424	\$107,788,171	\$ 102.22
Group No. 9 (By-products: gravel and stone).	29,532	\$ 28,403	\$ 0.96	51,625	\$ 45,109	\$ 0.87
Total	1,021,728	\$ 95,255,172		1,106,049	\$107,833,280	
Rock mined	22,565,234			32,239,218		
Rock milled	13,203,406			14,395,174		

Table 26. - Data on Quebec Asbestos Mining Industry for Years 1951 to 1960

Year	Fibre Shipped	Total Value	Average Value (Per Ton)	Fibre Produced (Tons)	Asbestos Content Per Ton of Rock Mined (Pounds)	Average Value Content of Rock Mined (Per Ton)	Rock Mined (Tons)
1951	946,610	\$ 77,627,863	\$ 82.01	965,081	160.49	\$ 6.58	12,026,989
1952	906,223	85,248,098	94.07	914,730	147.52	6.94	12,401,278
1953	884,595	81,000,775	91.57	893,265	135.78	6.22	13,157,297
1954	894,128	79,906,506	89.37	906,779	128.34	5.74	14,126,904
1955	1,022,065	88,607,804	89.88	1,022,343	121.59	5.46	16,815,642
1956	967,145	90,531,456	96.92	995,535	95.22	4.48	20,905,988
1957	993,424	93,616,875	93.28	989,089	93.58	4.42	21,138,451
1958	873,604	82,028,700	93.89	920,708	85.35	3.80	21,574,610
1959	992,196	95,226,769	95.98	1,015,336	89.99	4.22	22,565,234
1960	1,054,424	107,788,171	102.22	1,050,341	65.16	3.34	32,239,218

Mining Industry

Table 27. - Annual Shipments of Asbestos According to Grades
from 1951 to 1960
 (Tons of 2,000 lbs.)

Year	Crudes	Fibre	Shorts	Total Asbestos Shipped	Sand, Gravel and Waste Rock
1951	711	306,733	639,166	946,610	33,762
1952	721	328,578	576,924	906,223	35,317
1953	776	299,716	584,103	884,595	21,118
1954	655	296,735	596,738	894,128	26,429
1955	572	353,510	667,983	1,022,065	28,582
1956	644	345,951	620,550	967,145	45,428
1957	604	351,373	641,447	993,424	13,652
1958	574	290,864	582,166	873,604	18,450
1959	355	345,863	645,978	992,196	29,532
1960	235	419,246	634,943	1,054,424	51,625

Table 28. - Milling Capacity of Asbestos Mines, in Tons per 24 Hours

Mines	Townships	Capacity
Asbestos Corporation Limited:		
Mine King-Beaver	Thetford	6,000
Mine British Canadian	Thetford	5,500
Mine Normandie	Ireland	4,500
Bell Asbestos Mines Limited	Thetford	2,000
Canadian Johns-Manville Co. Limited .	Shipton	20,000
Carey Canadian Mines Limited	Broughton	2,000
Flintkote Mines Limited	Thetford	2,000
Johnson's Asbestos Company	Coleraine	4,000
Johnson's Company Limited	Thetford	2,400
Lake Asbestos of Quebec Limited	Ireland	4,500
National Asbestos Mines Limited	Thetford	3,000
Nicolet Asbestos Mines Limited	Tingwick	2,400
Total		58,300

FELDSPAR

Feldspar production in the Province of Quebec has been declining since 1957. In 1960, producers sold 13,862 tons of feldspar, 23 per cent less than in 1959.

Five producers mined and sold feldspar in 1960: their quarries are located in the Buckingham area. A sixth producer, Spar Mica Corporation, did not operate its Johan Beetz quarry; its sales consisted of feldspar extracted in 1959.

LIME, LIMESTONE AND MARBLE(Industrial)

The combined value of lime, limestone, marble and marl sold for industrial purposes, in 1960, rose to \$6,262,293, 7.7 per cent over the \$5,842,189 received by the producers in 1959.

Industrial Lime

Seven producers of industrial lime delivered 368,190 tons of lime valued at \$4,053,221. These totals include both quicklime and hydrated lime and are slightly above those of the year 1959, the differences being 6,336 tons and \$12,947.

Lime producers in the Province manufacture their products either directly through calcining limestone or as a by-product following the treatment of other substances. There are five producers in the first group; the largest are Dominion Lime Limited, located at Lime Ridge, and Gypsum Lime and Alabastine Canada Limited, with lime kilns located at Joliette and Saint-Marc-des-Carrières. At Saint-Hilaire-Est, La Raffinerie de Sucre de Québec operates a lime kiln, producing lime for its own use.

In the second group are Aluminum Company of Canada and Shawinigan Chemicals Limited. The first one obtains lime as a by-product in the treatment of brucite; the second, during the manufacture of calcium carbide.

Lime is used in industry as a chemical agent in the manufacture of paper and glass, in cyanidation and flotation plants, in tanning establishments, in the preparation of chemical products, in water purification plants and in the steel industry.

Table 29. - Distribution of the Production of Lime
in 1959 and 1960

(In tons)

Classification	1960		1959	
	Quicklime	Hydrated Lime	Quicklime	Hydrated Lime
Industrial Lime				
Sugar refineries	-	4,581	-	4,558
Tanneries	74	750	117	860
Pulp and paper mills	92,694	6,916	92,767	10,188
Agriculture	121	11,757	121	7,879
Iron and steel furnaces ..	7,377	696	2,935	472
Non-ferrous smelters	1,302	118,665	2,308	110,626
Uranium plants	6,489	1,169	9,608	999
Cyanide and flotation mills	3,027	6,241	3,463	9,762
Glass works	4,688	-	4,103	-
Carbide and other industrial uses	88,741	12,902	96,316	4,772
Total	204,513	163,677	211,738	150,116
Building Lime				
Building trade	7,415	19,570	16,100	20,482
Dealers and unspecified uses	204	185	1,503	161
Total	7,619	19,755	17,603	20,643
Grand Total	212,132	183,432	229,341	170,759

Table 30. - Quantity and Value of Limestone and Marble Products
Sold in 1959 and 1960

Classification	1960		1959	
	Quantity (Tons)	Value	Quantity (Tons)	Value
Building Limestone				
Building stone, rough	6,401	\$ 63,859	5,406	\$ 58,327
Building stone, dressed	10,690	842,531	15,663	996,402
Alphalt filler	30,691	133,588	46,633	179,973
Flagstone	616	4,316	-	-
Rubble and rip-rap	433,459	335,282	405,549	354,566
Crushed stone	16,432,986	18,200,911	17,006,583	19,070,923
Total	16,914,843	\$19,580,487	17,479,834	\$20,660,191
Industrial Limestone				
Flux	4,481	\$ 6,923	4,139	\$ 5,539
Pulp and paper mills	171,399	558,497	148,243	466,705
Agricultural limestone	533,251	1,300,447	360,500	963,752
Poultry grit	4,187	10,786	729	2,392
Other industrial uses	13,831	141,919	21,132	167,954
Total	727,149	\$ 2,018,572	534,743	\$ 1,606,342
Grand Total	17,641,992	\$21,599,059	18,014,577	\$22,266,533

Industrial Limestone and Marble

In 1960, 727,149 tons of limestone and marble were sold for industrial uses, for a total amount of \$2,018,572. Compared with the 1959 total of 534,743 tons valued at \$1,606,342, the 1960 figures surpass them by 35.9 and 25.6 per cent in quantity and value respectively.

The quarries of Saint-Marc-des-Carrières supplied the largest part of the industrial limestone produced, whereas quarries in Missisquoi and Shefford counties supplied the marble.

Table 30 shows that agriculture absorbed most of the industrial limestone; most of the largest users were the pulp and paper mills, then various industrial uses such as in the manufacture of glass, brick and roofing products.

LITHIUM

In 1960, sales of lithium oxide equalled seven per cent of the quantity sold during the preceding year: 204,666 pounds, compared with 2,756,280 pounds.

In November 1960, Quebec Lithium Corporation, sole Canadian producer, reopened its mine and plant, which had been closed since November 1959. Moreover, during the tuning up of its refinery, the company started producing lithium carbonate at the close of December 1960.

MARL

Marl is a calcareous substance employed solely as soil conditioner. Its extraction is a regional industry as all the deposits that are being mined are located on the south shore of the St. Lawrence and in the Gaspé peninsula.

In 1960, a total of 127,000 tons of marl worth \$190,500 was produced. This was a decrease of 3,375 tons or 2.6 per cent, compared with the 1959 production.

Table 31. - Production of Marl in the Province of Quebec
from 1954 to 1960

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1954	38,700	\$ 58,050	1958	144,434	\$ 216,651
1955	49,550	74,325	1959	130,375	195,563
1956	70,581	105,872	1960	127,000	190,500
1957	127,143	190,714			

MAGNESIITIC DOLOMITE AND BRUCITE

The combined value of the production of magnesitic dolomite and brucite in 1960 was \$3,279,021. This total was \$228,242 or 7.4 per cent greater than the one recorded in 1959.

Magnesitic Dolomite

Magnesitic dolomite is the main component of a large number of refractory products sold throughout the world by Canadian Refractories Limited.

The company extracts this mineral from its Kilmar mine in Argenteuil county. After being crushed and concentrated, magnesitic dolomite is calcined in rotary kilns and transformed into a product called dead-burnt magnesite. This, in turn, becomes the main ingredient of cements, bricks and refractory plastics manufactured by the company.

Brucite

Aluminum Company of Canada Limited produces brucite at Wakefield in Gatineau county.

Brucite occurs as nodules in a deposit of crystalline limestone. It is crushed and calcined in a rotary kiln and sold in various grades. Part of this brucite, for example, is an ingredient in the refractory products made by Canadian Refractories Limited.

MICA

In 1960, the production of mica in the Province of Quebec rose to 1,234,828 pounds valued at \$85,272. Compared with the 1959 figures, those of 1960 represent an increase of 58.7 per cent in quantity and of 37.4 per cent in value.

During the year reviewed, Quebec had eleven mica producers. One of them, Blackburn Bros., in addition to operating its own mine, purchased the production of all the others.

Canadian manufacturers absorbed all the Quebec production of mica, with the exception of the 70,000 pounds that was sold partly to Japan, and partly to the United States.

Table 32. - Distribution of the Production of Mica
in 1960 and 1959

Classification	1960 Quantity (Pounds)	1959 Quantity (Pounds)
Rough, mine-run	117,238	8,641
Mica for mechanical splitting	27,900	23,250
Ground mica	669,994	591,356
Scrap	352,678	139,131
Trimmed mica	28,462	15,698
Not classified	38,556	-
Total	1,234,828	778,076

MINERAL PIGMENTS

Ochre

Sherwin-Williams Company of Canada Limited produced 97.8 per cent of the ochre sold in 1960. Most of the company's production was marketed as ground calcined iron oxides.

The other producer sold only 20 tons of air-dried ochre.

Calcined ochre is used as pigment in the manufacture of paints, linoleums, paper, rubber and bricks.

Titanium Oxide

Quebec Iron and Titanium Corporation is the sole Canadian producer of titanium oxide. From \$8,507,149 in 1959, the value of the production of this company rose to \$12,947,000 in 1960, an increase of 52.1 per cent.

The crude oxide produced by the company is shipped to plants that refine it into a high-quality product used as pigment in paints, rubber and paper.

PEAT

Peat is one of the industrial minerals that have been in almost constant increased demand since 1951.

The 1960 results, 56,731 tons valued at \$1,342,338, are 12 per cent in quantity and 4 per cent in value greater than those of 1959, which were 50,578 tons and \$1,282,081.

A certain percentage of the peat produced is used as bedding in hen-houses but the largest tonnage is used as a soil conditioner in lawns and flower beds.

Table 33. - Production of Peat in the Province of Quebec
from 1951 to 1960

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1951	21,657	\$ 436,833	1956	40,269	\$ 951,644
1952	19,609	405,582	1957	48,704	1,140,476
1953	22,021	587,671	1958	43,669	1,056,811
1954	27,784	730,250	1959	50,578	1,282,081
1955	32,383	638,696	1960	56,731	1,342,338

PETROLEUM AND NATURAL GAS

In 1960, search for petroleum and natural gas was conducted in three areas of the Province: the Gaspé peninsula, the St. Lawrence Lowlands and the Charlevoix district.

Gaspé Area1.- Associated Developments Limited

The Associated Developments No. 1 Baillargeon well is located on block 54, Baillargeon township, Gaspé-South county.

Drilling was conducted on an additional 2,821 feet during the year with a cable tool drill; final depth was 3,270 feet. Small oil shows were met at 185, 486, 2,590, 3,109 to 3,114 and 3,234 feet. Natural gas shows occurred at the following depths: 420 to 430, 563, 717, 822, 1,260 and 3,234 feet. Fresh water came in at 28 feet and salt water at 185, 320, 430 to 449, 563 to 607 and 643 to 694 feet. The well was plugged with cement and rock cuttings from a depth of 1,290 feet, where drilling was obstructed, to the surface. The geological log is as follows:

0 -	17 feet	-	Overburden
17 -	3,088	"	York River (sandstone, silstone and shale)
3,088 -	3,270	"	Grande Grève (limestone)

St. Lawrence Lowlands Area

1. - Fathers of Sacerdotal Fraternity

The No. 2 well of the Fathers of Sacerdotal Fraternity is located on lot 111, Grand Chemin range, Pointe-du-Lac parish, St-Maurice county. It was drilled with a cable tool drill to a depth of 239 feet. A very strong natural gas show occurred at that depth, but, as the well was out of control, it was impossible to measure its flow with instruments. Gas was flowing out at an approximate pressure of 100 pounds per square inch, and the flow was estimated visually at between 20,000,000 and 50,000,000 cubic feet per 24 hours. This is, by a wide margin, the largest flow of natural gas witnessed in the Province to date. As previously noted, the well was out of control; it was endangering human lives and neighboring properties, consequently, the well had to be plugged. It took six weeks of hard work before the gas flow was controlled. The large volume of gas discovered in this well greatly revived interest in the search for natural gas in the St. Lawrence Lowlands. The geological log of this well reads as follows:

0 -	6 feet	-	Sand
6 -	90 "	-	Clay
90 -	144 "	-	Quicksand
144 -	147 "	-	Fine sand
147 -	239 "	-	Clay
at	239 "	-	Sand

2.- Verchères Ore-Oil Corporation

The Verchères Oil No. 1 St-Barnabé well is located on lot 557, range I, Augmentation de Caxton township, parish of Saint-

Barnabé, St-Maurice county. It was drilled with a cable tool drill to a depth of 295 feet. Small gas shows occurred at 33, 81, 95, 115, 160, 189 and 264 feet; salt water came in at 60 and 189 feet. The geological log of the well reads as follows:

0 - 215 feet - Overburden
215 - 295 " - Trenton

The Verchères Oil T-1 St. Barnabé well is located on lot 573, range I, Augmentation de Caxton township, parish of Saint-Barnabé, St-Maurice county. This test hole was drilled with a hand drill to a depth of 297 feet in overburden. Water came in at 20, 138 and 172 feet.

The Verchères Oil T-2 Trois-Rivières well is located on lot 346, range IV, parish of Trois-Rivières, St-Maurice county. This test well was drilled with a cable tool drill to a depth of 210 feet in overburden. Small shows of gas occurred at 150 feet and fresh water at 20 and 110 feet.

The Verchères Oil T-3 Trois-Rivières well is also located on lot 346, range IV, parish of Trois-Rivières, St-Maurice county; it is 50 feet west of the Verchères Oil T-2 Trois-Rivières well. The test well was drilled with a cable tool drill to a depth of 216 feet in overburden.

Charlevoix Area

De Iacobis (Mario)

The Paul No. 1 well is located on lot 263, range du Gouffre, parish of Baie-St-Paul, Charlevoix county. It was drilled with a cable tool drill to a depth of 267 feet in overburden. Water occurred at 219 feet.

Summary

In the Gaspé peninsula, only one company was active in 1960. It deepened its Associated Developments No. 1 Baillargeon well 2,821 feet.

In the St. Lawrence Lowlands, five wells were drilled for a combined footage of 1,257 feet.

In the Charlevoix area, one company drilled a 267-foot well.

In all, seven wells were drilled in search of petroleum and natural gas in 1960; the combined total depth was 4,345 feet.

PYRITE AND SULPHUR

The sulphur produced, in 1960, in the Province of Quebec, is that contained in iron pyrites extracted from certain mines.

During the year under review, these mines shipped the equivalent of 290,555 tons of sulphur valued at \$1,937,639. These figures represent a decrease of 37,697 tons and an increase of \$10,530, compared with those of 1959.

Pyrite from which sulphur is extracted was produced by the following mines: Amulet Dufault, Noranda, Normetal, Quemont, Waite-Amulet and Weedon. This last mine sold, in 1960, part of its pyrite concentrates produced before its closing down in November 1959.

The sulphur extracted from pyrite is used in the preparation of sulphuric and sulphurous acids. The latter is used in the pulp industry.

The principal consumers of pyrite in the Province are: Aluminum Company of Canada at Arvida, Nichols Chemical Company at Valleyfield, St. Lawrence Paper Mills at Trois-Rivières and Consolidated Paper Corporation at Grand'Mère.

QUARTZ, SILICA AND INDUSTRIAL SAND

In 1960, the combined production of quartz, silica and industrial sand amounted to 357,165 tons worth \$1,835,960. By comparison with that of 1959, 301,706 tons valued at \$1,533,206, the figures for the year in review represent an increase of 18.2 per cent in quantity and of 19.7 per cent in value.

Quartz and Quartzite

Two producers in Buckingham area extracted and sold some quartz, in addition to feldspar. They were International Minerals and Chemical Corporation (Canada) Limited and Buckingham Cartage Regd.

Dominion Silica Corporation operated its Saint-Donat quartzite quarry throughout the year. The company's property is located on lots 22 and 23, range II, Lussier township, Montcalm county.

Sandstone

High silica sandstone is also another source of silica. Five operators reported sales of silica during the year.

Canadian Silica Corporation shipped silica in various forms from its Saint-Canut plant, in Deux-Montagnes county. The company is mining a sandstone deposit on lots 126, 127 and 129, Concession de la Rivière du Nord, parish of Saint-Canut.

The company Bulwer Quarry extracted sandstone from its quarry located at Bulwer, Compton county.

E. Montpetit et Fils quarried some sandstone on Lots 302 and 305, parish of Saint-Clément, Beauharnois county.

A. Sicotte et Fils, contractor for Electric Reduction Company of Canada, operated a sandstone quarry at Howick, Châteauguay county.

Union Carbide Canada, Limited, operated its Melocheville sandstone quarry, in Beauharnois county.

Quartz, quartzite and sandstone are a source of silica used in glass, in alloying metals with silicon such as silicon carbide and ferrosilicon, in the manufacture of abrasives and for other various uses.

Industrial Sand

Two producers sold industrial sand in 1960: Gypsum Lime and Alabastine Canada Limited from its Sainte-Émilie sand pit in Joliette county, and Dominion Lime Limited from its Gohier sand pit located on lot 37, parish of Saint-Hilaire, Rouville county.

SOAPSTONE AND TALC

Baker Talc Limited and Broughton Soapstone and Quarry are the sole producers of these substances in the Province of Quebec.

The combined production of these two companies, in 1960, amounted to 14,222 tons valued at \$157,611, whereas in 1959, it reached 15,937 tons worth \$185,951. Production for the year under review was 10.7 per cent in quantity and 15 per cent in value below that of 1959.

II.- Building Materials

General Review

The total value of building materials sold in 1960 was \$86,046,452, an amount that was 3.4 per cent inferior to the one obtained in 1959.

Building contracts of all kinds awarded during 1960, in the Province of Quebec, aggregated \$722,926,800, representing \$190,631,600 less than had been awarded in 1959. The Province's total for 1960 is 23.6 per cent of the \$3,053,749,500 recorded for the whole of Canada.

Table 34. - Building Contracts Let in the Province of Quebec
from 1954 to 1960*

Year	Value in Dollars					Per Cent of Nation
	Residential	Business	Industrial	Engineering	Total	
1954	263,306,500	179,860,800	36,571,800	58,340,100	538,079,200	25.0
1955	376,789,800	208,332,400	70,703,700	123,018,000	778,843,900	24.4
1956	256,101,500	201,989,800	121,728,600	408,318,900	988,138,800	28.8
1957	218,948,500	200,330,600	85,367,200	199,078,500	703,724,800	23.6
1958	412,210,900	364,550,400	88,214,400	177,879,200	1,042,854,900	29.0
1959	273,870,500	305,281,900	113,324,300	219,081,700	913,558,400	28.3
1960	173,853,500	326,319,500	73,183,800	149,570,000	722,926,800	23.6

* From statistics compiled by MacLean Building Guide.

Table 35. - Distribution of Value of Production of
Building Materials during 1960 and 1959

Substances	1960	1959
Sand-lime and clay products	\$ 8,674,470	\$ 10,894,107
Cement and lime	28,660,732	30,007,325
Building stone	26,091,157	26,922,875
Sand and gravel	22,620,093	21,269,248
Totals	\$ 86,046,452	\$ 89,093,555

CEMENT

In 1960, the production of cement in the Province of Quebec amounted to 1,875,997 tons valued at \$28,315,159. These sales were 5 per cent in quantity and 4 per cent in value below the level obtained in 1959.

In 1960, there were five cement plants in operation in the Province: those of Canada Cement Company in Montreal-East and Hull, that of Miron Company in Ville St-Michel, that of Ciment Québec Inc. in Saint-Basile-de-Portneuf, and that of St. Lawrence Cement Company in Villeneuve.

Listed below are the quantities and points of origin of the raw materials used in the manufacture of cement:

Limestone	2,916,946 tons:	from Quebec
Gypsum	81,064 tons:	from the Maritimes Provinces
Silica	91,770 tons:	from Quebec and Ontario
Iron oxide	11,747 tons:	from Quebec
Other substances	66,809 tons:	from Quebec and foreign countries.

Table 36. - Production of Cement in the Province of Quebec
from 1955 to 1960

Year	Quantity (Tons)	Value	Average Price Per Ton
1955	1,662,085	\$ 24,132,519	\$ 14.41
1956	1,797,128	25,696,957	14.29
1957	2,051,201	30,267,092	14.75
1958	1,903,635	28,686,095	15.07
1959	1,975,452	29,520,710	14.94
1960	1,875,997	28,315,159	15.09

CLAY AND SHALE PRODUCTS AND SAND-LIME BRICKS

Sales of bricks and ceramic products in 1960 were 22 per cent below the 1959 level: \$8,093,038 compared with \$10,374,162.

Fifteen companies were engaged in manufacturing clay products. Four produced bricks only; six made bricks and pottery; five, pottery only.

With the exception of drainage tiles, the unit prices of clay and shale products decreased in 1960, compared with those for 1959.

	<u>1960</u>	<u>1959</u>
Bricks, per thousand	\$ 43.18	\$ 43.93
Building tiles and blocks, per ton .	19.61	20.91
Drainage tiles, per thousand	91.00	82.89

Sand-lime Brick

In 1960, Gypsum Lime and Alabastine Canada Limited shipped 22,590 thousand bricks and 92,543 blocks for a combined value of \$581,432.

Table 37. - Clay and Shale Products in 1959 and 1960

Classification	1960		1959		
	Quantity (Tons)	Value	Quantity (Tons)	Value	
<u>Brick:</u>					
Common brick, soft mud process	M	950	\$ 20,900	2,500	\$ 50,000
Face brick, stiff mud process	M	58,466	2,818,345	64,377	3,136,169
Common brick, stiff mud process	M	19,182	550,911	28,220	831,958
Face brick, dry press	M	56,003	2,601,295	35,876	2,141,797
Common brick, dry press	M	7,512	145,272	54,202	1,975,671
Total		142,113	\$ 6,136,723	185,175	\$ 8,135,595
<u>Other Products:</u>					
Structural tile and chimney blocks .	Tons	75,760	\$ 1,485,925	81,922	\$ 1,712,999
Drain tile	No.	2,961,603	269,497	2,371,467	196,584
Sewer pipe and flue lining			187,753		321,146
Other			13,140		7,838
Total			\$ 1,956,315		\$ 2,238,567
Grand Total			\$ 8,093,038		\$ 10,374,162

Mining Industry

Table 38. - Quantity and Value of Shale and Clay Products
from 1955 to 1960

Year	Brick		Other Products Value	Total Value
	Quantity (M)	Value		
1955	165,810	\$ 6,465,911	\$ 1,983,656	\$ 8,448,567
1956	175,893	7,270,450	2,143,464	9,413,914
1957	163,378	6,885,096	2,012,508	8,897,604
1958	197,835	8,634,102	2,039,813	10,673,915
1959	185,175	8,135,595	2,238,567	10,374,162
1960	142,113	6,136,723	1,956,315	8,093,038

CRUSHED STONE

During the year reviewed, ninety establishments, eleven of which were on a non-commercial basis, produced 18,579,673 tons of crushed limestone, granite and sandstone valued at \$21,305,301. The average unit price of crushed stone, \$1.15 per ton, was, in 1960, the same as it had been in 1959.

GRANITE

Of the 57 granite quarries in operation in the Province of Quebec, in 1960, seven were non-commercial establishments. Forty-three out of the 50 commercial quarries produced building stone or monumental and ornamental stone only.

As far as quantity and value are concerned, the 1960 production was slightly superior to that of 1959: 1,581,440 tons of granite valued at \$5,215,312 in 1960, compared with 1,419,317 tons worth \$5,056,980 in 1959.

Quebec granites come in a wide range of colours. Black, brown and dark pink granites are found in the Chicoutimi - Lac St-Jean region; pink granite is quarried at Guénette; dark red granite, near Grenville; grey and green granites come from the Eastern Townships; and the quarries around Rivière-à-Pierre supply a grey and a dark green variety of granite.

Table 39. - Production of Crushed Stone in the Province of Quebec, 1959 and 1960

Classification	1960			1959		
	Quantity (Tons)	Value	Average Per Ton	Quantity (Tons)	Value	Average Per Ton
LIMESTONE						
Commercial quarries:						
Montreal and Jesus Islands	11,056,542	\$ 12,212,265	\$ 1.10	11,754,532	\$ 13,349,157	\$ 1.14
City of Quebec District	1,303,580	1,336,557	1.03	1,014,656	966,349	0.95
Other parts of the Province	4,048,250	4,618,374	1.14	4,209,471	4,719,606	1.12
Total	16,408,372	\$ 18,167,196	\$ 1.11	16,978,659	\$ 19,035,112	\$ 1.12
Non-commercial quarries (a)	24,614	33,715	1.37	27,924	35,811	1.28
Total	16,432,986	\$ 18,200,911	\$ 1.11	17,006,583	\$ 19,070,923	\$ 1.12
GRANITE						
Commercial quarries	572,992	\$ 778,543	\$ 1.36	301,729	\$ 450,368	\$ 1.49
Non-commercial quarries (a)	734,578	1,338,096	1.82	714,900	1,117,303	1.56
Total	1,307,570	\$ 2,116,639	\$ 1.62	1,016,629	\$ 1,567,671	\$ 1.54
SANDSTONE						
Commercial quarries	316,022	\$ 490,326	\$ 1.55	220,289	\$ 385,830	\$ 1.75
Non-commercial quarries (a)	523,095	\$ 497,425	0.95	533,583	550,853	1.03
Total	839,117	\$ 987,751	\$ 1.18	753,872	\$ 936,683	\$ 1.24
TOTALS	18,579,673	\$ 21,305,301	\$ 1.15	18,777,084	\$ 21,575,277	\$ 1.15

Mining Industry

(a) Municipal- and government-owned quarries, and contractors who, themselves, use the whole of their output.

Table 40. - Quantity and Value of Granite in 1959 and 1960

Classification	1960		1959	
	Quantity (Tons)	Value	Quantity (Tons)	Value
Building stone, rough	9,567	\$ 207,903	10,679	\$ 247,008
Building stone, dressed ...	15,206	1,504,878	18,435	2,061,380
Monumental and ornamental stone, rough	9,949	241,109	6,699	169,114
Monumental and ornamental stone, dressed	7,483	715,260	5,390	641,315
Curbstone	233	8,874	505	17,366
Paving blocks	261	3,908	181	1,934
Rubble and rip-rap	231,171	416,741	360,799	351,192
Crushed stone	1,307,570	2,116,639	1,016,629	1,567,671
Total	1,581,440	\$5,215,312	1,419,317	\$5,056,980

LIME AND LIMESTONE

(Building)

During the year reviewed, the combined tonnage of limestone quarried in the Province of Quebec for building and industrial purposes equalled 21,205,008 tons, some 428,101 tons less than in 1959.

