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THE MINING INDUSTRY OF THE PROVINCE OF QUEBEC IN 1961

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MINISTÈRE DES RICHESSES NATURELLES QUÉBEC

QUEBEC

DEPARTMENT OF NATURAL RESOURCES

René LÉVESQUE, Minister — P.-E. AUGER, Deputy Minister

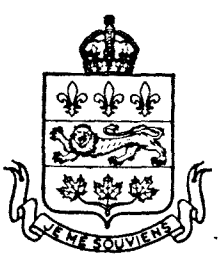
THE MINING INDUSTRY

OF THE

PROVINCE OF QUEBEC

IN

1961



QUEBEC

1963

Mr. 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 1961". This report contains a detailed account of mining operations and statistical data for the year 1961.

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 impratical 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 "Department of Natural Resources Annual Report", 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 published "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 1962

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THE MINING INDUSTRY OF THE PROVINCE OF QUEBEC

IN 1961

General Review

In 1961, the total mineral production of the Province of Quebec was valued at $455,522,933, exceeding by $8,885,732, or 1.9 per cent, the record high of $446,637,201 attained in 1960.

For the third consecutive year, the total revenue derived from the sale of metallic substances declined.

On the other hand, 1961 was the fourth consecutive period during which an increase in the combined sales of all the industrial minerals was achieved.

Two substances in each of the above-mentioned groups are mostly responsible for the respective gains and losses: copper and iron ore, in the metallics group; asbestos and titanium oxide, in the industrial minerals class.

The value of the production of building materials increased by 5.8 per cent, in 1961, in comparison with the total sales recorded in 1960. As the building materials extracted from the ground of the Province are mostly consumed within the Province, the status of this third branch of the mining industry is a better gauge of the economic health of the Province than are the other two categories.

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	1920	$ 28,392,939	1942	$ 104,404,146
1899	2,083,272	1921	15,522,988	1943	101,840,299
1900	2,546,076	1922	18,335,153	1944	90,198,739
1901	2,987,731	1923	21,326,314	1945	91,570,982
1902	2,985,463	1924	18,952,896	1946	92,213,656
1903	2,772,762	1925	23,824,912	1947	116,042,000
1904	3,023,568	1926	25,740,002	1948	152,285,045
1905	3,750,300	1927	29,124,110	1949	165,168,603
1906	5,019,932	1928	37,325,237	1950	220,665,103
1907	5,391,368	1929	46,454,820	1951	255,931,822
1908	5,458,598	1930	41,158,740	1952	270,739,552
1909	5,552,062	1931	36,051,366	1953	252,354,181
1910	7,323,281	1932	25,683,065	1954	278,932,718
1911	8,679,786	1933	28,164,540	1955	357,562,029
1912	11,187,110	1934	31,310,752	1956	423,003,917
1913	13,119,811	1935	39,141,734	1957	406,488,734
1914	11,732,783	1936	49,755,985	1958	366,001,902
1915	11,465,873	1937	65,203,976	1959	441,299,661
1916	13,287,024	1938	68,877,345	1960	446,637,201
1917	16,189,179	1939	77,312,141	1961	455,522,933
1918	18,707,762	1940	86,418,853		
1919	20,813,670	1941	99,700,027		

Table 2. - Mineral Production of the Province of Quebec in 1960 and 1961

Substance		1961		1960	
		Quantity	Value	Quantity	Value
METALLICS					
Bismuth	pounds	174,832	$ 297,670	172,983	$ 297,018
Cadmium	pounds	-	-	66,499	94,429
Columbium	pounds	62,229	65,619	-	-
Copper	pounds	298,013,711	86,990,202	314,939,446	95,395,158
Gold	ounces	1,054,029	(a) 37,375,868	1,033,072	(a) 35,072,794
Iron		-	14,720,064	-	10,972,979
Iron ore (b)	tons	5,639,931	53,627,608	7,457,971	61,752,485
Lead	pounds	6,784,464	692,694	5,338,901	570,195
Molybdenum	pounds	771,358	1,092,201	762,207	1,005,880
Selenium	pounds	214,998	1,397,487	279,759	1,958,313
Silver	ounces	4,315,844	4,068,115	4,114,993	3,658,640
Tellurium	pounds	63,904	309,934	29,925	104,738
Titeniferous iron ore	tons	17,944	151,303	20,519	174,151
Zinc	pounds	108,010,062	13,598,467	99,614,995	13,298,602
Sub-totals		-	$ 214,397,232	-	$ 224,355,382
NON-METALLICS					
1.- Industrial Minerals					
Asbestos	tons	1,103,545	$ 115,944,729	1,054,424	$ 107,788,171
Feldspar	tons	10,507	229,626	13,862	239,273
Graphite		-	146	-	-
Industrial lime	tons	376,350	4,702,202	368,190	4,053,221
Industrial limestone and marble	tons	1,117,639	2,974,454	727,149	2,018,572
Lithium	pounds	536,190	392,871	204,666	84,135
Magnesitic dolomite and brucite		-	3,064,403	-	3,279,021
Marl	tons	68,812	120,421	127,000	190,500
Mica	pounds	1,373,200	102,390	1,234,828	85,272
Mineral water	gallons	357,948	205,923	372,799	199,874
Ochre and iron oxide	tons	808	68,199	909	76,780
Peat (moss and humus)	tons	75,741	1,788,349	56,731	1,342,338
Quartz and industrial sand	tons	302,432	1,717,502	357,165	1,835,960
Soapstone and talc	tons	16,274	178,911	14,222	157,611
Sulphur	tons	263,600	1,856,318	290,555	1,937,639
Titanium dioxide and other titanium products		-	16,723,743	-	12,947,000
Sub-totals		-	$ 150,070,187	-	$ 136,235,367
II.- Building Materials					
Building lime	tons	31,077	$ 384,774	27,374	$ 345,573
Building limestone	tons	17,798,804	20,308,109	16,914,843	19,580,487
Building marble	tons	21,301	310,154	15,988	135,570
Cement	tons	2,029,159	31,412,617	1,875,997	28,315,159
Clay products (Brick	M	148,509	6,341,787	142,113	6,136,723
(Other products		-	1,854,003	-	1,956,315
Granite	tons	2,716,957	7,695,381	1,581,440	5,215,312
Sand and gravel	tons	44,126,199	21,793,232	46,255,963	22,620,093
Sand-lime products (Brick	M	(c)	(c)	22,590	563,675
(Blocks, No.		(c)	(c)	92,543	17,757
Sandstone	tons	876,000	932,531	895,042	1,070,547
Slate and shale	tons	30,553	32,926	115,475	89,241
Sub-totals		-	$ 91,065,514	-	$ 86,046,452
TOTALS		-	$ 455,522,933	-	$ 446,637,201

(a) Value in Canadian funds. The standard value at the rate of $20.671834 per ounce troy is $21,788,713 for 1961 and $21,355,493 for 1960.

(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.

(c) Beginning with 1961, sand-lime products will not be included in the mineral production.

Table 3. - Mineral Production of the Province of Quebec, 1930 to 1961 (a)

Year	Metals		Industrial Minerals		Building Materials		Total
	Value	%	Value	%	Value	%	
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
1961	214,387,232	47	150,070,187	33	91,065,514	20	455,522,933

(a) Mineral production figures for the years 1910 to 1929 will be found in "Mining Industry of the Province of Quebec in 1956".

PROSPECTING AND STAKING OF MINING CLAIMS

The totals given in Tables 4 and 5 show that prospectors staked out a larger number of mining claims in 1961 than during the preceding year.

Because of a change in the method of registering claims, the number of development licenses issued and renewed in 1960 and 1961 is incomparable. The totals are, however, virtually the same — 8,380 in 1960 and 8,365 in 1961.

There was also less work done on lands held under various permits, that is work required by the Quebec Mining Act from those wishing to obtain and retain rights to mining lands.

Table 4. - Mining Titles Issued, or Renewed, from 1952 to 1961

Year	Miner's Certificates Issued	Claims Recorded	Development Licenses Issued	Development Licenses Renewed	Mining Concessions Granted
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
1961	11,153	34,557	2,074	6,291	11

Table 5. - Exploratory Work on Claims and Lands under License, Reported for the Years 1952 to 1961

Year	Number of Working Days	Number of Feet of Drilling
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
1961	1,065,109	593,715

METALLIC SUBSTANCES

General Review

The table of the mineral production of the Province of Quebec, for the years 1960 and 1961, shows that eleven metals or metallic substances were produced during these two years. There were no sales of cadmium in 1961, but, on the other hand, columbium was marketed under the form of columbium pentoxide.

The total value of the metallics sold in 1961 was $214,387,232, a sum that is $9,968,150 below that recorded in the previous year. The combined gains registered by eight of the eleven substances were insufficient to counterbalance the losses entailed by the copper and iron ore industries.

Four mines come into production during 1961: those of Marban Gold Mines Limited, St. Lawrence Columbium and Metals Corporation, The Coniagas Mines Limited and Vauze Mines Limited. A fifth company, Solbec Copper Mines Limited, was on the verge of formally entering into production at the end of the year, its milling plant having been operated on a tune-up basis.

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 Field Limited	Fournière	1,800
Sigma Mines (Quebec) Limited	Bourlamaque	1,100
Sullivan Consolidated Mines Limited ...	Dubuisson	750
Total capacity (January 1961)		9,850
Total capacity (December 1961)		9,850

*These plants also produce silver.

Table 7.- Base-metal Ore-dressing Plants

Plant	Township or Parish	Daily Capacity (Tons)	Metals Produced (a)										
			Cu	Fe	Pb	Zn	Mo	Bi	Li	Py	Au	Ag	Cb
Campbell Chibougamau Mines Limited	Obalski	3,000	x								x	x	
Coniagas Mines Ltd., The	Lesueur	350(b)			x	x						x	
Copper Rand Chibougamau Mines Limited	McKenzie	1,500	x								x	x	
East Sullivan Mines Ltd.	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 Ltd.	Bourlamaque	1,300	x		x	x					x	x	
Merrill Island Mining Corporation Limited	Obalski	500	x								x	x	
Molybdenite Corporation of Canada Ltd...	Lacorne	650					x	x					
New Calumet Mines Ltd.	Grand-Calumet	750			x	x					x	x	
Noranda Mines Ltd. ...	Rouyn	4,000	x							x	x	x	
Normetal Mining Corporation Ltd.	Desmeloizes	1,000	x			x				x	x	x	
Opemiska Copper Mines (Quebec) Limited	Lévy	2,000	x										
Quebec Lithium Corp. .	Lacorne	1,800							x				
Quemont Mining Corp. .	Rouyn	2,300	x			x					x	x	
St. Lawrence Columbium and Metals Corp.	Oka (P)	500(b)											x
Vauze Mines Ltd.	Dufresnoy	350(b)	x			x						x	
Waite-Amulet Mines Ltd.	Dufresnoy	2,000	x			x				x	x	x	
Total capacity (January 1961)		32,800											
Total capacity (December 1961)		34,000											

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

(b) Began production in 1961.

Table 8.- Capital Expenditures of the Principal Mine Operators in the Province of Quebec in 1961

(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	$ 680,368	$ 6,615,105	$ 7,295,473
Columbium	251,240	1,072,699	1,323,939
Copper	6,980,439	4,978,596	11,959,035
Feldspar and quartz	2,400	797,347	799,747
Iron	23,821,383	4,403,433	28,224,816
Titaniferous iron	11,826	3,264,571	3,276,397
Lithium	28,053	330,055	358,108
Magnesite and brucite	-	236,638	236,638
Molybdenite	1,324,453	111,801	1,436,254
Nickel	1,434,524	-	1,434,524
Gold	783,034	1,407,150	2,190,184
Petroleum	597,118	-	597,118
Peat	-	97,996	97,996
Zinc and lead	4,879,383	495,322	5,374,705
Others	104,872	-	104,872
Total 1961	$40,899,093	$ 23,810,713	$ 64,709,806
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 9. - Dividends Paid by Companies Operating Metal Mines in the Province of Quebec, from 1930 to 1961, Inclusive

	Authorized Capital (Shares)	Date of first Dividends	Dividends in 1961		Total Dividends (To end of 1961)
			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) Ltd..	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 Ltd.	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 (a) .	4,500,000	May 25th, 1950	-	-	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	-	-	2,550,005.95
Hollinger North Shore Exploration Co. Ltd.	3,000,000	Dec. 28th, 1959	3,639,562.50	1.50	8,492,312.50
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	19,515,000.00
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 (b)	6,000,000	Jan. 2nd, 1930	9,412,535.10	2.10	243,611,740.23
Normetal Mining Corporation Ltd..	4,000,000	June 24th, 1946	1,014,393.24	0.27	22,053,660.44
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	827,250.00	0.15	1,378,750.00
Perron Gold Mines Limited	5,000,000	Dec. 21st, 1938	-	-	2,820,000.00
Powell Rouyn Gold Mines Ltd.	3,000,000	Oct. 16th, 1939	-	-	425,000.00
Quemont Mining Corporation Ltd...	2,500,000	Dec. 28th, 1951	1,891,951.20	0.90	30,901,869.60
Sigma Mines Limited	3,000,000	Sept. 1st, 1937	-	-	30,000.00
Sigma Mines (Quebec) Limited	1,000,000	July 27th, 1940	175,000.00	0.17½	9,775,000.00
Siscoe Mines Limited .....(c)	5,000,000	Mar. 31st, 1932	-	-	8,650,408.86
Stadacona Mines (1944) Limited ..	5,000,000	Feb. 16th, 1948	-	-	1,075,293.48
Sullico Mines Limited	5,000,000	Dec. 12th, 1961	440,000.00	0.10	440,000.00
Sullivan Consolidated Mines Ltd..	4,000,000	June 15th, 1937	-	-	9,600,000.00
Waite-Amulet Mines Limited	3,500,000	July 15th, 1940	2,310,000.00	0.70	68,145,000.00
Total			$ 20,310,692.04		$ 477,631,127.02

(a) From the end of 1960 dividends of East Sullivan Mines Ltd. are no longer considered as derived from direct mining operations.