The building limestone delivered under one form or another by the 75 producing quarries amounted to 19,888,443 tons in 1960.

Building Lime

Seven quarries maintained lime kilns in the Province during 1960 to produce 27,374 tons of building lime valued at \$345,573. These totals are respectively 28 and 29 per cent lower than the totals for 1959.

Building Stone

Twenty-nine producers shipped building limestone, either as rubble, rough or dressed stone. Fifteen of them sold as crushed stone the rejects of their dressing plants.

Crushed Stone

In addition to the fifteen producers mentioned above, 52 other operated their quarries solely to produce crushed limestone. This last group does not include quarries operated to supply limestone to cement plants.

Table 41. - Distribution of Limestone in 1959 and 1960

Classification	1960	1959
	Quantity (Tons)	Quantity (Tons)
Building limestone	16,914,843	17,479,834
Manufacture of cement	2,916,946	2,951,518
Manufacture of building lime (a) ...	40,666	59,712
Manufacture of industrial lime (a) .	589,416	583,742
Industrial limestone	727,149	534,743
Building marble	15,988	23,560
Total	21,205,008	21,633,109

(a) To obtain the quantity of limestone required to manufacture lime, the quantities of quicklime must be divided by the factor 0.56 and those of hydrated lime by 0.73.

Table 42. - Total Production of Limestone from 1955 to 1960

Year	Quantity (Tons)	Year	Quantity (Tons)
1955	12,193,585	1958	17,074,399
1956	13,910,428	1959	21,633,109
1957	16,188,163	1960	21,205,008

In 1960, a total of 16,432,986 tons of crushed limestone was produced. The quarries of the Montreal area supplied 11,056,542 tons, or 67.2 per cent of the total; those around Quebec, 1,303,580 tons or 9.1 per cent; the rest of the Province, including the non-commercial operations, 4,072,864 tons, or 23.7 per cent.

MARBLE

(Building)

There were nine marble quarries in operation in the Province in 1960. Eight reported sales of crushed marble, with one of these also supplying some rough monumental stone. The ninth producer shipped dressed monumental stone.

Sales of marble were lower, both as to quantity and value in 1960, than they had been in 1959. The production of 15,988 tons of marble was 32 per cent lower than the 1959 output; the value, \$135,570, was 19 per cent less.

Crushed marble is used almost exclusively in the manufacture of terrazzo.

Table 43. - Marble Products Sold in 1959 and 1960

Classification	1960	1959
	Quantity (Tons)	Quantity (Tons)
Building and ornamental stone, rough	31	256
Building and ornamental stone, dressed	45	525
Crushed marble	15,912	22,779
Total	15,988	23,560

SAND AND GRAVEL

Compared with that of 1959, the 1960 production of sand and gravel increased 8.9 per cent in quantity and 6.1 per cent in value. Sand- and gravel-pit operators sold or used 46,255,963 tons of these materials, the value of which reached \$22,620,093.

Most of the sand and gravel produced is consumed in road building and road maintenance by the Department of Roads of the Province. Other users are the manufacturers of concrete products, the municipalities and railways.

It is noteworthy that despite the expansion of the mining industry, the use of sand and gravel as backfill material in underground mines is decreasing. The mine operators are using instead the coarse fraction of the concentrating plant tailings.

Table 44. - Quantity of Sand and Gravel Sold in 1959 and 1960

Classification	1960	1959
	Quantity (Tons)	Quantity (Tons)
Washed and screened sand and gravel	3,089,435	2,693,090
Ballast	1,440,846	1,543,738
Sand and gravel for building, concrete and roads	30,911,316	26,844,047
Sand and gravel for mine back filling	237,154	573,275
Crushed gravel	(a)10,488,378	(b)10,751,793
Other sands	88,834	43,791
Total	46,255,963	42,449,734

(a) 977,535 tons was used as ballast.

(b) 590,666 tons was used as ballast.

SANDSTONE, SLATE AND SHALE

Sandstone

Of the eleven sandstone quarries in operation, nine produced crushed stone during the year reviewed. Two of these nine were non-commercial enterprises, one of which produced 60 per cent of all the crushed sandstone.

The 1960 production, 895,042 tons valued at \$1,070,547, surpassed by 14 per cent in quantity and by 9 per cent in value the respective totals for 1959.

Slate and Shale

These two materials, when used as quarried, are absorbed mostly as fill material.

Production of slate and shale in 1960 was 115,475 tons valued at \$89,241. This represents a quantity increase of 104 per cent and a value 55 per cent higher than that recorded in 1959.

Table 45. - Quantity and Value of Sandstone Sold in 1959 and 1960

Classification	1960		1959	
	Quantity (Tons)	Value	Quantity (Tons)	Value
Rubble and rip-rap	53,875	\$ 57,981	29,763	\$ 43,641
Crushed stone	841,167	1,012,566	753,872	936,683
Total	895,042	\$1,070,547	783,635	\$ 980,324

EXPLORATION IN THE PROVINCE OF QUEBEC

IN 1960

The regional grouping of operative mines has led to the division of the Province into six mining districts. These are, from north to south:

- 1 - The New Quebec and North Shore district;
- 2 - The Chibougamau district;
- 3 - The Val d'Or district;
- 4 - The Rouyn - Noranda district;
- 5 - The Montreal - Quebec district;
- 6 - The district south of the St. Lawrence.

New Quebec and North Shore District

The most important exploration work done in the district was carried out by Murray Mining Corporation Limited and Great Whale Iron Mines Limited.

Murray Mining Corporation Limited performed its work near Watts lake, 30 miles south of Hudson strait, at latitude 61°48' North and longitude 73°58' West. This work, done on an asbestos deposit discovered in 1959, consisted of:

1. - Establishment of a base of operations;
2. - Construction of a 3,000-foot-long landing strip;

3. - Survey of the property and location of the diamond-drill holes;
4. - Core logging, sampling and general prospecting;
5. - Drilling, between May and August, of 19 holes, for a cumulative total of 10,000 feet. The company reports that the drilling has indicated the presence of 11,681,260 tons of asbestos ore worth \$18.59 per ton and that the presence of an additional 3,901,744 tons worth \$17.81 per ton may be assumed. These combined tonnages would be large enough to warrant a milling rate of 2,000 to 2,500 tons of ore per day.

Great Whale Iron Mines Limited mapped and drilled the "E" sector of its property in 1960. This area, 75 miles east of Great Whale, at Latitude 55°00' North and 76°30' West, contains an ore deposit that was explored with 17 diamond-drill holes. The total footage drilled reached 10,110 feet.

The 1960 field work brings the total amount of ore found to 942,000,000 tons grading 36 per cent iron, according to company statements. This tonnage could be concentrated into 400,000,000 tons of material grading 67.1 per cent iron.

Phelps Dodge Corporation of Canada Limited did some detailed surveys on properties held under a special exploration license, north of Eastmain river.

Chibougamau District

A - Northern region

Noranda Mines Limited and O'Brien Gold Mines Limited prospected and examined areas near the central part of the Eastmain River area. Noranda was reported to have found some sulphides and to have done some drilling with a pack-sack drill.

Consolidated Mogul Mines Limited optioned a group of 150 claims that were staked early in the year under review and geophysically surveyed from the air. These are located in the greenstone belt along Broadback river, east of Evans lake. The company reports probable occurrences of magnetite-rich formations. Farther east along Broadback

river and near Assinica lake, Sirmac Mines Limited carried out a study of its spodumene-bearing pegmatite property in projected township 1219, a discovery that was made in 1959. The surface sampling to date indicates the presence of a considerable tonnage of good-grade lithium-bearing pegmatite. The pegmatites are zoned and the presence of beryl and other minerals were also determined.

The Lac Frotet region received little to no attention during the year, except a prospecting programme carried out in the general area by Taché Lake Mines Limited.

The activities of Albanel Minerals Limited were restricted this year to the taking of another 150-ton bulk sample from its iron ore property near Albanel lake in township 1530. The amount of drill-indicated ore at present is reported to be roughly 700 million tons of 30 per cent iron. In the same area Dauphin Iron Mines Limited performed a few surveys during the year in an attempt to evaluate its holdings.

B - The Chibougamau-Opemisca Region

Chib-Kayrand Copper Mines Limited performed over 1,800 feet of drilling in two programmes on separate properties in McKenzie township: one in the southeast quarter of the township and the other southeast of Bourbeau lake. The Northeast Exploration Company explored an area at the western end of Bourbeau lake in McKenzie township and drilled 1,200 feet, partly to test a quartz vein that carried gold at surface in one locality.

Copper Rand Chibougamau Mines Limited carried out 6,000 feet of drilling to test a number of geophysical indications in anorthosite in the vicinity of Portage island, in Roy township, and in the Doré Lake area, McKenzie township.

Campbell Chibougamau Mines Limited drilled a total of 9,000 feet in anorthosite and granitic rocks containing some sulphides in an area under Chibougamau lake off Northeast Point, Portage island. Mid-Chibougamau Mines Limited and Campbell Chibougamau Mines Limited performed an 800-foot joint drilling programme on an anomaly under Chibougamau lake south of Valiquette narrows. Chibougamau Mining and Smelting Company Incorporated and Lempira Mines Limited carried out minor drilling on their Nepton Bay and Bag Bay properties, respectively, to test surface showings of sulphide zones.

In the fall of the year, O'Leary Malartic Mines Limited reported a sulphide discovery on its Gunn Bay property, in Roy township, which attracted an amount of attention to the area. Five holes were drilled to test the occurrence but early reports indicated little of economic importance. Reward Uranium Limited carried out an amount of pack-sack drilling on its property at the south end of Waconichi lake, in Richardson township.

Albanel Minerals Limited holds a claim group in Vienne township on which 2,700 feet of drilling was done during the year. Valco Mines Company drilled one hole on its Queylus property.

Amalgamated Mining Development Corporation Limited performed 6,700 feet of drilling in Scott township where there are indications of copper mineralization in a brecciated and hematized zone near or along a granite contact. Chibougamau Mining and Smelting Company Incorporated drilled 1,500 feet at the south end of Gwillim lake, in Barlow township.

The Hoyle Mining Company Limited property, in Lévy township, adjacent of the Opemiska mine at the north, was drilled to some extent during the year, and Olympia Mining Exploration Limited recently started a drill programme on its property near Springer lake, in Lévy township. Early in 1960, McIntyre Porcupine Mines Limited carried out some drilling on its Dolomieu property near Lamarck river.

C - The South Chibougamau Sector

Rohault Mines Limited completed, in January of 1960, a drilling programme that was started in 1959. No results of interest were reported. Galloway Chibougamau Mines Limited is presently drilling for assessment purposes on its property in Rohault and La Dauversière townships, adjacent to the Anacon mine on the west. New Jersey Zinc Exploration Company (Canada) Limited also performed a minor amount of drilling on its La Dauversière property near the Anacon mine.

Two large companies, The Anaconda Company (Canada) Limited and Selco Exploration Company Limited undertook comprehensive exploration programmes in this southern Chibougamau sector in the area of Des Vents and Doda lakes. Selco Exploration drilled one hole in Druillettes township near Des Vents lake.

D - The Western Chibougamau Sector

This area between Capisisit and Inconnu lakes has been receiving a certain amount of attention during the last few years and Asarco Exploration Company of Canada Limited and Denison Mines Limited are presently exploring large claim groups in the area. Ventures Claims Limited drilled 2,000 feet in Kreighoff township, after a number of surveys. Copper Rand Chibougamau Mines Limited in Branssat township, Lenmac Mines Limited and Norsco Mines Limited in Gand township, Caesar Minerals Limited in Boyvinet, and Gibson Mines Limited in Kreighoff each carried out minor drilling on their properties in this western sector.

E - The Bachelor-Opawica Region

Opemisca Explorers Limited performed 2,700 feet of drilling over 19 holes to test the small, but reportedly spectacular, gold-bearing vein on its property in Lespérance township. The drilling revealed nothing of interest. The Cook claims of Noranda Mines Limited in Le Tac township were also drilled during the year. An amount of exploration was carried out in Carpiquet township by H.W. Knight and Fab Metal Mines Limited.

Val d'Or District

There was a considerable reduction in exploration activity in the Val d'Or - Matagami Lake district in 1960. Diamond drilling and geophysical work or geophysical work was completed on at least 102 properties. Diamond drilling was undertaken on at least 70 properties, and 51 properties were subjected to only geophysical work. In 1959, on the other hand, 217 properties were subjected to diamond drilling and geophysical work or geophysical work only; 94 of these were diamond drilled and 159 were covered with one or more geophysical surveys. The much lower number of properties surveyed in 1960 indicates much less drilling activity for 1961. Of course, a new discovery, an increase in the price of gold or an upsurge in the demand for base metals can alter this picture.

There was only one important mineral discovery during the year in the Val d'Or district. On the property of Lamaque Gold Mines Limited, in Bourlamaque township, a high-grade gold deposit, a mile southeast of the main shaft area, was discovered. This is the equivalent of a new mine for the Val d'Or district.

During the year under review, Falconbridge Nickel Mines Limited decided to put the nickel property of Marchant Mining Company Limited, in La Motte township, into production. The new company formed to mine the deposit is called Marbridge Mines Limited. Shaft sinking is presently being carried out and part of the Canadian Malartic Gold Mines Limited mill is being converted to a nickel concentrator.

In 1960, Marban Gold Mines Limited, in Dubuisson township, sank a shaft 825 feet and began work on the 650- and 800-foot levels to explore gold zones discovered in drilling about 15 years ago.

Lavandin Mining Company, in Malartic township, cut some spectacular gold-bearing ore in exploration drilling. The geological structure is very complicated on this property and the correlation of the ore sections has been very difficult. Work is continuing. The properties of Lavandin Mining Company were formerly part of Hugh Malartic Mines Limited and Citra-Lartic Mines Limited.

In the Matagami Lake area Mattagami Lake Mines Limited completed a shaft to a depth of 1,135 feet. No drilling was done during the year to extend the known ore reserves.

Orchan Mines Limited, south of Mattagami Lake Mines, in Galinée township, continued its drilling programme throughout the year. Substantial additions were made to the ore reserves. The announcement of an underground programme is awaited at the end of 1960.

New Hosco Mines Limited, in Daniel township, completed a limited amount of deep drilling, which confirmed the depth extension of the orebodies to at least 1,500 feet. The property is idle at the present time. The ore reserves stand at 2,500,000 tons of 2.64 per cent copper and 1,000,000 tons of 7.96 per cent zinc.

Radiore Uranium Mines Limited, in Isle-Dieu township, also completed during the year some deep drilling, which confirmed the depth extension of the orebodies to at least 1,500 feet. The property was idle at the close of 1960.

Two new discoveries were made in the Matagami Lake area in 1960. Bell Channel Mines Limited discovered a copper-bearing zone under the waters of Bell river, to the east of the Radiore property. The company completed a limited amount of drilling from the ice last winter. Work is to continue after freeze-up in 1961.

The Consolidated Mining and Smelting Company of Canada Limited optioned the property of Levack Nickel Mines Limited, in Galinée township. Some good copper assays were obtained, but subsequent work failed to outline an orebody.

Most of the drilling on the other properties was to explore anomalous geophysical conditions. The results in all cases were inconclusive.

Rouyn-Noranda District

There was a slight decrease in exploration activities during the year reviewed, compared with those of 1959. About 100 properties, compared with 170 in 1959, were subjected to some kind of investigation in 1960. At least fifty of these were diamond drilled, compared with seventy in 1959. The others were explored by geophysical or geological parties. Surface diamond drilling totalled 220,000 feet in 1960, whereas the footage drilled in 1959 reached 260,000 feet. However, many companies had not yet handed in their reports at the end of the year.

Lake Dufault Mines Limited completed one of the largest drilling programmes for a total of 39,421 feet. This footage was partly distributed as follows: 14,900 feet on the Norbec property and 23,898 feet in the Dupresnoy section. In this latter section, the drilling uncovered small deposits that appear to be the western extension of the copper-zinc orebody discovered in 1957-58.

South Dufault Mines Limited drilled an area four miles northeast of Noranda and found two copper zones. These are rather small and their tonnage and grade had not yet been calculated at the end of the year under review. Drilling was still in progress at that time.

In Montbray township, Inmont Copper Mines Limited dewatered the shaft of the old Robb-Montbray mine, in order to conduct an underground diamond drilling programme. In 1935, 1,500 tons of good-grade gold-copper ore was shipped from that property. A total of 10,090 feet of drilling was done to explore an area where surface drilling had shown the presence of interesting ore. No commercial deposit was found. There was also 10,527 feet of drilling done from surface.

Norque Copper Mines Limited, which for the past few years had carried out geophysical surveys on large areas of Dufresnoy and Duprat townships, started a drilling campaign to test the main anomalies.

Eight holes, totalling 3,742 feet, were drilled in Dufresnoy township, four of them in a mineralized zone in range IX.

Early in the summer of the year reviewed, a few mining companies acquired ground to the west of Noranda, in Montbray and Duprat townships, on the extension or presumed extension of a rhyolite band. Results of many geophysical surveys were not encouraging. Southwest Potash Corporation, which was holding a recently found mineralized zone in Montbray township, sank a few holes and obtained at depth the same results as on surface - a shear zone with some copper mineralization. The width of this zone would preclude economical operations. The same company also drilled some mineralized zones in Duprat township; the zones contained only low-grade ore.

Waite Lake Mines Limited did some drilling just west of the Consolidated Vauze deposit.

Centurion Mines Limited and Trade-Horn Limited did some aerial magnetic and electromagnetic surveys over a 200-square-mile area along the transcontinental rail line west of Amos. These surveys were followed by drilling that totalled 11,197 feet. Although many mineralized zones were found, none was of economic value.

During the year reviewed, Prospectors Airways Company Limited and Rio Canadian Exploration Limited announced simultaneously the discovery of some sulphide zones containing interesting assays of copper or zinc. These zones were located in Joutel and Poirier townships. The first discoveries were tests by drilling in 1960. Rio Canadian outlined a 2,000-foot sulphide lens containing fairly high assays of copper and zinc. However, no commercial deposit had been found at the end of the year.

Prospectors Airways Company Limited explored a similar zone, but its material was not rich enough in minerals to be classified as ore. It was only at the end of September that a copper-rich zone was discovered. This was northeast of the first zone. A drill hole cut a 103-foot section grading 3.48 per cent copper. Eight holes have been put down since September 1960, with encouraging results, but the attitude of the deposit has not been determined yet and its dimensions are somewhat vague.

In the same area, Southern Union Oils Limited and East Sullivan Mines Limited explored a zone containing some disseminated chalcopyrite. It was on a property located in Poirier township. Some new drilling has been planned for the 1961 season.

Noranda Mines Limited did some exploration farther east, in Subercase and Ste-Hélène townships. The company did not locate any economic concentration of minerals.

In summary, the most noteworthy discoveries of the year were:

- 1.- Prospectors Airways Company Limited: high-grade copper ore in Joutel township; deposit to be proved.
- 2.- Anglo American Mines Limited: molybdenite ore in Preissac township; proved deposit.
- 3.- South Dufault Mines Limited: copper ore in Rouyn township; small deposit.

Added to these discoveries, are two deposits discovered in years past and already in the development stage: the Preissac Molybdenite deposit in Preissac township and the Consolidated Vauze deposit in Dufresnoy township.

Montreal - Quebec District

Four companies account for about 80 per cent of the exploration done in the Montreal - Quebec district. They are New Calumet Mines Limited, St. Lawrence Columbium and Metals Corporation, Columbium Mining Products Limited, and Quebec Columbium Limited.

More than 14,500 feet of diamond drilling and 4,100 feet of drifting were done by New Calumet Mines Limited, on its Grand-Calumet township property, to outline an ore zone found late in 1959. This zone has been traced on the 900-, 1,050-, 1,200-, 1,675-, and 1,800-foot levels. Drilling in progress at the end of the year indicated the presence of the same zone on the 1,900-foot level

St. Lawrence Columbium and Metals Corporation, formerly St. Lawrence River Mines Limited, centered its exploration work on the southeastern extension of the "A" orebody on its Oka property. Thirty diamond-drill holes were put down for a total of 15,199 feet. A bulk sample, treated in a pilot plant located in l'Ecole Polytechnique, produced a concentrate containing 50 per cent Cb_2O_5 (columbium pentoxide). Late in 1960, the company started on the construction of a concentrator with a daily capacity of 500 tons.

Also toward the end of 1960, Columbiu Mining Products Limited, in Oka, undertook some drilling and some bulk sampling. The samples will be used in concentration tests. The company has made public its intention of building a 200-ton-per-day mill. Purchase contracts and exclusive sales agencies have been entered into with the United States and West German firms.

Quebec Columbiu Limited, in Oka, put down 13 deep holes to explore its "Manny" deposit. Two other holes were drilled in the southwest or "Bond" deposit. Total footage drilled equalled 14,200 feet.

Trans-Nation Minerals Limited conducted detailed magnetometer surveys and geological mapping on a 50-claim group in Houdet township, Hull county. The work centered along a 2-mile-long magnetite zone already outlined and drilled by Holannah Mines Limited during the summer of 1957.

Tamara Mining Limited carried out a small amount of work on its 950-acre titaniferous iron property in Wexford township. The work included geological mapping and preliminary metallurgical tests on a 40-ton bulk sample.

Denison Mines Limited optioned a group of six claims and investigated the old Bain Molybdenite property in Masham township. The company removed the overburden from most of the mineralized zone. This was followed by detailed geological mapping and bulk sampling. Assay results showed a molybdenite content of less than 0.75 per cent.

Hupon Mining and Exploration Limited worked on the old Gratton Molybdenite property in Huddersfield township. The company trenched 100 feet along the east-west strike of the zone. Information at the close of the year under review indicated that the company was preparing to drive an adit.

Mr. Lorenzo Hudon staked and sampled the old Squaw Lake mine in Huddersfield township.

Quebec Smelting and Refining Limited announced the proposed formation of a new company to develop some apatite deposits in the Buckingham area. In co-operation with the Department of Mines and Technical Surveys in Ottawa, the Company has been working on two different processes: the one, to make a marketable concentrate; the other, to produce a fused phosphate fertilizer.

During the summer, Luckridge Phosphate Mines Ltd. investigated an apatite occurrence, three miles north of Buckingham. Seven holes, totalling 1,500 feet, were drilled by the company.

Ghislau Mining Corporation Limited, owner of the old Tétreault mine at Montauban, plans to get into production soon. The company's main project will be the treatment of the 960,000 tons of tailings left by former operators. These tailings are said to contain some \$8,000,000 worth of metals. Considering the successful outcome of a research programme conducted at the Department of Mines pilot plant and of the modernizing of the milling plant of the old mine, company officials feel that they can recover 80 per cent of the metals left in the tailings. In addition, the company will have established reserves of 500,000 tons of ore, after a diamond-drill exploration programme. This ore can be extracted through the two shafts already in existence.

Finally, in Kénogami township, Saguenay Exploration and Mining Incorporated has kept up its prospecting activities, a programme initiated a few years prior to the year reviewed. The company's main property is adjacent to the old mining property of Canada Iron Furnace Company Limited (1902). During the summer of the year under review, many titaniferous magnetite deposits were uncovered. A 3/4-mile access road was built to the most important showings. These recent finds of the company are located about 4 1/2 miles southeast of the St. Charles titaniferous iron deposits.

Finally, most of the exploration work for petroleum and natural gas was done within the Montreal - Quebec district during 1960.

District South of the St. Lawrence

At the beginning of 1960, Stratford-Cyprus Mines Corporation Limited became Solbec Copper Mines Limited. The latter owns, in Stratford township, a deposit containing 1,500,000 tons of ore grading 2.25 per cent copper, 3.92 per cent zinc, 1.21 ounce of silver and 0.016 ounce of gold per ton. During the summer of 1960, the company had three drills in operation to obtain data on the deposit as a guide for sinking operations. Buildings constructed include an office, a repair shop, an electrical sub-station, the mill (not completed) and a storehouse for diamond-drill cores. The cement shaft collar has been poured and the headframe is almost completed. Shaft-sinking operations began in October of 1960; an advance of 200 feet per month is expected. The shaft will be bottomed at 1,400 feet. Production is scheduled for the summer of 1961.

Solbec and other affiliated firms did geophysical and diamond drilling work outside the main property. During the summer of the year reviewed, another deposit was discovered. It straddles lots 4 and 5, range VII, S.W., Stratford township. This second deposit is located 7,000 feet southwest of the first one, on the same stratigraphic horizon. A few diamond-drill holes have partially outlined a mineralized zone 15 feet wide and 450 feet long that extends to a depth of 1,200 feet. No tonnage figures were given, as exploration was still in progress at the close of 1960. The ore contains some bornite and would appear to have a higher copper content than that of the first deposit.

The Moneta group financed by Moneta Porcupine Mines Limited (45%), Dome Exploration Company (Quebec) Limited (45%) and Hastings Mining and Development Company Limited did a fair amount of exploration in the Eastern Townships. Recently, the Moneta group announced a copper discovery in Clinton township, Frontenac county. Electromagnetic and magnetic ground surveys detected a favourable area. Subsequent drilling disclosed the presence of a lenticular body of massive sulphides containing copper. The first hole cut 12.2 feet (true width) of massive sulphides grading 3.41 per cent copper, 0.89 per cent zinc, 0.006 ounce of gold, and 0.17 ounce of silver per ton. This interesting discovery could result in a bright future for the area.

Beauce Placer Mining Company Limited has been engaged, for the past three years, in an extensive exploration programme covering the gold-bearing sands of the Chaudière River valley. To date, the company has executed 28,558 feet of boring. Reserves in the Rigaud-Vaudreuil seigniory were evaluated by the company at 16,796,000 cubic yards of sands having a gold content of \$3,775,000. No important exploration or development work was done during the year reviewed. However, should it obtain adequate finances, the company plans to carry out, in 1961, the work programme it had planned for 1960.

Black Hawk Mining Limited was actively engaged in exploring for gold on the group of eight claims it holds in Bellechasse township. It centered its efforts on lot 2, range III, the old N.A. Timmins (1938) Limited gold prospect. During the summer of 1960, the company did some rock stripping, a magnetic survey and some shallow and deep diamond drilling. To date, eleven holes have been drilled and gold assays derived in some sections of the first six. Assay results of the other holes were not complete at the end of the year reviewed.

Moreover, a total of 60 tons of bulk samples was sent to the Department of Mines, for assay. A 24-ton sample gave 0.65 ounce of gold per ton, and an 18-ton sample, 0.58 ounce of gold per ton.

Steerola Explorations Limited (affiliated with Steep Rock Iron Mines Limited) undertook, during the years prior to the one reviewed here, a programme of geological and geophysical surveys in Acton township, in the vicinity of the old Acton copper mine. These detailed surveys were followed, in 1960, by a diamond-drilling campaign. In addition, the company did some exploration for copper in Newport township, in Gaspé-Sud county.

During the few years preceding 1960, Frontenac Mining Corporation Limited did some prospecting, geophysical surveys, and diamond drilling on its molybdenite property in Gayhurst and Dorset townships, in Frontenac county. At the end of 1960, it had put down 21 holes for a total of 17,256 feet of drilling. The company plans to drive an adit in 1961 to assess the real value of the deposit.

In the same county Fontbrune Nickel Mines Limited carried out some exploration work on its Spalding Township property. Some exploration pits were dug, a magnetic survey conducted, and five diamond-drill holes put down. The company is mainly interested in the iron deposits of the area.

The exploration and development work carried out in the Gaspé area were done by Noranda Mines Limited or its subsidiary, Gaspé Copper Mines Limited.

DEVELOPMENT AND MINING OPERATIONS IN THE PROVINCE OF QUEBECDURING 1960

This chapter contains a summary of the mining operations conducted in the Province of Quebec in 1960. Only mining and development work are reviewed, as general exploration work performed by mining companies has been treated in another chapter of this report.