(b) Norands Mines Ltd. received the following amounts in dividends and interests on investments: $ 5,102,469 in 1961 and $ 81,121,652 from 1946 to 1961, inclusive.

(c) From the end of 1951 dividends of Siscoe Mines Ltd. are no longer considered as derived from direct mining operations.

Table 10. - Average Price of Some Metals in Canada from 1956 to 1961

	1956	1957	1958	1959	1960	1961
Gold, dollars per ounce troy ..	34.45	33.55	33.98	33.57	33.95	35.46
Silver, cents per ounce troy ..	89.68	87.37	86.81	87.78	88.91	94.26
Copper, cents per pound	41.41	28.95	25.42	29.61	30.29	29.19
Lead, cents per pound	15.51	13.96	11.36	10.61	10.68	10.21
Zinc, cents per pound	14.84	12.09	10.88	12.24	13.35	12.59
Selenium, dollars per pound ...	13.50	11.00	7.50	7.00	7.00	6.50
Tellurium, dollars per pound ..	1.75	1.75	1.70	2.15	3.50	4.85

BISMUTH

Two producers recover bismuth as a by-product of the treatment of their main ore in the Province; they are Molybdenite Corporation of Canada Limited and Gaspé Copper Mines Limited.

The first concern mines a molybdenite deposit in Lacorne township; the second, a deposit of copper ore, located in Holland township.

The production during 1961, which was 174,832 pounds valued at $297,670, was nearly equal to that of 1960, which amounted to 172,983 pounds worth $297,018.

Two other provinces, British Columbia and Ontario, reported sales of bismuth in 1961. Quebec ranks second, having produced 36 per cent of the 479,700 pounds of metal which is the estimated Canadian production for 1961.

Bismuth is used mainly as an alloy with zinc, lead and tin. It also enters into the manufacture of pharmaceutical products, cosmetics and pigments.

In 1961, two mining companies, Anglo American Molybdenite Mining Corporation and Preissac Molybdenite Mines Limited undertook underground development work in their respective molybdenite deposits located in Preissac township. In both cases, the chief ore contained bismuth, which is to be extracted as a by-product.

Table 11. - Production of Bismuth in the Province of Quebec, 1954 to 1961

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
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
1957	160,093	267,908	1961	174,832	297,670

COLUMBIUM

Columbium is produced at Oka, near Montreal, by St. Lawrence Columbium and Metals Corporation.

The production for 1961, 62,229 pounds valued at $65,619, was obtained during the last quarter of the year. St. Lawrence Columbium and Metals Corporation is the sole producer of this metal in Canada. The company markets its production under the form of columbium pentoxide.

This metal is used exclusively as an alloy in space technology.

COPPER

In 1961, the average price of copper fell to 29.19 cents a pound from the 30.29 cents a pound that had prevailed in 1960.

Quebec ranks second in Canada amongst the copper producing provinces. The output for 1961, 298,013,711 pounds, is five per cent below the level reached in 1960. The decrease in production, coupled with the lower unit price received, accounted for the eight per cent decline suffered by the industry. The total copper sales amounted to $86,990,202 in 1961.

In this report, a chapter entitled "Development and Mining Operations in the Province of Quebec in 1961" summarizes the work performed by the following producers:

Company	Township
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 1954 to 1961

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1954	167,860,775	$ 48,948,202	1958	262,890,590	$ 66,826,788
1955	202,041,072	74,502,645	1959	269,823,777	79,894,820
1956	244,599,468	101,288,640	1960	314,939,446	95,395,158
1957	224,818,449	65,084,491	1961	298,013,711	86,990,202

GOLD

In 1961, the gold-quartz and base-metal mines of the Province produced 1,054,029 ounces (troy) of gold valued at $37,375,868. This sum represents an increase of $2,303,074 more than the value obtained in 1960. The Province of Quebec still ranks second in Canada as a gold producer.

Gold is used mostly as a monetry reserve to stabilize paper money issued by governments and central banks and to balance trade payments between countries.

In jewelry, gold is alloyed with copper, silver, nickel, or palladium to increase its hardness and resistance to wear. Gold is sold in bars, plates, sheets, leaves, wires and in solution.

Because of its resistance to corrosion, its ductility and electrical conductivity, gold is finding more and more applications in the industrial field. Chemical electronic and electrical industries, in addition to dentistry, are the largest users of gold.

Table 13.- Gold Production of Mines of the Province of Quebec in 1961

Property	Year of First Production	Ore Raised (Tons)	Ore Treated (Tons)	Gold (fine) Shipped (Ounces)	See Footnote
Gold Mines					
Akasaba	1960	91,339	91,315	15,526	(b)
Barnat	1938	608,303	608,063	71,179	(b)
Bevcon	1947	222,400	222,350	28,068	(b)
Canadian Malartic	1935	479,864	472,797	40,151	(b)
East Malartic	1938	547,877	547,877	107,298	(b)
Elder	1946	147,948	144,427	18,793	(c)
Eldrich	1956	121,842	119,093	14,808	(c)
Lamaque	1935	771,130	771,130	133,339	(b)
Malartic Gold Fields	1939	279,385	279,385	47,553	(b)
Marban	1961	41,635	41,635	5,079	(b)
Norlartic	1959	149,671	149,671	18,450	(b)
Sigma	1937	436,712	436,712	80,356	(b)
Sullivan Consolidated	1934	284,798	252,644	50,120	(b)
Other mines				478	
Sub-total		4,182,904	4,137,099	631,198	
Base Metal Mines (1)					
Amulet Dufault	1941	215,183	215,183	6,033	(c)
Campbell Chibougamau	1955	712,493	712,493	25,960	(c)
Coniagas	1961	68,964	79,826	715	(c)
Copper Rand	1959	602,880	604,480	31,313	(c)
Gaspé Copper	1955	2,680,960	2,670,147	2,737	(c)
Manitou-Barvue	1942	461,245	461,245	10,526	(b) (c)
Merrill Island	1958	154,300	154,300	1,474	(c)
New Calumet	1943	94,405	94,676	1,104	(c)
Noranda	1927	1,509,744	1,509,598	205,307	(c)
Normetal	1937	355,001	355,001	6,682	(c)
Opemiska	1954	597,015	599,015	13,558	(c)
Quemont	1949	819,871	822,275	110,667	(b) (c)
Sullico	1949	1,028,201	1,028,201	4,825	(c)
Vauze	1961	22,615	22,301	728	(c)
Waite-Amulet (Waite	1930	32,035	32,071	724	(c)
(Amulet	1928	1,575	1, 575	21	(c)
Other mines				457	
Sub-total		9,356,487	9,362,387	422,831	
GRAND TOTAL		13,539,391	13,499,486	1,054,029	

(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, 1952 to 1961

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
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
1961	4,137,099	631,198	22,382,281	422,831	14,993,587	1,054,029	37,375,868

* Complex-ore mines also producing base metals.

IRON

Quebec Iron and Titanium Corporation is the sole Canadian mining company obtaining iron through the treatment of its ore.

In its Sorel plant, the company treats ilmenite mined from a deposit north of Havre-Saint-Pierre. Iron is produced as cast iron. The popularity of the company's product has risen considerably, as can be seen from its record of sales which climbed steadily from a value of $5,120,620 in 1958 to $14,720,064 in 1961.

IRON ORE

In 1961, Quebec Cartier Mining Company became the third producer of iron ore in the Province. However, this increase in the number of producers did not result in greater production.

As Canada can absorb only a very small percentage of its iron ore production, Quebec must export to Europe, and especially to the United States, its surplus production. Iron ore exports to the latter are influenced by many factors such as the activity of the steel industry and the competition from African and South American producers.

The 1961 production, tabled at 5,639,931 tons and worth $53,627,608, was 32 per cent lower in value than the 7,457,971 tons produced and valued at $61,752,485 in 1960.

Table 15. - Production of Iron Ore in the Province of Quebec from 1954 to 1961*

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1954	650,415	$ 3,818,309	1958	6,060,325	$ 46,859,490
1955	4,103,173	27,164,396	1959	11,515,169	92,497,012
1956	7,956,549	58,373,270	1960	7,457,971	61,752,485
1957	8,872,948	65,805,057	1961	5,639,931	53,627,608

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

LEAD

In 1961, Quebec ranked fourth in Canada amongst the lead producing provinces.

The lead produced in Quebec is marketed in concentrates which are obtained as a by-product in the treatment of zinc ores. Despite the fact that the average price of lead in Canada was 0.5 cents lower than it had been in 1960, our producers delivered 25 per cent more lead and their income was 21 per cent higher than that in 1960. The 1961 production amounted to 6,784,464 pounds valued at $692,694.

Lead is used mostly in the manufacture of storage batteries, lead tetraethyl and as oxide in paints.

Table 16. - Production of Lead in the Province of Quebec, from 1954 to 1961

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1954	15,635,942	$ 2,084,271	1958	6,299,475	$ 715,620
1955	11,216,005	1,612,862	1959	5,819,148	617,412
1956	5,745,615	891,143	1960	5,388,901	570,195
1957	5,417,795	756,324	1961	6,784,464	692,694

MOLYBDENUM

Molybdenite Corporation of Canada Limited was the sole Canadian producer of molybdenum in 1961. This company operates a molybdenite mine located at the junction of the townships of Lacorne, Malartic, Vassan and LaMotte, in Abitibi-East county.

The bulk of the molybdenite concentrates produced in the mill is wasted to molybdic oxide. The company's output is expressed in pounds of molybdenum, because sales prices are based on the metal content of its products. In addition to the oxide, the company markets two grades of molybdenite: very pure and extremely pure.

The steel industry is the largest user of molybdenum. Molybdenum increases the hardness of steel and the resistance of steel at high temperatures.

Table 17. - Production of Molybdenum in the Province of Quebec from 1957 to 1961

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
1961	771,358	1,092,201

SELENIUM AND TELLURIUM

These two metals are not mined directly in the Province. They are recovered during the treatment of the residues produced by the electrolytic refining of copper anodes at Canadian Copper Refiners Limited in Montreal-East.

The quantity of selenium produced in 1961 was slightly below that obtained in 1960: 214,998 pounds valued at $1,397,487, compared with 279,759 pounds worth $1,958,313 in 1960. The major part of the selenium produced is used in the manufacture of current rectifiers.

The 63,904 pounds of tellurium worth $309,934 that was produced in 1961 marks an output record for the Province. The manufacture of thermoelectric devices absorbs a large part of the tellurium marketed. The other main consumers are the rubber industry and the ferrous and non-ferrous alloy industries.

Table 18. - Production of Selenium in the Province of Quebec from 1954 to 1961

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1954	135,051	$ 675,255	1958	179,397	$ 1,345,478
1955	236,767	1,775,759	1959	194,233	1,359,631
1956	117,555	1,586,993	1960	279,759	1,958,313
1957	168,290	1,851,190	1961	214,998	1,397,487

SILVER

With a production of 4,315,844 ounces (troy) of silver worth $4,068,115, in 1961, the Province of Quebec still ranks fourth among the Canadian provinces producing this metal.

In Quebec, silver is a by-product of gold-quartz mines and of base-metal mines.

Minting of new coinage still absorbs the largest proportion of the silver produced. The other industries that use a large amount of silver are the manufacture of silverware, electro-plating and the photographic arts. The metal is also employed in the fabrication of electrical instruments, where it is used in welding and brazing alloys and in wires.

Table 19. - Production of Silver in the Province of Quebec from 1954 to 1961

Year	Quantity (Ounces troy)	Value	Year	Quantity (Ounces troy)	Value
1954	4,908,203	$ 4,086,423	1958	3,905,815	$ 3,391,506
1955	4,786,889	4,221,079	1959	4,109,772	3,607,558
1956	4,063,504	3,644,150	1960	4,114,993	3,658,640
1957	3,646,168	3,185,657	1961	4,315,844	4,068,115

TITANIFEROUS IRON

Titaniferous iron, or ilmenite, extracted and used as such, is employed in the building field; a smaller amount is used in research.

One of the main uses of titaniferous iron is as a very heavy aggregate in the heavy concrete used to shield atomic reactors.

Table 20. - Production of Titaniferous Iron in the Province of Quebec from 1954 to 1961

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1954	1,541	$ 9,462	1958	234,496	$ 1,608,324
1955	1,464	10,634	1959	36,210	214,367
1956	2,310	16,561	1960	20,519	174,151
1957	26,570	264,904	1961	17,944	151,303

ZINC

The Province of Quebec ranks third, as a zinc producer, amongst the Canadian provinces. The quantity of metal produced, in concentrates during 1961, amounted to 108,010,062 pounds valued at $13,598,467. This is a gain of eight per cent in weight and of two per cent in value over the figures recorded in 1960.

In the chapter entitled Development and Mining Operations in the Province of Quebec in 1960 will be found a résumé of the operations of the following producers:

Company	Township
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 largest users of zinc are the galvanizing, die casting and alloying industries. Bronze and brass are the main zinc alloys.

It should be noted that Quebec will soon have a zinc refinery. Construction of the refinery was in progress at Valleyfield, near Montreal, during the last quarter of the year in review.

Table 21. - Production of Zinc in the Province of Quebec from 1954 to 1961

Year	Quantity (Pounds)	Value	Year	Quantity (Pounds)	Value
1954	214,002,774	$ 25,637,532	1958	113,845,036	$12,386,340
1955	202,862,034	27,690,668	1959	94,115,963	11,519,794
1956	171,945,511	25,516,714	1960	99,614,995	13,298,602
1957	148,589,484	17,964,469	1961	108,010,062	13,598,467

NON-METALLIC MINERALS

I - INDUSTRIAL MINERALS

General Review

For the third consecutive year, sales of asbestos and titanium oxide contributed, in a large part, to the increase in the total value of the industrial minerals produced.

Among the nine substances that registered a gain, in 1961, compared with those for 1960, lithium oxide sales were four times as much as they had been in 1960.

Just as the three substances mentioned previously are exported mainly to the United States and to Europe, the other industrial minerals are consumed for the most part in Quebec and in Canada. They thus contribute more to the economic and industrial expansion of our Province and our country.

ASBESTOS

Table 22, showing an estimation of the world production of asbestos, by country, was taken from Mineral Trade Notes, Volume 53, No. 3, September 1962, a review published by the Bureau of Mines of the United States Department of Interior.

Along with Canada, many countries show an increase of asbestos production. In this field, the Soviet Union is the one indicating the largest increase. During the last three years, many experts have expressed the fear that Russian asbestos may displace the Quebec product on the European markets.

The declared ambition of the U.S.S.R. is to surpass the United States in the industrial field. However, that country may not have enough asbestos for export and, consequently, Quebec's traditional market may still survive.

Table 22.- World Production of Asbestos, by Countries, from 1957 to 1961

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

Country (a)	1957	1958	1959	1960	1961
North America:					
Canada (sales) (c)	1,046,086	925,331	1,050,429	1,118,456	1,175,615
United States (sold or used by producers)	43,653	43,979	45,459	45,223	52,814
Total	1,089,739	969,310	1,095,888	1,163,679	1,228,429
South America:					
Argentina	319	285	320	(d) 330	(d) 330
Bolivia (exports)	181	-	168	66	57
Brazil	2,654	3,816	12,125	14,590	(d) 16,500
Venezuela	8,390	9,152	5,095	4,333	650
Total	11,484	13,253	17,708	19,319	17,500
Europe:					
Bulgaria	1,100	1,100	1,100	(d) 1,100	(d) 1,100
Finland (e)	10,979	7,932	9,957	10,534	10,339
France	16,006	20,742	23,360	28,111	30,865
Greece	9	-	-	-	-
Italy	40,361	42,500	49,778	56,672	62,816
Portugal	64	98	40	144	110
Spain	-	-	19	4	-
U.S.S.R. (d)	500,000	550,000	600,000	660,000	880,000
Yugoslavia	6,128	5,960	4,748	5,970	6,709
Total (d)	575,000	630,000	690,000	765,000	990,000
Asia:					
China (d)	33,000	66,000	88,000	88,000	88,000
Cyprus	15,028	16,494	14,424	23,369	(d) 22,000
India	1,925	1,302	1,464	1,886	1,618
Japan	13,192	11,187	13,633	17,042	18,799
Korea (Republic of)	96	22	88	740	341
Formosa	268	47	150	485	44
Turkey	99	839	411	238	496
Total (d)	64,000	96,000	118,000	132,000	131,000
Africa:					
Bechuanaland	1,582	2,265	1,410	1,849	1,924
Kenya	109	120	43	117	151
Morocco: Southern zone	132	-	-	-	-
Mozambique	152	198	37	22	162
Rhodesia and Nyasaland Federation of: Southern Rhodesia	132,124	127,115	119,699	133,963	161,610
Swaziland	30,727	25,261	24,807	32,026	30,793
Union of South Africa	157,474	175,644	182,405	175,867	194,834
United Arab Republic (Egypt Region).	22	485	502	496	(d) 500
Total	322,322	331,088	328,903	344,340	389,974
Oceania:					
Australia	14,670	15,570	17,856	15,613	16,746
New Zealand	230	454	640	319	(d) 330
Total	14,900	16,024	18,496	15,932	17,076
World total (estimate) (a) (b)	2,080,000	2,055,000	2,270,000	2,440,000	2,775,000

(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.

Table 23.- Production of Asbestos in the Province of Quebec in 1960 and 1961

Grade	1960 Shipments			1961 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)	235	$ 198,318	$ 843.91	163	$ 143,296	$ 879.12
Milled Asbestos						
Group No. 3 (Spinning)	23,152	9,670,943	417.72	23,157	8,647,570	373.43
No. 4 (Shingle)	247,570	45,752,443	184.81	285,776	52,649,222	184.23
No. 5 (Paper)	148,524	18,798,495	126.57	169,768	21,333,516	125.66
No. 6 (Waste, stucco or plaster)	179,361	14,589,795	81.34	192,846	15,675,761	81.29
No. 7 (Refuse or shorts) ...	445,509	18,572,870	41.69	423,116	17,316,959	40.93
No. 8 (Sand)	10,073	205,307	20.38	8,719	178,405	20.46
Total	1,054,424	$ 107,788,17	$ 102.22	1,103,545	$ 115,944,729	$ 105.07
Group No. 9 (By-products: gravel and stone) ..	51,625	$ 45,109	$ 0.87	41,696	$ 38,028	$ 0.91
Total	1,106,049	$ 107,833,280		1,145,241	$ 115,982,757	
Rock mined	32,239,218			37,015,224		
Rock milled	14,395,174			15,954,291		

Another factor is the economic and industrial growth of Europe and of the Common Market countries in particular. This growth will undoubtedly affect the use of asbestos. The Soviet Union may somehow have succeeded, to the detriment of Quebec's producers, in meeting the increased demand for asbestos fibres in Europe.

It is evident, however, that the increased Russian production is responsible for the fact that Quebec's share was only 39.4 per cent of the world's production of asbestos fibres in 1961.

The following companies have reported sales of asbestos in 1961. A summary of their mining operations will be found in the chapter entitled: "Development and Mining Operations in the Province of Quebec in 1961".

Company	Township
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 24. - Comparative Statement of Asbestos Production in the Province of Quebec, in Canada and in the World, from 1956 to 1961

Year	Production (Tons)			Percentage of	
	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	2,055,000	94.4	42.6
1959	992,196	1,050,429	2,270,000	94.4	43.9
1960	1,054,424	1,118,426	2,440,000	94.3	43.6
1961	1,103,545	1,175,615	2,775,000	93.8	39.4

Table 25.- Data on Quebec Asbestos Mining Industry for Years 1952 to 1961

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)
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
1961	1,103,545	115,944,729	105.07	1,096,509	59.24	3.13	37,015,224

Table 26.- Annual Shipments of Asbestos According to Grades from 1952 to 1961

(Tons of 2,000 lbs.)

Year	Crudes	Fibre	Shorts	Total Asbestos Shipped	Sand, Gravel and Waste Rock
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
1961	163	478,701	624,681	1,103,545	41,696

Table 27. - Milling Capacity of Asbestos Mines, in Tons per 24 Hours

Mines	Townships	Capacity
Asbestos Corporation Limited:		
King-Beaver Mine	Thetford	6,000
British Canadian Mine	Thetford	5,500
Normandie Mine	Ireland	4,500
Bell Asbestos Mines Limited	Thetford	2,000
Canadian Johns-Manville Company 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

FELDSPAR

Six producers, all grouped in the Buckingham area, mined and sold 10,507 tons of feldspar in 1961 for a value of $229,626.

LITHIUM

In 1961, sales of lithium oxide more than doubled compared with those during 1960: 536,190 pounds against 204,666 pounds.

This increase was made possible because Quebec Lithium Corporation was in operation throughout the year. The major part of the ore mined and milled was transformed into lithium carbonate in the refinery that the company started operating in December 1960.

It is worth mentioning here that the transformation of lithium oxide concentrate into lithium carbonate is accomplished through a process discovered and perfected in the laboratories of the Department of Natural Resources.

LIME, LIMESTONE AND MARBLE

(Industrial)

The combined value of lime, limestone, marble and marl sold for industrial uses, in 1961, reached $7,797,077, 24.5 per cent more than the $6,262,293 received in 1960.

Industrial lime

The seven producers of industrial lime located in the Province of Quebec sold or used 376,350 tons of lime in 1961. This tonnage, including both quicklime and hydrated lime, was valued at $4,702,202.

Lime producers in the Province obtain their products either through the direct calcination of limestone or through the treatment of other substances. The first group numbers five producers: the largest are Dominion Lime at Lime Ridge, Gypsum, Lime and Alabastine Canada Limited with lime kilns located at Joliette and Saint-Marc-des-Carrières. Finally, at Saint-Hilaire-Est, La Raffinerie de Sucre de Québec operates a kiln, producing lime for its own use.

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

Table 28. - Distribution of the Production of Lime in 1960 and 1961

(In tons)

Classification	1961		1960	
	Quicklime	Hydrated Lime	Quicklime	Hydrated Lime
Industrial Lime				
Sugar refineries	-	6,594	-	4,581
Tanneries	79	765	74	750
Pulp and paper mills	107,509	7,231	92,694	6,916
Agriculture	95	15,535	121	11,757
Iron and steel furnaces	9,848	3,542	7,377	696
Non-ferrous smelters	-	65,946	1,302	118,665
Uranium Plants	5,965	41	6,489	1,169
Cyanide and flotation mills	3,243	17,120	3,027	6,241
Glass works	3,209	-	4,688	-
Carbide and other industrial uses	125,970	3,658	88,741	12,902
Total	255,918	120,432	204,513	163,677
Building Lime				
Building trade	6,495	15,569	7,415	19,570
Dealers and unspecified uses	7,552	1,461	204	185
Total	14,047	17,030	7,619	19,755
GRAND TOTAL	269,965	137,462	212,132	183,432

Table 29. - Quantity and Value of Limestone and Marble Products Sold in 1960 and 1961

Classification	1961		1960	
	Quantity (Tons)	Value (Dollars)	Quantity (Tons)	Value (Dollars)
Building Limestone				
Building stone, rough	6,427	67,479	6,401	63,859
Building stone, dressed	12,254	809,878	10,690	842,531
Asphalt filler	28,287	124,940	30,691	133,588
Flagstone	947	6,275	616	4,316
Rubble and rip-rap	487,472	482,683	433,459	335,282
Crushed stone	17,263,417	18,816,854	16,432,986	18,200,911
Total	17,798,804	20,308,109	16,914,843	19,580,487
Industrial Limestone				
Flux	5,236	7,247	4,481	6,923
Pulp and paper mills	187,838	570,728	171,399	558,497
Agricultural limestone	898,716	2,179,631	533,251	1,300,447
Poultry grit	5,105	20,472	4,187	10,786
Other industrial uses	20,744	196,376	13,831	141,919
Total	1,117,639	2,974,454	727,149	2,018,572
GRAND TOTAL	18,916,443	23,282,563	17,641,992	21,599,059

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

Industrial Limestone and Marble

The year 1961 was a record one for the producers of industrial limestone and marble. Sales of 1,117,639 tons of these materials, worth $2,974,454, represent a volume of business 53 per cent larger in quantity and 42 per cent greater in value than the results recorded in 1960.

The quarries in and around Saint-Marc-des-Carrières supplied most of the industrial limestone, whereas the marble was extracted from quarries located in Missisquoi and Shefford counties.

Table 29 shows that agriculture absorbs most of the industrial limestone; pulp and paper mills, glass and brick manufactures, and roofing products are the most important users of this industrial non-metallic.

MARL

Marl is a calcareous substance employed solely as a 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 1961, only 68,812 tons of marl valued at $120,421 was produced, compared with 127,000 tons worth $190,500, in 1960.

Table 30. - Production of Marl in the Province of Quebec from 1955 to 1961

Year	Quantity (tons)	Value
1955	49,550	$ 74,325
1956	70,581	105,872
1957	127,143	190,714
1958	144,434	216,651
1959	130,375	195,563
1960	127,000	190,500
1961	68,812	120,421

MAGNESITIC DOLOMITE AND BRUCITE

The combined value of the production of magnesitic dolomite and brucite, in 1961, was $3,064,403, a decrease of $214,618 by comparison with the total for 1960. These two substances are grouped because they both contain a large percentage of magnesium and are both used in the manufacture of industrial refractory products.

Magnesitic Dolomite

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

This company extracts this mineral from its Kilmar mine in Argenteuil county. After grinding and beneficiation, it is calcined and transformed into a product called dead-burnt magnesite. This, in turn, is the raw material used in the refractory cements, bricks and plastics manufactured by the company.

Brucite

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

Brucite occurs as nodules in crystalline limestone deposits. It is crushed and calcined in rotary kilns and sold in various grades of purity depending on buyers' specifications. Part of this brucite, for example, is an ingredient in the refractory products made by Canadian Refractories Limited.

MICA

In 1961, a total of 1,373,200 pounds of mica was produced in Quebec. This production was worth $102,390. When compared with the equivalent figures for 1960, the 1961 totals are 11 per cent larger in quantity and 20 per cent higher in value.

Eighteen operators reported sales of mica; Blackburn Brothers, one of the producers, purchased the production of all the others.

With the exception of some 66,000 pounds shipped partly to the United States, partly to Japan, all the Quebec production was obsorbed by Canadian manufacturers.

Of the three Canadian provinces producing mica, Quebec ranks first in the output of this commodity.

Table 31. - Distribution of the Production of Mica in 1961 and 1960

Classification	1961 Quantity (Pounds)	1960 Quantity (Pounds)
Rough, mine-run	73,541	117,238
Mica for mechanical splitting	24,577	27,900
Splittings	250	-
Ground mica	1,184,097	669,994
Scrap	44,850	352,678
Trimmed mica	45,885	28,462
Not classified	-	38,556
Total	1,373,200	1,234,828

MINERAL PIGMENTS

Ochre

Since the advent of western natural gas in Quebec, ochre is sold only as calcined and ground iron oxides.

Sherwin Williams of Canada Limited, with its plant at Red Mill, near Trois-Rivières, was the sole producer of this mineral in 1961.

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

Titanium oxide

Quebec Iron and Titanium Corporation is the sole producer of titanium oxide in Canada. From $12,947,000 in 1960, the value of the oxide sold rose to $16,723,743 in 1961, a 29 per cent increase.

Titanium oxide is used mainly in the manufacture of pigments. The bulk of the company's production is sold in Europe and in the United States.

PEAT

Sales of peat in 1961 show the industry to be one of continued progress.