METALLIC SUBSTANCESAKASABA GOLD MINES, LIMITEDAbitibi-East CountyLouvicourt Township

Producer: gold

Shipments of ore to the mill at Bevcon Mines started in March 1960. Out of a total of 72,472 tons shipped, about 9,108 tons of ore was taken from the surface stockpile. The average grade of ore treated was 0.120 ounce of gold per ton.

Only one stope, located partly above and partly below the 150-foot level, is in operation. The second stope is being prepared for mining.

Surface and underground drilling, totalling 1,406 feet, served to outline the stoping area.

There was no development activity during 1960, and possible ore reserves as at December 31 stood at 146,807 tons averaging 0.174 ounce gold per ton.

The mine employed 32 men in 1960; the manager was Mr. H.R. Graham.

ANACON LEAD MINES, LIMITEDAbitibi-East CountyRohault Township

Producer: gold, silver, copper

Operations at the property of Anacon Lead Mines were suspended for an indefinite period on August 21st, 1960, and the mine workings were allowed to fill with water.

During the year, 114,223 tons of ore was treated. For the first seven months of the year, the average grade of ore treated was 0.164 ounce of gold per ton and 0.342 per cent copper. Production for this same period amounted to 16,213.5 ounces of gold and 649,758 pounds of copper.

Underground, a new ore zone to the west of the mine workings was explored on the 300-, 450- and 600-foot levels with some actual mining being done in this zone on the last two levels. Other development work was carried out in the No. 5-vein north zone and the "A" and "B" south zone on the 1,350-foot horizon. Lateral development work amounted to 4,355 feet.

Some 630 feet of raising was completed in extending the ore pass system between the 1,350- and 1,200-foot levels and in routine stope preparation work.

Exploratory diamond drilling was carried out underground only and consisted mainly in testing the new west zone from the 450- and 600-foot levels, the No. 5-vein north zone from the 1,050-, 1,200- and 1,350-foot levels and the "A" and "B" south zone from the 1,350-foot level.

Ore reserves at date of cessation of operations are reported to be 170,400 tons grading 0.20 ounce of gold per ton and 0.35 per cent copper.

The mine employed 115 men; the manager was Mr. K.C. Wilson.

ANGLO AMERICAN MOLYBDENITE MINING CORPORATIONAbitibi-East CountyPreissac Township

Underground development: molybdenum, bismuth

As a result of an extensive diamond drilling programme that was carried out at the property of Anglo American Molybdenite Mining Corporation sufficient molybdenum- and bismuth-bearing ore was indicated to warrant underground development.

During the latter part of the year reviewed, a decision was reached to sink a three-compartment vertical shaft to an initial depth of 350 feet from surface. The shaft was collared during November, and preparations were made to erect a 90-foot headframe and to begin actual sinking about the end of January 1961.

Ore reserves indicated by diamond drilling were reported to be about 579,000 tons having an average grade of 0.6 per cent molybdenite (MoS_2) and 0.087 per cent bismuth, in the East-West deposit. In the North-South deposit, indicated ore reserves were reported to be 834,000 tons having an average grade of 0.47 per cent molybdenite and 0.054 per cent bismuth, plus 1,316,000 tons having an average grade of 0.32 per cent molybdenite and 0.034 per cent bismuth.

The mine manager was Mr. L. Dixon.

BARNAT MINES, LIMITEDAbitibi-East CountyFournière Township

Producer: gold, silver

A total of 445,585 tons of ore, grading 0.155 ounce of gold per ton, was treated during the year 1960. The average daily treatment rate was 1,218 tons, compared with a daily rate of 615 tons, and an average ore grade of 0.179 ounce of gold per ton during the previous year. The daily ore production of about 572 tons was treated in the mill at the Malartic Gold Fields Limited property. The remainder was treated in Barnat's own treatment plant. The treatment rate climbed steadily throughout the year and, by year end, had reached 1,400 tons per day.

This increase in the treatment rate was made possible when stopes of the newly developed porphyry orebody were brought into production. About 85 per cent of the ore hoisted came from three stopes of this orebody, above the 900- and 1,250-foot levels. The remainder came mostly from six stopes in the "diorite" zone, above the 700-, 900-, 1,250- and 1,575-foot levels.

A long drive on the 700-foot level was completed to the west boundary of the property, as a base from which exploratory diamond drilling was carried out. Other exploration work consisted of extending drifts west on the 1,250- and 1,575-foot levels, as a base from which to explore the downward extension of the porphyry orebody. Another drive was also completed on the 1,250-foot level in order to test, by diamond drilling, ore conditions to the south of the area between the "porphyry" and "diorite" orebodies.

All exploratory diamond drilling was carried out underground, and totalled 56,961 feet. Aside from the above-mentioned work, this drilling consisted mostly in completing the outlining of the porphyry orebody at the 700-foot horizon.

Ore reserves, as at the end of December 1960, have been estimated at about 1,310,000 tons grading 0.140 ounce of gold per ton, including 19,370 tons of broken ore averaging 0.181 ounce of gold per ton.

In 1960, the mine employed 224 men; the general manager was Mr. V.E. Nethery.

BATEMAN BAY MINING COMPANY LIMITED

Abitibi-East County

McKenzie Township

Underground development: copper

Prior to the closing down of the property of Bateman Bay Mining on June 13th, 1960, a three-compartment vertical shaft was put down to a depth of 526 feet from surface and a considerable amount of underground exploration and development work was carried out on mine levels established at the 250-, 375- and 500-foot elevations.

During the year under review, up to the time of closure, work at this property was carried out under the management of Merrill

Island Mining Corporation Limited. This work consisted of 1,970 feet of underground exploratory diamond drilling, 332 feet of drifting on the 500-foot level and 1,178 feet of raising.

Approximately 8,600 tons of ore was mined and shipped to the Merrill Island mill for metallurgical test purposes.

Work was suspended on June 13th, and the mine was allowed to flood.

The manager was Mr. E.W. Wett.

BEVCON MINES, LIMITED

Abitibi-East County

Louvicourt Township

Producer: gold, silver

During 1960, production was maintained at a rate of about 639 tons per day, for a total of 233,910 tons averaging 0.130 ounce of gold per ton. This compares with 243,788 tons treated during the previous year, when the grade was the same. In addition to the above, Bevcon's mill also, on a custom basis, treated 72,472 tons of ore for Akasaba Gold Mines Limited.

The source of mill feed at the Bevcon mine still lies between the 800- and 2,100-foot horizons. Development ore accounted for about 18 per cent of the mill feed, whereas 13 per cent of the remainder was derived from above the 900-foot level at the Buffadison mine, and between the 1,600- and 1,975-foot levels at the Lencourt sections of the property.

Lateral work carried out from most of the levels between the 900- and 2,100-foot horizons is a continuation of the development of vein systems.

All exploratory diamond drilling was confined to the underground workings and totalled 38,975 feet.

The only changes in the surface plant were certain modifications of the treatment plant equipment in order to handle a higher tonnage of ore.

The mine employed 193 people; the mine manager was Mr. H.R. Graham.

CAMPBELL CHIBOUGAMAU MINES, LIMITEDAbitibi-East CountyObalski, McKenzie and Roy Townships

Producer: copper, gold, silver

During 1960, the copper concentrator at the property of Campbell Chibougamau Mines treated 816,718 tons of ore grading 2.35 per cent copper, 0.057 ounce of gold per ton and 0.612 ounce of silver per ton.

The mill operated 93.27 per cent of maximum running time at an average rate of 2,237 tons per calendar day.

At the end of the year, an additional rod mill was installed in the grinding circuit in order to increase the capacity of the treatment plant to 3,000 tons of ore daily early in 1961.

The concentrates shipped, during 1960, contained: 36,105,194 lbs. of copper, 38,603.18 ounces of gold and 386,889.68 ounces of silver.

During the year, the mill feed was derived as follows:

	Mill Feed Tons	Mill Heads	
		Copper %	Gold oz./ton
Main mine	78,917	1.64	0.032
Kokko Creek	174,623	2.91	0.009
Cedar Bay	261,685	2.29	0.111
Henderson	68,132	3.10	0.044
Total	824,529	2.35	0.057

Main Mine

At the Main mine, mining was most active between the 1,300- and 400-foot levels. The mining methods used were cut-and-fill, shrinkage and pillar recovery.

During 1960, a minor amount of lateral work and raising was carried out to develop further the "A" and "B" zones. The emphasis on development, however, was in connection with the No. 1 Winze programme.

Deep exploration by drilling, late in 1959, indicated a new ore zone at depth within the company's wholly owned ground. Immediately plans were made to sink a three-compartment vertical internal shaft approximately 1,400 feet south south-west from the No. 1 shaft, at the 1,750-foot level. The hoistroom and sheave locations are on the 1,750-foot horizon, and the shaft deck is on the 1,900-foot elevation. The shaft will be put down to about the 3,900-foot mine horizon. Access drives were completed on the 1,750- and 1,900-foot levels during the second quarter of the year. A shaft pilot raise, driven up from the 1,900-foot horizon, was started on July 19th. Shaft sinking proper was commenced on October 12th and, at year's end, 787 feet of sinking had been completed. In conjunction with this project, 1,350 feet of lateral work and 276 feet of raising were achieved during the year.

Exploration by diamond drilling was carried out from the underground workings only and amounted to 32,822 feet.

Kokko Creek Division

During 1960, operations at the Kokko Creek division were mainly confined to stope preparation and mining between the 500-foot level and surface. A total of 10,360 feet of exploratory diamond drilling was done from the different levels to outline the extensions of the orebody.

Cedar Bay Division

At the Cedar Bay division, cut-and-fill stoping was being used more extensively and has helped to reduce dilution.

Mining was most active between the 650- and 375-foot levels.

Lateral work, which amounted to 4,597 feet of advance, was mainly confined to driving eastward on the 500- and 800-foot levels to explore two new ore zones indicated approximately 1,200 feet east of the active stoping areas.

Exploratory diamond drilling carried out from surface on a zone 1,000 feet to the west of the main workings yielded additional ore tonnage. Development of this zone will be accomplished from the 800-foot elevation. Underground diamond drilling was done from different elevations but more especially from the 500- and 800-foot elevations. A total of 39,148 feet was drilled from underground in 1960.

Henderson Mines Division

The Henderson mine, although still being developed, started to truck ore to the Main Mine mill at the end of April 1960. At year's end, 68,132 tons of copper-bearing ore had been shipped to the mill.

The shaft-sinking programme was completed on March 20th, the four-compartment vertical shaft having reached a depth of 793 feet. Shaft stations were established at the following elevations: the 100-foot, 275-foot, 525-foot, and 650-foot; loading stations were excavated at the 650- and 760-foot horizons.

Following completion of the shaft sinking programme, lateral development was carried out on the 100-, 275-, and 650-foot levels, in order to prepare the main Henderson zone for full-scale production for the second quarter of 1961. In conjunction with development, exploration was carried out eastward on the 275- and 525-foot horizons in order to reach and outline the Henderson offset zone. This zone is approximately 1,200 feet northeast of the main Henderson zone. During 1960, 11,142 feet of lateral work was accomplished.

Stope preparation was begun from the 525-foot level, which will be the main haulage level. From raises driven up from the 525-foot horizon, the 450-foot sub-level was advanced in the zone and thus formed the floor of four adjacent large cut-and-fill stopes.

At year's end, the stopes were being prepared for large-scale mining, with mechanical trackless equipment.

A crusher room was excavated on the 650-foot level, and, from the crusher room up to the 525-foot level, near the shaft, a conveyor way was driven.

Raising was carried out for developing ore passes between the 525- and 760-foot levels, for opening a combined ventilation-escape raise between surface and the 100-foot level, and for establishing regular development access raises. A total of 1,608 feet of raising was driven during 1960.

Exploratory diamond drilling was carried out from surface and from the underground workings. A total of 9,406 feet was drilled from the ice of Chibougamau lake, whereas 45,199 feet was drilled from the underground workings.

The surface plant was completed during the year reviewed. Large fans and heaters have been installed above the ventilation raise to control ventilation and air temperatures underground.

Proved ore reserves, as reported in the company's annual report for June 30th, 1960, amount to 2,437,609 tons averaging 2.52 per cent copper and 0.052 ounce of gold per ton. This includes ores at the Main mine and the Kokko Creek, Cedar Bay and Henderson mine divisions.

The mine manager was Mr. A.M. Walker; 692 persons were employed during the year.

CANADIAN MALARTIC GOLD MINES, LIMITED

Abitibi-East County

Fournière Township

Producer: gold, silver

The mill at Canadian Malartic Gold Mines treated 468,694 tons of ore during 1960. The average grade of the mill feed was about 0.097 ounce of gold per ton. This compares with 467,413 tons of ore grading 0.099 ounce of gold per ton treated during the previous year.

The mill feed came from the various orebodies between the 375- and 1,000-foot horizons. In the Main break, stoping is active down to the 750-foot level. In the East area, south of the Main break, mining operations are located between the 625- and 1,000-foot levels. In the South branch of the Main break, which is in the area of the No. 3 shaft, the "A", "K" and "F" stopes are in operation respectively from above the 375-, 875- and 500-foot levels.

During the year, the Northeast drive on the 1,375-foot level towards the Barnat boundary, the drive towards the Gouldie zone on the 750-foot level, and the exploratory diamond drilling relative to these two areas were completed without having found any appreciable ore indications. Development and exploration are now centered on the 375-foot level around the No. 3 shaft area. This development consists of crosscuts driven north towards a pegmatitic porphyry area and south towards an area of scattered high-grade ore content obtained from surface drilling. Outside of these two main exploratory headings,

there are also a number of sections being drilled along the north porphyry-greywacke contact at the 500-, 625- and 750-foot horizons.

Part of the mill has been modified to handle the nickel ore, which will be eventually shipped from Marbridge Mines at an expected rate of 300 tons per day.

Ore reserves, as at year end, are estimated to be approximately 809,900 tons grading 0.102 ounce of gold per ton, an appreciable decline of tonnage and grade over the 952,500 tons averaging 0.104 ounce of gold per ton and reported at the end of the previous year.

The general superintendent was Mr. A.R. Meyers; in 1960, employees numbered 272.

CHIBOUGAMAU JACULET MINES LIMITED

Abitibi-East County

McKenzie Township

Producer: copper, gold

Chibougamau Jaculet Mines Ltd. merged with Copper Rand Chibougamau Mines Ltd. on August 31, 1960.

The property is now known as the Jaculet Mine of Copper Rand Chibougamau Mines Limited.

For details on mining activities, see Copper Rand Chibougamau Mines Ltd.

THE CONIAGAS MINES LIMITED

Abitibi-East County

Lesueur Township

Underground development: zinc, silver, lead

The Coniagas Mines Ltd. reached a decision, during the year 1960, to bring into production its property located in Lesueur township, and to proceed with the construction of a concentrator.

The property, which had been idle since April 1958, was reopened in August 1960, and construction of a 400-ton-per-day

concentrator, crushing plant, diesel power plant, and other ancillary buildings was started immediately. A small trailer camp, comprising about sixteen units was provided for the families of employees.

The 1,250-foot three-compartment vertical shaft was dewatered to about 50 feet below the 790-foot level. Near the end of the current year, underground work was concentrated on the ore pass and the ventilation raise systems.

Ore reserves to a depth of 650 feet from surface were reported to be about 400,000 tons having an average grade of 15.7 per cent zinc, 1.04 per cent lead, and 8.77 ounces of silver per ton.

The mine manager was Mr. R.J. Dionne.

CONSOLIDATED VAUZE MINES, LIMITED

Rouyn-Noranda County

Dufresnoy Township

Underground development: copper, zinc

Near the end of 1959, a three-compartment vertical production shaft was collared on the property of Consolidated Vauze Mines, Ltd., and the construction of a surface mining plant and ancillary buildings was started.

Sinking of the shaft was begun on March 17, 1960, and was completed to its objective depth of 773 feet from surface on July 30, 1960. Stations were established at depths of 63, 225, 375, 550, and 720 feet from surface.

Lateral work, which amounted to 1,845 feet, was carried out on the four lower levels, but most of it was done on the 225-, 375-, and 550-foot levels. In addition, 45 feet of raising was completed near the end of the year.

Most of the 19,218 feet of diamond drilling that was completed underground during the current year was done to explore the North zone, which is located about 400 feet north of the shaft. Only 1,195 feet of exploratory drilling was carried out from surface.

Indicated ore reserves were reported to be about 100,000 tons containing an average of 6.76 per cent copper, 4.95 per cent zinc, 2.28 ounces of silver, and 0.065 ounce of gold per ton.

The Manager was Mr. E.P. Graham.

CONTINENTAL TITANIUM CORPORATION

Charlevoix County

Producer: ilmenite

Work was centered in the Bignell mine and consisted of stripping and mining. Production averaged 150 tons of ilmenite per day, from early June to October.

In 1960, Continental Titanium Corp. shipped 12,000 tons of crushed ilmenite to the United States, where it is used as building material in the atomic energy industry.

The grinding and concentration plant have also been in operation. The company has on hand about 10,000 tons of fines, which are dried and concentrated at the rate of 10 to 30 tons per hour.

The manager was Mr. M. Zwonock; the plant employed 30 persons.

COPPER RAND CHIBOUGAMAU MINES LIMITED

Abitibi-East County

McKenzie Township

Producer: copper, gold

Through an agreement between the parties concerned, effective August 5th, 1960, Copper Rand Chibougamau Mines Ltd. assumed ownership of the former Portage Island (Chibougamau) Mines Ltd. and the Chibougamau Jaculet Mines Ltd. These latter properties are now designated respectively as the Portage Mine and the Jaculet Mine. All ores mined from these two mines are treated in the mill of Copper Rand Chibougamau Mines Ltd.

During 1960, 550,568 tons of ore grading 2.63 per cent copper and 0.04 ounce of gold per ton was treated. The ore was

derived as follows: Copper Rand, 77 per cent; Jaculet Mine, 15 per cent; and Portage Mine, 8 per cent.

According to the company's annual report, proved ore reserves, as at December 31, 1960, are as follows:

	<u>Tons</u>	<u>Copper Per Cent</u>	<u>Gold Oz./ton</u>
Copper Rand	1,198,000	2.60	0.025
Jaculet Mine	79,400	1.93	0.025
Portage Mine	762,600	2.69	0.16

The total of proved ore is 2,040,000 tons grading, on an average, 2.61 per cent copper and 0.075 ounce of gold per ton.

Copper Rand

Most of the ore produced at the Copper Rand mine was drawn from the Eaton Bay zone, between the 1,300- and 150-foot horizons and virtually all of the known important ore shoots in this zone were developed above the 1,300-foot horizon.

In the Machin No. 1 zone, three shrinkage stopes were prepared for mining on the 400-foot level and one on the 525-foot level.

In the Machin No. 2 zone, mining development was continued on the 1,150- and 1,300-foot levels and was started on the 850- and 1,000-foot levels.

Lateral development work amounted to 5,070 feet. A total of 3,302 feet of raising was carried out.

Surface exploratory diamond drilling amounted to 1,926 feet and underground diamond drilling amounted to 37,001 feet, of which 12,314 feet was for water control purposes.

Copper Rand also carried out 22,734 feet of diamond drilling and 850 feet of lateral drives from its 1,000- and 1,300-foot mine levels on behalf of the adjoining Bouzan Mines Limited property.

Considerable work was carried out preparatory to the deepening of the No. 4 shaft an additional 680 feet, in order to provide for four new mine levels below the present bottom, or 1,450-foot, level. The shaft deepening programme is scheduled to start during 1961.

Jaculet Mine

Most of the ore production here came from two stopes between the 600- and 300-foot levels in the No. 1 zone. In the No. 2 zone, one stope was developed above the 450-foot level. A limited amount of development drifting, amounting to 960 feet of advance, was carried out on the 600-foot level. Exploratory diamond drilling amounted to 1,118 feet from surface and 2,018 feet from underground.

Portage Mine

Production from this mine started in August and, by year end, 45,953 tons of ore had been trucked to the Copper Rand mill.

The four-compartment vertical shaft was deepened an additional 111 feet, to a final depth of 878 feet, in order to provide for loading pocket facilities.

Lateral development on the 250-, 400-, 550- and 700-foot levels was continued, and amounted to 6,720 feet of drifting and crosscutting.

Development raising amounted to 2,225 feet.

By year end, 8 stopes were being prepared for mining.

The hydro electric line was extended to the Portage mine and the mining plant was readied for production.

The mine manager was Mr. D.C. McDonald; there were 364 men employed in 1960.

DUVAN COPPER COMPANY LIMITEDAbitibi-West CountyDesmeloizes Township

Producer: copper, silver

The property of Duvan Copper Company, which had been idle since September 1957, was reopened in August 1960.

Dewatering of the 1,000-foot three-compartment vertical shaft was started about the 1st of August, and was completed to

the 950-foot level, on October 28, 1960. The property was mined on an ore salvage basis by Clarke Equipment Co. Ltd. From October 28, till November 5, a total of 400 tons of ore from the surface stockpile, as well as 1,159.6 tons of ore from underground, was shipped to the Noranda smelter for treatment. The average grade of the stockpile ore that was treated was 6 per cent copper and 2.94 ounces of silver per ton, and that of the ore from underground was 11.99 per cent copper, and 2.94 ounces of silver per ton.

No exploratory diamond drilling or lateral work was carried out during this period. After November 5, all salvageable equipment was removed to surface. This latter work was completed on November 25, 1960, and the underground workings were allowed to flood.

Mr. D. Sykes was in charge of operations.

EAST MALARTIC MINES, LIMITED

Abitibi-East County

Fournière Township

Producer: gold, silver

The mill at East Malartic Mines, Limited, during 1960, treated 544,939 tons of ore, an average daily rate of 1,490 tons. The average grade of the ore to the mill was 0.211 ounce of gold per ton. This is very similar to the 544,137 tons treated during the previous year, when the grade was 0.213 ounce of gold per ton.

Ore reserves, as estimated at year end, amounted to 1,823,000 tons, averaging 0.182 ounce of gold per ton. This is a slight decrease both in tonnage and grade, compared with the previous year's reserves of 1,905,438 tons averaging 0.202 ounce of gold per ton.

The bulk of the mill feed was derived from stoping operations in the Main zone, between the 3,265- and 2,485-foot levels, and in the Sladen Fault zone above the 2,785- and 2,935-foot levels. Lesser amounts came from the 1,570-, 2,035- and 3,445-foot levels in the Main zone.

Lateral work consisted mostly of advancing a heading eastward on the 2,935-foot level, starting a similar drive on the 3,805-foot level, drifting on the 3,625-foot level in the Main zone,

and completing the drifting and crosscutting from No. 4 shaft to the new No. 5 internal shaft location on the 3,625- and 3,805-foot levels.

The No. 5 internal shaft, a four-compartment vertical opening, is located about 1,850 feet to the east of the main No. 4 shaft. When completed, it will extend from the 3,625-foot mine level to a depth of about 1,080 feet below this level in order to provide for seven new mine levels, at 150-foot vertical intervals. Actual sinking operations were commenced in February 1960, and by year end had reached a depth of 995 feet.

Underground exploratory drilling comprised routine testing of the Main zone on the 3,445- and 3,625-foot levels, exploration for the downward extension of the Barnat south zone in the west part of the mine at the 3,265- and 3,805-foot horizons, and also exploration in conjunction with the lateral work on the 2,935-foot level. This latter drilling and development uncovered what is believed to be a new zone, which is farther east than the downward projection of the East zone.

The general manager was Mr. V.E. Nethery; in 1960, the mine employed 466 persons.

EAST SULLIVAN MINES, LIMITED

Abitibi-East County

Bourlamaque Township

Producer: gold, silver, copper, zinc, cadmium

During 1960, the ore concentrating plant at the mine of East Sullivan Mines Limited treated an average of 2,663 tons of ore daily, for a total of 974,532 tons of ore averaging about 0.704 per cent copper, 1.18 per cent zinc, 0.011 ounce of gold and 0.375 ounce of silver per ton. Cadmium is now included in the returns; its grade averaged about 0.005 per cent.

Production came mainly from the A, B, C and D orebodies, mined from the levels above the 900-foot horizons, and from the M, K, Q and R orebodies mined respectively from above the 1,275-, 1,300-, 1,800- and 2,200-foot levels. Smaller amounts were taken from the G and H orebodies, and from the L, S and T stopes, which are in the preparation stage. Removal of the "A" orebody surface pillar was initiated this year.

Routine lateral development work was carried out from the 2,700-, 3,300-, 3,600- and 3,900-foot levels. Exploratory diamond drilling was confined mainly to the section of the mine between the 2,400- to the 3,900-foot horizons. On the 3,300-foot level, a drive was completed south almost to the boundary of d'Aragon Mines Ltd., and, as a result of an agreement between both companies, this was followed by diamond drilling into this neighbouring property. No significant results were obtained from this latter exploration.

Some changes were made in the mill in order to raise its capacity to a 3,000-ton-per-day treatment rate.

The mine manager was Mr. O.R. Wray, and the labour force numbered 301 persons.

ELDER MINES AND DEVELOPMENTS LIMITED

Rouyn-Noranda County

Beauchastel Township

Producer: gold

During the year 1960, Elder Mines and Developments maintained its shipments of gold-bearing silicious fluxing ore, for treatment at the Noranda smelter, at an average daily rate of 400 tons containing 0.1341 ounce of gold per ton. In comparison, the average daily shipments during the previous year, 1959, were 393 tons containing 0.1422 ounce of gold per ton.

Most of the ore produced came from stopes that were located in the main ore zone west of the main shaft crosscuts, between the 950-foot and the 1,625-foot levels. A total of 1,419 feet of drifting and crosscutting, as well as 240 feet of raising, was completed during the current year. Exploratory diamond drilling for new ore was confined underground, mainly to the 950-foot and 1,220-foot levels, and amounted to 3,362 feet.

No definite estimates of ore reserves were published by this company, but they were reported to be adequate for at least another year at the current production rate.

The company continued to participate in the operation of Eldrich Mines, Limited, in Duprat township. Operations at this latter property are covered elsewhere in this report. There were 87 persons employed under Mr. A.H. Hornsberger, mine manager.

ELDRICH MINES, LIMITEDRouyn-Noranda CountyDuprat Township

Producer: gold

During 1960, Eldrich Mines, Limited, shipped a slightly larger tonnage of gold-bearing fluxing ore to the Noranda smelter for treatment than that during 1959, but the average grade of ore shipped was slightly lower than that during the year 1959. For comparison, during 1960, average shipments per calendar day were 339 tons of ore containing 0.129 ounce of gold per ton, as against average daily shipments of 331 tons of ore containing 0.141 ounce of gold per ton for the year 1959.

Most of the ore produced came from stopes located just above the 500-foot level, although some mining was carried out on all levels between surface and the 750-foot horizon.

Lateral work which was completed during the year amounted to 2,925 feet. Most of this work was carried out on the 875-foot and 625-foot levels. The remainder was done mainly on the 250- and 500-foot levels. A total of 918 feet of raises was also completed during this same period.

Underground exploratory diamond drilling, which amounted to 16,827 linear feet, was carried out on all levels between the 250- and the 875-foot horizons. In addition, 1,857 feet of diamond drilling for new ore-bearing veins was carried out from surface.

No definite estimates of ore reserves are published by the company, owing to the irregular structure of the silicious ore zone, but they were reported to be adequate for at least another year at the current rate of production.

The mine manager was Mr. W. Dent; the mine employed 52 people.

FRONTENAC MINING CORPORATION LIMITEDFrontenac CountyGayhurst Township

Underground development: molybdenite

In December 1960, Frontenac Mining Corporation Limited undertook an exploration programme on its property in Gayhurst and Dorset townships.

Trenching and diamond drilling done in 1956 and 1957 indicated the presence of a molybdenite deposit. The present programme entails the driving of a 1,500-foot-long adit to be used as a diamond drilling base.

The mine manager was Mr. W.W. Bake.

GASPE COPPER MINES LIMITED

Gaspe-North County

Holland Township

Producer: copper, gold, silver, bismuth, selenium

During 1960, an average of 7,000 tons of ore per day was treated in the mill of Gaspé Copper Mines.

The following comparative table summarizes the work done in 1960 and 1959.