For the year in review, 75,741 tons of peat was sold for $1,788,349, an increase of 33 per cent in quantity and of 40 per cent in value more than the 1960 production, which was 56,731 tons worth $1,342,338.

Table 32. - Production of Peat in the Province of Quebec from 1954 to 1961

Year	Quantity (Tons)	Value	Year	Quantity (Tons)	Value
1954	27,784	$ 730,250	1958	43,669	$ 1,056,811
1955	32,383	638,696	1959	50,578	1,282,081
1956	40,269	951,644	1960	56,731	1,342,338
1957	48,704	1,140,476	1961	75,741	1,788,349

PETROLEUM AND NATURAL GAS

In 1961, the search for petroleum and natural gas was conducted in two areas of the Province: the Gaspé peninsula and the St. Lawrence Lowlands.

In the St. Lawrence Lowlands, activities were centered around Pointe-du-Lac following the discovery of natural gas on the property of the Fathers of Sacerdotal Fraternity.

Gaspé Area

1 - Associated Developments Limited

The Imperial Lowlands Associated No. 1 York well, in York township, Gaspé-South county, was drilled by Lowlands Exploration Limited (subsidiary of Imperial Oil Limited) following an agreement between the latter and Associated Developments Limited. A diamond drill was used to depth of 3,712 feet; salt water was found at 3,605 feet. Drilling begun on August 25th, 1961, was completed on December 8th, 1961. The geological log is as follows:

0 - 3,712 feet - Silurian

2 - British American (Quebec) Inc.

This subsidiary of British American Oil Company Limited conducted a geological and seismological survey on the ground covered by its exploration license, in the southern part of the Gaspé peninsula.

St. Lawrence Lowlands

A discovery of natural gas on the property of the Fathers of Sacerdotal Fraternity at Pointe-du-Lac, made in 1960, increased the tempo of activities in that area of the St. Lawrence Lowlands.

1 - Corporation des Gaz et Pétroles du Lac Saint-Pierre Limitée

La Corporation des Gaz et Pétroles du Lac Saint-Pierre Limitée alone drilled 25 wells in the Pointe-du-Lac area; 12 of the holes indicated gas in commercial quantities. The wells are some 1,320 feet apart and their depth ranges between 200 and 350 feet. The gas discovered is mainly on the bedrock surface and in a layer of sand above bedrock. The absolute flow (by the A.O.F. test) ranges between 6 and 10 million cubic feet per day and the pressure is approximately 85 pounds per square inch. In addition, this company drilled five wells in the Yamachiche area; gas was discovered, but not in commercial quantities. One of these wells entered the Trenton formation and reached a depth of 777 feet, whereas the others barely went into the bedrock; their depth varied between 275 and 350 feet.

2 - Bald Mountain Oil Company

Following an agreement between Intercity Propane Inc. and Bald Mountain Oil Company, the latter drilled 13 wells in the Pointe-du-Lac area. All are located on the north side of the lake and even in the lake itself. Ten of these wells indicated the presence of natural gas in commercial quantities. They are spaced 660 feet apart and their depth ranges from 200 to 350 feet. As in the wells mentioned in the preceding paragraph, the gas is just above bedrock and in a layer of sand adjacent to it. The absolute flow (by the A.O.F. test) ranges between 7,000,000 and 12,000,000 cubic feet per day and the pressure is approximately 85 pounds per square inch.

Bald Mountain Oil Limited also drilled four wells in the Sorel area. The last few feet of each well is in the bedrock. The wells are 180 to 220 feet deep. At the contact with the bedrock, a little natural gas and some salt water were found.

At Yamachiche, Bald Mountain Oil Limited drilled two wells; they entered the overburden but did not reach bedrock. Their respective depths are 150 and 170 feet. A little natural gas was encountered while drilling these wells.

A 311-foot well was also drilled at Berthier. The presence of salt water and natural gas was noted at 294 feet on the bedrock surface.

At Saint-Ignace-de-Loyola, the company drilled a 272-foot well and found salt water; the last few feet were drilled into bedrock.

3 - Laduboro Oil Limited

Laduboro Oil Limited drilled six test wells in the Champlain area to study the geological structure. The drilling depth ranges between 400 and 800 feet. The drilling was carried out on land held under exploration license by Almega (Quebec) Limited following an agreement with the company.

4 - North Shore Pipe Lines

North Shore Pipe Lines drilled two wells near Louiseville. These two wells barely entered bedrock and reached respective depths of 260 and 347 feet. This work was done on land held under an exploration license by Seaway Gas and Oil Limited following an agreement between this company and North Shore Pipe Lines.

5 - Senneterre Metals Mines Limited

Senneterre Metals Mines drilled two wells at Sainte-Angèle-de-Laval, Nicolet county. They were 703 and 767 feet deep. Both entered the Lower Lorraine formation; there was no gas flow.

6 - Tamara Mining Limited

Tamara Mining drilled a well at Saint-Barnabé, Saint-Maurice county. The well was stopped at a depth of 200 feet without having penetrated into the bedrock. Very little gas was met during the drilling.

7 - Verchères Ore-Oil Corporation

Verchères Ore-Oil drilled two wells in the Trois-Rivières area. One of these wells entered bedrock, the Utica formation, whereas the other one was stopped in the overburden. Very little gas was found.

Summary

In the Gaspé area, one well was drilled in 1961, the Imperial Lowlands Associated No. 1 York. The well reached a depth of 3,712 feet. In addition, British American (Quebec) Inc. made a geological and a seismological survey on its property.

In the St. Lawrence Lowlands, 64 wells were drilled for a total footage of 19,767 feet. Thirty-eight were drilled in the Pointe-du-Lac area, representing a combined depth of 9,613 feet.

All in all, 65 wells were drilled in 1961, resulting in a total depth of 23,479 feet.

QUARTZ

In 1961, 302,432 tons of quartz valued at $1,717,502 was produced in Quebec. These totals represent a decrease of 15 per cent in quantity and six per cent in value in relation to the figures published in 1960.

For statistical purposes, the word "quartz" includes the quartz, quartzite, sandstone and sand used for industrial purposes, namely: in the manufacture of glass, in the alloying of metals with silicium such as silicium carbide, ferrosilicium, etc., in the manufacture of abrasive products and in other industrial uses.

SOAPSTONE AND TALC

Baker Talc Limited and Broughton Soapstone and Quarry Limited are the sole producers of soapstone and talc. Their combined production in 1961 reached 16,274 tons valued at $178,911, an increase of 2,052 tons and $21,300 more than the figures obtained in 1960.

The talc mined in the Province of Quebec is a product of the alteration of serpentine. Once ground, its impurities colour it grey, thus limiting its uses and causing it to be classified as "low grade".

The main uses of this talc are as powdering agent on roofing paper, gypsum boards and rubber products, and as an ingredient in floor tiles and asphalted enamels.

Soapstone is used mostly for tinsmith's pencils and as a sculpturing medium.

SULPHUR AND PYRITE

The sulphur produced in the Province of Quebec is extracted from pyrite mined in a few base-metal mines.

In 1961, these mines shipped pyrite containing 263,600 tons of sulphur valued at $1,856,318. These figures represent decreases of 26,955 tons and $81,321 in comparison with the totals for 1960.

The pyrite from which sulphur was extracted was produced by Noranda Mines Limited, Quemont Mining Corporation Limited, Normetal Mining Corporation and Waite-Amulet Mines Limited.

Sulphur is used in the manufacture of sulphuric and sulphurous acids, the latter being used by pulp mills.

The main 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.

II - BUILDING MATERIALS

General Review

Building materials sold, in 1961, by Quebec producers, were valued at $91,065,514, this amount being six per cent more than the value in 1960.

Building contracts of all kinds awarded in the Province of Quebec during 1961 reached the sum of $888,672,500, an increase of $165,745,700 in relation to the total for 1960. The total contracts let in Quebec represents 27.6 per cent of the $3,220,937,300 awarded in the wnole of Canada.

Table 33. - Distribution of Value of Production of Building Materials during 1960 and 1961

Substances	1961	1960
Sand-lime and clay products (a)	$ 8,195,790	$ 8,674,470
Cement and lime	31,797,391	28,660,732
Building stone	29,279,101	26,091,157
Sand and gravel	21,793,232	22,620,093
Totals	$ 91,065,514	$ 86,046,452

(a)Beginning in 1961, sand-lime products will not be included in the mineral production.

Table 34. - Building Contracts Let in the Province of Quebec from 1955 to 1961*

Year	Value in Dollars					Per Cent of Nation
	Residential	Business	Industrial	Engineering	Total	
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
1961	284,376,600	285,687,000	89,763,800	228,845,200	888,672,500	27.6

*From statistics compiled by MacLean Building Guide.

CEMENT

In 1961, the five cement plants in Quebec marketed 2,029,159 tons of cement valued at $31,412,617. These sales are eight per cent larger in quantity and nearly eleven per cent higher in value than those recorded in 1960.

The following lists give first the location of the cement plants, and then the tonnage and points of origin of the raw materials used in the manufacture of cement.

Company	Location
Canada Cement Company	Montreal-East
Canada Cement Company	Hull
Ciment Québec Inc.	Saint-Basile-de-Portneuf
Compagnie Miron	Ville Saint-Michel
St. Lawrence Cement Company	Villeneuve

Materials	Quantity	Origin
Limestone:	2,839,171 tons	Quebec
Gypsum:	18,080 tons	Maritime Provinces
Silica:	96,726 tons	Quebec and Ontario
Iron oxide:	20,211 tons	Quebec
Others:	103,305 tons	Quebec and foreign countries

Table 35. - Production of Cement in the Province of Quebec from 1956 to 1961

Year	Quantity (Tons)	Value	Average price Per Ton
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
1961	2,029,159	31,412,617	14.48

CLAY AND SHALE PRODUCTS

Sales of clay and ceramic products, in 1961, were slightly above the level reached in 1960: $8,195,790, compared with $8,095,038.

In 1961, the unit prices of two out of three types of clay products were slightly below those of 1961.

	1961	1960
Bricks, per thousand	$ 42.70	$ 43.18
Building and chimney blocks, per ton	19.92	19.61
Drainage tile, per thousand	71.82	91.00

Table 36. - Quantity and Value of Shale and Clay Products from 1956 to 1961

Year	Bricks		Other Products Value	Total Value
	Quantity (M)	Value		
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
1961	148,509	6,341,787	1,854,003	8,195,790

Table 37. - Clay and Shale Products in 1960 and 1961

Classification	1961		1960	
	Quantity (Tons)	Value	Quantity (Tons)	Value
Brick:				
Common brick, soft mud process ..... M	1,500	$ 30,000	950	$ 20,900
Face brick, stiff mud process ..... M	67,197	3,292,375	58,466	2,818,345
Common brick, stiff mud process ..... M	29,643	805,007	19,182	550,911
Face brick, dry press .. M	48,347	2,180,166	56,003	2,601,295
Common brick, dry press M	1,822	34,239	7,512	145,272
Total	148,509	$6,341,787	142,113	$6,136,723
Other Products:				
Structural tile and chimney blocks .....Tons	63,706	$1,269,166	75,760	$1,485,925
Drain tile ..... No.	3,465,124	248,813	2,961,603	269,497
Sewer pipe and flue lining		336,024		187,753
Others				13,140
Total ...		$1,854,003		$1,956,315
Grand Total ...		$8,195,790		$8,093,038

LIME AND LIMESTONE

(Building)

The total quantity of limestone extracted from the sub-soil of Quebec, whether for industrial or building purposes, was 22,447,300 tons in 1961. Of this amount, a total of 1,739,610 tons was used as industrial limestone and 20,707,690 tons, for building.

Table 38. - Distribution of Limestone in 1960 and 1961

Uses	Quantity (Tons)	
	1961	1960
Building limestone	17,798,804	16,914,843
Manufacture of cement	2,839,171	2,916,946
Building lime (a)	48,414	40,666
Industrial lime (a)	621,971	589,416
Industrial limestone	1,117,639	727,149
Marble (building)	21,301	15,988
Totals	22,447,300	21,205,008

(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.

Building Lime

The seven producers of lime in the Province of Quebec sold 31,077 tons of building lime valued at $384,774; these amounts are respectively 13 and 11 per cent higher than the equivalent totals in 1960.

Building Limestone

Twenty-eight quarries reported sales of building stone. This material was delivered either rough, dressed or in the form of rubble. Sixteen of these operators also sold the rejects of their dressing plant as crushed stone.

Crushed Stone

Apart from the 16 operators mentioned in the preceding paragraph, 39 others produced crushed stone only. These 55 operators produced 17,263,419 tons of crushed limestone. The quarries of the Greater

Montreal area supplied 63 per cent of the total; those of the Quebec area, seven per cent. The remaining 30 per cent was delivered by quarries located elsewhere in the Province.

Table 39. - Total Production of Limestone from 1956 to 1961

Year	Quantity (Tons)	Year	Quantity (Tons)
1956	13,910,428	1959	21,633,109
1957	16,188,163	1960	21,205,008
1958	17,074,399	1961	22,447,300

CRUSHED STONE

In 1961, 82 establishments produced 23,429,335 tons of crushed stone whether limestone, granite or sandstone; this production had a total value of $23,429,335. The unit price, $1.15 per ton, was only $0.01 above the 1960 level.

GRANITE

Among the 56 granite quarries that were in operation in 1961, 37 produced building stone or monumental and ornamental stone only. The others produced crushed granite.

For commercial and statistical purposes, the granite sold is divided into eight classes. In 1961, two of these showed no gain with regard to the totals for 1960. The increase of 47 per cent in value and of 71 per cent in quantity recorded, in 1961 in comparison with the figures for 1960, was caused by sales of dressed granite and crushed stone.

MARBLE

(Building)

In 1961, marble quarry operators in Quebec shipped 21,301 tons of material worth $310,154. The increase of 5,313 tons is divided equally between sales of dressed marble and those of crushed marble. But it is mostly the marble dressed for building or ornamental purposes that is responsible for the difference in the values received in 1961 and 1960. Receipts for the year in review, $310,154, are 129 per cent higher than the $135,570 received in 1960.

Table 40. - Production of Crushed Stone in the Province of Quebec, 1960 and 1961

Classification	1961			1960		
	Quantity (Tons)	Value	Average Per Ton	Quantity (Tons)	Value	Average Per Ton
Limestone						
Commercial quarries:						
Montreal and Jesus islands	10,874,161	$ 11,754,823	$ 1.08	11,056,542	$ 12,212,265	$ 1.10
City of Quebec district	1,250,312	1,359,309	1.09	1,303,580	1,336,557	1.03
Other parts of the Province	5,128,791	5,685,241	1.11	4,048,250	4,618,374	1.14
Total	17,253,264	$ 18,799,373	$ 1.09	16,408,372	$ 18,167,196	$ 1.11
Non-commercial quarries (a)	10,153	17,481	1.72	24,614	33,715	1.37
Total	17,263,417	$ 18,816,854	$ 1.09	16,432,986	$ 18,200,911	$ 1.11
Granite						
Commercial quarries	818,619	$ 1,070,475	$ 1.31	572,992	$ 778,543	$ 1.36
Non-commercial quarries (a)	1,279,353	2,641,109	2.06	734,578	1,338,096	1.82
Total	2,097,972	$ 3,711,584	$ 1.77	1,307,570	$ 2,116,639	$ 1.62
Sandstone						
Commercial quarries	296,451	$ 406,916	$ 1.37	316,022	$ 490,326	$ 1.55
Non-commercial quarries	566,363	493,981	0.87	523,095	497,425	0.95
Total	862,814	$ 900,897	$ 1.04	839,117	$ 987,751	$ 1.18
TOTALS	20,224,203	$ 23,429,335	$ 1.16	18,579,673	$ 21,305,301	$ 1.15

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

Table 41. - Quantity and Value of Granite in 1960 and 1961

Classification	1961		1960	
	Quantity (Tons)	Value	Quantity (Tons)	Value
Building stone, rough	10,168	$ 205,018	9,567	$ 207,903
Building stone, dressed ...	20,147	2,184,706	15,206	1,504,878
Monumental and ornamental stone, rough	12,795	357,025	9,949	241,109
Monumental and ornamental stone, dressed	6,869	607,113	7,483	715,260
Curbstone	756	20,056	233	8,874
Paving blocks	425	6,640	261	3,908
Rubble and rip-rap	567,825	603,239	231,171	416,741
Crushed stone	2,097,972	3,711,584	1,307,570	2,116,639
Total ...	2,716,957	$7,695,381	1,581,440	$5,215,312

Table 42. - Marble Products Sold in 1960 and 1961

Classification	1961	1960
	Quantity (Tons)	Quantity (Tons)
Building and ornamental stone, rough ...	107	31
Building and ornamental stone, dressed .	2,744	45
Crushed marble	18,450	15,912
Total	21,301	15,988

SAND AND GRAVEL

There was, in 1961, a slight reduction in the production of sand and gravel, compared with the output for 1960: 4.6 per cent in quantity and 3.6 per cent in value.

The construction and maintenance of roads and the making of concrete are the building fields using about 80 per cent of the sand and gravel produced. The Department of Roads is the largest user of sand and gravel in the Province of Quebec.

Table 43. - Quantity of Sand and Gravel Sold in 1960 and 1961

Classification	1961 Quantity (Tons)	1960 Quantity (Tons)
Washed and screened sand and gravel .	2,992,221	3,089,435
Ballast	153,827	1,440,846
Sand and gravel for building, concrete and roads	32,091,238	30,911,316
Sand and gravel for mine back filling	43,266	237,154
Crushed gravel	(a) 8,797,052	(b) 10,488,378
Other sands	48,595	88,834
Total	44,126,199	46,255,963

(a) 202,324 tons was used as ballast.
(b) 977,535 tons was used as ballast.

SANDSTONE, SLATE AND SHALE

Sandstone

Of the 11 sandstone quarries in operation in 1961, eight produced crushed sandstone. Although the production during 1961 was only two per cent lower in quantity than that of 1960, the difference in values was 13 per cent. The small quantity of rubble and rip-rap produced in 1961, together with the lower unit price received for crushed sandstone, is responsible for this reduction. It should be noted that the price of sandstone rubble rose from $1.07 per ton, in 1960, to $1.23 in 1961.

Slate and Shale

Slate and shale are mostly used for back fill.

The production during 1961, 30,553 tons valued at $32,926, is 73 per cent less in quantity and 63 per cent lower in value than that of 1960.

Table 44. - Quantity and Value of Sandstone Sold in 1960 and 1961

Classification	1961 Quantity (Tons)	1961 Value	1960 Quantity (Tons)	1960 Value
Building stone, rough	94	$ 540	-	-
Rubble and rip-rap	10,892	13,494	53,875	$ 57,981
Cursched stone	865,014	918,497	841,167	1,012,566
Total	876,000	$932,531	895,042	$ 1,070,547

EXPLORATION IN THE PROVINCE OF QUEBEC IN 1961

New Quebec and North Shore District

Four companies did exploration and development work on the Cape Smith belt in the northern part of Ungava during the year reviewed.

Murray Mining Corporation Limited completed its third field season on its property. The company's two concessions lie 30 miles south of Hudson strait and cover a total area of 108.1 square miles.

Since 1959, the company has drilled 68 holes totalling 30,935 feet. The main asbestos zone is exposed, on surface, over a length of 2,400 feet; the average width of the zone, as shown by drilling, is 150 feet. The amount of ore indicated by the work done stands at 15,231,000 tons grading 10.87 per cent asbestos fibre.

During the 1961 season, emphasis was placed on the study of sites suitable for the construction of docks, roads, a mining village and a treatment plant.

Raglan Nickel Mines Limited devoted its field season to a thorough study of its main concession at Cross lake, 38 miles south of Deception bay.

Three drills bored 42 holes, for a total of 17,146 feet of drilling. Two copper-nickel sulphide deposits, in the Cross Lake concession, were carefully examined. These sulphides - pyrrhotite, nickeliferous pyrrhotite, pentlandite and chalcopyrite - occur in a massive as well as a disseminated state. Drilling indicated the presence of 3,896,000 tons of ore grading 1.66 per cent nickel and 0.78 per cent copper. The massive sulphide orebody probably contains 3,255,000 tons; the other, 641,000 tons.

British Ungava Exploration Limited carried out an airborne magnetometer survey of the entire Cape Smith belt. Moreover, geological survey parties, using snow-mobiles studied numerous copper-nickel-bearing zones; the most important of these is in the vicinity of Kenty lake.

Falconbridge Nickel Mines Limited conducted a geological and geophysical survey of its concession located east of the Raglan concession and only a few miles from the Murray Mining property.

Two spectacular copper discoveries resulted in a staking boon in two areas located respectively some 50 miles north and south of Fort McKenzie.

The first of these discoveries, credited to McIntyre Porcupine Mines Limited, is located near Wapanikskan lake; there are five showings in an area one mile and a half long by one mile wide.

The other discovery, made by Taché Lake Mines Limited, south of Fort McKenzie, consists in copper mineralization occurring over a distance of more than a quarter of a mile.

It has been reported that the copper content of samples taken at both locations is very high. Companies holding claims in these areas have announced that they are planning drilling programmes for the summer of 1962.

Chibougamau District

Encouraging results of exploratory drilling by Bruneau Mines Limited, in McKenzie township, and the discovery of a copper, lead and zinc mineral showing in the Frotet Lake area also served to attract interest to this district, though general exploratory activities were restricted in scope.

A preliminary count of the exploration diamond drilling performed in 1961 shows that only 28 drilling programmes were carried out for a total of about 75,000 feet of drilling, compared with a total of some 95,000 feet in 1960 and that of 160,000 feet in 1959. The number of mining claims recorded in this district for 1961 totals approximately 2,700; this compares favourably with the 1,700 claims registered in 1960, but is much lower than the total of 9,400 claims for 1959. A few aerial geophysical surveys were carried out in the district, and ground surveys were conducted on some 55 properties.

(1) Northern Sector: Eastmain River - Evans Lake to Mistassini Lake Area

Interest in the northern area between Mistassini lake and James bay appears to be increasing as a result of the provincial government's decision in February 1961 to open the northern areas to claim staking. Mention should be made here of the discovery, by Canadian Dyno Mines Limited, of rich copper mineralization at the west end of Duncan lake, approximately 90 miles north of Eastmain river.

Noranda Mines Limited continued to prospect in the Eastmain area, both south of the river at its great bend and immediately to the

north in the Village Lakes area. Ultrabasic rocks and associated oxide minerals are reported in the area south of the great bend. Kerr Addison Gold Mines Limited prospected in the Village Lakes area and found some sulphide mineralization.

The area east of Evans lake was studied by Osisko Lake Mines Limited. The property of Sirmac Mines Limited, in township 1219, north of Assinica lake, was optioned and drilled by Consolidated Mining and Smelting Company of Canada Limited during the year. The surface outcrop of the main spodumene-bearing pegmatite showed a zone measuring 900 feet long and 56 feet wide grading some 2.7 per cent lithia. Cominco's drill results were not overly encouraging for they indicated that the pegmatite body narrows with depth and ends between the 200- and 400-foot levels. It should be noted that the area of the parent intrusive of these pegmatites could be a favourable one for the occurrence of other minerals, such as beryl, caesium minerals, molybdenite and others.

The Frotet Lake area witnessed a moderate amount of exploration. The Canadian Nickel Company Limited exploration programme, carried out under agreement with Chibougamau Mining and Smelting Company Inc., resulted in 2,500 feet of drilling distributed among six holes, three in township 1214 and three in 1219. The discovery of a banded copper, lead and zinc showing in the northeast quarter of township 1222 by a Falconbridge Nickel Mines Limited prospecting party attracted attention to the Frotet Lake area at the end of the year reviewed and resulted in the staking of over 250 mining claims by various interests.

No work was carried out during the 1961 season in the northern Albanel Lake area on the iron properties of Albanel Minerals.

(2) Central Sector : Chibougamau to Bachelor Lake

(a) Chibougamau - Opemisca Lake Area

The exploration programmes completed in the immediate Chibougamau and Opemisca areas were, for the most part, restricted in size. Of most interest was the drilling of a new copper-bearing rhyolite breccia zone by Bruneau Mines Limited in McKenzie township. About 9,000 feet of drilling distributed among 22 holes was completed at the close of the year under review here. Grandroy Mines Limited, in Roy township, reported a new copper showing in the northern section of its property. Copper Rand Chibougamau Mines Limited completed 4,000 feet of drilling over anomalies in Doré lake, southwest of the main mine, and in Chibougamau lake adjacent to Portage island. Campbell Chibougamau Mines Limited also completed over 6,000 feet of exploration drilling in Chibougamau lake, north and east of Henderson mine. Merrill Island Mining Corporation Limited completed some exploration drilling on the mainland west of Merrill island. Chibougamau Mining and Smelting Company Inc. undertook a rather comprehensive survey

of a large claim group south of Chibougamau lake in Queylus township where Federal Chibougamau Mines Limited also drilled 1,000 feet distributed among three holes. McAdam Mining Corporation Limited, in McCorkill township, carried out a systematic drilling exploration programme of its asbestos property. At the end of 1961, over 6,000 feet of drilling was completed and results are reported to be quite encouraging. A strike length of up to 1,000 feet and widths of over 300 feet are reported to contain asbestos assays ranging from $4.00 to $5.00 per ton. Drilling is continuing.

In Lévy township, Chiboug Copper Corporation Limited continued to drill its property located northeast of the Opemiska mine, and a total of 8,600 feet was completed. Also in Lévy, Olympia Mining Exploration Limited drilled six holes, for a total of over 5,000 feet, along the northeast extension of the Campbell Lake fault, which crosses the Opemiska mine property. Conwest Exploration Company Limited tested by drilling an anomaly on its Lévy property with a 500-foot hole.

Phelps Dodge Corporation of Canada Limited is exploring an area northwest of Opemisca lake, and McIntyre Porcupine Mines Limited drilled 550 feet distributed between two holes on a claim group in Julien township. Prospectors Airways Company Limited recently commenced a drill-test of its Dolomieu Township property.

Farther west, in Guercheville township, Kerr Addison Gold Mines Limited carried out some prospecting and staked a group of claims to cover a reported new showing.

(b) The Western or Inconnu Lake Area

Only minor exploration was reported in this area. Copper Rand Chibougamau Mines Limited drilled three holes in sedimentary formations containing some sulphide and graphite on its Branssat Township property, following geophysical surveys. Asarco Exploration Company of Canada Limited surveyed and drilled two holes on a property, in Kreighoff township.

(c) Bachelor and Opawica Lakes Area

Exploration activities in this area increased during 1961 and the increase is probably due, in part, to the beginning of The Coniagas Mines Limited operation. Sturgeon River Mines Limited completed over 6,000 feet of drilling on the optioned property of O'Brien Gold Mines Limited, Lesueur township, in an attempt to extend and partly to retest the known gold-bearing structure outlined by O'Brien Mines in 1949. Chesbar Chibougamau Mines Limited completed surveys and drilled five holes, totalling 3,000 feet in the northeastern part of Lesueur township, in an attempt to

outline magnetic iron horizons. Denison Mines Limited and Asarco Exploration Company of Canada Limited carried out drill programmes totalling respectively 2,500 feet and 4,000 feet, in the central and southeast parts of Boyvinet township. Lenmac Mines Limited completed over 400 feet of packsack drilling in Gand township, and the G. Céré interests drilled a property on Opawica island in Lespérance township. Lichen Lake Mining Company Limited recently started a drilling programme on its Le Tac Township claims.