	<u>1960</u>	<u>1959</u>
Ore broken		
A Zone	1,507,862 tons	844,425 tons
B Zone	535,865 "	541,191 "
C Zone	1,309,748 "	1,406,631 "
Total:	3,353,473 tons	2,792,247 tons
Drifts	10,443 feet	6,772 feet
Raises	1,948 "	2,020 "
Inclined roadways	1,727 "	2,340 "

There are two main ore deposits in the Gaspé Copper property: the Needle Mountain and the Copper Mountain deposit.

Most of the work was done in the Needle Mountain deposit, which contains four ore zones; the "A", "B", "C" and "D". Production is currently coming from the first three. Zone "A" is located between 2,600 and 2,000 feet above sea level, zone "B", between 2,000 and 1,400 feet and zone "C", between 1,800 and 1,000 feet (actual known depth). They supplied respectively 24, 22 and 54 per cent of the ore tonnage extracted.

In the "A" zone, located at the top of Needle Mountain, mining is by open-pit methods. In the other zones, the method is the room and pillar while using diesel-powered trackless equipment.

In the "A" zone, mining is carried out on benches located at elevations of 2,460, 2,500 and 2,340 feet. There was a substantial increase in the tonnage of rock broken this year. It passed from 844,425 tons to 1,507,862 tons, a 79 per cent increase. The zone supplied 583,951 tons of ore, 77 per cent more than in 1959.

Mining and development work in the "B" zone were regulated so as to permit the extraction of an average of 40,000 tons of ore per month. Production for the year amounted to 535,863 tons of ore.

The "C" zone supplied 1,309,748 tons of ore, about seven per cent less than last year.

The extension of the inclined roadway between the 1,700 and the 1,800-foot levels and the driving of secondary access drifts to stoping areas were the main development work carried out in the "C" zone.

Preparations for the installation of a third jaw crusher on the 1,800-foot level were continued. The necessary equipment is being installed.

A drift, connecting the Needle Mountain deposit to the Copper Mountain deposit, was driven at the 1,500-foot elevation. At the Copper Mountain end, exploration work will be undertaken to study the ore at that depth.

Drifts have also been driven from the present underground workings to prepare the "East Shoulder" deposit for mining; this orebody is the eastward extension of the "B" and "C" zones.

The manager was Mr. W.G. Brissenden; in 1960, there were 1,032 persons employed.

THE HILTON MINES

Pontiac County

Bristol Township

Producer: iron ore

Mining in the iron ore open pit of The Hilton Mines was carried out on four benches located at elevations of 1,270, 1,245, 1,217 and 1,184 feet.

In 1960, a total of 699,021 long tons of concentrate was produced; it contained 67.26 per cent iron. Extraction from the pit totalled 4,885,408 long tons, of which 2,943,171 tons was sent to the primary crushing plant. The wet concentration plant treated 1,461,046 long tons of ore.

In March 1960, the company completed the building of an extension to the wet concentration plant. The ball-mill and the magnetic separators in this extension are now part of the mill flow-sheet.

The superintendent was Mr. Edwin R. Tyler, with 404 men in his employ.

INMONT COPPER MINES LIMITED

Rouyn - Noranda County

Montbray Township

Underground exploration: copper, gold

During the year 1960, the activities at the property of Inmont Copper Mines consisted mainly of exploration by diamond drilling, from underground and from surface, for copper-bearing orebodies.

Dewatering of the 535-foot two-compartment vertical shaft of the underground workings that had been abandoned since about 1934 was begun on March 30, 1960. Underground diamond drilling was commenced on April 21, 1960, and was continued until August 20, 1960. A total of 10,090 feet of diamond drilling was carried out from the five levels that had been established by previous operators.

Surface diamond drilling of two other copper-bearing zones was commenced on March 20, 1960, and, at the end of August, a total of 10,527 feet had been completed.

No important ore deposit was reported to have been found as a result of the above exploration, and the underground workings were allowed to flood.

The resident engineer was Mr. K.O'Flaherty.

IRON ORE COMPANY OF CANADADuplessis CountyNew Quebec

Producer: iron ore

Iron ore mining in the open-pits of Schefferville stopped on October 22nd and the last boat-load of ore left the Sept-Iles dock on November 2nd. A lower demand in the United States for run-of-mine ore is the reason behind the premature ending of the mining and shipping seasons, which usually extend to mid-November.

Ore extraction in the pits around Knob Lake amounted to 8,140,955 long tons, some 2,700,000 long tons less than in 1959. Shipments from Sept-Iles totalled 6,608,771 long tons, whereas, in 1959, a total of 10,860,125 long tons was moved.

Mining activities in the various open-pits in Schefferville, from April 15th to November 9th, 1960, are summarized in the following table:

Open pit	Stripping (Cubic Yards)	Ore Stockpiled at Mine (Cubic Yards)	Ore Shipped (Long Tons (a))
Gagnon A and C	4,716,731	-----	2,109,710
Ferriman	1,576,197	33,379	1,422,284
French	2,413,289	35,208	1,931,899
Ruth Lake	2,933,364	67,106	2,677,062
Totals:	11,639,581	135,693	8,140,955

(a) Final figures for 1960.

The Schefferville operations employed 1,174 people; The manager was Mr. V. Gregoire. The Sept-Iles terminus had a labour force of 508 persons.

LAMAQUE MINING COMPANY, LIMITEDAbitibi-East CountyBourlamaque Township

Producer: gold, silver

Ore milled during the year at the property of Lamaque Mining Company aggregated 759,200 tons or an average daily rate of 2,078 tons grading 0.181 ounce of gold per ton. This compares with 761,140 tons milled for 1959.

Stoping operations extend from the 300- to the 3,600-foot horizon. No work was carried out in stopes located above the 450-, 575-, 1,075-, 1,200- and 2,500-foot levels. Blast hole ore, which is provided by the Main "A", Dyke "A" and "J" zones, accounted for 35 per cent of the mill feed.

Drift headings were advanced in the main ore zone on about two-thirds of the levels located between the 700- and 3,600-foot horizons, and into the new ore structure discovered in the "East plug", on the 2,700- and 2,800-foot levels. No. 5 shaft, which is now closed down, was connected with the main mine area on the 575- and 700-foot levels.

Extensive exploratory drilling was carried out both from underground and surface. Underground, the No. 5 shaft or "West plug" area and the "East plug" zone drilling has added substantially to the ore reserves, as well as the outlining of the extension of previously indicated ore structures. On surface, three areas of magnetic survey anomalies were tested. Drilling of the first area, located about one mile to the southeast of the productive zone of the Main mine and called No. 3 mine, has outlined sufficient ore to warrant shaft sinking. The second and third areas, which gave encouraging results, are located respectively 3,000 feet southeast and 2,600 feet north of No. 3 mine.

Sinking of the No. 3 mine, three-compartment, vertical shaft was initiated in September and had reached a depth of 100 feet at the end of the year. A depth of 500 feet is planned with the opening of three levels. Ancillary buildings and installations are essentially those transferred from the inoperative No. 2 mine.

This company's fiscal year end is now transferred to September 30, and at this date in 1960 positive ore reserves were estimated at 2,337,869 tons grading 0.183 ounce of gold per ton,

compared with 2,365,710 tons grading 0.181 ounce of gold per ton reported for December 31, 1959.

The mine manager was Mr. A.W. Foley; there were 571 persons employed in 1960.

MALARTIC GOLD FIELDS, LIMITED

Abitibi-East County

Fournière Township

Producer: gold, silver

During the year, the mill at the Malartic Gold Fields mine treated 404,186 tons of its own ore, or a daily average of 1,104 tons grading 0.163 ounce of gold per ton. This compares with 578,483 tons milled during the previous year. The tonnage milled including custom ore from Barnat Mines and Norlartic Mines totals 745,610 tons or 2,040 tons per day.

The ore milled was derived mostly, and about equally, from stopes between the 1,200- and 2,400-foot levels at the No. 1 mine, and from stopes between the 1,600- and 2,400-foot levels at the No. 2 mine. At this latter mine, a few stopes were opened above the 150-foot level.

A major part of the lateral work and exploratory drilling was directed towards the development of the east end at No. 1 mine, mainly on the 1,800-, 1,950- and 2,100-foot levels. At No. 1 mine, lateral work was carried out on the 150-foot level. Minor amounts of development were done in scattered areas at No. 2 mine.

On surface, anomalies were tested south of No. 2 shaft. Negative results were obtained.

As of December 31, 1960, ore reserves were estimated at approximately 313,000 tons grading 0.175 ounce of gold per ton, compared with 400,000 tons grading 0.170 ounce of gold per ton for the previous year.

There were 390 persons employed under Mr. R.W. Dempsey, mine manager.

MANITOU BARVUE MINES, LIMITEDAbitibi-East CountyBourlamague Township

Producer: gold, silver, lead, zinc, copper

A total of 456,755 tons of ore was treated at the property of Manitou Barvue Mines during 1960. Of this tonnage, 292,065 tons was classed as copper ore with an average grade of 1.17 per cent copper and 0.023 ounce of gold per ton. The remaining 164,690 tons was zinc ore, which averaged 6.08 per cent zinc, 0.69 per cent lead, 0.030 ounce of gold and 5.11 ounces of silver per ton. This compares with 297,650 tons of copper ore and 170,575 tons of zinc ore treated during the previous year.

The copper ore was still derived from the block of nine levels located between the 210- and 1,870-foot horizons, and the zinc ore from the section of the mine between the 2,330- and 3,090-foot levels.

Routine lateral development and exploratory diamond drilling were carried out in the copper zone between the 660- and 960-foot horizons, and on the 1,870- and 2,180-foot levels. Similar work was done between the 2,640- and 3,390-foot levels in the zinc section. A heading was driven in the area west of the known orebodies to explore zinc possibilities on the 2,640-foot level and long holes were drilled to the north from the 1,720- and 2,640-foot levels, the latter holes serving also to acquire geological structure information.

A ventilation raise was driven between the 3,240- and 2,790-foot levels and some work was started on a parallel ventilation-way between the 510- and 1,720-foot levels. The ore-pass system was extended from the 2,790- to the 3,240-foot levels.

Deepening of the internal shaft began in June, 1960. A depth of 3,852 feet from surface was reached at the end of the year and four stations were cut at 150-foot intervals. The previous bottom was at a depth of 3,280 feet and the ultimate depth will be at 4,200 feet.

Assured zinc ore reserves, as of January 1, 1961, are reported at 375,866 tons grading 6.5 per cent zinc, 0.03 ounce of gold and 5.00 ounces of silver per ton. Copper reserves are estimated at 833,502 tons grading 1.12 per cent copper and 0.015 ounce of gold per ton.

Zinc ore reserves show a decrease of 62,306 tons and copper reserves, an increase of 36,174 tons from the previous year's estimated tonnage.

The mine manager was Mr. S.A.J. Hopper. The labour force totalled 370 people.

MARBAN GOLD MINES, LIMITED

Abitibi-East County

Dubuisson Township

Underground development: gold

The mine of Marban Gold Mines has not started to produce yet. Shaft sinking was completed during 1960 to a depth of 848 feet, a total advance of 791 feet for the year. Stations were cut at the following depths: 350, 500, 650 and 800 feet.

Two levels were opened at the 650- and 800-foot horizons. On the 650-foot level, zones of mineralized quartz associated with sheared greenstone were intersected. Two zones, located respectively to the south and to the northeast of the shaft, have been developed separately from the 650-foot level ("C" zone) and from the 800-foot level ("D" zone).

Exploratory diamond drilling paralleled this lateral development, and has intersected new zones as well. The continuity of mineralized sections is not well defined yet, and consequently no attempt has been made to establish ore reserves.

Instead, development continues. Exploration raises have been driven between the 800- and 650-foot levels, and above this latter level in the "C" zone to establish the vertical continuity of ore values.

About 18,000 tons of development ore has been stockpiled on surface.

Mr. R.W. Dempsey, manager of Malartic Gold Fields, was also in charge of this operation.

MARBRIDGE MINES LIMITEDAbitibi-East CountyLaMotte Township

Underground development: nickel

Marbridge Mines, which is owned equally by Falconbridge Nickel Mines and Marchant Mining Company, Ltd., was incorporated to take over the development and mining of the property of this latter company in LaMotte township.

A three-compartment shaft was collared to a depth of 45 feet on Lot 9, Range V of LaMotte township.

The shafthouse and the crusherhouse were completed, the bin was erected, and the crusherhouse equipment brought in. The hoist-room was also completed, and the hoisting equipment installed. Ancillary buildings and installations were built at the same time, including a service building, warehouse, boilerhouse, sub-station and water-tank.

The power-line, for which a contract has been given, has not been brought to the property yet. Initiation of the shaft-sinking operations is dependent upon this.

Since 1957, an extensive drilling programme was carried out on the surface showing along a length of about 450 feet. Estimates seem to indicate a tonnage to a depth of 800 feet of approximately 350,000 tons averaging 2.95 per cent nickel. The ore was found in a peridotite formation.

Part of the mill at Canadian Malartic Gold Mines has been modified to handle the ore from Marbridge Mines, on a custom basis at a rate of about 300 tons per day.

The superintendent of this operation was Mr. R.C. Staveley.

MATTAGAMI LAKE MINES LIMITEDAbitibi-East CountyGalinée Township

Underground development: zinc, copper, gold, silver

Following the indication, by exploratory diamond drilling,

of a large zinc orebody, Mattagami Lake Mines reached the decision to bring the property into production, and early in 1960, after a winter road was completed to the property, a six-compartment vertical production shaft was collared.

The sinking of this shaft was begun on the 28th of May 1960, and was completed to its objective depth of 1,185 feet from surface on the 21st of October 1960. Shortly after, crosscuts were started on the 350-, 550-, and 750-foot levels. Ore- and waste-pass raising was begun on these levels, as soon as the crosscuts had progressed to their proposed location. Only a minor amount of exploratory diamond drilling was carried out during the current year.

Estimated ore reserves were reported to be 21 million tons having an average grade of 12.76 per cent zinc, 0.68 per cent copper, 0.018 ounce of gold and 1.31 ounce of silver per ton, in the No. 1, or main, orebody. A second smaller orebody, a short distance from the main one, was reported to contain 2 million tons having an average grade of 12.86 per cent zinc, 0.86 per cent copper, 0.013 ounce of gold and 0.99 ounce of silver per ton.

This project was under the management of Mr. M.W. Airth.

MERRILL ISLAND MINING CORPORATION, LIMITED

Abitibi-East County

Obalski Township

Producer: copper, gold, silver

The milling plant at the property of Merrill Island Mining Corp. treated 158,899 tons of copper-bearing ore during 1960. The average recovery of the copper for the period was 94.64 per cent. From the ore milled, 6,621,235 lbs. of copper, approximately 1,210 ounces of gold and 53,530 ounces of silver were produced.

During the year, this mill treated 8,622 tons of development ore from Bateman Bay Mining, on a custom basis.

The ore at this property was drawn from cut-and-fill stopes located in the "A" and "B" ore zones, above the 475-foot elevation. Approximately 7 per cent of the mill feed came from development ore of the "C" and "D" zones, above the 300-foot elevation.

Lateral work was carried out on all the levels, but more especially on the 150- and 925-foot horizons. On the upper levels, crosscuts and drifts were driven in order to prove ore in the "C" and "D" zones. On the 925-foot level, a long drive was advanced towards the boundary and then southward to permit deep exploration drilling below the known zones. A total of 3,369 feet of lateral work was accomplished during the year.

The raising carried out during 1960 had to do with regular development work; a total of 2,777 feet of such raising was done during the period.

Surface exploratory diamond drilling was carried out at the main mine and at the Kokko Creek properties. Underground diamond drilling was done on different mine levels but mostly on the 925-foot horizon. A total of 41,308 feet of diamond drilling was completed during the year.

In 1960, the labour force at the property averaged 123 persons, including staff employees.

In order to mine the "A" and "B" zones near surface during the cold weather months, a fan, with heater, was installed over the ventilation raise on surface, during the last quarter of the year.

The mine manager was Mr. E.W. Watt.

MOLYBDENITE CORPORATION OF CANADA, LIMITED

Abitibi-East County

Lacorne Township

Producer: molybdenite, bismuth

During 1960, a total of 217,796 tons of ore was treated in the mill at the mine of Molybdenite Corporation of Canada. The average grade was 0.337 per cent molybdenite and 0.042 per cent bismuth. This compares with 207,533 tons treated during the previous year, when the grade averaged 0.360 per cent molybdenite and 0.039 per cent bismuth. The above tonnage for 1960 does not include the 15,501 tons of waste sorted on the picking belt.

Bismuth production amounted to 135,223 lbs., whereas molybdenite treatment resulted in the production of 893,186 lbs. of oxide, 274,593 lbs. of sulphide, and 4,395 lbs. of lubricant.

Mining operations were carried out at all horizons down to the 750-foot level. About 40 per cent of the mill feed came from the No. 29 East-West vein, 25 per cent from other East-West veins, and the remainder from the richer North-South structures.

Lateral work in the No. 29 vein system has continued on all levels including lengths of respectively 300 and 700 feet advanced from the two new lower levels, which are at the 875- and 1000-foot horizons. Vein No. 83 has also been actively developed at the 625- and 750-foot levels.

Following the completion of shaft deepening at the end of 1959, ore passes and loading pockets were established between the 1000- and 750-foot levels, and the waste passes were completed to the 850-foot level. A development raise was also started from the 1000-foot level in No. 29 vein. Another raise, for ventilation and for testing purposes, was driven between the 250-foot level and surface, about 1000 feet east of the shaft.

It is proposed to build an extension to the mill building in view of increased daily tonnage. A 650-ton-capacity bin was erected and the extension to the mill started.

Total blocked out and broken ore reserves, as at December 31, 1960, amounted to 246,350 tons grading 0.36 per cent molybdenite and 0.042 per cent bismuth. Reserves reported the previous year totalled 237,541 tons.

The mine manager was Mr. G. Langlois; in 1960 the mine employed 168 persons.

NEW CALUMET MINES LIMITED

Pontiac County

Grand-Calumet Township

Producer: zinc, lead, gold, silver and copper

Production was maintained at the daily rate of 326 tons during 1960 at New Calumet Mines. A total of 100,445 tons of ore was treated in the mill. The average grade of the ore was 7.36 per cent zinc, 1.92 per cent lead, 0.016 ounce of gold and 4.13 ounces silver per ton.

Underground, 85,310 tons of ore was mined and 15,135 tons extracted on a recuperation basis.

Development of the new mineralized zone, discovered a year ago, was continued. Five stopes were in operation in this deposit.

Diamond drilling footage amounted to 19,000 feet during the year; drifting, crosscutting and raising advance totalled more than 5,000 linear feet.

At the end of 1960, the company reported its proved ore reserves at 310,132 tons grading 8.72 per cent zinc, 2.57 per cent lead, 0.021 ounce of gold and 5.34 ounces silver per ton.

The mine labour force averaged 130 men, underground and on surface. The mine manager was Mr. J.C. Cunningham-Dunlop.

NORANDA MINES, LIMITED

Rouyn-Noranda County

Rouyn Township

Producer: copper, gold, silver, pyrite

The total quantity of ore delivered from the Horne Mine to the smelter and concentrator, during 1960, was 1,330,686 tons, which was slightly less than that during the previous year, 1959. The concentrator, which treated 995,047 tons of ore from the Horne Mine, produced 178,559 tons of copper-gold concentrate, 212,208 tons of pyrite concentrate, and 31,732 tons of pyrrhotite concentrate.

The copper-gold concentrate was sent to the smelter, and the pyrite concentrate was treated by cyanidation to recover its gold and silver content. The pyrite and pyrrhotite produced were shipped to chemical plants after drying.

In addition to the copper concentrate from the concentrator, the smelter treated 335,639 tons of smelting ore from the Horne Mine, 172,551 tons of flux ore from the Don Rouyn section, and 852,928 tons of ores, concentrates, secondary metal-bearing scrap and slag which were smelted for other companies.

In the Horne Mine, the gold-copper-bearing ores were mined in stopes located between surface and the 2,975-foot level. Most of this mining, which consisted of pillar recovery, was done by cut-and-fill methods.

Stope preparation involved some 250 feet of raising and 357 feet of drifting. General development consisted of 1,496 feet of drifting and 2,592 feet of raising. Most of the drifting was done on the 5,975-foot level, where preparations are underway for the sinking of an internal exploration shaft from that level to a proposed depth of about 8,000 feet below surface elevation. A ventilation and emergency exit raise system was completed between the 5,975-foot level and the 4,225-foot horizon.

Underground diamond drilling for exploratory purposes was done mainly on the 5,225-foot and 5,975-foot levels, and amounted to 28,292 feet. No exploratory diamond drilling was carried out from surface.

After extracting 1,331,000 tons of ore from the Horne Mine, ore reserves were reported to have been reduced by about the same amount as during the year 1959, which was approximately 800,000 tons.

The mine manager was Mr. C.E. Anderson. In 1960, the number of employees totalled 1,880 persons.

NORBEAU MINES (QUEBEC), LIMITED

Abitibi-East County

McKenzie Township

Underground development: gold

Considerable surface exploration work and diamond drilling carried out on the gold-prospect property of Norbeau Mines (Quebec) several years ago resulted in the finding of an encouraging gold content.

Late in 1959, the present management resumed surface diamond drilling and a decision was made to test further the potential ore values underground by means of an adit opening.

Driving of this exploratory opening was commenced in January 1960 and was completed in April of the same year, after some 825 feet of lateral work along the Norbeau vein had been accomplished.

NORLARTIC MINES, LIMITEDAbitibi-East CountyVassan Township

Producer: gold, silver

During the year 1960, a total of 132,284 tons of ore, grading 0.140 ounce of gold per ton, was shipped to the mill of Malartic Gold Fields. This corresponds to a daily shipment rate of 360 tons. The previous year's shipment rate was 312 tons of ore per day with an average grade of 0.130 ounce of gold per ton.

The ore was derived from stoping operations from the three upper levels, at the 250-, 375- and 500-foot horizons. Except a slight amount taken from below the 250-foot level in the North zone, all the ore came from the Main syenite zone.

Lateral development and exploratory drilling to locate and outline the Main zone was carried out mainly on the 626- and 750-foot levels. On the 1000-foot level, a crosscut was driven and long holes were drilled to test the North zone.

The ore-pass system was extended from the 625- to the 750-foot level, and the waste pass, from the 375- to the 625-foot level.

Ore reserves, as of December 31, 1960, are estimated at 640,000 tons grading 0.16 ounce of gold per ton. The previous year's reserves were estimated at 772,500 tons with a similar grade.

The manager of this property, which employed 50 men, was Mr. R.W. Dempsey.

NORMETAL MINING CORPORATION LIMITEDAbitibi-East CountyDesmeloizes Township

Producer: copper, zinc, gold, silver, pyrite

During 1960, the concentrating plant of Normetal Mining Corporation Limited treated an average of 949 tons per calendar day, compared with 1,031 tons daily, during 1959. The average grade of the ore treated was 3.28 per cent copper, 4.17 per cent zinc, 0.025 ounce

of gold, and 2.02 ounces of silver per ton. A total of 26,575 tons of pyrite concentrate was shipped to chemical plants and pulp mills.

Approximately 80 per cent of the ore milled came from the No. 4 internal shaft area, below the 3,070-foot level. The remainder came from pillar recovery, and ore salvage work at shallower horizons.

From October 10, to November 11, 1960, extensive repairs were made to the upper section of the internal shaft, between the 3,240-foot and 2,920-foot levels. During that period, the mill was operated only a few days a week, which accounts for the lower tonnage treated during 1960, compared with that of the previous year, 1959.

A total of 4,789 feet of lateral work and 748 feet of raising was completed during the year. The lateral work was carried out mainly on the block of four new levels between the 5,160-foot and 6,160-foot horizons, whereas most of the raising was done between the 4,765-foot and 4,165-foot levels, in order to improve the main ventilation system of the mine.

No exploratory diamond drilling was carried out from surface during the year. Underground, most of the 8,063 feet of exploratory drilling completed during 1960 was done on the lower levels of the mine.

De-sliming equipment, for the production of hydraulic fill from the mill tailings, and large storage tanks were added to the concentrator. A total of 5,377 feet of large-diameter bore holes was drilled for the distribution of the hydraulic fill underground. In addition, 2,481 feet of interlevel drain holes was drilled to handle the additional water introduced underground with the hydraulic fill.

Ore reserves as at December 31, 1960, are reported in the company's annual report as being 1,434,600 tons, grading 3.54 per cent copper and 5.49 per cent zinc.

The mine manager was Mr. R. J. Allen; there were 576 persons employed in 1960.

OPEMISKA COPPER MINES (QUEBEC) LIMITEDAbitibi-East CountyLévy Township

Producer: copper, gold, silver

During 1960, the copper concentrator at the property of Opemiska Copper Mines treated 751,453 tons of ore grading 2.89 per cent copper, 0.032 ounce of gold per ton and 0.408 ounce of silver per ton. For the previous year, 443,444 tons of ore was treated, which had an average grade of 3.36 per cent copper, 0.038 ounce of gold and 0.46 ounce of silver per ton.

Concentrates shipped during the year reviewed contained 41,092,891 pounds of copper, plus 18,576 and 247,727 ounces of gold and silver respectively.

The No. 3 vein supplied approximately 83 per cent of the total feed to the concentrator. The remainder was derived from the Nos. 1, 2, 4, 5 and 13 vein systems. The most active mining area was between the 1,125- and 675-foot levels.

Lateral work, amounting to 12,347 feet, was carried out on all levels but the emphasis was in the No. 3 vein on the 1,125-, 1,300-, 1,475-, 1,650- and 2,000-foot levels. At the Perry Mine section of the property lateral work, amounting to 7,358 feet, was carried out in developing the "B" and "D" zones on the 275-, 675-, 825-, 1,125- and 1,300-foot levels.

At the Springer Mine, the main ore pass was extended an additional 186 feet and the ventilation raise between the 975- and 675-foot levels was slashed out to normal size. At the Perry mine an ore-pass raise was driven between the 2,000- and 1,475-foot levels.

Exploratory diamond drilling was confined to the underground workings, where 58,060 feet of drilling was completed at the Springer mine and 35,328 feet, at the Perry mine.

Ore reserves, at December 31, 1960, as reported in the company's annual report, amount to 4,876,600 tons of assured ore and 928,700 tons of indicated ore, for a total of 5,805,300 tons grading 3.03 per cent copper.

The mine manager was Mr. F.G. Cooke; the mine employed 566 persons in 1960.

PORTAGE ISLAND (CHIBOUGAMAU) MINES LIMITEDAbitibi-East CountyRoy Township

Producer: copper, gold

Portage Island (Chibougamau) Mines merged with Copper Rand Chibougamau Mines Ltd. on August 31, 1960.

The property is now known as the Portage Mine of Copper Rang Chibougamau Mines Ltd.

For details on mining activities, see Copper Rand Chibougamau Mines Ltd.

PREISSAC MOLYBDENITE MINES LIMITEDAbitibi-East CountyPreissac Township

Underground development: molybdenum, bismuth

A three-compartment vertical shaft was collared, in 1959, on the property of Preissac Molybdenite Mines, which had been formerly owned by Indian Molybdenum Limited.

During the year 1960, a 15-mile power-line was constructed from Quebec Hydro's Pandora sub-station in Cadillac township to the property. A temporary headframe was erected and buildings, such as an office, machine and carpenter shops, were completed.

Sinking of the three-compartment shaft was begun on November 28, 1960. At the end of December the shaft had progressed to a depth of 204 feet from surface. It will be carried to a proposed depth of about 600 feet.

Indicated ore reserves were reported to be 1,250,000 tons having an average grade of 0.53 per cent molybdenite (MoS_2).

The mine manager was Mr. B. Joyal.

QUEBEC CARTIER MINING COMPANYSaguenay CountyConan Township

Development: iron ore

Quebec Cartier Mining reached the final stage in its preparation to mine its Lac Jeannine iron ore deposit.

The first phase of this project that was completed was the Hart-Jaune river hydroelectric plant located 12 miles from the mine. The initial capacity of the plant is 60,000 h.p.

The official inauguration of the railroad took place on December 8th, and the first regular train reached the mine on December 15th, 1960. Ballast operations will need to be done before the ore trains can run on a normal schedule.

Equipment installation in the crushing plant and the concentrator was completed and tuning up is in progress.

The repair shop, train loading bins, boiler-room and railroad station are virtually completed.

At the mine site, stripping was in progress throughout the year. The orebody is ready for mining. This will be carried out on eight 40-foot benches.

The mine manager was Mr. V.R. Huff.

QUEBEC IRON AND TITANIUM CORPORATIONDuplessis CountyParker Township

Producer: ilmenite

The Quebec Iron and Titanium mine, 27 miles north of Havre-St-Pierre, had a record production year in 1960. During the season ending November 4th, a total of 915,000 long tons of ilmenite was shipped by boat to the Sorel smelter.

Most of the 905,000 long tons of ore mined from the open-pit came from the lower, or 610-foot bench. Mining operations were also conducted on the benches located at the following elevations: 645, 680, 715, 750 and 785 feet.

In addition, 70,000 tons of overburden and 200,000 tons of low-grade ore and waste rock were removed during the summer.

Ore reserves, as reported by the company, stand at 225,000,000 tons grading 35 per cent TiO_2 (titanium oxide) and 40 per cent iron.

There were 170 men employed at Havre-St-Pierre, under Mr. S. Luciani, superintendent.

QUEBEC SOUTH SHORE STEEL CORPORATION

Gatineau County

Hull Township

Development: iron ore

Early in the summer of 1960, Quebec South Shore Steel Corporation suspended, for an indefinite period, all development work at its Ironside property, near Hull.

When work was halted, the headframe was nearly completed and a hoist had been installed and was in operation. Underground development work had been done on the 200-, 300-, 400-, and 500-foot levels.

Mr. D. Sykes was in charge of operations at the mine.

QUEMONT MINING CORPORATION LIMITED

Rouyn-Noranda County

Rouyn Township

Producer: copper, zinc, gold, silver, pyrite

At Quemont Mining Corp., during the year 1960, an average of 2,341 tons of ore per day was treated, compared with 2,329 tons per day, in 1959. The average grade of the ore treated, which was 1.3 per cent copper, 2.57 per cent zinc, 0.147 ounce of gold, and 0.81 ounce of silver per ton, was slightly lower than that for the year 1959.

The copper concentrate was treated in the Noranda smelter, and most of the zinc concentrate was shipped to treatment plants in the United States. After cyanidation, for the purpose of recovering its content of precious metals, 212,000 tons of the pyrite produced was sent to chemical plants.

Most of the ore treated came from stoping operations between the 200- and the 2,340-foot levels. Variations of cut-and-fill mining accounted for 50.6 per cent of the total, and 49.2 per cent came from shrinkage and sub-level open stopes. The remainder came from development work.

During the year, most of the mine development work was carried out below the 3,270-foot level, where ore and waste passes were driven and a new crushing room was excavated at the 3,940-foot horizon. In addition, exploration drifts were advanced towards the northeast section of the property, on the 3,270-foot and 1,080-foot horizons. A total of 6,877 feet of lateral work, as well as 3,320 feet of raising, was completed during the year.

Underground exploratory diamond drilling for new orebodies and detailed drilling of the known ones amounted to 49,400 feet. On surface, exploration of the north end of the property by diamond drilling was continued during the year, for a total of 25,600 linear feet.

At December 31, 1960, the ore reserves were reported to be 5,340,000 tons having an average grade of 1.29 per cent copper, 2.75 per cent zinc, 0.174 ounce of gold, and 1.05 ounces of silver per ton, and 51 per cent pyrite.

The mine manager was Mr. A.G. Ballachey; in 1960 there were 723 men on the payroll.

RAINVILLE MINES, LIMITED

Abitibi-East County

Louvicourt Township

Underground development: copper

Operations at the property of Rainville Mines were resumed in February 1960, but they were discontinued again at the end of November of the same year.

During this period, the 850- and 1,000-foot levels were opened for lengths of respectively 350 and 1,300 feet, at the No. 2 shaft, and diamond drilling was carried out from these levels to explore the No. 2 and No. 4 zones. No appreciable ore indications were found.

About 600 tons of development ore was stockpiled on surface.

SIGMA MINES (QUEBEC), LIMITED

Abitibi-East County

Bourlamaque Township

Production: gold, silver

The quantity of ore treated in the mill at the mine of Sigma Mine (Quebec), during 1960, amounted to 430,136 tons, for a daily average treatment rate of about 1,175 tons grading 0.188 ounce of gold per ton. This compares with a total of 410,112 tons treated during the previous year, for an average daily rate of 1,124 tons.

Stoping operations were carried out mostly between the 475- and 2,250-foot horizons. Two stopes located above the 3,150-foot level were mined ahead of normal schedule to provide a space to dump the waste rock from the internal shaft sinking operations.

Lateral development was all routine work carried out mainly between the 1,725- and 3,150-foot horizons. Routine exploratory diamond drilling took place mainly from levels between the 1,850- and 2,700-foot horizons.

Sinking of the internal shaft, from the 2,700-foot level to a proposed depth of about 4,150 feet below surface, continued during 1960. After this shaft was opened from the 3,150- to the 2,700-foot level, the friction hoist was installed above the shaft and used as a drum hoist for sinking. At year end, the bottom of the shaft reached a depth of about 3,984 feet below surface, with stations cut at 150-foot intervals.

Ore reserves, as of December 31, 1960, are estimated at 1,409,500 tons, with 575,000 tons of broken ore having no assigned grade, and 834,500 tons of ore in place grading 0.226 ounce of gold per ton. The previous year's reserves were slightly smaller at 1,383,600 tons.

Mr. F. J. O'Connell was the general manager; in 1960, there were 409 employees.

SOLBEC COPPER MINES LIMITEDWolfe CountyStratford Township

Development: copper

Incorporated early in 1960, Solbec Copper Mines Limited began, in June, to develop a copper deposit in Stratford township.

Diamond-drill holes put down previously to a depth of 500 feet had indicated the presence of more than 1,000,000 tons of ore grading 2.16 per cent copper, 3.90 per cent zinc and some gold and silver.

Shaft sinking to a proposed 1,400-foot depth began in October. At the end of the year the bottom of the shaft was 600 feet below ground, and four stations had been cut at the following elevations: 205, 330, 455 and 580 feet.

The necessary surface plant was built during the fall. A 1,000-ton-per-day mill is scheduled to be built in 1961.

The mine manager was Mr. R. Gosselin.

ST. LAWRENCE COLUMBIUM AND METALS CORPORATIONDeux-Montagnes CountyL'Annonciation Parish

Development: columbium pentoxide

In November 1960, the St-Lawrence Columbium and Metals Corp. began the building of a 500-ton-per-day mill on its property located about two miles from the village of Oka. An estimated sum of \$2,000,000 will be spent before this mine comes into production.

The mill will use a flotation gravity concentration method to produce a concentrate containing 50 per cent columbium pentoxide with a recovery of 80 per cent of the metal content of the ore. This plant will be producing concentrate at the rate of 5,000 pounds per day.

Stripping operations were done on the "A" block at the end of the year. This deposit is reported to contain 17.6 million tons of ore grading 0.36 per cent Cb_2O_5 (columbium pentoxide).

The mine manager was Mr. H. Monette.

SULLIVAN CONSOLIDATED MINES, LIMITEDAbitibi-East CountyDubuisson Township

Producer: gold, silver

During the year 1960, a total of 233,438 tons of ore, grading 0.195 ounce of gold per ton, was treated in the mill at this property of Sullivan Consolidated Mines. Production for the previous year came from the treatment of 178,942 tons of ore grading 0.240 ounce of gold per ton. The milled tonnage shown for 1960 does not include the 31,128 tons discarded at the picking belt.

The main sources of ore were veins Nos. 14, 9, 4, and 16, mined respectively between the 850- and 1,150-, 1,250- and 2,125-, 1,750- and 2,375-, 2,000- and 2,375-foot levels. Other stopes in operation were in veins "A", "K", 12 and 49 at various horizons.

Lateral work consisted mostly in the development of the above veins in the block of mine levels located between the 1,450- and 3,000-foot horizons and in the development of the new vein, No. 94, between the 550- and 750-foot levels.

All exploratory diamond drilling was carried out underground, and totalled 47,518 feet.

On surface, a fan was installed on top of the ventilation raise. Flotation was added to the straight cyanide process of treating the company's gold-silver ore.

Ore reserves are reported to be about 640,000 tons. The previous year's reserves were estimated at 645,945 tons grading 0.241 ounce of gold per ton.

The mine employed 260 persons with Mr. J.P. Bonneville as mine manager.

WAITE-AMULET MINES, LIMITEDand SubsidiaryAMULET DUFAULT MINES, LIMITEDRouyn-Noranda CountyDufresnoy Township

Producer: copper, zinc, gold, silver, pyrite

The mill at this property treated copper-zinc ore, from the Waite-Amulet and Amulet Dufault sections, at an average rate of 813 tons per day, compared with an average daily rate of 853 tons, during 1959. The average grade of the ore treated during the year was 4.68 per cent copper, 3.48 per cent zinc, 0.039 ounce of gold and 0.95 ounce of silver per ton. In comparison, the average grade of the ore treated during 1959 was 4.36 per cent copper, 3.73 per cent zinc, 0.033 ounce of gold, and 0.97 ounce of silver per ton.

The East Waite orebody supplied 44.5 per cent of the ore treated. The remainder came from the Amulet Dufault and the Waite-Amulet "A-11" Winze sections of the property. Recovery of the main pillar in the Amulet Dufault section was begun in 1959, and was continued during the year reviewed.

No exploratory development was carried out during the year 1960, but ore development amounted to 840 feet of drifting and 1,374 feet of raising.

Exploratory diamond drilling, which amounted to 6,024 feet, was carried out from surface only. One hole was drilled north of the East Waite section and four other holes east of the "F" shaft.

Ore reserves at December 31, 1960, are reported as being 327,500 tons grading 5.1 per cent copper and 3.1 per cent zinc.

The mine manager was Mr. T.E. Little; in 1960, the labour force numbered 239 people.

NON-METALLICINDUSTRIAL MINERALSALUMINUM COMPANY OF CANADA LIMITEDHull Township, Gatineau

Producer: magnesium oxide, lime

Every month during the year reviewed, approximately 9,000 tons of ore was fed to the two rotary kilns of Aluminum Company of Canada, at Wakefield. This ore was extracted from two deposits: the Maxwell and the Cross, respectively located at Wakefield and Farm Point.

The Cross deposit, where mining began on a continuous basis in the early part of the summer, supplied about 40 per cent of the kiln feed. Two faces are advanced concurrently on the 475- and 500-foot elevations. Part of the work consisted in exposing the ore on surface. In the Maxwell deposit, mining was carried out on only one bench at the 240-foot elevation.

The finished products marketed by the company are the following:

Magnesium oxide 95%:	sold as refractory product.
Magnesium oxide 90%:	sold to the uranium industry.
Magnesium oxide 75%:	sold to the agricultural industry.
Magnesium oxide 65%:	sold to the agricultural industry.
Quicklime:	sold to the uranium and glass industries.
Hydrated lime:	sold to the construction and paper-making industries.

In 1960, the mine employed 106 persons under Mr. J. Gneadinger, mine manager.

ARMAND SICOTTE ET FILS LIMITEDHowick Parish, Châteauguay

Producer: crushed silica

With the quarry in operation from May till November, production of crushed silica averaged 1,000 tons per day.

ASBESTOS CORPORATION LIMITEDThetford Township, Mégantic

Producer: asbestos

Asbestos Corporation Limited was more active in 1960 than it had been in 1959.

Tonnage of ore treated was 25 per cent in excess of that processed the previous year. The company's three mines, King-Beaver, British Canadian and Normandie, supplied respectively 27, 41 and 32 per cent of the tonnage of ore treated.

As a whole, the King-Beaver and British Canadian mines supplied respectively 2 and 7 per cent more ore and the Normandie, 5 per cent less than in 1960. However, the volume of ore treated in each mill increased. The following comparative table will illustrate better the case in point.

	1960	1959
Broken rock	14,620,382 tons	8,678,833 tons
Ore treated	4,164,934 "	3,332,955 "
Broken rock, per day	62,214 "	53,329 "
Ore treated, per day	17,760 "	13,612 "

The 68 per cent increase in the quantity of rock broken in 1960, compared with that in 1959, shows an intensified activity in the company's open-pits.

A summary of the operations at each mine follows.

King-Beaver Mine

A total of 3,200,357 tons of rock was broken in the underground workings of the King section and in the Bennett-Martin and Beaver open-pits.

The mined ore was crushed and dried at the King section and milled at the new plant of the Beaver section. Total tonnage treated amounted to 1,141,907 tons, at a daily rate of 5,715 tons, which is an increase of 18 per cent more than that for 1959.

The underground workings of the King section supplied 581,048 tons - that is, 51 per cent of the ore treated in the Beaver mill. Mining took place in block 701 above the 700-foot level and in blocks 903, 908, 919 and 910A, above the 855-foot level. Production drifts and raises were driven in blocks 716 and 721 above the 700-foot level. Exploration drifts in a southern and an eastern direction were continued on the 1,100-foot level. The remaining 49 per cent of the ore treated came from the Bennett-Martin open-pit that is now adjacent to the Bell open-pit.

Stripping operations entailed the removal of 2,058,450 tons of waste rock from the Bennett-Martin and Beaver open-pits. The ratio of ore to waste rock is 1 : 3.6.

British Canadian Mine

Open-pit mining took place on benches located at 925, 1,000, 1,050 and 1,200 feet above sea level.

Of the 4,695,064 tons of rock broken, 1,684,095 tons was treated in the mill at a daily rate of 6,620 tons, a 50 per cent increase over the previous year. The ore to waste rock ratio is 1 : 1.8.

Normandie Mine

Open-pit mining took place on benches located at 910, 860, 800, 750, 700 and 650 feet above sea level. The 910- 860- and 800-foot benches were mined out in 1960.

The amount of rock broken amounted to 6,724,961 tons, of which 1,338,932 tons was ore material treated in the mill at the daily rate of 5,425 tons, a 7 per cent increase more than that for 1959.

The ore to waste rock ratio is 1 : 4. A certain amount of the waste rock removed came from the upper benches. This was done to permit mining at depth.

The company employed 1,785 persons in 1960 and had, as general manager, Mr. G.F. Jenkins.

BAKER TALC LIMITED

Potton Township, Brome

Producer: soapstone, talc

Baker Talc Limited is mining a deposit of soapstone and talc located on lots 606 and 607, range V, Potton township. Approximately 10,000 tons of ore is extracted per year. This ore comes from underground workings reached through an adit. It is afterward transported 14 miles by truck to the company's plant at Highwater.

Development work, consisting in drifts and raises, was done to prepare for the mining of three veins located southwest of the main zone. The veins were discovered during an exploration programme performed in 1959.

In 1960, the company employed 10 men under Mr. J.H. Morgan, general manager.

BELL ASBESTOS MINES LIMITED

Thetford Township, Mégantic

Producer: asbestos

During 1960, Bell Asbestos Mines Limited increased its production by 9 per cent. Tonnage of ore treated passed from 572,000 tons in 1959 to 625,000 tons in 1960, an increase of 53,000 tons. The daily rate of treatment was 1,900 tons.

The ore was extracted from stopes located in blocks 2, 3, 4, 5 and 6, above the 650-foot level.

Development work, consisting in production drifts and raises, was carried out in blocks 5, 6 and 7 above the 650- and

700-foot levels. The development of block 7 is almost completed.

Mr. G.W. Smith, president and general manager of the company, directed a labour force of 441 employees in 1960.

BLACKBURN BROS. LIMITED

Hull Township, Gatineau

Producer: mica

The underground workings of the Blackburn mine, at Perkins Mills, were operated intermittently in 1960. When not in operation (which was from June 15th to August 24th and from October 1st to November 30th), all members of the crew were employed in the crushing plant.

The only stope in operation, located in the Carey vein on the 100-foot level, 150 feet from the shaft, produced 15 tons of sheet mica and 45 tons of ground mica.

The mine employed 13 men under Mr. D. Fisher-Rowe, president of the company.

BROUGHTON SOAPSTONE AND QUARRY COMPANY LIMITED

Leeds Township, Mégantic

Producer: soapstone and talc

Broughton Soapstone and Quarry Company Limited owns a treatment plant located in Leeds township and three quarries located in Leeds, Broughton and Thetford townships. These last two were in operation in 1960.

About 10,000 tons of soapstone and talc-bearing rock was extracted; part of this was cut and sold in various shapes, the remainder was ground and marketed in bags.

Mr. P.-A. Cyr, mine manager, had 13 men working for him.

CANADIAN JOHNS-MANVILLE COMPANY LIMITEDShipton Township, Richmond

Producer: asbestos

During 1960, Canadian Johns-Manville Company Limited undertook an open-pit development programme and awarded some contracts for stripping operations on the north and east sides of the open-pit. The company aims to reduce its underground operation until such time as it will be abandoned and then gradually to replace this work by a continuous and expanded open-pit operation.

The tonnage of ore treated, as supplied by both the underground and open-pit operations, was maintained at the daily rate of 20,000 tons. A waste-picking system eliminates 2,000 tons of rock per day.

Underground blocks 3, 5, 7, 11 and 13, located above the 750-foot level, supplied about 36 per cent of the ore. There was very little development work done.

In the open-pit, mining was carried out on the 540- 510- 405- and 370-foot benches. Work has been progressing on the installation of an inclined skip way that will carry the ore to a primary crushing plant located at the south end of the pit. The hoistroom and the crushing plant are almost completed.

In 1960, the mine employed 1,640 men; Mr. J.O. Eby was mine manager.

CANADIAN REFRACTORIES LIMITEDGrenville and Harrington Townships, Argenteuil

Producer: magnesitic dolomite

Canadian Refractories Limited maintained the production of its Kilmar mine at a daily average of 450 tons of ore per day in 1960. The major portion of this output was sent to two of the company's brick plants located respectively at Kilmar and Marelan.

A small tonnage of ore was extracted from the 308 and 311 stopes in the No.1 shaft area. These stopes, with their magnesite- and serpentine-rich ore, are operated only when either of these minerals needs to be added to the run of mine ore.

In the No. 2 shaft zone, stopes 7375 and 8335 were operated using an overhand sub-level stoping method. Development work was carried out in stopes 8320 and 4310 to ready them for production.

At the main concentrating plant in Kilmar, an annex was built to give a more uniform grade of feed to the rotary kilns. Two 1,000-ton silos were also built. The dead-burning plant produced a daily average in 1960 of 130 tons of clinker and 30 tons of special cements.

In the year reviewed, the mine employed 250 men under Mr. W.T. Bray, mine manager.

CANADIAN SILICA CORPORATION LIMITED

Lac des Deux-Montagnes Seignior, Deux-Montagnes

Producer: sand, silica flour

From its St-Canut quarry, Canadian Silica Corporation Limited extracted a monthly average of 9,000 tons of rock, which was transformed into 5,000 tons of finished products.

The quarry and plant employed 45 men in 1960, with Mr. B.C. Fillingham as manager.

CAREY CANADIAN MINES LIMITED

Broughton Township, Beauce

Producer: asbestos

Carey Canadian Mines Limited ended its first complete year of operation on its Broughton Township property.

Open-pit mining in the "C" deposit was carried out on the 1,280-, 1,250- and 1,215-foot benches, the last being the bottom of the pit.

The mill treated 717,870 tons of ore. In addition to this tonnage of ore, 171,630 tons of waste rock and 337,878 tons of overburden were removed from the open-pit.

New machinery installed in the mill will boost its daily capacity from 2,000 to 3,000 tons.

Mr. E.A. Boadway, general manager, had 267 employees in the employ of the company.

DOMINION LIME LIMITED

Dudswell Township, Wolfe

Producer: limestone

The installation of a new crushing system for the production of aggregates made it possible for Dominion Lime Limited to increase its output slightly in 1960.

Quarrying was carried out on one 60-foot-high bench. A total of 215,000 tons of rock was mined, of which tonnage 35 per cent was routed through the crushed stone plant, 20 per cent transformed into agricultural lime and the remainder, into ordinary lime.

In 1960, the company employed 54 men. The general manager was Mr. R. Pudden.

DOMINION SILICA CORPORATION LIMITED

Lussier Township, Montcalm

Producer: crushed silica

The St-Donat quarry of Dominion Silica Corporation produced a daily average of 600 tons of crushed silica.

Mr. G.P. Blix, superintendent, had 45 men working for him.

FLINTKOTE MINES LIMITED

Thetford Township, Mégantic

Producer: asbestos

Of the 1,461,166 tons of rock mined from the open-pit of Flintkote Mines Limited, 941,284 tons was waste material. Most of

this latter tonnage was removed from the south side of the pit to make it easier to deepen. The ore dips 55° to the south.

The mill treated 519,882 tons of ore, 10 per cent less than in 1959. Preparations for the installation of an inclined skip way and of a new crushing plant on the east side of the open-pit were continued throughout the year. The company foresees that these facilities will be operative in 1961. The ore will be then carried in skips from the floor of the pit directly to surface.

Mr. J.P. Hodgson is mine manager; the mine employed 208 persons in 1960.

GOLDEN AGE MINES LIMITED

Rigaud-Vaudreuil Seigniory, Beauce

Producer: asbestos

In 1960, Golden Age Mines Limited conducted a research programme aimed at producing a dust-free short asbestos fibre. To this end, the company installed some new machinery in its pilot plant.

Since the beginning of its operations, the company has milled about 10,000 tons of ore extracted from open-pits Nos. 3 and 9, located on concession No. 451.

The company employed 10 men in 1960 under the direction of Mr. P.H. Lachance, manager.

INTERNATIONAL MINERALS AND CHEMICAL CORP. (CANADA) LIMITED

Buckingham and Derry Townships, Papineau

Producer: potash feldspar

The Buckingham plant of International Minerals and Chemical Corp. (Canada) Limited treated a monthly average of 850 tons of feldspar during the year under review.

The ore came from the Back and Smith Lake mines, located in Derry township, 17 miles from Buckingham. Both mines are partly underground. The Back mine produced a daily average of 32 tons of ore, whereas the Smith Lake mine produced 12 tons.

The company, with Mr. W.H. Hood as general manager, employed 27 men in 1960.

JOHNSON'S ASBESTOS COMPANYColeraine Township, Mégantic

Producer: asbestos

On February 29, 1960, the Black Lake property of Johnson's Asbestos Company Limited was again placed in operation. It had been closed since December 12, 1959, owing to over-production.

From 1,804,412 tons of rock mined, 809,110 tons was sent to the mill at the daily rate of 3,870 tons. The ratio of ore to waste rock is 1 : 1.2.

Mining was carried out so as to join the old Nos. 1, 2 and 3 workings into a single open-pit. Activities were centered on three benches located at 1,000, 1,050 and 1,100 feet above sea level.

The east side of the open-pit was stripped at elevation 1,170, so as to extend the pit in that direction and to allow mining at depth. Mining faces varied in height from 45 to 55 feet.

The company, under Mr. W.J. Johnson as general manager, employed 255 persons.

JOHNSON'S COMPANY LIMITEDThetford Township, Mégantic

Producer: asbestos

During 1960, the mill of Johnson's Company Limited treated 543,400 tons of ore at a daily rate of 2,255 tons, which rate is 3 per cent less than that of the previous year.

An open-pit located on lot 461, Thetford township, supplied 51,568 tons of ore from its first bench. In addition, 146,630 tons of waste rock was removed. This ore to waste ratio is very high, owing to the fact that the open-pit has just been started.

The underground workings supplied 491,832 tons of ore; 32 per cent of this total came from blocks 2 and 3 above the 700-foot level, 33 per cent was derived from each of blocks 11 and 18 above the 1,100-foot level and the remaining 2 per cent was supplied by development headings in blocks 12 and 17 above the 1,100-foot level.

A new rock-drying system, which uses oil instead of coal as fuel, was installed. The building also contains a crushing plant for the ore supplied by the open-pit. Formerly all crushing operations were done underground.

In 1960, the mine employed 531 persons and the general manager was Mr. W.J. Johnson.

LAKE ASBESTOS OF QUEBEC LIMITED

Ireland Township, Mégantic

Producer: asbestos

During 1960, Lake Asbestos of Quebec Limited began its third year of operation. A total of 8,498,214 tons of rock was mined, which was 54 per cent more than that for the previous year. Mining took place in the "A" and "C" deposits on benches located at 550, 590 and 630 feet above sea level. Stripping operations entailed the removal of 2,405,241 tons of overburden.

The mill treated 1,650,511 tons of ore at a daily rate of 6,400 tons, which was a 17 per cent increase compared with the rate for the year 1959.

During the year reviewed, the mine employed 538 persons and had, as general manager, Mr. M.J. Messel.

NATIONAL ASBESTOS MINES LIMITED

Thetford Township, Mégantic

Producer: asbestos

The year 1960 marked the second complete one of operation for National Asbestos Mines Limited.

A total of 740,264 tons of rock was mined from the only bench of the open-pit, which bench is at 1,150 feet above sea level.

The mill treated 572,338 tons of ore at the daily rate of 2,500 tons, a decrease of 7 per cent from the 1959 figure.

A total of 167,926 tons of waste rock and 491,623 cubic yards of overburden was removed from the open-pit.

Mr. R.S. Coleman, mine manager, had 153 persons working for him in 1960.

NICOLET ASBESTOS MINES LIMITED

Tingwick Township, Arthabaska

Producer: asbestos

The mill of Nicolet Asbestos Mines Limited treated a daily average of 1,600 tons of ore in 1960. Sorting eliminated 10 per cent of the very low-grade ore before treatment. The ore came from the open-pit where mining operations were conducted in the centre and at the west end on the second bench. The ratio of ore to waste rock is 2 : 1.

A new primary crushing system was commenced during the year and it increased the plant's capacity by 50 tons per hour.

The three rotary drying kilns are now oil-fired; previously, coal was used as fuel.

In 1960, the company employed 100 men and had Mr. L.-O. Montpetit as mine manager.

QUEBEC LITHIUM CORPORATION

Lacorne Township, Abitibi-East

Producer: lithium oxide, lithium carbonate

Milling and underground operations were resumed in mid-November of 1960. A total of 3,694 tons of ore, grading 1.55 per cent lithium oxide, was treated to produce 683 tons of chemical-grade concentrate and 37 tons of glass-grade concentrate. The preceding year's mill feed averaged 1.50 per cent lithium oxide.

On surface, a 6,000-ton stockpile of concentrate was kept replenished. At year end, the storage bins contained 550 tons of glass-grade concentrate. During 1960, 1,560.7 tons of this type of concentrate was sold.

About 1,200 tons of chemical-grade concentrate was depreciated during the year. Only 45 tons of depreciated material was used in the refinery, as part of the preliminary "tune-up" of the circuit. No lithium carbonate has been produced for the market yet. The beginning of 1960 saw the completion of the installation of machinery in the refinery.

In 1960, there were 85 employees under Mr. A. Séguin, mine manager.

SPAR-MICA CORPORATION LIMITED

Johan-Beetz Township, Duplessis

Producer: feldspar

Spar Mica Corporation Limited went into bankruptcy in December 1959.

The company's assets were sold to Minaco Equipment of Toronto in the latter part of 1960.

UNION CARBIDE CANADA LIMITED

(Electro Metallurgical Company)

St-Clement Parish, Beauharnois

Producer: quartzite

The quarry of Union Carbide Canada Limited operated for only three months in 1960, during which time it produced at the rate of 1,000 tons of crushed stone per day.

B U I L D I N G M A T E R I A L S

CARRIÈRE ANDORNO LIMITÉECap St-Martin, Laval

Producer: building limestone

The production of the quarry, in 1960, was approximately 4,000 tons of rough stone. A lot of development work was done to make ready another quarry for production.

JEAN BÉDARD LIMITÉECaughnawaga Reserve, Laprairie

Producer: crushed limestone

The average daily production of the quarry amounted to 2,000 tons of crushed limestone.

A. BILLET LIMITÉECanton Bélanger, Laval

Producer: crushed limestone

Output varied between 2,200 and 3,000 tons of crushed limestone per day.

BRIQUE CITADELLE LIMITÉEBoischatel and Beauport-Est, Québec

Producer: brick

The Boischatel plant operated at its normal rate of 150,000 bricks per day.