(3) Southern Sector: Doda Lake to Barry Area

Aumacho River Mines Limited continued to explore its holdings in Urban township, and over 3,000 feet of drilling was completed during the year. Sogemines Development Company Limited explored its Marceau Township property and carried out some drilling with a small drill.

Icon Syndicate undertook a comprehensive exploration programme in Buteux, Bressani and Marceau townships. Anaconda Company (Canada) Limited tested by drilling a number of anomalies on its Doda Lake properties in Gradis and Druillettes townships.

Val d'Or District and Matagami Lake Area

There was a reduction of 25 per cent in exploration activity in the Val d'Or - Matagami Lake district in 1961, compared with that of 1960. Diamond drilling or geophysical work and, in some cases, both types of work were done on at least 75 properties. Diamond drilling was undertaken on at least 48 properties, and 22 properties were subjected to geophysical work only. Compared with the number of properties investigated in 1960, 101 properties were subjected to diamond drilling and geophysical work or to only one type of work during the year reviewed, 70 of these being diamond drilled and 51 being covered by one or more geophysical surveys.

The prospects for a reversal of this diminishing activity are not favourable unless there is a new spectacular discovery or a substantial increase in the value of base metals or in the price of gold. The decrease in 1962 should not be as severe as that in the past two years. The companies now carrying out exploration work are the more substantial ones, the financially weaker companies having been inactivated by lack of funds. Much of the past high activity, however, was the result of the Matagami Lake discoveries. The mining areas of northwestern Quebec are of great interest to exploration companies because of the favourable geology, the large variety of economic minerals, the number of successful exploitations, the closeness to centres of major population, the transportation

facilities, and the relatively low cost of exploration and mining.

There were no new discoveries made during the year reviewed that would appear to be potentially capable of becoming mines in the near future.

The most important discovery made during the year was that by Radiore Uranium Mines Limited on its No. 2 sulphide zone in the southeast corner of Isle-Dieu township in the Matagami Lake area. A small copper-bearing sulphide body at least 300 feet long, 280 feet deep and over 10 feet wide was partly explored by diamond drilling during the year under study. Work was being continued on the property.

Lavandin Mining Company Limited (Malartic Hygrade Gold Mines Limited), in Malartic township, sank a shaft 430 feet deep and cut stations at the 250- and 400-foot levels. The company is now driving drifts towards the small but high-grade orebodies discovered in drilling during 1960.

Quebec Lithium Corporation is building an addition to its chemical plant in Lacorne township to make a lithium hydroxide mono-hydrate.

During the year 1961, Mattagami Lake Mines Limited, in Galinée township, continued its underground development programme. For instance, stopes were prepared on the 350-, 550- and 750-foot levels; a crusher room was excavated on the 870-foot level. This development work produced some 14,000 tons of ore which was stock-piled on surface.

The building of the permanent headframe and of some surface buildings, such as the dry, the repair shop, and the office, was postponed until the spring of 1962. The construction of the mill has been scheduled for the spring of 1962.

Orchan Mines Limited, in Galinée township, carried out 25,378 feet of drilling in 29 holes on its orebodies during the year and began to sink its shaft. The company expects to be in production in 1963.

New Hosco Mines Limited, in Daniel township, accepted management control from Noranda Mines. A pilot hole for the shaft was sunk and shaft-sinking will begin early in 1962. This company also expects to be in production by 1963.

O.-L. Giroux, a prospector from Malartic, discovered a beryl deposit of interest in Fournière township. This discovery will require careful work before its value can be assessed.

Most of the work on the other properties gave inconclusive results.

Rouyn-Noranda District

Exploration work carried out during the year reviewed in this district was at about the same level as in 1960. Most of it was centered around Joutel township, north of Amos. At the end of September, new discoveries by Area Mines Limited and specially by Lake Dufault Mines Limited brought a new spark of life to the district.

During the year under review, 95 properties were explored, 52 of them by means of surface diamond drilling programmes. These figures are about the same as those in 1960; however, the footage drilled decreased slightly: 170,000 feet, compared with a little more than 230,000 feet for 1960. Figures for 1961 are subject to revision, as some companies had not reported by the end of the year.

Joutel Area

During most of the year under study, the greatest amount of exploration work was concentrated in the Joutel and Poirier townships area. At the close of 1960, Prospectors Airways Company Limited had obtained many interesting intersections while drilling in Joutel township. The mineralized zone was studied during the year through a programme of systematic drilling. More than 51,000 feet of drilling was completed on the property. The company succeeded in outlining a deposit containing a minimum of 1,000,000 tons of ore containing 2.3 per cent copper. As far as could be ascertained, this deposit is made up of three superimposed lenses. The structure is further complicated by faulting, and it is felt that only an underground exploration programme would show the true dimensions of the deposits. Plans call for sinking a 1,000-foot shaft; a new company would be incorporated for that purpose.

Following this new discovery, numerous properties were explored by geophysical surveys and diamond drilling.

Chesterville Mines Limited drilled eleven holes, totalling more than 5,000 feet, in two electromagnetic anomalies on the east side of Harricana river. Although copper and zinc assays are low, there is a considerable amount of sulphides. Sections of 150 feet contain more than 20 per cent sulphides, either pyrite or pyrrhotite, in bands or in pockets.

On the opposite side of Harricana river, Iso Mines Limited drilled more than 7,000 feet, and Southwest Potash Corporation, more than 4,000 feet around a gabbro intrusive. A thin zone with a little copper and zinc mineralization was found around the gabbro.

Farther north, The Mining Corporation of Canada Limited drilled nine holes on two properties. Consolidated Mogul Mines Limited and Glenburk Mines Limited also drilled a few holes.

In Valrennes township, Massval Mines Limited drilled five holes on two properties. A section contained some sulphides and a little copper.

Broulan Reef Mines Limited put down 2,127 feet of drilling in Poirier township.

Preissac Area

Two companies are engaged in underground exploration in Preissac township; they are Preissac Molybdenite Mines Limited and Anglo American Molybdenite Mining Corporation. The first concern, which had already reported ore reserves of 1,250,000 tons grading 0.53 per cent molybdenite found through surface diamond drilling, sank a 615-foot shaft and did some exploration work on the 450- and 575-foot levels. Results of this work seem to confirm earlier estimates so that the company is giving consideration to the building of a mill that will have a capacity of 1,200 tons per day. Should this be agreed upon, production could start in mid-1962.

Shaft sinking on the property of Anglo American Molybdenite began early in the year 1961. The shaft is 375 feet deep. A total of 1,400 feet of drifts was driven on the 150- and 300-foot levels. Surface diamond drilling performed in 1960 revealed the presence of three ore zones: one made up of east-west trending veins containing 579,000 tons of ore grading 0.6 per cent molybdenite and 0.087 per cent bismuth, and another a north-south pegmatite dyke holding 834,116 tons of ore grading 0.47 per cent molybdenite and 0.054 per cent bismuth; both of these are amenable to underground mining. Finally a bulge in the north end of the dyke could be mined by open-pit methods and could contain 1,315,937 tons of ore grading 0.32 per cent molybdenite and 0.034 per cent bismuth. The underground work tends to confirm the earlier estimates. Many other veins that had been missed by the surface drilling programme were found. Many of them were followed underground and, at last report, the north-south pegmatite dyke had been reached. On surface, stripping of the northern section of the dyke was begun.

Noranda Area

Following a geological survey, Lake Dufault Mines Limited resumed its drilling programme. The first hole located in the north end of the property went through bodies of massive sulphides on the favourable andesite-rhyolite contect. At 1,076 feet, a 153.5-foot section assayed 4 per cent copper, 12.2 per cent zinc, 3.8 ounces of silver and 0.04 ounce of gold per ton. Another 70-foot section at 1,345 feet assayed 2.41 per cent copper and 0.74 per cent zinc. Other sections, not so rich, were met at greater depths. At the close of the year reviewed, the company had three drills in operation to outline these sulphide masses.

This sensational discovery spurred several other companies to undertake or resume exploration programmes. Among those that are drilling in this area are New West Amulet Mines Limited, Vauze Mines Limited, Tribag Mining Company Limited, Powell Rouyn Gold Mines Limited, and Paramaque Mines Limited.

At the beginning of the year under study, New West Amulet Mines Limited had already bored 18,000 feet of drill holes. This work made it possible to explore thoroughly the Bedford Hill deposit and to increase slightly the tonnage of proved ore that had been already established at 108,000 tons grading 2 per cent copper. A new drilling programme was initiated along the Waite-Amulet F shaft fault, to study the favourable andesite-rhyolite contact.

Tribag Mining Company Limited began, during the summer of 1961, a deep drilling programme in the town of Rouyn. In a joint undertaking with Noranda Mines Limited, three 2,000-foot holes will be drilled near the boundary of the two properties.

The other companies started their drilling programmes at the close of 1961. Many of these obtained ground in the area and intend to do some work.

Abitibi Lake Area

Another discovery, which earlier gave rise to a staking rush, was made by Area Mines Limited on Napawa island in the northern section of Roquemaure township. In the first diamond drill hole, a 7.5-foot section of core assayed 16.8 ounces of silver to the ton; some native silver was noted. Eight other holes drilled in the vicinity failed to show interesting values.

Many other companies have secured ground in this area and will probably undertake some exploration.

In addition to the work mentioned above, many other companies did some drilling in the Noranda area.

Daniel Mining Company Limited continued its exploration of a copper-nickel deposit in Brodeur township; the work had been started in 1959 by Kerr-Addison Gold Mines Limited.

At the end of the year reviewed, Garney Mines Limited was drilling the property that was formerly held by Golconda Mines Limited in Duparquet township. The company put down about 5,000 feet of drill holes in the gold-bearing zone; results are not known yet.

Ansil Mines Limited drilled five vertical holes in Duprat township. A dome-like structure containing a low copper and zinc content was located.

In the Turgeon River area, Paudash Mines Limited, studied, by means of drilling, a conductor in La Peltrie township. Many sulphide bands were intersected. However, the content in zinc and copper was found to be too low to be of economic value. Wawagosic Syndicate, which drilled many holes in Estrées township, also obtained assays of no commercial interest.

As a rule, none of the other drilling programmes revealed the existence of economic mineral deposits.

Montreal District

During 1961, the amount of exploration and development work carried out by the various mining companies in the Montreal district remained about even with that of 1960.

The total number of claims staked in the district during the year reviewed was about 940, a 20 per cent increase on the preceding year's total of 758. Out of the 1961 total, over 400 claims were staked on Dupas island and the surrounding islands in Berthier county. Some gold assays of over $1.00 per cubic yard were reported in the silt covering these islands. Subsequent assays have thrown some doubt on whether or not this gold content is really present in this silt.

An increasing interest was shown for some substances such as silica, columbium, and lead and zinc, whereas the search for the other metals or non-metals was on a par with that of the year 1960. The district can now count three new producing mines, namely: St. Lwerence Columbium and Metals Corporation, for columbium; Baskatong Mining Corporation, for quartz; and Ghislau Mining Corporation, for lead and zinc.

Drummond Copper Corporation Limited drilled six holes for a total footage of 189 feet on its titaniferous iron property. The drilling was done on the southeast half of lots 15 and 16, range IV, in Wexford township. Magnetic separation tests on the company's ore were also conducted in McGill University Mineral Dressing Laboratory of the Mining Engineering Department.

In February, Grand Manitou Mines Limited drilled two holes for 394 feet on its magnetite property on lot 13, range II, of Montigny township.

In Lussier township, Federated Industries Limited drilled five holes totalling 885 feet on its property adjacent to Dominion Silica's holdings.

Montrose Securities Limited drilled eight holes totalling 2,535 feet during the months of April, May and June of 1961.

Consolidated Pershcourt Mining Limited drilled one hole for 170 feet on lot 147 in L'Annonciation parish.

While doing a limited amount of exploration on its Oka Columbium property, Columbium Mining Products Limited was seeking funds for the building of its mill, which will have a daily capacity of 250 tons.

In April and May of 1961, Grand Calumet Mining Company Limited, which holds a 1,163-acre property adjacent to New Calumet, drilled two holes totalling 1,146.3 feet in the search for lead and zinc mineralization.

Ghislau Mining Corporation and Laviolette Mining and Metallurgical Corporation started in July 1961 to operate on a salvage basis a mill of a 1,000-ton daily capacity in Montauban and Chavigny townships. The companies were recovering the lead, zinc, gold and silver from the tailings left by the former producer Anacon Lead Mines Limited. Since July of the year reviewed, the mill has been treating from 400 to 800 tons per day.

Hupon Mining and Exploration Corporation drilled 11 holes totalling 444.4 feet on a molybdenite prospect located on lot 36, range VII, of Huddersfield township. The drilling was done to determine the extension of a mineralized vein.

In July 1961, a magnetometer survey was made on the magnetite property of Messrs. H. Authier and B. Janelle in Fréville township.

Mr. Arthur Thompson drilled six holes for a total of 160 feet on a base-metal property in the part of Montcalm county that is not subdivided.

In August of the year reviewed, Mr. Richard Walsh drilled four holes totalling 250 feet on a copper-nickel-molybdenite prospect on lot 50, range II, Aldfield township.

Quebec and South Shore District

More exploration work was undertaken in this district in 1961 than in the preceding year. The number of claims staked and registered increased by 25 per cent.

For the few years prior to the one reported on here, Golden Age Mines Limited had been doing some test work in its pilot-plant located near Beauceville. In 1961, the company modified its plant to improve both the recovery and the quality of the asbestos fibre; it also studied its marketing possibilities. The tests have shown that the recovery of the fibre equals 30 per cent of the ore treated. This fibre has been placed in a special class (called X-1); it is almost pure white and contains very little magnetite. Reports from the company indicate that it has sold all the fibre produced during a one-month operation period. The mill was working on a 24 hours a day basis. It is apparent that these fibres could be suited to certain industrial applications, such as in thermoplastics, in paints and in a few other uses.

The company estimates its proved ore reserves at 2,040,960 tons having a fibre content valued between $9 and $14 per ton; in addition, its deposits contain 4,796,258 tons of indicated ore and 12,665,250 tons of probable ore.