At Beauport, there was no production, only sales and shipping of stocked bricks.

BRODIE'S LIMITEDCampbell Township, Labelle

Producer: building granite

The activities of this quarry were greatly reduced in 1960. Its entire production amounted to only 150 tons of granite.

CANADA CEMENT COMPANYHull Township, Gatineau

Producer: cement

Canada Cement Company continued its quarrying operations in its limestone property. Extraction took place on two benches at elevations 5 and 55 feet.

In 1960, 255,583 tons of limestone and 37,007 tons of clay were used to produce 193,000 tons of cement.

CANADA CEMENT COMPANYMontreal-Est, Laval

Producer: cement

The Montreal-Est quarry produced between 5,000 and 6,000 tons of crushed limestone per day.

CANADIAN PINK GRANITECampbell Township, Labelle

Producer: building granite

The quarry produced an average of 150 tons of rough stone per week.

CARRIÈRE BEAUDRY LIMITÉEVille de Duvernay (St-Elzéar Range), Laval

Producer: crushed limestone

The quarry was in operation throughout the year producing between 2,500 and 3,000 tons of crushed limestone per day.

CARRIÈRE BERNIER LIMITÉEBaronie de Longueuil, Saint-Jean

Producer: crushed limestone

Daily production of crushed limestone varied between 2,500 and 3,000 tons.

LES CARRIÈRES AND EXCAVATIONS BONNEAU LIMITÉEVille de Laflèche, Chambly

Producer: crushed schist

The average daily production amounted to 700 tons.

CARRIÈRE DU CAP ST-MARTIN LIMITÉECap Saint-Martin, Laval

Producer: crushed limestone

Daily production varied between 200 and 1,200 tons per day. A new crushing plant was installed during the year reviewed.

CARRIÈRE L. CHARBONNEAU LIMITÉEVille de Saint-François, Laval

Producer: building limestone

Production of the quarry averaged 4 to 5 tons of rough stone per day.

CARRIÈRE CHUTE-DU-DIABLETaillon Township, Lac Saint-Jean

Producer: building granite

Production for the year 1960 amounted to 2,000 tons of granite.

CARRIÈRE DULUDE LIMITÉERange 25, Chambly

Producer: crushed silicious limestone

The average daily production of crushed material amounted to 1,200 tons.

CARRIÈRE FORTIN AND FRÈRESSt-Louis-de-Gonzague Township, Beauharnois

Producer: crushed limestone

The output of the quarry varied between 1,500 and 1,700 tons of crushed rock per day.

CARRIÈRE ROLAND GAUTHIERHull Township, Gatineau

Producer: limestone

Quarrying is done on one 10-foot-high bench. The quarry's production, averaging 16 tons per day, is shipped to neighbouring paper mills.

CARRIÈRE GOUIN LIMITÉESt-Marc-des-Carrières, Portneuf

Producer: crushed limestone

The quarry produced about 100 tons of limestone per day. The product was shipped to paper mills.

CARRIÈRE ELIE GRENIER ENRG.Shawinigan Township, Saint-Maurice

Producer: crushed granite

Operating only during the summer months, this quarry produced 2,500 tons of crushed granite at a rate varying between 25 and 30 tons per day.

CARRIÈRE GOYER(Division of Dominion Lime Limited)Range 22, Chambly

Producer: crushed silicious limestone

This quarry had an average daily production of 2,700 tons per day.

CARRIÈRE JOLIETTE LIMITÉESainte-Thérèse Parish, Joliette

Producer: crushed limestone

This quarry produced an average of 1,000 tons of crushed stone per day.

LES CARRIÈRES LAGACÉ LIMITÉEL'Abord à Plouffe (Now part of Chomedey), Laval

Producer: crushed limestone

Les Carrières Lagacé Limitée operates three quarries:

1° The Lagacé Quarry, at Saint-Martin: average daily production, 4,000 tons.

2° The Back River Quarries, at Cap Saint-Martin: average daily production, 3,600 tons.

3° Terrebonne Quarry, at Saint-François-de-Sales: average daily production, 1,800 to 2,800 tons.

CARRIÈRE D. LAMOTHEArgenteuil Seigniory, Argenteuil

Producer: crushed stone

This is a granite quarry, operated by D. Lamothe Limitée, for the Quebec-Hydro Commission. The crushed stone produced is used exclusively as concrete aggregate for the Carillon dam across the Ottawa river.

The crushing plant produced a daily average of 3,500 tons of stone per day in 1960. Transport of the aggregate to the construction site is by railroad.

Quarrying is carried out on only one bench, which varies in height from 45 to 80 feet.

LES CARRIÈRES LAURENTIENNES INC.Saint-Antoine des Laurentides, Terrebonne

Producer: crushed limestone

Production average 1,000 tons per day.

CARRIÈRE ANTOINE LLORCALetellier Township, Duplessis

Producer: crushed stone

Daily production amounted to 500 tons of crushed stone.

A mobile crushing plant delivers products ranging from 1/4 inch to 2 1/2 inches in size. All is used for construction purposes.

The quarry is on a hill-side; the face is 40 feet high.

LES CARRIÈRES MARTINEAU ET DESCHAMBAULT INC.St-Marc-des-Carières, Portneuf

Producer: crushed and dressed limestone

At Saint-Marc-des-Carières production averaged 1,200 tons of stone per day, whereas the Notre-Dame-des-Anges granite quarry produced 40 tons of stone per week. The latter operates during the summer months only.

CARRIÈRE MONTREAL-EST LIMITÉESaint-Léonard de Port-Maurice, Laval

Producer: crushed limestone

This quarry had an average daily production of 4,000 tons of crushed stone.

LES CARRIÈRES NORMONT LIMITÉECanton Bélanger, Laval

Producer: crushed limestone

The production at this quarry averaged between 2,500 and 2,700 tons per day until September 5, 1960, when operations were suspended.

CARRIÈRE POINTE-CLAIRE INC.Beaconsfield, Jacques-Cartier

Producer: crushed limestone

The output of the quarry varied between 2,500 and 2,800 tons of crushed stone per day.

LES CARRIÈRES ROBERVAL LIMITÉERoberval Township, Roberval

Producer: crushed limestone

From May 1st to November 1st, 1960, this quarry produced approximately 30,000 tons of crushed stone.

CARRIÈRE SAINT-BARTHÉLEMI LIMITÉEDusablé Seigniory, Joliette

Producer: crushed limestone

The output of this quarry was about 1,000 tons per day.

CARRIÈRE SAINT-AURICE INC.Sainte-Marquerite Range, Saint-Maurice

Producer: crushed limestone

This quarry produced a daily average of 1,500 tons of crushed limestone.

CARRIÈRE ST-RÉGIS QUARRY ENRG.Concession de St-Régis, Laprairie

Producer: crushed limestone

The daily production of this quarry was at the rate of 2,000 tons.

CARRIÈRE J.-O. SAUVÉHull Township, Gatineau

Producer: limestone

The output of this quarry, shipped to paper mills in the neighbourhood, averaged 50 tons of limestone per day.

Operations are conducted on a 15-foot bench.

LES CARRIÈRES VARENNES LIMITÉEButte-aux-Renards Range, Verchères

Producer: crushed gneiss

Production at this quarry varied from 2,000 to 2,500 tons per day.

CIMENT QUÉBEC INC.D'Auteuil Seigniory, Portneuf

Producer: crushed limestone for cement

The quarry produced an average of 1,000 tons of crushed stone per day.

COOKSVILLE-LAPRAIRIE BRICK LIMITEDLaprairie and Delson, Laprairie

Producer: bricks

This company operated two schist quarries: one at Laprairie, where the daily production was at the rate of 500 tons; the other at Delson, with a monthly production rate of 9,000 tons of schist.

FEATHEROCK INC.Saint-François-du-Lac, Yamaska

Producer: clay

Featherock Inc. operated its Saint-François-du-Lac property during the month of October 1960 only. The work consisted mostly in testing the economic efficiency of the light aggregate plant. These aggregates are made from clay.

J.O. GAUTHIER LIMITÉESaint-Marc-des-Carières, Portneuf

Producer: crushed and dressed limestone

This quarry produced approximately 2,000 tons of agricultural limestone and 700 tons of crushed limestone per month; in addition, the annual production of limestone for paper-making amounted to 46,000 tons and that of dressed stone, between 6,000 and 8,000 tons.

GINGRAS ET FRÈRES LIMITÉESaint-Marc-des-Carrières, Portneuf

Producer: building limestone

During the 26 weeks that this quarry was in operation in 1960, its production averaged 48 tons of stone per week.

GRANIT NATIONAL LIMITÉESignay Township, Lac Saint-Jean

Producer: building granite

Granit National Limitée operated two quarries; both the Saint-Gédéon and the Ile d'Alma quarries had a daily production of 75 tons of granite per day.

GYPSUM, LIME AND ALABASTINE LIMITED(Formerly: Standard Lime Co. Ltd.)Joliette and Sainte-Emélie, JolietteSt-Marc-des-Carrières, Portneuf

Producer: crushed limestone, sand

The Joliette quarry had a weekly production of 10,500 tons of crushed rock.

The Sainte-Emélie sand pit had a daily output of 2,500 tons of sand and 40 tons of gravel.

The quarry of Saint-Marc-des-Carrières produced an average of 400 tons of limestone per day.

KOMO CONSTRUCTION LIMITÉEBeauport-Est, Quebec

Producer: crushed limestone for cement.

This quarry had a daily output of 2,000 tons of rough stone.

LAURENTIAN GRANITE COMPANY LIMITED

Campbell Township, Labelle

Producer: building granite

This quarry was operated during four months only in 1960. Its production amounted to 100 tons per month.

MELROSE GRANITE LIMITED

Labelle Township, Labelle

Producer: building granite

Average weekly production of this quarry was 100 tons of rough stone.

MIRON ET FRÈRES

Ville Saint-Michel, Laval

Producer: crushed limestone

This quarry produced between 85,000 and 90,000 tons of rough stone per week.

MONTREAL CUT STONE LIMITED

Ville St-François, Laval

Producer: building limestone

This quarry produced 4,000 tons of dressed stone during the year.

MOUNT-ROYAL PAVING AND SUPPLIES LIMITED

Clarendon Township, Pontiac

Producer: crushed gravel

Mount-Royal Paving and Supplies Limited operates a gravel deposit located seven miles from Shawville.

The pit is approximately 400 feet wide, 500 feet long and 45 feet high.

The crushing plant has a rated capacity of 300 tons per hour. The gravel is shipped by train to asphalt plants in Montreal and Ottawa.

BRANDON TOWNSHIP, BERTHIER

Producer: sand

The sand pit located at Saint-Gabriel-de-Brandon produced an average of 5,000 tons of sand per day.

NATIONAL QUARRIES LIMITED

Ville St-Michel, Laval

Producer: crushed limestone

Daily production of this quarry ranged from 2,500 tons of crushed stone during three months to 20,000 tons during the summer months.

PLOURDE ET PLOURDE LIMITÉE

Tremblay Township, Chicoutimi

Producer: crushed limestone

This quarry produced an average of 350 tons of crushed stone per day during the two months it was operated - namely, August and September.

QUEBEC READY MIX

(Formerly: Michaud et Simard Inc.)

Charlesbourg-Ouest, Quebec

Producer: crushed limestone

Daily production averaged 3,000 tons of crushed stone and 1,200 tons of gravel.

RED GRANITE QUARRY LIMITEDGrenville Township, Argenteuil

Producer: granite

Red Granite Quarry Limited operated its granite quarry, located at Rawcliffe, during the summer months only, producing building and monumental stone.

SABLES DES MILLE-ILES LIMITÉEL'Assomption and Joliette Counties

Producer: sand

Sables des Mille-Iles Limitée had three sand pits in operation in 1960. Their locations and output were as follows: at Saint-Henri-de-Mascouche, 600 tons per day; at Mascouche, 400 tons per day; and at Notre-Dame-de-Lourdes, 400 tons per day.

SCOTSTOWN GRANITE COMPANY LIMITEDGrenville Township, Argenteuil

Producer: granite blocks

Scotstown Granite Company Limited extracted 20 tons per day of granite in blocks, from its Rawcliffe quarry. These blocks were shipped to the company's dressing plant located at Cap Saint-Martin.

ST-FRANCIS ROCK PRODUCTS AND EQUIPMENT LIMITEDVille de Saint-Laurent, Jacques-Cartier

Producer: crushed limestone

The daily production of this quarry averaged 400 tons of crushed stone.

ST-LAWRENCE BRICK COMPANYLaprairie, Laprairie

Producer: bricks

From its quarry, St. Lawrence Brick Company extracted 250 tons of schist per day.

UNION CONSTRUCTION LIMITÉEBaronnie de Lonqueuil, Saint-Jean

Producer: crushed limestone

This quarry has an average production of 2,000 tons of crushed stone per day.

UNION DES CARRIÈRES ET PAVAGES LIMITÉECharlesbourg-Ouest, Québec

Producer: crushed limestone

Daily production at this quarry amounted to 2,400 tons of crushed stone and 1,200 tons of quarry gravel.

UNITED STONE PRODUCTSSainte-Geneviève Parish, Jacques-Cartier

Producer: crushed limestone

A daily production of 1,000 tons per day was maintained at this quarry.

ELZÉAR VERREAULT LIMITÉEGiffard, Québec

Producer: crushed limestone

The production of the quarry varied between 800 and 1,000 tons of crushed stone per day.

PAUL VIAU CONSTRUCTIONNouveau-Salaberry Village, Beauharnois

Production: crushed limestone

A daily average of 1,000 tons of crushed stone was produced at this quarry.

WESTERN QUEBEC CONSTRUCTION LIMITEDHull Township, Gatineau

Producer: crushed limestone

Quarrying in this company's limestone deposit was carried out on two benches, 15 and 20 feet high respectively. The mobile crushing plant averaged 100 tons of crushed material per hour. Part of this output was absorbed by an asphalt plant located on the premises.

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960

(Locality means township except when otherwise stated;
symbols "p" "t" signify parish and territory.)

Locality	Mine	Mine (Feet)	Total (Feet)
Abitibi (T)	Albanel Minerals Limited	2,067	2,067
Acton	Steerola Explorations Limited	1,100	1,100
Barlow	Chiboug Copper Corporation Limited ...	1,079	
	Chibougamau Mining and Smelting Co. ..	1,518	3,497
Barraute	Canadian Shield Mining Corporation ...	1,200	
	Terra Nova Explorations Limited	1,454	2,654
Beauchastel	Burbank Minerals Limited	1,740	
	Verona Rock Products Limited	1,322	
	West Wasa Mines Limited	2,241	5,303
Bellechasse	Black Hawk Mining Company	3,101	3,101
Barnetz	Hudson Bay Exploration and Development Company Limited	3,434	3,434
Berthiaume	Du Maurier Mines Limited	2,063	2,063
Bolton	Terra Nova Explorations Limited	2,340	2,340
Bourlamaque	Agar, Veney, Brossard, Butler, Baker .	1,000	
	Akasaba Gold Mines Limited	1,406	
	Aumaque Gold Mines Limited	13,761	
	East Sullivan Mines Limited	18,192	
	Gamma Mines Limited	76	
	Lamaque Mining Company Limited	115,594	
	Leitch Gold Mines Limited	2,131	
	Manitou-Barvue Mines Limited	38,248	
	Norvalie Mines Limited	1,234	
	Sigma Mines (Quebec) Limited	33,198	224,840
Boyvinet	Ceasar Minerals Limited	1,022	1,022
Broughton	Carey-Canadian Mines Limited	455	455
Bruneau	Bruneau Mines Limited	7,254	7,254
Carpentier	Macassa Mines Limited	1,516	1,516
Cavelier	Marchant Mining Company Limited	1,875	1,875
Château Richer (P)	Quebec Clay Mining Limited	300	300
Cléricy	Korich Mining Company Limited	2,070	2,070
Clinton	Moneta Porcupine Mines Limited	8,107	8,107
Courville	Big Town Copper Mines Limited	2,316	
	Eastville Gold Mines Limited	159	2,475

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
Daniel	Hydra Explorations Limited	2,829	
	New Hosko Mines Limited	16,723	
	Sand River Gold Mining Company Limited	653	20,205
Denain	Alsab Mines Limited	5,659	5,659
Desjardins	Kerr Addison Gold Mines Limited	1,500	1,500
Desmazures	Alcourt Mines Limited	2,427	2,427
Desmeloizes	Area Mines Limited	1,350	
	Jacmar Explorations Limited	4,098	
	Normetal Mining Corporation	8,102	
	The Mining Corporation of Canada	1,451	15,001
Destor	Elk Lake Mines Limited	2,983	2,983
Disson	Rouanda Mining Company	1,693	1,693
Dolomieu	McIntyre Porcupine Mines Limited	1,804	1,804
Druillettes	Selco Exploration Company Limited	618	618
Dubuisson	Marban Gold Mines Limited	16,457	
	Newlund Mines Limited	1,487	20,926
	Augusta Exploration Limited	306	
Dufresnoy	Consolidated Vauze Mines Limited	22,150	
	Lake Dufault Mines Limited	44,082	
	Norque Copper Mines Limited	3,742	
	Waite Amulet Mines Limited	6,024	76,309
	Ava Gold Mining Company Limited	3,500	3,500
Duparquet	Jomac Mines Limited	1,031	
	Southwest Potash Corporation	2,775	
	Sunburst Exploration Limited	474	
	Waite Lake Mines Limited	5,219	9,499
Du Tast	Hudson Bay Exploration and Development Company Limited	360	360
Enjalran	Korich Mining Company Limited	2,060	2,060
Fiedmont	Copper Prince Mines Limited	201	201
Figury	Copperstream Mines Limited	3,000	3,000
Fournière	Barnat Mines Limited	56,961	
	Canadian Malartic Gold Mines Limited .	55,965	
	East Malartic Mines Limited	41,103	
	Malartic Gold Fields Limited	10,268	164,927
Fonteneau	Hudson Bay Exploration and Development Company Limited	70	70

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960 (Cont'd)

Locality	Mine	Mine (Feet)	Total (Feet)
Galinée	Bracemac Mines Limited	18,148	
	Iso Mines Limited	3,811	
	Jellicoe Mines (1939) Limited	1,510	
	Larum Mines Limited	1,557	
	Mattagami Lake Mines Limited	10,674	
	Newmont Mining Corporation of Canada Limited	1,656	
	Orchan Mines Limited	53,904	
	Ventures Limited	2,484	93,744
Gamache	New Jersey Zinc Exploration (Canada) Limited	443	443
Gand	Lenmac Mines Limited	1,919	
	Norsco Mines Limited	1,018	2,937
Grand-Calumet	New Calumet Mines Limited	19,116	19,116
	New Jersey Zinc Exploration (Canada) Limited	247	247
Grenville	Canadian Refractories Limited	21,475	21,475
Guérin	Carlmand Mines Limited	538	538
Haig	McWatters Gold Mines Limited	2,362	2,362
Holland	Gaspé Copper Mines Limited	68,964	68,964
Hurault	Hudson Bay Exploration and Development Company Limited	770	770
Ireland	Lake Asbestos of Quebec Limited	8,634	8,634
Isle-Dieu	Marchant Mining Company Limited	1,238	
	Mattagami Explorers Corporation	1,048	
	Newmont Mining Corporation Limited ...	6,622	
	Radiore Uranium Mines Limited	13,152	22,060
Jonquière	Saguenay Exploration and Mining Inc. .	489	489
Joutel	Prospectors Airways Company	13,299	
	Southwest Potash Corporation	2,316	15,615
Kreighoff	Gibson Mines Limited	683	
	Ventures Limited	2,609	3,292
Lacorne	Molybdenite Corporation of Canada	25,636	25,636
La Dauver- sière	New Jersey Zinc Exploration Company (Canada) Limited	1,493	
	Rohault Mines Limited	431	1,924
La Martinière	Monpré Mining Company Limited	847	847
Lamorandière	Terra Nova Properties Limited	1,020	1,020

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
La Motte	Bilson Quebec Mines Limited	2,517	
	Marbridge Mines Limited	2,634	5,151
Landrienne	Rouanda Mining Company	408	
	Canadian Shield Mining Corporation ...	975	1,383
Languedoc	Rouanda Mining Company	104	104
L'Annoncia- tion (P)	General Managers Inc.	2,343	2,343
La Pause	Nickel Rim Mines Limited	500	500
Launay	Trade Horn Limited	5,117	5,117
Lespérance	Opemisca Explorers Limited	1,354	1,354
Le Tac	Noranda Mines Limited	32,356	32,356
Le Tardif	Rexton Mines Limited	1,200	1,200
Lévy	Chiboug Copper Corporation Limited ...	8,187	
	Hoyle Mining Company Limited	705	
	Olympia Mining Exploration Limited ...	1,192	
	Opemiska Copper Mines (Quebec) Limited	93,888	103,972
Ligneris	Rouanda Mining Company	1,479	1,479
Louvicourt	Bevcon Mines Limited	38,975	
	Denison Mines Limited	2,270	
	Dome Exploration Company Limited	1,278	
	Rainville Mines Limited	6,565	49,088
	Lavandin Mining Company	20,150	20,150
Malartic	Moneta Porcupine Mines Limited	2,175	2,175
McKenzie	Bateman Bay Mining Company	8,164	
	Chibougamau Jaculet Mines Limited	570	
	Copper Rand Chibougamau Mines Limited	66,751	
	Norbeau Mines (Quebec) Limited	22,097	
	The Northeast Exploration Company	1,256	98,848
McCorkill	Chibougamau Mining and Smelting Co. ..	595	595
Mistassini (T.)	Standard Iron Mining Company Ltd.	6,206	6,206
Montbray	Montbray Explorers Limited	20,617	
	Southwest Potash Corporation	2,193	22,810
Montgolfier	Dennco Exploration Limited	1,650	1,650
Normanville	Boulder Lake Mines Limited	5,605	
	Warren S. Moore	2,775	8,380
Obalski	Campbell Chibougamau Mines Limited ...	136,935	
	Chib-Kayrand Copper Mines Limited	1,872	
	Merrill Island Mining Corporation	69,171	207,978

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960 (Cont'd)

Locality	Mine	Mine (Feet)	Total (Feet)
Oka (P.)	Columbium Mining Products Limited	15,662	
	Consolidated Pershcourt Mining Limited	280	
	Quebec Columbium Limited	15,428	
	St. Lawrence Columbium and Metals Corporation	7,729	39,099
Pershing	Croinor Pershing Mines Limited	600	
	Twentieth Century Mining Company Ltd..	5,000	5,600
Poirier	Copper Prince Mines Limited	510	
	Rio Tinta Canadian Exploration	8,805	
	Southern Union Oils	2,764	12,079
Port-Daniel	Noranda Mines Limited	775	775
Portland (Est)	Luckridge Phosphate Mines Limited	1,500	1,500
Preissac	Anglo American Molybdenite	15,614	
	Canadian Shield Mining Corporation ...	1,341	16,955
Quévillon	Quebelle Mines Limited	3,785	3,785
Queylus	Valco Mines Limited	299	299
Rochebaucourt	Newmont Mining Corporation of Canada Limited	1,354	1,354
Rohault	Gallway Chibougamau Mines Limited	845	845
Rouyn	Elder Mines and Development Limited ..	3,362	
	Eldrich Mines Limited	16,287	
	Invex Corporation Limited	21,065	
	Quemont Mining Corporation	78,436	
	Wiltsey-Coghlan Mines Limited	4,229	123,379
Roy	Lempira Mines Limited	250	
	O'Leary Malartic Mines Limited	1,780	
	Portage Island (Chibougamau) Mines Limited	22,943	24,973
Subercase	Hudson Bay Exploration and Development Company Limited	1,255	
	Nipiron Mines Limited	1,596	
	Noranda Mines Limited	12,010	14,861
Scott	Chibougamau Mining and Smelting Co. ..	7,955	7,955
Seignelay	Mineral Ventures Limited	7,782	7,782
Senneville	Kateri Mining Company Limited	1,214	1,214
Shefford	Roxford Mining Corporation	45	45
Shipton	Canadian Johns-Manville Company Limited	3,116	3,116

Table 46. - Exploratory Diamond Drilling in the
Province of Quebec in 1960 (Cont'd)

Locality	Mine	Mine (Feet)	Total (Feet)
Simard	Saguenay Exploration and Mining Inc. .	191	191
Spalding	Fontbrune Nickel Mines Limited	600	600
St. Urbain (P)	Kelly Mining Corporation	80	80
Ste. Hélène	Eastate Projects Limited	1,403	1,403
Stratford	East Sullivan Mines Limited	34,076	
	Hastings Mining and Development Company Limited	2,439	
	Moneta Porcupine Mines Limited	2,701	
	Solbec Copper Mines Limited	28,894	68,110
Taché	Inter Ocean Exploration Company Ltd. .	500	500
Themines	Hudson Bay Exploration and Develop- ment Company Limited	1,913	1,913
Thetford	Asbestos Corporation Limited	79,855	
	Empire Asbestos Limited	2,238	
	Flintkote Mines Limited	943	
	Paradis, J.A.	518	83,554
Tiblemont	Quebec Smelting and Refining	1,854	
	Valiant Gold Mines Limited	9,499	11,353
Trécesson	Trade-Horn Limited	2,197	2,197
Ungava (T.)	Great Whale Iron Mines Limited	10,110	
	Hollinger North Shore and Exploration Company Limited	1,488	
	Iron Ore Company of Canada Limited ...	4,416	
	Keewa Quebec Mines Limited	15,487	31,501
Urban	Fab Metal Mines Limited	1,120	1,120
Ussedat	Quebec Cartier Mining Company	50,811	50,811
Valrennes	Mid Chibougamau Mines Limited	500	
	Rio Tinto Canadian Exploration Limited	844	1,344
Vassan	Norlartic Mines Limited	8,712	8,712
Veza	Rio Tinto Canadian Exploration Limited	341	341
Villemontel	Trade-Horn Limited	627	627
Watford	Montclair Mining Corporation Limited .	1,000	1,000
Wexford	Tamara Mining Limited	200	200
	Total		2,002,805

Table 47. - General Mining Operations in the
Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mining Company	Lateral Work (Feet)	Raising (Feet)	Shaft Sinking (Feet)	Exploratory Diamond Drilling (Feet)
Akasaba Gold Mines Limited	-	-	-	-
Anacon Lead Mines Limited	-	-	-	-
Barnat Mines Limited	2,791	-	-	56,961
Bevcon Mines Limited	-	-	-	-
Campbell Chibougamau Mines Ltd.	12,157	3,201	(a) 2,415	162,858
Canadian Malartic Gold Mines Limited	8,187	3,307	-	55,965
Copper Rand Chibougamau Mines Limited	12,690	5,888	111	70,676
East Malartic Mines Limited ...	(b) 13,729	-	984	41,101
East Sullivan Mines Limited ...	(b) 6,548	-	-	30,973
Elder Mines and Developments Limited	1,409	240	-	3,362
Eldrich Mines Limited	2,925	918	-	18,684
Gaspé Copper Mines Limited	-	-	-	-
Lamaque Mining Company Limited	8,544	4,379	-	91,431
Malartic Gold Fields Limited ..	-	-	-	-
Manitou Barvue Mines Limited ..	-	-	-	-
Marban Gold Mines Limited	3,708	1,043	850	16,457
Merrill Island Mining Corp.Ltd.	-	2,892	-	32,985
Molybdenite Corporation of Canada Limited	8,568	1,995	110	25,895
New Calumet Mines Limited	(b) 5,019	-	-	18,981
Noranda Mines Limited	-	-	-	-
Norlartic Mines Limited	2,817	2,350	-	-
Normetal Mining Corporation Limited	4,789	748	-	16,165
Opemiska Copper Mines (Quebec) Limited	19,704	5,501	-	93,388
Quebec Lithium Corporation	-	-	-	-
Quemont Mining Corporation Ltd.	6,877	3,319	-	75,078
Sigma Mines (Quebec) Limited ..	7,814	5,633	1,102	33,198
Sullico Mines Limited	(b) 3,383	-	-	18,249
Sullivan Consolidated Mines Limited	7,855	4,279	-	47,518
Waite Amulet Mines Limited	80	160	-	-

(a) Includes shaft stations

(b) Includes raises

Table 48. - Production from Gold Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mine	Ore Treated (Tons)	R E C O V E R Y		Gold Recovered Per Ton of Ore Treated (Ounces)
		Gold (Ounces)	Silver (Ounces)	
Akasaba Gold Mines Limited	72,472	8,010	2,276	0.110
Anacon Lead Mines Limited	114,223	-	-	-
Barnat Mines Limited	445,585	66,158	-	0.148
Bevcon Mines Limited	233,910	27,359	8,400	0.117
Canadian Malartic Gold Mines Limited	468,694	40,497	17,540	0.086
East Malartic Mines Limited	544,939	110,587	-	0.203
Elder Mines and Developments Limited	146,444	19,634	-	0.134
Eldrich Mines Limited	124,105	15,991	-	0.129
Lamaque Mining Company Limited	569,390	99,543	15,901	0.174
Malartic Gold Fields Limited	404,186	64,045	4,690	0.158
Marban Gold Mines Limited	-	-	-	-
Norlartic Mines Limited	132,284	17,799	1,548	0.111
Sigma Mines (Quebec) Limited	430,136	77,422	-	0.180
Sullivan Consolidated Mines Limited	233,438	42,929	9,365	0.184

Table 49. - Ore Reserves of Producing Gold Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mine	RESERVES		Tons Treated 1960	Mill Heads Oz./Ton	Commencement of Operations
	(Tons)	Gold Content Oz./Ton			
Akasaba Gold Mines Limited	139,968	0.199	72,472	0.125	1960
Anacon Lead Mines Limited	-	-	114,223	-	1956
Barnat Mines Limited	1,349,213	0.143	445,585	0.155	1938
Bevcon Mines Limited	300,000	0.14	233,910	0.130	1952
Canadian Malartic Gold Mines Limited	809,900	0.102	468,694	0.097	1935
East Malartic Mines Limited	1,821,586	0.182	544,939	0.210	1938
Elder Mines and Development Limited	-	-	146,444	-	1946
Eldrich Mines Limited	-	-	124,107	-	1956
Lamaque Mining Company Limited	2,337,869	0.183	569,390	0.181	1935
Malartic Gold Fields Limited	313,000	0.175	404,186	0.158	1939
Marban Gold Mines Limited	120,000	0.14	-	-	1960
Norlartic Mines Limited	640,000	0.16	132,284	-	1960
• Sigma Mines (Quebec) Limited	1,409,500	0.226	430,136	0.188	1937
Sullivan Consolidated Mines Limited	653,246	0.235	233,438	0.200	1934

Table 50. - Production of Base-metal Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mining Company	Tons Treated	P R O D U C T I O N					
		Copper (Pounds)	Zinc (Pounds)	Lead (Pounds)	Gold (Ounces)	Silver (Ounces)	Pyrite (Tons)
Anacon Lead Mines Limited	114,223	-	-	-	-	-	-
Campbell Chibougamau Mines Limited	796,637	37,487,176	-	-	34,415	397,726	-
Copper Rand Chibougamau Mines Ltd.	550,568	27,745,308	-	-	18,291	99,878	-
East Sullivan Mines Limited (a) ..	563,792	7,387,341	9,895,568	-	4,125	155,557	-
Gaspé Copper Mines Limited	2,450,300	69,194,000	-	-	-	-	-
Manitou Barvue Mines Limited	292,065	6,538,255	18,791,106	1,862,725	9,620	637,983	-
Merrill Island Mining Corp. Ltd...	146,737	6,486,000	-	-	1,182	53,480	-
New Calumet Mines Limited	100,463	-	13,779,735	3,551,520	885	307,782	-
Noranda Mines Limited	1,331,700	51,558,000	-	-	209,860	-	212,200
Normetal Mining Corp. Ltd.	347,164	21,471,485	20,626,138	-	6,361	515,798	28,453
Opemiska Copper Mines (Quebec) Limited	751,453	41,137,094	-	-	17,813	242,646	-
Quemont Mining Corporation Ltd. ..	856,632	20,417,386	33,181,530	-	103,222	392,754	215,851
Sullico Mines Limited	40,740	5,159,673	7,170,789	-	3,476	108,035	-
Waite Amulet Mines Limited	297,062	26,305,904	14,700,240	-	8,345	193,877	53,948

(a) Property sold to Sullico Mines Limited, August 1st, 1960: 7 months of operation

Table 51. - Ore Reserves of Base-metal Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mine	Reserves (Tons)	Copper Content (Per Cent)	Zinc Content (Per Cent)	Gold Content (Oz./Ton)	Silver Content (Oz./Ton)	Tons Treated in 1960	Commencement of Operations
Anacon Lead Mines Limited	-	-	-	-	-	114,223	1956
Campbell Chibougamau Mines Limited	2,885,319	2.36	-	0.057	-	796,637	1956
Copper Rand Chibougamau Mines Ltd.	2,040,000	2.60	-	0.066	-	550,568	1960
East Sullivan Mines Ltd. (a)	3,200,740	0.93	0.51	0.007	0.28	563,792	1943
Gaspé Copper Mines Limited	61,233,000	1.29	-	-	-	-	1955
Manitou Barvue Mines Limited:						292,065	1942
Copper ore	805,000	1.1	-	0.02	0.2		
Zinc ore	375,900	-	6.5	0.03	5.0		
Merrill Island Mining Corp. Ltd...	458,325	2.35	-	0.01	0.45	146,737	1958
New Calumet Mines Limited	310,132	-	8.72	0.021	5.34	100,463	1943
Noranda Mines Limited:						1,331,700	1927
Sulphide ore	8,695,000	2.32	-	0.18			
Fluxing ore	750,000	-	-	0.13			
Chadbourne	1,550,000	-	-	0.13			
Zone No. 5	320,000	-	-	0.23			
Zone No. 5	1,500,000	0.7	-	0.12			
Joliet (fluxing)	1,500,000	1.0	-	-			
Normetal Mining Corp. Ltd.	1,434,600	3.54	5.49	-	-	347,164	1937
Opemiska Copper Mines (Quebec) Limited	4,876,600	2.91	-	-	-	751,453	1954
Quemont Mining Corporation Ltd. ..	5,340,000	1.29	2.75	0.174	1.05	856,632	1949
Sullico Mines Limited	2,790,000	0.96	-	0.007	0.27	410,740	1960
Waite Amulet Mines Limited	327,500	5.0	3.0	0.03	1.25	297,062	1937

(a) Property sold to Sullico Mines Limited, August 1st, 1960: 7 months of operation

Table 52. - Production of Various Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mining Company	Tons Treated	Bismuth (Pounds)	Molybdenum (Pounds)	Lithium Oxide (Pounds)
Molybdenite Corporation of Canada Limited ..	215,609	138,597	801,556	-
Quebec Lithium Corporation	3,694	-	-	-

Table 53. - Ore Reserves of Various Mines in the Province of Quebec in 1960

(As reported in annual reports of mining companies when available)

Mining Company	Reserves	Molybdenite (Per Cent)	Lithium (Per Cent)	Tons Treated in 1960	Commencement of Operations
Molybdenite Corporation of Canada Limited ..	243,931	0.36	-	215,601	1942
Quebec Lithium Corporation	4,000,000	-	1.5	3,694	1955

EMPLOYMENT, WAGES, AND ACCIDENTS IN MINES ANDQUARRIES DURING THE YEAR 1960EMPLOYMENT

During the year 1960, there were 32,245 men employed in the mining industry of the Province of Quebec, a decrease of 739 compared with the figure of the preceding year.

In the mines, the number of men employed in the development and production of metals decreased by 643, compared with that of 1959.

The number employed in quarries decreased by 96. The total number of man-hours worked was 60,983,576.

Employment was distributed among 459 mines, mining contractors and exploration companies, 174 quarries, 4,462 sand and gravel pits of which 2,178 were operated by the Quebec Department of Roads and 912 by the Quebec Department of Colonization, and 33 diamond drilling contractors, as well as numerous claim holders who carried out assessment work.

Table 54.- Men Employed in Mines and Quarries
in the Province of Quebec from 1954 to 1960

	1954	1955	1956	1957	1958	1959	1960
Number of men employed	29,680	31,103	31,743	34,726	31,927	32,984	32,245
Number of million man-hours worked	57.853	61.940	63.919	65.962	61.203	63.250	60.984

Table 56 shows the distribution of workmen in the various branches of the mining industry.

Table 55.- Personnel Employed by the Mining Industry of the
Province of Quebec in 1960

Substance	Number of Employees	Salaries and Wages	Number of Hours Worked	Number of 300-day Workers (a)
METALLICS				
Columbium and uranium	73	\$ 124,121	61,301	26
Copper (includes sulphur and selenium)	7,149	30,946,570	14,602,261	6,084
Gold	3,285	12,056,154	7,073,461	2,947
Iron and titanitic iron (includes titanium dioxide)	3,427	19,604,580	7,396,187	3,082
Molybdenum	228	614,749	370,442	154
Nickel	9	8,406	4,905	2
Zinc and lead	684	2,654,693	1,421,776	592
Sub-totals	14,855	\$ 66,009,273	30,930,333	12,887
NON-METALLICS				
I.-Industrial Minerals				
Asbestos	5,990	\$ 28,872,291	12,229,126	5,095
Feldspar	60	113,222	73,400	31
Lime	257	1,059,383	601,516	251
Lithium	90	304,789	192,328	80
Magnesitic dolomite and brucite	361	1,590,429	754,052	314
Marl	31	93,354	54,401	23
Mica	30	38,022	34,904	15
Mineral water	17	24,158	24,930	10
Ochre and iron oxide	22	44,885	36,193	15
Petroleum	17	45,223	16,352	7
Peat	482	853,840	957,699	399
Quartz and industrial sand	187	472,969	284,713	119
Soapstone and talc	23	62,158	54,250	23
Other (beryllium, fluorite, graphite, kaolin)	17	30,600	31,092	12
Sub-totals	7,584	\$ 33,605,323	15,344,956	6,394
II.-Building Materials				
Cement	976	\$ 4,494,008	2,047,537	853
Clay products	896	3,184,776	1,734,328	723
Granite	684	1,806,055	1,188,513	495
Limestone	1,631	4,838,980	3,111,562	1,297
Marble	46	56,829	53,415	22
Sand and gravel	4,798	6,025,707	5,082,592	2,118
Sand-lime products	43	203,912	106,789	45
Sandstone	52	120,902	93,939	39
Slate and shale	10	22,667	15,549	6
Sub-totals	9,136	\$ 20,753,836	13,434,224	5,598
Diamond drilling contractors	670	\$ 2,263,774	1,274,063	531
TOTALS	32,245	\$122,632,206	60,983,576	25,410

(a) Number of hours divided by 2,400.

WAGES

Wages paid to mine and quarry workers in the Province in 1960 amounted to \$122,632,206, compared with \$123,637,544 in 1959.

Details concerning wages and employment in the various branches of the mining industry are listed in Table 55. Of the total, workmen in mines received \$101,878,370 and quarry workers, \$20,753,838, compared with \$102,707,530 and \$20,930,014, respectively, in 1959.

The average wage per man per 300 days of work in the mining industry was \$5,283, compared with \$4,969 for the previous year.

The average wage per man per 300 days of work in the quarrying industry was \$3,707, compared with \$3,682 in the previous year.

Table 56.- Employees in the Mining Industry of the Province of Quebec in 1960

	Number of Employees	Salaries and Wages	Number of Man-hours of Work	Number of 300-day Workers
Producing mines	21,309	\$ 96,547,546	44,682,282	18,618
Non-producing mines	1,130	3,067,050	1,593,007	664
Quarries and sand and gravel pits	9,136	20,753,836	13,435,424	5,598
Diamond drilling contractors	670	2,263,774	1,272,863	530
Total	32,245	\$122,632,206	60,983,576	25,410

ACCIDENTS

During the year 1960, the Department of Mines received reports of 848 accidents that occurred in mines, quarries, peat bogs and sand and gravel pits in the Province of Quebec, compared with 820 accidents reported in the previous year.

Table 57. - Summary of Fatal Accidents in Mines, Quarries and Annexed Plants
of the Province of Quebec in 1960

No	Date	Mine or Quarry	Employer	Locality	Victim	Age	Marital Status	Occupation	Place	Cause of Accident
1	Jan. 13	Campbell Chibougamau Mines Ltd.	Campbell Chibougamau Mines Ltd.	Chibougamau	Gino Placidi	29	Single	Miner	Stope I-7-Sill	Fall of object
2	Jan. 16	Campbell Chibougamau Mines Ltd.	Campbell Chibougamau Mines Ltd.	Chibougamau	Roland Roy	33	Married 3 children	Miner	Main crosscut 1,600' level	Fall of rock
3	Jan. 20	Barnat Mines Ltd.	Barnat Mines Ltd.	Malartic	Roland Lambert	25	Married 2 children	Miner	Crosscut, slot N 11-12	Explosives
4	Feb. 4	Malartic Gold Fields, Ltd.	Malartic Gold Fields, Ltd.	Dubuisson	André Collin	24	Single 1 dependent	Miner	Stope 22-R-56 No. 1 Mine	Fall of rock
5	Feb. 25	East Malartic Mines, Ltd.	East Malartic Mines, Ltd.	Malartic	Willie J. Fillion	40	Married	Equipment inspector	24-E drift, 3805 level	Crushed by ore car
6	Mar. 20	Canadian Refractories Ltd.	Canadian Refractories Ltd.	Kilmar	Roméo Poirier	35	Married 1 child	Machinist	Welding shop No. 1 Mine	Flying dodr: acetylen explosion
7	Mar. 30	Normandie	Asbestos Corporation Ltd.	Thetford Mines	Roch Mathieu	26	Married 2 children	Miner	Open-pit	Fall of rock
8	Apr. 18	Sullivan Consolidated Mines Ltd.	Sullivan Consolidated Mines Ltd.	Sullivan	Joseph Morin	44	Married 8 children	Miner	Stope 2116- N-13	Fall of rock
9	June 4	Mine French	Iron Ore Company of Canada	Scheffer-ville	Maurice Gagnon	38	Married 5 children	Foreman	Open-pit	Crushed by truck
10	July 15	Barnat Mines Ltd.	Barnat Mines Ltd.	Malartic	Côme Gill	19	Single	Miner	16-32 W drift	Fall of rock
11	July 24	Continental Diamond D. Co. Ltd.	Continental Diamond D. Co. Ltd.	Rouyn	Roger Landry	33	Married 5 children	Diamond drill operator	Dewatering of shaft	Wrong hoisting manoeuvre
12	July 29	Miron Quarry Ltd.	Miron Quarry Ltd.	Ville St-Michel	Albert Hogue	28	Married 2 children	Truck driver	Miron quarry	Crushed by truck
13	Aug. 25	Dominion Lime Ltd.	Dominion Lime Ltd.	St. Adolphe	Gérard Laurin	52	Married 5 children	In charge of lime making	Warehouse	Fall of object

Table 57. - Summary of Fatal Accidents in Mines, Quarries and Annexed Plants
of the Province of Quebec in 1960 (Cont'd.)

No.	Date	Mine or Quarry	Employer	Locality	Victim	Age	Marital Status	Occupation	Place	Cause of Accident
14	Sept.19	Noranda Mines Ltd.	Noranda Mines Ltd.	Noranda	Lawrence Eslinger	48	Married 2 children	Rigger 1st class	Overhead crane track con- verter aisle of smelter	Crushed by crane
15	Sept.25	Campbell Chibouga- mau Mines Ltd.	MacIsaac Mining and Tunnelling Co. Ltd.	Chibougamau	Armand Goulet	35	Married 3 children	Shaftman	No. 1 Winze station 1900' level	Fall of rock
16	Oct. 3	Manitou-Barvue Mines Ltd.	Manitou-Barvue Mines Ltd.	Val d'Or	Victor Ulanowicz	46	Married 4 children	Mucking machine operator	Draw-off chute 1501-E ore pass 1570' level	Fall of rock
17	Nov. 8	Shawinigan Chemicals Ltd.	Shawinigan Chemicals Ltd.	Bedford	Léopold Lamothe	55	Married 6 children	Conveyor maintenance man	No.1 conveyor crushing plant	Caught by conveyor belt
18	Nov. 8	Mine Ferriman	Iron Ore Company of Canada	Scheffer- ville	Roméo St-Arneault	41	Married 2 children	Truck driver	Mine Ferriman	Haulage
19	Nov.11	Mine Lamaque	Lamaque Mining Co. Ltd.	Val d'Or	Jean Delisle	25	Single	Miner	Chute,32-32 (S) 42, 3,200' level	Chute pulling
20	Dec. 2	Coniagas Mines Ltd.	Coniagas Mines Ltd.	Amos	Laurent Dubois	29	Married	Miner	Shaft station 790' level	Collapse of scaffolding
21	Dec.22	Carrière Shawinigan Ltée	Carrière Shawinigan Ltée	Shawinigan	Yvan Lemire	24	Married	Quarryman	Quarry	Explosives

Included in these figures are 21 fatalities in addition to 827 accidents of over five days' lost time or otherwise compensable.

Accidents and man-hours worked at the railway terminals of Sept-Iles and Port Cartier and those of the Arvida and Sorel refineries are not included in the accident statistics that follow.

The accident rate per million man-hours worked was 13.9 for the year 1960.

Accident prevention work was continued throughout the Province and again resulted in a very low accident frequency rate. In this respect, Sigma Mines (Quebec) Limited with a frequency of 1.30 per million man-hours won the John T. Ryan Safety Trophy for the whole of Canada.

The Mine Rescue Training Plan, sponsored by the Quebec Metal Mines Accident Prevention Association and the Quebec Asbestos Mining Association, operated throughout the Province under the supervision of the Department of Mines. Active mine rescue personnel, distributed among 27 mines, numbers 356 men. Seventy-nine certificates of training in mine rescue were awarded to as many new recruits during 1960.

Mine Rescue Stations

The number of mine rescue stations remained unchanged, compared with that of 1959. One sub-station was relocated, however, that of Anacon Lead Mines Limited being moved to Copper Rand Chibougamau Mines Limited. Following are the location and type of mine rescue stations in operation:

Noranda	Main Station
Bourlamaque	" "
Thetford Mines	" "
Canadian Johns-Manville (Asbestos)	Sud-station
Campbell Chibougamau Mines	" "
Canadian Refractories	" "
Copper Rand Chibougamau Mines	" "
Gaspé Copper Mines	" "
New Calumet Mines	" "
Normetal Mining Corporation	" "
Opemiska Copper Mines	" "

Mine Rescue Competition

The annual provincial mine rescue competition was held at Val d'Or in September 1960. The trophy for proficiency in mine rescue operations was won by a team from Lamaque Mining Company Limited, which competed with eight other teams.

Table 58.- Number of Victims of Accidents in Mines, Quarries
and Annexed Plants in the Province of Quebec in 1960

	Fatal Accidents		Non-fatal Accidents		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Mines:						
Surface	1	0.1	197	23.2	198	23.3
Underground	12	1.4	287	33.9	299	35.2
Open pits	2	0.2	64	7.5	66	7.8
	15	1.7	548	64.6	563	66.3
Quarries						
Surface	2	0.2	107	12.7	109	12.9
	2	0.2	107	12.7	109	12.9
Annexed plants:						
Concentrators	0	0.0	40	4.7	40	4.7
Repair shops	1	0.1	48	5.8	49	5.9
Crushing plants ..	1	0.1	35	4.2	36	4.3
Lime kilns	0	0.0	15	1.8	15	1.8
Warehouses	1	0.1	9	1.1	10	1.2
Dressing works ...	0	0.0	17	2.0	17	2.0
Smelter	1	0.1	4	0.4	5	0.5
Construction	0	0.0	3	0.3	3	0.3
Power plants	0	0.0	1	0.1	1	0.1
	4	0.4	172	20.4	176	20.8
Totals:	21	2.3	827	97.7	848	100.0

Table 59- Analysis of Fatal Accidents in Mines, Quarries
and Annexed Plants in the Province of Quebec in 1960

Cause of Accident	Under- ground	Surface	Open Pits	Annexed Plants	Total	
					No.	Per Cent
Mines:						
Fall of rock	4	0	1	0	5	23.6
Haulage and transportation	1	1	1	0	3	14.2
Chute loading	2	0	0	0	2	9.4
Hoisting	1	0	0	0	1	4.8
Lifting heavy object	1	0	0	0	1	4.8
Explosives	1	0	0	0	1	4.8
Scaffolding and ladders ..	1	0	0	0	1	4.8
Machinery and tools	1	0	0	0	1	4.8
Flying rock or object	0	0	0	1	1	4.8
Mechanical shovel or crane	0	0	0	1	1	4.8
Total: mines	12	1	2	2	17	80.8
Quarries:						
Haulage and transportation	0	1	0	0	1	4.8
Warehouses	0	0	0	1	1	4.8
Explosives	0	1	0	0	1	4.8
Crushing plants	0	0	0	1	1	4.8
Total: quarries	0	2	0	2	4	19.2
Total: mines and quarries	12	3	2	4	21	100.0

The ages of victims of fatal accidents in mines, quarries and annexed plants are shown in the following table.

Table 60- Fatalities According to Age Groups

17-20	21-25	26-30	31-35	36-40	41-45	46-50	Over 50	Total
1	4	4	4	1	2	2	3	21

The following table shows the accident frequency rate for the past ten years.

Table 61.- Accident Rates per 1,000,000 Man-hours

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Mines and annexed plants	21.5	17.5	16.7	13.5	15.7	17.0	15.5	12.0	14.2	14.2
Quarries and annexed plants	13.2	13.3	10.9	10.3	9.8	15.4	12.4	9.7	11.1	12.1
Mining industry	19.7	16.6	15.4	12.8	14.3	16.7	14.8	11.9	13.5	13.9

Table 62 presents a summary of accidents in mines, quarries and annexed plants in 1960.

Table 62.- Summary of Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1960

	Number of Million Man-hours	Accidents			Per Million Man-hours
		Fatal	Non-fatal	Total	
Mines and annexed plants	47.548	17	659	676	14.2
Quarries and annexed plants	13.435	4	168	172	12.1
Totals	60.983	21	827	848	13.9

Non-fatal Accidents:

Tables 63, 64 and 65 classify the non-fatal accidents according to cause.

Mines:

Statistics show that, in mines, fall of person caused the largest number of accidents.

Table 63.- Non-fatal Accidents in Mines in 1960

Cause of Accident	Under-ground	Open pits	Surface and annexed plants	Total	
				No.	Per cent
Fall of person	24	5	47	76	11.5
Diamond drilling	18	0	57	75	11.5
Machinery and tools	18	3	52	73	11.2
Haulage and transportation	24	14	16	58	8.3
Lifting heavy object	17	3	30	50	7.6
Handling rock or other material	20	5	21	46	7.0
Fall of object	17	5	18	40	6.1
Drilling	23	11	2	36	5.6
Fall of rock	29	4	3	36	5.6
Miscellaneous	5	5	15	25	3.8
Scaffolding and ladders ...	12	0	7	19	3.0
Flying rock or object	7	0	9	16	2.4
Scaling	12	0	1	13	2.0
Burns	0	1	12	13	2.0
Chute loading	11	0	0	11	1.7
Slide of rock or other material	9	1	1	11	1.7
Tramming	8	0	2	10	1.5
Mechanical shovel or crane .	4	4	2	10	1.5
Gearing, belting, etc.	2	1	6	9	1.4
Scraping	8	0	0	8	1.2
Explosives	6	0	0	6	0.9
Electricity	0	1	4	5	0.8
Hoisting	4	0	0	4	0.6
Sledging	4	0	0	4	0.6
Nails	3	0	1	4	0.6
Hand mucking	1	1	1	3	0.5
Dust, ashes	1	0	1	2	0.3
Totals	287	64	308	659	100.0

For statistical purposes, non-fatal accidents are those involving a loss of five days of work or resulting in permanent disability.

Quarries

More than 51 per cent of the non-fatal accidents which occurred in the quarries of the Province of Quebec were caused through fall of person, fall of object and use of tools and machinery of every description.

Table 64. - Non-fatal Accidents in Quarries in 1960

Cause of Accident	Surface	Annexed Plants	Total	
			No.	Per Cent
Fall of person	20	13	33	19.6
Machinery and tools	20	9	29	17.4
Fall of object	16	9	25	14.8
Flying rock or object	7	7	14	8.3
Handling rock or other material	11	2	13	7.7
Drilling	8	0	8	4.8
Haulage and transportation	7	0	7	4.1
Burns	2	5	7	4.1
Gearing, belting, etc.	1	4	5	3.0
Mechanical shovel or crane	5	0	5	3.0
Fall of rock	0	4	4	2.4
Lifting heavy object	2	2	4	2.4
Dust, ashes	1	2	3	1.8
Diamond drilling	1	2	3	1.8
Sledging	0	2	2	1.2
Miscellaneous	2	0	2	1.2
Nails	1	0	1	0.6
Slides of rock or other material	1	0	1	0.6
Explosives	1	0	1	0.6
Scaling	1	0	1	0.6
Totals	107	61	168	100.0

Annexed Plants

Machinery and tools, fall of person and fall of object head the list as the cause of non-fatal accidents in annexed plants, aggregating 49.7 per cent of these accidents.

Table 65. - Non-fatal Accidents in Annexed Plants in 1960

Cause of Accidents	Concentrators	Repair Shops	Crushing Plants	Lime Kilns	Warehouses	Dressing Works	Smelter	Construction	Power Plants	Total	
										No.	Per Cent
Machinery and tools ..	11	11	5	1	1	3	1	0	0	33	19.1
Fall of person	9	4	6	7	1	2	1	3	0	33	19.1
Fall of object	1	6	5	0	4	4	0	0	0	20	11.5
Lifting heavy object .	6	6	2	0	2	0	0	0	0	16	9.7
Flying rock or object	0	8	3	1	0	1	1	0	0	14	8.1
Handling of rock or other material	2	4	2	1	0	0	1	0	0	10	5.8
Burns	2	3	1	3	0	0	0	0	1	10	5.8
Miscellaneous	1	3	3	0	0	0	0	0	0	7	4.1
Gearing, belting, etc.	2	0	3	1	0	0	0	0	0	6	3.5
Fall of rock	0	0	2	0	0	4	0	0	0	6	3.5
Diamond drilling	1	0	1	0	0	1	0	0	0	3	1.6
Scaffolding and ladders	2	0	1	0	0	0	0	0	0	3	1.6
Haulage	0	1	0	0	1	0	0	0	0	2	1.2
Sledging	0	0	1	0	0	1	0	0	0	2	1.2
Electricity	1	1	0	0	0	0	0	0	0	2	1.2
Dust	0	0	0	1	0	1	0	0	0	2	1.2
Scaling	1	0	0	0	0	0	0	0	0	1	0.6
Slides of rock or other material	1	0	0	0	0	0	0	0	0	1	0.6
Mechanical shovel or crane	0	1	0	0	0	0	0	0	0	1	0.6
Totals	40	48	35	15	9	17	4	3	1	172	100.0

The following table shows the frequency of injuries to the various parts of the body in accidents which occurred in mines. It should be noted that 63.6 per cent of all injuries affect the limbs and extremities of the body.

Table 66. - Location of Injuries on Body in Mining Accidents
in 1960

Parts of the Body	No. of Accidents	Per Cent
Hands	174	25.7
Trunk	113	16.7
Feet	106	15.7
Legs	101	14.9
Head	57	8.4
Arms	50	7.4
Strained back	44	6.6
Eyes	24	3.6
General	5	0.7
Poisoning	2	0.3
Totals	676	100.0

The following table shows the frequency of injuries to various parts of the body in accidents which occurred in quarries. It should be noted that 66.1 per cent of all injuries affect the hands, arms, legs and feet.