Solbec Copper Mines Limited made rapid progress in the development of its copper orebody, in Stratford township. Underground preparations for mining were well advanced; drifting was completed on the

second, third and fourth levels and started on the first. Development has progressed in such a way that the mine will be in a position to supply ore to the mill in the near future. All the essential equipment was installed in the 1,000-ton-per-day mill; only the water and electrical connections now remain to be made. The necessary water supply line from Aylmer lake should be completed very soon. The Solbec mine should be in production at the end of 1961 or early in 1962.

The Solbec deposit, having a true width of 25.9 feet and a length of 1,000 feet, is estimated by the company to contain 1,380,000 tons of ore above the 600-foot level. The tonnage of ore in the extension at depth of the orebody has not been determined. The average grade of the ore has been given as follows: 1.92 per cent copper, 3.80 per cent zinc, 0.50 per cent lead, 0.014 ounce of gold and 1.05 ounces of silver per ton.

Company officials feel that they stand a good chance of finding more orebodies in the northeast-southwest extension of the main ore zone.

Cupra Mines Limited, a newly incorporated society, will bring into production a deposit discovered some 2.5 miles southwest of the Solbec mine by the Sullivan group in 1960.

Information supplied by Cupra Mines indicates ore reserves totalling 818,995 tons between surface and a depth of 1,200 feet. This ore grades 3.82 per cent copper, 3.53 per cent zinc, 0.59 per cent lead, 0.023 ounce of gold and 1.36 ounces of silver per ton. The average width of this lenticular orebody is 10.6 feet and its true length varies between 200 and 400 feet. Long drill holes have indicated that the orebody is lengthening and widening with depth.

Eighteen feet of overburden was removed from the shaft site, and the preliminary sinking of this entry attained a depth of 42 feet. At the end of November of the year reviewed, the shaft collar and headframe footings had been poured and the headframe was completed. The company plans to start sinking a 1,600-foot-deep shaft early in 1962.

A good road connecting the Solbec and Cupra Mines is under construction. Ore from the Cupra mine will be trucked 2.5 miles to Solbec for treatment.

Terra Nova Explorations Limited undertook the exploration of a block of claims in Garthby township, Wolfe county. A geological study and some geophysical surveys of the property have been made.

Results, at the close of 1961, have led the company to plan a diamond drilling programme, which will be started very soon.

The Moneta group, financed by Moneta Porcupine, Dome, and Hastings Mining and Development Company Limited, continued its exploration programme started the preceding year in Marston and Clinton townships, Frontenac county.

An airborne electromagnetic survey and some ground electromagnetic and magnetic surveys have indicated structures favourable to mineral deposits. Subsequent drilling revealed the presence of massive sulphides containing copper. Drilling is being continued by the Moneta group to ascertain whether or not these lenses of metallic sulphides have any commercial value.

The Sullivan group also did some exploration work in Woburn township, Frontenac county. Ground electromagnetic surveys and diamond drilling operations have not given any encouraging results.

Frontenac Mining Corporation holds the mining rights to a molybdenite deposit located in a group of claims in the adjoining Gayhurst and Dorset townships, Frontenac county. Exploration drilling performed by the company in previous years had disclosed reserves of ore estimated at 414,361 tons grading 0.66 per cent molybdenite and 228,324 tons grading 0.33 per cent molybdenite.

In 1961, a programme of underground work was initiated in the south zone of the property to ascertain the continuity of the ore, its real grade, and information regarding mining and milling methods. The company estimates having driven some 2,150 feet of drifts and crosscuts. The company's consulting engineer reports that, so far, results have been encouraging and that the diamond drill results appear to be confirmed. Up to the end of the year reviewed, there was little exploration drilling done from these drifts; however, more drilling is planned in order to increase ore reserves.

A 1 3/4-mile all-weather gravel road was built to the molybdenite deposit of the south zone. An electric power line is planned for the near future; in the meantime compressed air is supplied by a diesel-driven compressor.

Beauce Placer Mining Company Limited began its operations on its gold-bearing sand deposits in the Rigaud-Vaudreuil seigniory. Ore reserves have been evaluated at 16,796,000 cubic yards of gold-bearing sand grading 22.24 cents per yard. The company has estimated its operating costs at 9.12 cents per cubic yard.

During the year reviewed, the company erected and placed in operation a bucket dredge and a dragline excavator. The Yuba-type dredge was modified to dig into sand and into the first few feet of underlying bedrock. It can reach fifty feet below the level of a pond and can handle 6,000 cubic yards of sand per day. The dragline, equipped with a 150-foot boom, removes the overburden covering the gold-bearing sand; its capacity is 6,000 tons of sand per day. Both machines have a combined capacity of 12,000 cubic yards of material per day. Dredging operations are planned for nine months of the year. The company is planning another drilling programme to outline additional ore reserves.

Laviolette Mining Company Limited continued its 1960 exploration programme in Suzor township, Laviolette county. The company is operating on the suzorite deposits formerly held by Siscoe Gold Mines. Two other deposits have been found, one of them containing 75 to 80 per cent phlogopite; the ore, which is amenable to open-pit mining, has been estimated at 14,000,000 tons.

The company is installing a small laboratory in Montreal to study the industrial potential of its phlogopite.

Les Mines Roy et Ross Inc. explored a baryte and galena deposit on range I, Nicolas - Rioux seigniory, Rimouski county. During the year under study, an adit abandoned a few years previous was driven deeper into a hill-side. Other excavations were made to follow the mineralized veins.

East MacDonald Mines Limited, owner of the former Candego Mines in Boisbuisson and Christie townships, Gaspé-North county, did a little exploration work, mostly rock stripping, on its property. A large part of the mill equipment has been sold and removed.

Noranda Exploration Company explored a group of claims in Boisbuisson township, Gaspé-North county. The company reported meagre results from its prospecting, geological and geophysical surveys and diamond drilling programme.

During the 1961 season, Denison Mines Limited conducted a geochemical survey in Raudin township, near Grand Pabos river, in Gaspé-South county. The company also prospected in other areas of the Gaspé peninsula.

In 1960, Rio Tinto Canadian Exploration Limited conducted a combined geological and geochemical survey of its Lemieux township property, in Gaspé-North county. During the season reviewed here, it

undertook a diamond drilling programme, but, owing to technical difficulties, the company did not complete its programme satisfactorily.

New Jersey Zinc Exploration Company (Canada) Limited examined numerous prospects in the Gaspé peninsula. Work was also performed in the vicinity of Cascapédia river.

Many other companies, syndicates, and prospectors were engaged in prospecting and exploring for minerals in the Eastern Townships and Gaspé areas. Most of this work will be continued and interesting results are expected.

DEVELOPMENT AND MINING OPERATIONS IN THE PROVINCE OF QUEBEC IN 1961

This chapter reviews briefly the mining operations conducted in the Province of Quebec in 1961. Only mining and development work are summarized, as general exploration work performed by mining companies has been treated in the preceding chapter of this report.

METALS

AKASABA GOLD MINES, LIMITED

Louvicourt Township - Abitibi-East

Producer: gold

During 1961, Akasaba Gold Mines Limited shipped 91,315 tons of ore to the mill of Bevcon Mines Limited; this represents daily shipments averaging 250 tons. This ore assayed 0.185 ounce of gold per ton.

There was only one stope in operation, and, at the end of the year reviewed, two-thirds of the ore present had been drawn. Preparation for extraction from another stope had also been completed. All the outlined ore is located between the surface and the 300-foot level. Ore reserves are estimated at 78,651 tons grading 0.168 ounce of gold per ton.

Late in the year, underground and surface diamond-drill exploration was resumed. No development work was carried out.

In 1961, the mine employed 23 people; Mr. H.R. Graham was the manager.

ANGLO AMERICAN MOLYBDENITE MINING CORPORATION

Preissac Township - Abitibi-East

Development: molybdenum, bismuth

The sinking of a vertical three-compartment shaft, started early in 1961, was completed to a depth of 375 feet below surface on or about May 23rd of the same year by Anglo American Molybdenite Mining Corporation. Two stations were excavated at the 150- and 300-foot horizons respectively.

Lateral development and exploration began late in June and were centered on the 150-foot level, north of the shaft. A raise was driven from this level to the surface. Near the end of the year, a drift was started on the 300-foot level. All this work entailed the driving of 1,989 feet of drifts and 122 feet of raises.

For exploration purposes, a total of 7,337 feet of diamond-drill holes was completed underground but was not done on surface.

Towards the end of the year, the overburden covering the northern sector of the deposit was removed, in preparation for future open-pit mining operations.

Mr. L. Dixon was the manager of this property.

BARNAT MINES LIMITED

Fournière Township - Abitibi-East

Producer: gold, silver

In 1961, Barnat Mines Limited treated 608,063 tons of ore grading 0.123 ounce of gold per ton. The daily milling rate was 1,666 tons, compared with 1,218 tons grading 0.155 ounce of gold per ton for 1960. Approximately 983 tons per day was milled in the plant of Malartic Gold Fields, the rest, in the Barnat plant.

About seven per cent of the ore was extracted from the diorite stopes, between the 1,575- and the 525-foot levels, whereas the rest was mined in the porphyry zone, above the 1,075- and 900-foot levels.

The main development work carried out consisted in drifting, westward, on the 1,575-foot level, to a point close to the Canadian Malartic boundary and, also westward, on the 525-foot level, up to the North Sladen zone. This was followed by diamond drilling.

In addition to the drilling mentioned above, some drilling at depth was carried out from the 2,175-foot level.

At the end of December 1961, the company estimated its reserves of ore at 1,714,572 tons grading 0.117 ounce of gold per ton. The preceding year, the ore reserves had been established at 1,310,000 tons.

Mr. V.E. Nethery was the general manager of the mine, which employed 205 persons.

BEAUCE PLACER MINING COMPANY LIMITED

Rigaud-Vaudreuil Seigniory - Beauce

Producer: placer gold

Beauce Placer Mining Company Limited resumed its operations in March 1961. The work consisted in the installation of a dredge capable of handling close to 8,000 cubic yards of gold-bearing sands per day. This dredge started operating in August.

Operations were suspended on December 21st until the end of the year because of mechanical trouble. During its operating period the dredge handled a total of 355,197 cubic yards of earth and sand, 40 per cent of which was gold-bearing sands. Production amounted to 478.369 ounces of gold and 64.41 ounces of silver.

All the dredging done was carried out in preparation for future regular operations.

BEVCON MINES LIMITED

Louvicourt Township - Abitibi-East

Producer: gold, silver

In 1961, the treatment plant of Bevcon Mines Limited processed 222,350 tons of ore grading 0.141 ounce of gold per ton. The preceding year, 233,910 tons averaging 0.130 ounce of gold per ton had been milled. If the ore shipped from the Akasaba mine is included, the plant handled 313,665 tons, compared with a total of 306,382 tons in 1960.

The Bevcon ore was mined from stopes located between the 600- and 2,100-foot levels. Approximately 17 per cent of the ore came from blocks of ground purchased from the Lencourt and Buffadison mines. A total

of 40,704 feet of diamond-drill holes was bored underground to outline stopes and to probe for the possible longitudinal extension of the main vein.

At December 31st, 1961, the ore reserves were estimated at 320,312 tons grading 0.14 ounce of gold per ton

Mr. H.R. Graham was the mine manager. The labour force numbered about 200 people.

CAMPBELL CHIBOUGAMAU MINES LIMITED

Obalski, McKenzie and Roy Townships - Abitibi-East

Producer: copper, gold, silver

In 1961, the treatment plant of Campbell Chibougamau Mines Limited handled 712,493 tons of ore having an average grade of 2.44 per cent copper, 0.049 ounce of gold and 0.548 ounce of silver per ton. The above tonnage was supplied by the Main, Kokko Creek, Cedar Bay and Henderson mines.

Main Mine

From the "A" and "B" zones of the Main mine, 54,510 tons of ore was sent to the mill; the average metal content of this ore was 1.98 per cent copper, 0.036 ounce of gold and 0.486 ounce of silver per ton. In addition, development work on the levels serviced by the internal shaft supplied 9,043 tons of ore averaging 0.81 per cent copper, 0.015 ounce of gold and 0.151 ounce of silver per ton.

Development and exploration were centered on the group of six levels located between the 2,700- and 3,450-foot elevations. Lateral development work represented a linear advance of 4,727 feet. Underground diamond-drilling footage totalled 63,547 feet, whereas similar work on surface amounted to only 604 feet.

Proved ore reserves in the "A" zone are placed at 143,337 tons grading 2.12 per cent copper and 0.033 ounce of gold per ton, whereas the "B" zone contains 188,723 tons averaging 2.08 per cent copper and 0.027 ounce of gold per ton.

Kokko Creek Mine

The Kokko Creek mine produced, in 1961, 125,297 tons of ore with an average content of 2.53 per cent copper, 0.012 ounce of gold and 1,347 ounce of silver per ton.

There was no development work done during the year. The 1,882 feet of diamond-drill holes bored were aimed at the detailed exploration of the deposits.

Ore reserves amounted to 162,157 tons containing 2.72 per cent copper and 0.012 ounce of gold per ton.

Cedar Bay Mine

There was a total of 242,056 tons of ore extracted from the Cedar Bay mine in 1961; the average metal content was 2.37 per cent copper, 0.077 ounce of gold and 0.275 ounce of silver per ton

The mining methods used are the shrinkage and the cut-and fill; there were 27 or 28 stopes in operation between the 250- and the 800-foot levels.

Development and exploration were carried out mostly on the following levels, namely: the 650-, 800-, 500- and 375-foot. The work consisted in the driving of 4,169 feet of drifts and 462 feet of raises.

Exploration diamond drilling either to find new ore zones or to outline more accurately those already known amounted to 46,982 feet bored underground, whereas drilling was not done from the surface.