Table 67.- Location of Injuries on Body in Quarrying Accidents
in 1960

Parts of Body	No. of Accidents	Per Cent
Hands	51	29.6
Trunk	35	20.4
Legs	29	16.8
Feet	29	16.8
Eyes	12	7.0
Head	7	4.1
Arms	5	2.9
Strained back	3	1.8
General	1	0.6
Totals	172	100.0

Table 68.- Employment and Accidents to Employees at Mines and Annexed Plants

Year	Number Employed	Persons Injured			Number of Million Man-hours			Rate per Million Man-hours	
		Fatally	Non-fatally	Total	Producing Operations	Non-Producing Operations	Total	Fatally	Non-fatally
1940	14,545	28	1,428	1,456	31.176	2.093	33.269	0.84	43
1941	15,487	32	1,539	1,571	33.163	2.177	35.340	0.91	44
1942	15,584	29	1,765	1,794	34.051	1.562	35.613	0.81	50
1943	13,990	20	1,703	1,723	31.853	768	32.621	0.61	52
1944	13,973	20	1,717	1,737	29.686	1.742	31.428	0.64	55
1945	13,805	22	1,616	1,638	25.920	4.118	30.038	0.73	54
1946	15,578	20	1,754	1,774	26.906	7.899	34.805	0.57	50
1947	16,774	36	1,447	1,483	30.023	6.840	36.863	0.98	39
1948	17,283	22	1,298	1,320	33.883	5.386	39.269	0.56	33
1949	17,489	24	1,072	1,096	35.062	2.827	37.889	0.63	28
1950	19,103	25	926	951	39.186	3.749	42.935	0.58	22
1951	20,430	25	960	985	40.979	4.788	45.767	0.55	21
1952	22,398	21	826	847	41.808	6.650	48.458	0.43	17
1953	21,283	16	719	735	37.520	6.382	43.902	0.36	16
1954	21,404	29	572	601	38.439	5.916	44.355	0.65	13
1955	22,319	27	721	748	44.091	3.602	47.693	0.57	15
1956	24,765	21	858	879	46.146	5.664	51.810	0.41	17
1957	24,037	24	770	794	44.756	6.304	51.060	0.47	15
1958	22,121	14	586	600	42.848	2.548	45.396	0.30	13
1959	23,752	18	651	669	47.349	2.259	49.608	0.36	13
1960	23,109	17	659	676	45.955	1.593	47.548	0.37	14
Totals	397,964	490	23,587	24,077	780.800	84.867	865.667	-	-
Average	18,951	23	1,123	1,147	37.180	4.041	41.222	0.57	27

Table 69. - Employment and Accidents to Employees

at Quarries and Annexed Plants

Year	Number Employed	Persons Injured			Number of Million Man-hours Producing Operations	Rate per Million Man-hours	
		Fatally	Non-fatally	Total		Fatally	Non-fatally
1940	10,446	3	380	383	12.082	0.25	31
1941	5,975	3	383	386	7.843	0.38	49
1942	5,355	7	332	339	7.582	0.92	44
1943	5,190	2	277	279	6.888	0.29	40
1944	4,526	3	278	281	6.300	0.48	44
1945	4,762	3	323	326	7.130	0.42	45
1946	5,927	3	345	348	9.528	0.31	36
1947	6,591	1	394	395	11.014	0.09	36
1948	8,221	4	322	326	12.727	0.31	25
1949	7,411	5	345	350	12.468	0.40	28
1950	7,340	6	218	224	12.055	0.50	18
1951	8,068	8	164	172	13.027	0.62	13
1952	8,412	2	172	174	13.061	0.15	13
1953	7,805	4	136	140	12.890	0.31	11
1954	8,276	3	136	139	13.498	0.22	10
1955	8,784	6	134	140	14.246	0.42	9
1956	6,978	6	180	186	12.108	0.50	15
1957	9,326	2	183	185	14.902	0.13	12
1958	8,857	0	134	134	13.799	0.00	9
1959	9,232	1	150	151	13.642	0.07	11
1960	9,136	4	168	172	13.435	0.29	12
Totals	156,618	76	5,154	5,230	240.219	-	-
Average	7,458	4	245	249	11.439	0.35	21

ALPHABETICAL INDEX

	<u>Page</u>		<u>Page</u>
Accidents	149	Chibougamau Mining and Smelting Co.	54,55
Akasaba Gold Mines	65	Clay products	3,44
Albanel Minerals	54,55	Columbium Mining Products	61
Aluminum Company of Can.	108	Conan twp., operations in	101
Amalgamated Mining Development Corp. ...	55	Coniagas Mines	74
Amulet Dufault Mines	107	Consolidated Mining and Smelting	58
Anaconda Company	55	Consolidated Mogul Mines	53
Anaconda Lead Mines	8,10,66	Consolidated Vauze Mines	75
Anglo American Molybdenite	67	Continental Titanium Corp.	76
Armand Sicotte et Fils	109	Contracts, building	42
Asarco Exploration Co.	56	Copper	3,7,11
Asbestos	3,25,27,28,29,30	Copper Rand Chibougamau Mines	8,54,56,76
Asbestos Corporation Ltd.	30,109	Crushed stone	46,47,49
Average price of metals	7		
Baker Talc	111	Denison Mines	56,61
Barnat Mines Ltd.	7,67	Desmeoizes twp., operations in	78,97
Base-metal -		Development	65
Ore-dressing plants	8	Diamond drilling	6,135
Production	144	Dividends, mining companies	10
Reserves	145	Dolomite, magnesitic	3,34
Bateman Bay Mining	68	Dome Exploration Co.	63
Beauce Placer Mining Co.	63	Dominion Lime	115
Beauchastel twp., operations in	81	Dominion Silica Corp.	115
Beattie Gold Mines	10	Dufresnoy twp., operations in	75,107
Bell Asbestos Mines	30,111	Dupart twp., operations in	82
Bell Channel Mines	57	Dubuisson twp., operations in	90,106
Belleterre Quebec Gold	10	Duvan Copper Co.	78
Bevcon Mines Ltd.	7,69		
Bismuth	3,11	East Malartic Mines	7,10,79
Blackburn Bros.	112	East Sullivan Mines	8,59,80
Black Hawk Mining	63	Elder Mines	10
Bourlamaque twp., operations in ...	80,87,89,104	and Developments	81
Bristol twp., operations in	85	Eldrich Mines	82
Brick	3	Employment	147
Broughton Soapstone and Quarry	112	Exploratory work	6,52,135
Brucite	3,34		
Building contracts	42	Falconbridge Nickel	57
Building lime	3,48	Fab Metal Mines	56
Building limestone	3,48	Fatal accidents	151
Building marble	3,50	Feldspar	3,31
Building materials	2,42,121	Flintkote Mines	30,115
		Fontbrune Nickel Mines	64
Cadmium	3,11	Fournière twp., operations in	67,73,79,88
Caesar Minerals	56	Francoeur Mines	10
Campbell Chibougamau Mines	8,54,70	Frontenac Mining Corp.	64,82
Canadian Johns-Manville	30,113		
Canadian Malartic Gold Mines	7,57,73	Galinée twp., operations in	91
Canadian Refractories	113	Galloway Chibougamau Mines	55
Canadian Silica Corp.	114	Gas, natural	37
Capital expenditures	9	Gaspé Copper Mines	8,64,83
Carey Canadian Mines	30,114	Gayhurst twp., operations in	82
Cement	3,43	Ghislau Mining Corp.	62
Centurion Mines	59	Gibson Mines	56
Charlevoix county, operations	76	Gold	3,7,13-15,142,143
Chib-Kayrand Copper Mines	54	Golden Age Mines	116
Chibougamau Jaculet Mines	74	Golden Manitou Mines	10
		Grand-Calumet twp.,	94

	<u>Page</u>		<u>Page</u>
Granite	3,46	Manitou Barvue Mines	8,89
Gravel	3,50	Marban Gold Mines	57,90
Great Whale Iron Mines	52	Marble	3,33
Hastings Mining and Development	63	Marbridge Mines	57,91
Hilton Mines (The)	8,84	Marchant Mining Co.	57
Holland twp., operations in	83	Marl	3,34
Hollinger North Shore Expl.	10	Mattagami Lake Mines	57,91
Hoyle Mining Co.	55	McIntyre Porcupine Mines	55
Hudon, Lorenzo	61	McKenzie twp., operations in	68,70,74,76,96
Hull twp., operations in	102	McWatters Gold Fields	10
Hupon Mining and Exploration	61	Merrill Island Mining Corp.	8,92
Industrial lime	3,31	Metallic substances	3,6,65
Industrial limestone	3,33	Mica	3,35
Industrial marble	3,39	Mid-Chibougamau Mines	54
Industrial minerals	2,25	Mineral pigments	36
Industrial sand	3,41	Mineral water	3,36
Immont Copper Mines	59,85	Mine rescue stations	150
International Minerals and Chemical ...	116	Mining operations	65,141
Iron	3,18	Mining titles	5
Iron ore	3,18	Molybdenite Corporation of Can.	8,93
Iron Ore Co. of Canada	86	Molybdenum	3,20
Iron oxide -		Moneta Porcupine Mines	63
Production	3	Montbray twp., operations in	85
Johnson's Asbestos Co.	30,117	Murray Mining Corp.	52
Johnson's Company Ltd.	30,117	National Asbestos Mines	30,118
Knight, H.W.	56	Natural gas	37
Lacorne twp., operations in	93	New Calumet Mines	8,10,60,94
Lake Asbestos of Quebec	30,118	New Hosco Mines	57
Lake Dufault Mines	10,59	New Jersey Zinc Exploration	55
Lamaque Gold Mines	7,10,56,87	New Quebec, operation in	86
LaMotte twp., operations in	91	New Senator-Rouyn	10
Lavandin Mining Co.	57	Nicolet Asbestos Mines	30,119
Lead	3,7,19	Non-fatal accidents	156
Lempira Mines	54	Non-metallics	3,25,108
Lenmac Mines	56	Noranda Mines Ltd.	8,10,53,60,64,95
Lesueur twp., operations in	74	Norbeau Mines (Quebec)	96
Levack Nickel Mines	58	Norlartic Mines	97
Lévy twp., operations in	99	Normetal Mining Corp.	8,10,97
Lime	3,31	Norque Copper Mines	59
Limestone	3,31	Norsco Mines	56
Lithium	3,34	Northeast Exploration Co.	54
Louvicourt twp., operations in	65,69,103	Obalski twp., operations in	70,92
Luckridge Phosphate Mines	62	O'Brien Gold Mines	10,53
Magnesium	3	Ochre	3,36
Magnesitic dolomite	3,34	O'Leary Malartic Mines	55
Malartic Gold Mines	7,10,88	Olympia Mining Exploration	55
		Opemisca Explorers	56
		Opemiska Copper Mines	8,10,99
		Orchan Mines	57
		Ore-dressing plants	7,8

	<u>Page</u>		<u>Page</u>
Parker twp., operations in	101	Selco Exploration Co.	55
Peat	3, 37	Shale	3,44,51
Perron Gold Mines	10	Sigma Mines (Quebec)	7,10,104
Personnel	148	Silica	40
Petroleum	37	Silver	3,7,22
Phelps Dodge Corp.	53	Sirmac Mines	54
Preissac Molybdenite Mines	100	Siscoe Mines	10
Preissac twp., operations in	67,100	Slate	3,51
Production tables	2,3,4,142,144,146	Soapstone	3,42
Prospecting	5	Solbec Copper Mines	105
Prospectors Airways Co.	59	South Dufault Mines	59
Portage Island (Chibougamau) Mines	100	Southern Union Oils	59
Pyrite	40	Southwest Potash Corp.	59
		Spar-Mica Corp.	120
Quarries	121	Stadacona Mines	10
Quartz	3,40	Staking of mining claims	5
Quartzite	41	Steerola Exploration Ltd.	64
Quebec Cartier Mining	101	Stratford - Cyprus Mines	62
Quebec Columbian Ltd.	61	Stratford twp., operation in	105
Quebec Iron and Titanium Corp.	101	Sullivan Consolidated Mines	7,10,106
Quebec Lithium Corp.	8,119	Sulphur	3,40
Quebec Smelting and Refining	61		
Quebec South Shore Steel Corp.	102	Talc	3,42
Queumont Mining Corp.	8,10	Tamara Mining Ltd.	61
		Tellurium	3,7,21
Radiore Uranium Mines	57	Titaniferous iron ore	3,23
Rainville Mines	103	Titanium oxide	36
Reward Uranium Ltd.	55	Trade-Horn Ltd.	59
Rio Canadian Exploration	59	Trans-Nation Minerals	61
Rohault Mines Ltd.	55		
Rohault twp., operations in	66	Union Carbide Canada	120
Rouyn twp., operations in	95,102		
Roy twp., operations in	70,100	Vassan twp., operations in	97
		Ventures Claims Ltd.	56
Saguenay Exploration and Mining Que.	62		
St-Lawrence Columbian and Metals	60,106	Wages	149
Sand	3,40	Waite-Amulet Corp.	8,10,107
Sand-lime products	3,44	Waite Lake Mines	59
Sandstone	3,41,51	Water, mineral: production	3
Selenium	3,7,21	Zinc	3,7,23

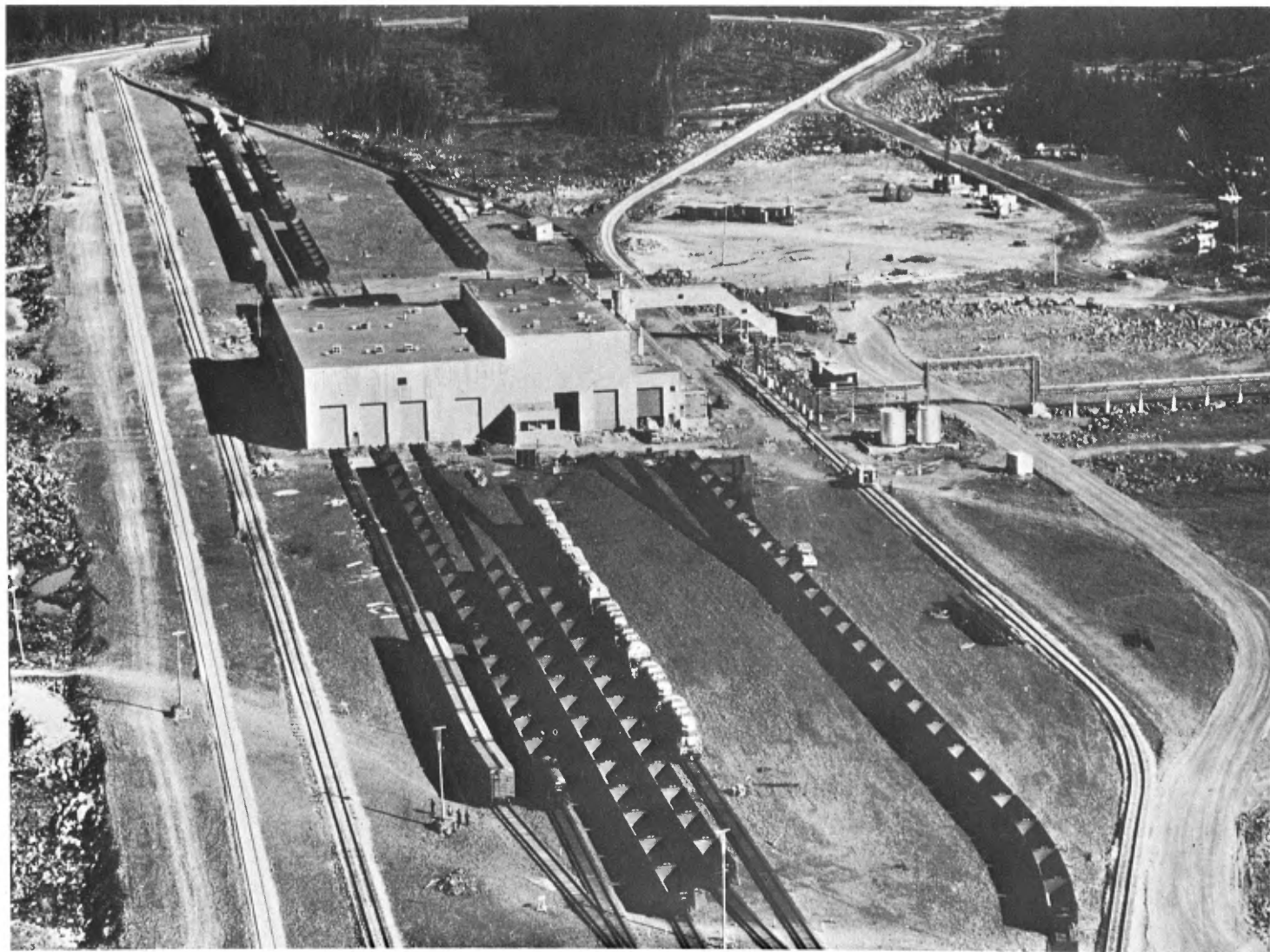
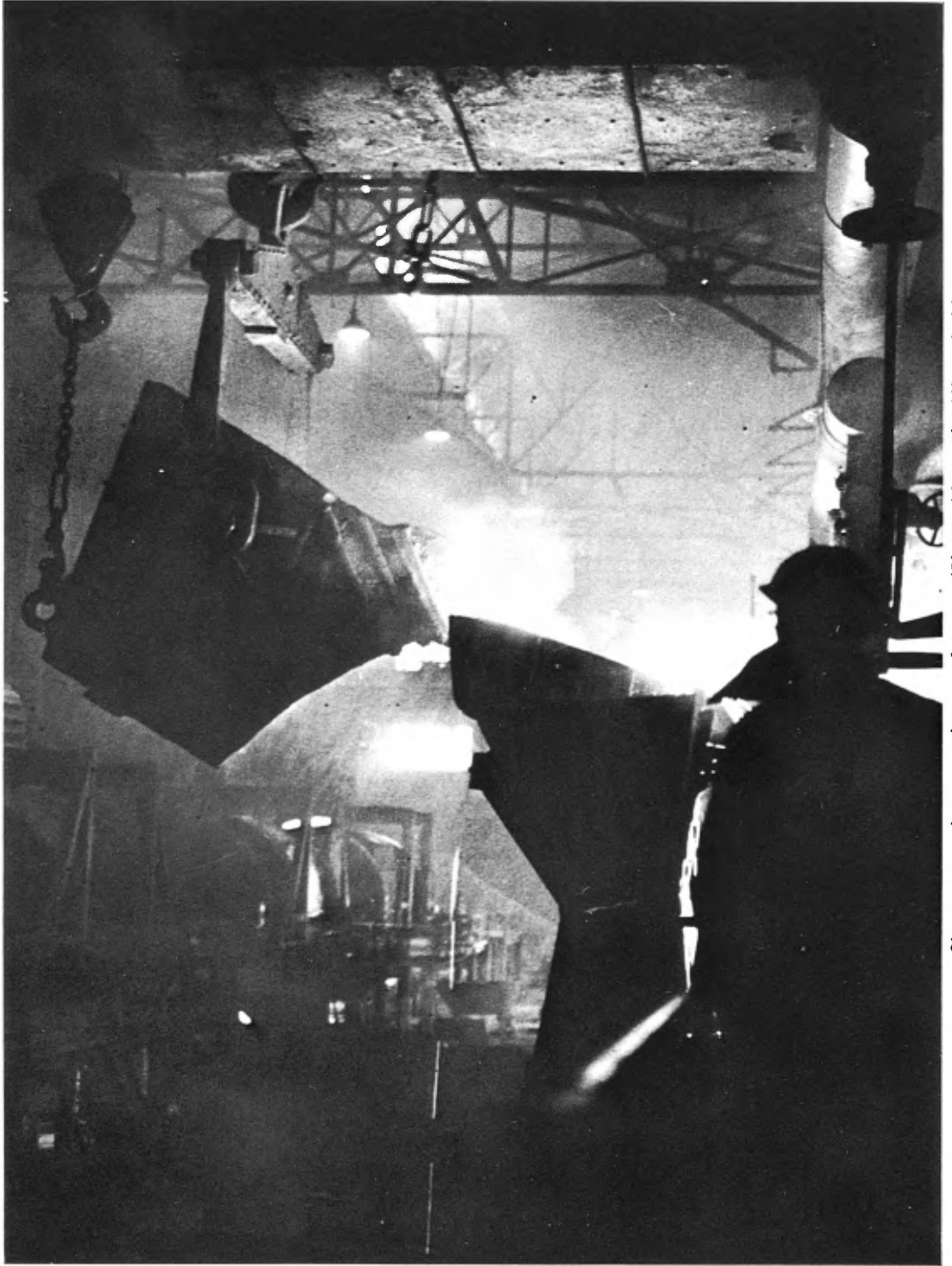


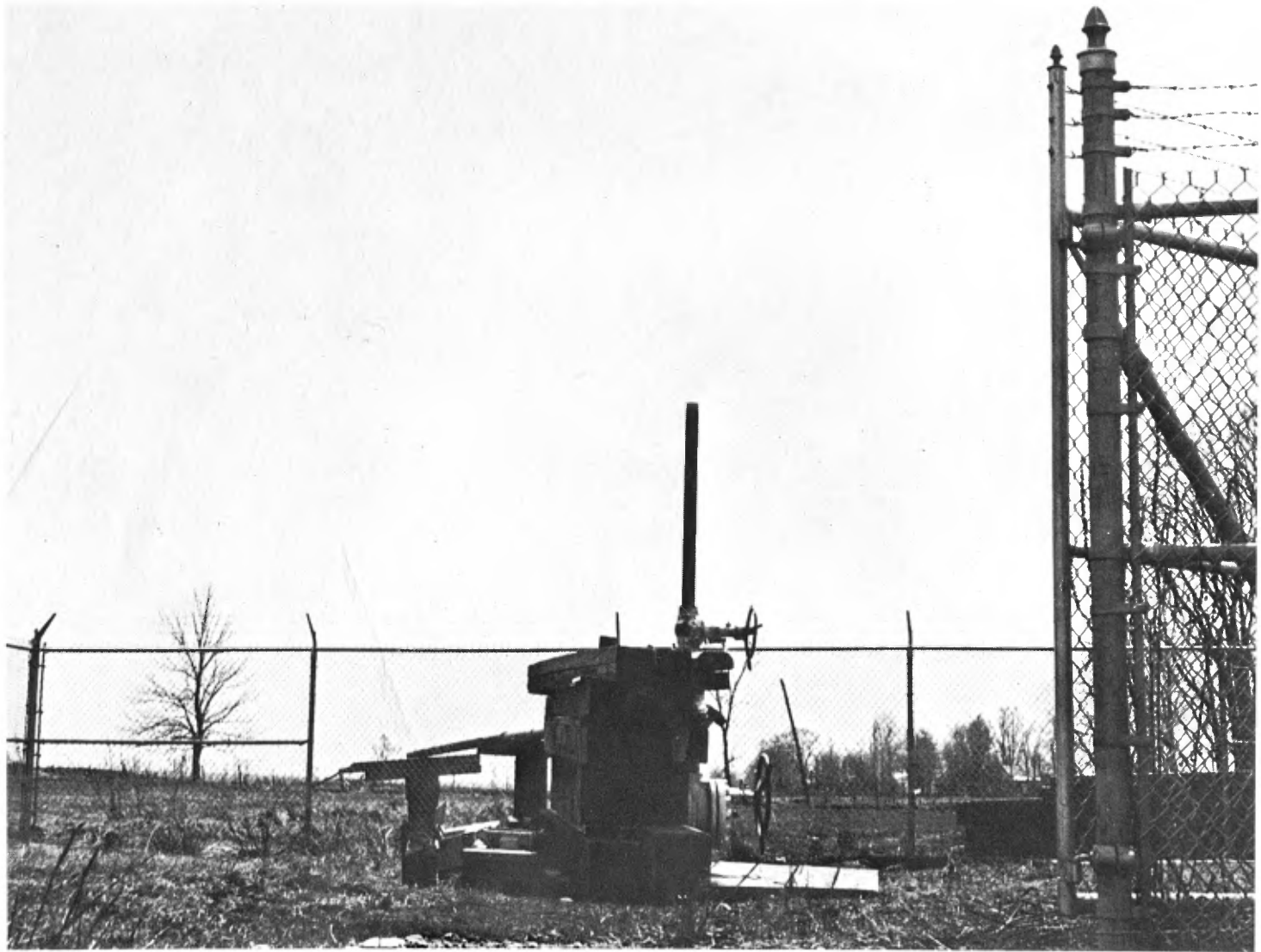
PLATE I

Diesel and railroad equipment repair shop at Port-Cartier
(Photo: Geo. Hunter; courtesy: Quebec Cartier Mining Co.)

PLATE II



Slag returned to reverberatory furnace (Photo: Noranda Mines Ltd.)



Gas well head, Bald Mountain Oil Co.
(Province of Quebec Film Board)

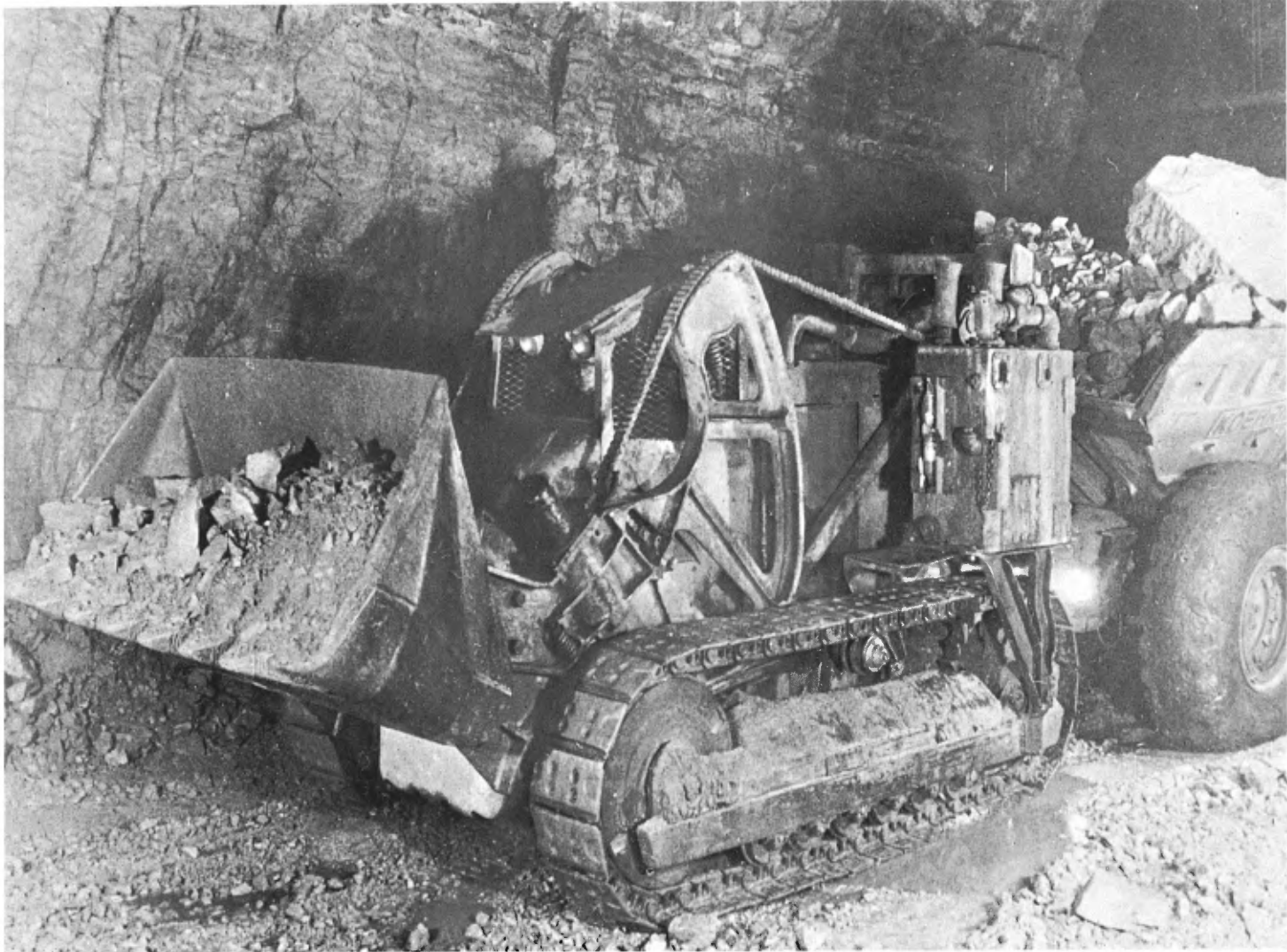


PLATE IV

Trackless mining equipment (Photo: Gaspé Copper Mines Ltd.)