At last report, proved ore reserves at the Cedar Bay mine amounted to 529,386 tons grading 2.62 per cent copper and 0.072 ounce of gold per ton.

Henderson Mine

Ore extraction from this mine, in 1961, reached 272,411 tons grading 2.65 per cent copper, 0.039 ounce of gold and 0.415 ounce of silver per ton.

This tonnage came mostly from six stopes in the "A" zone located between the 275- and the 525-foot levels.

Development work was carried out on the 100-, 275- and 525-foot levels. Drifts, specially on the last two levels, were driven eastward and northeastward to explore the "A", "B" and G" zones. This development comprised 4,530 feet of drifts and 1,850 feet of raises.

The installation of a jaw crusher on the 650-foot level was completed at the beginning of the year.

On surface, diamond drilling from the ice on Chibougamau lake totalled 19,070 feet. Drilling underground amounted to 38,055 feet.

At the last report, ore reserves were established at 1,816,716 tons grading 2.29 per cent copper and 0.063 ounce of gold per ton.

Mr. A.M. Walker is the manager of Campbell Chibougamau Mines Limited: the four mines employed 742 persons.

CANADIAN MALARTIC GOLD MINES LIMITED

Fournière Township - Abitibi - East

Producer: gold, silver

In 1961, the concentrator of Canadian Malartic Gold Mines treated 472,797 tons of ore grading 0.096 ounce of gold per ton, compared with 468,694 tons grading 0.097 ounce of gold per ton in 1960.

Mining took place in the greywacke rocks in No. 1 shaft area, between the 500- and 1,125-foot levels, in the same type of rocks as around No. 3 shaft between the 250- and 500-foot levels and in the porphyry of No. 1 shaft above the 250- and 375-foot levels. Stope M, south of No. 3 shaft in the porphyry zone, between the 750- and 875-foot levels, is undergoing development.

The western extension of the "F" ore zone was diamond drilled both from surface and from the 250-foot level drift, which was pushed westward. Development work was also carried out in the greenstone contact area on the 1,375-foot level, in the mineralized porphyry zone east of the "B" deposit, between the 375- and 750-foot levels and in the vertical extensions of many stopes, such as Nos. 12, 29, 48, 49 and others.

At the end of the year reviewed here, the company had not quite finished transforming part of its mill to adopt it to the treatment of nickel ore from the Marbridge mine.

Ore reserves, at December 31st, 1961, had been estimated at 810,000 tons grading 0.102 ounce of gold per ton, both figures identical to those reported at the end of 1960.

Mr. A.R. Meyers was promoted to the post of mine manager: there were 242 men on the payroll.

THE CONIAGAS MINES LIMITED

Lesueur Township - Abitibi-East

Producer: zinc, lead, gold, silver

Construction of the mill at the property of The Coniagas Mines Limited, which was started towards the end of 1960, was completed early in March 1961. The mill was placed in operation towards the middle of March and treated 79,826 tons of ore, for an average of 278 tons per day. Average grade of the ore milled was 17.75 per cent zinc, 1.73 per cent lead, and 9.15 ounces of silver per ton.

Recovery, as concentrates, amounted to 24,000,000 pounds of zinc, 335,000 pounds of lead, 524,000 ounces of silver and 642 ounces of gold.

Lateral development work involved 706 feet of drifting, of which 230 feet was driven on the 1,080-foot level to explore the extension of the deposit at depth. Raises driven for stope preparation, ventilation and ore passes totalled 1,960 feet.

On surface, only four diamond-drill holes were bored for a total footage of 1,280 feet; underground, 92 holes were put down for a total of 9,274 feet.

The company reports that, at the end of December 1961, its ore reserves were adequate to insure two years of mining at a daily rate of 315 tons.

A heating plant was installed at the main fan in order to warm the air sent underground for ventilation purposes in winter.

The mine manager is Mr. J.R. Harrison; the mine personnel numbered 103 people in 1961.

CONTINENTAL TITANIUM CORPORATION

St-Urbain - Charlevoix

Producer: crushed ilmenite

Mining operations of Continental Titanium Corporation were centered mostly in the Fourneau mine, because of the heavier nature of the ore there which was needed to fulfill sales' contract requirements. Production was rather low, averaging 500 tons per week, due first to the large

tonnage of waste rock that had to be removed to get at the ore, and, secondly, to the need of hand cobbing the ore from the waste.

Approximately 15,000 tons of ore was mined in 1961 at the Fourneau mine. The Bignell mine yielded 6,000 tons of ore.

Shipments totalled 18,000 tons of crushed ore, to be used as heavy aggregate; of this tonnage, about 6,000 tons was finely ground (from 4 to 100 mesh). No concentrates were produced. At Baie-Saint-Paul, the foundations for a titanium oxide manufacturing plant were poured, and part of the machinery ordered. Construction of the plant will probably be resumed in May 1962.

COPPER RAND CHIBOUGAMAU MINES LIMITED

McKenzie and Roy Township - Abitibi-East

Producer: copper, gold, silver

In 1961, the Copper Rand mill treated 604,480 tons of ore grading 2.44 per cent copper, 0.063 ounce of gold and 0.26 ounce of silver per ton. This ore was supplied by the Copper Rand (or Main), Jaculet and Portage mines.

Copper Rand Mine

The Copper Rand mine accounted for 353,515 tons of ore, which contained 2.37 per cent copper and 0.04 ounce of gold per ton. Ore was extracted from about 30 stopes located between the 275- and 1,300-foot levels; however, three-fifths of the ore milled originated from the lower horizons.

The main development work done was the deepening of No. 4 shaft, by an additional 681 feet; this opening now extends to a depth of 2,131 feet below surface.

Five new stations were cut at the following depths; 1,470, 1,620, 1,770, 1,920 and 2,090 feet. Drifting was started on all levels to permit the driving of both ore and waste passes. But most of the lateral development work took place on the 1,300-foot level; drifts were driven both east and west to explore the extension of the cupriferous ore zones. In all, 3,793 feet of drifts and more than 3,524 feet of raises were driven.

Underground, a total of 22,382 feet was diamond drilled in 1961 for exploration purposes, whereas on surface the total was 5,501 feet.

The company reports that the ore reserves, at this mine, stand at the same level as they did the year before: 1,804,000 tons grading 3.05 per cent copper and 0.025 ounce of gold per ton.

Jaculet Mine

In 1961, this mine supplied the concentrator with 79,460 tons of ore averaging 2.15 per cent copper. This ore was mined from shrinkage stopes located between the 300- and 600-foot levels.

Most of the development work was centered on the 300- and 450-foot levels. It included 1,560 feet of drifts and more than 635 feet of raising done as part of the stoping programme.

Exploration diamond drilling was centered in No. 1 zone; a total of 11,447 feet was drilled underground and 1,760 feet, from surface.

A company's report sets the ore reserves of this mine at 96,000 tons grading 2.85 per cent copper and 0.025 ounce of gold per ton.

An electrically heated fan was installed over the emergency exit in order to improve the mine ventilation.

Portage Mine

This mine shipped to the mill, in 1961, 171,505 tons of ore, containing 2.87 per cent copper and 0.151 ounce of gold per ton. This ore was mined in stopes located between the 250- and 750-foot levels.

A large proportion of the development took place on the 250-foot level, where the main drift was pushed an additional 639 feet to the west. In 1961, total development footage comprised 1,886 feet of drifts and 696 feet of raises.

It was also on the 250-foot level that most of the 9,539 feet of diamond-drill holes were bored. Exploration drilling from the surface totalled 4,634 feet.

The company established the ore reserves at this mine at 1,100,000 tons assaying 2.24 per cent copper and 0.18 ounce of gold per ton.

These three mines are under Mr. D.C. McDonald, mine manager; the total labour force numbered 498 people in 1961.

EAST MALARTIC MINES LIMITED

Fournière Township - Abitibi-East

Producer: gold, silver

The East Malartic mill treated 547,877 tons of ore at the rate of 1,501 tons per day assaying 0.202 ounce of gold per ton. In 1960, the tonnage treated was 544,939 tons averaging 0.211 ounce of gold per ton.

Ore reserves, as estimated at the end of 1961, were 1,825,000 tons grading 0.172 ounce of gold per ton, compared with 1,823,000 tons assaying 0.182 ounce of gold per ton at the end of the preceding year.

Most of the ore treated (about 85 per cent) came from stopes located between the 3,445- and 2,485-foot levels of the Main ore zone. The rest was obtained mainly from the East zone, between the 2,935- and 2,485-foot levels.

Drifting was done to study ground east of the East zone, on the 2,935-, 3,445-, 3,805- and 4,845-foot levels. Development work was done east and west of a crosscut in the Main zone on the 3,945-foot level. Finally, crosscuts were driven northwards from all the stations of No. 5 Internal Shaft. Holes were drilled in the Main and East zones, following the development work.

No. 5 Internal Shaft was completed, early in May 1961, to a depth of 4,940 feet. Shaft stations were opened at the following depths: 3,945, 4,095, 4,245, 4,395, 4,545, 4,695 and 4,845 feet.

A new ventilation raise is replacing the one already in use between the 2,945- and 2,485-foot levels.

Mr. V.E. Nethery, general manager, had 435 employees working under him.

EAST SULLIVAN MINES LIMITED

Bourlamaque Township - Abitibi-East

Producer: gold, silver, copper, zinc

During 1961, the East Sullivan concentrator treated 2,817 tons of ore daily, for a total of 1,028,201 tons assaying 0.688 per cent copper, 0.466 per cent zinc, 0.0057 ounce of gold, and 0.187 ounce of silver per ton. During 1960, the daily tonnage treated was less, at 2,663

tons, but its value was definitely higher. An improvement in milling methods in the flotation cell circuit resulted in a greater tonnage being treated.

Ore was mined from most of the known zones. Among those, there are many where stoping is still in progress, such as in the "A" zone surface pillar, in the "E" zone on the 900-foot level, in the "B", "E", "J1" and "J2", "L" and "M", "R" and "Q", at various elevations above the 1,800-foot level, and in the "P", "S" and "T" zones, at various elevations between the 1,800- and 2,850-foot levels. In addition, development and stope preparation are in progress in the "X" zone, in the extension of the "B" zone above the 900-foot level, and in the "U" zone above the 2,400-foot level. Finally, some work has been done in order to reach the zinc ore zone "F" on the 300-foot level; this zone was located through surface diamond drilling.

Underground diamond drilling has not disclosed, so far, any extension of the ore zones below the bottom, or 3,900-foot, level. The crusher room, on the 3,750-foot level, was completed.

On August 31st, 1961, ore reserves amounted to 2,550,000 tons grading 0.94 per cent copper and 0.47 per cent zinc.

The mine manager was Mr. O.R. Wray; employees numbered 287, in 1961, of which about 120 were underground workers.

ELDER MINES AND DEVELOPMENTS LIMITED

Beauchastel Township - Rouyn-Noranda

Producer: gold

During 1961, Elder Mines continued its shipments of silicious gold fluxing ore to the Noranda smelter at the rate of 396 tons per day. The average gold content of the ore was 0.1341 ounce per ton. By way of comparison, in 1960, shipments were at the rate of 400 tons per day and the grade of ore was identical, 0.1341 ounce of gold per ton.

This ore came mostly from stopes located in the Western sector of the mine, between the 950- and 1,625-foot levels. The ore mined from the Eastern sector was obtained through the recovery of pillars left during the regular mining cycle to support the stope walls.

Lateral work completed during the year was done in the western end of the main ore zone, on every level between the 950- and

1,625-foot levels, with the exception of that of the 1,220-foot. This work comprised the driving of 1,569 feet of drifts; no raises were driven.

Exploratory diamond drilling was done underground only, and mainly on the 950-foot level; total footage amounted to 1,708 feet.

The company does not publish any ore reserve figures; however, it is believed that there is sufficient ore to insure another nine months of operations at the present rate of mining.

Mr. A.H. Honsberger, mine manager, had 86 men in his employ, in 1961.

ELDRICH MINES LIMITED

Duprat Township - Rouyn-Noranda

Producer: gold

In 1961, Eldrich Mines shipped a slightly lesser tonnage of silicious gold fluxing ore to the Noranda smelter than it had in 1960; but the gold content was almost identical. For example, the 1961 shipments were made at a daily rate of 326 tons of ore assaying 0.1277 ounce of gold per ton, whereas, in 1960, the figures were 339 tons and 0.129 ounce of gold per ton.

This ore was extracted from stopes located on all the levels between surface and the 875-foot level.

Drifting during the year totalled 1,797 feet distributed on the 250-, 625-, 875- and 1,015-foot levels. Most of the 599 feet of raises driven originated from the 1,015-foot level. Diamond drilling also extended to all the levels and totalled 7,976 feet. There was no surface diamond drilling.

Owing to the irregular nature of the mineralized zone, the company does not publish any ore reserve estimates. It is believed that there is enough ore present for another nine months of mining at the present rate.

Mr. W. Dent was the mine manager; in 1961, 53 persons were employed at the mine.

FRONTENAC MINING CORPORATION

Gayhurst Township - Frontenac

Underground exploration: molybdenite

Frontenac Mining Corporation began driving an adit, in February 1961, on its mining property located on lots 17 and 18, range IX, Gayhurst township.

The adit was pushed over a distance of 2,400 feet in a northeasterly direction. Five diamond-drill holes were bored, at right angles to the adit, towards the north. In December, drifting was suspended. The company sampled the ore zones discovered and will plan a diamond drilling programme based on the sampling results.

GASPÉ COPPER MINES LIMITED

Holland Township - Gaspé-North

Producer: copper, gold, silver, bismuth, selenium

During 1961, the concentrator of Gaspé Copper Mines treated an average of 7,094 tons of ore per day, for a total of 2,589,000 tons grading 1.31 per cent copper. A total of 174,900 tons of concentrates, including 55,900 tons of custom material and 81,000 tons of fluxing ore, was smelted; metals recovered consisted of 43,000 tons of copper, 7,300 tons of gold and 479,000 ounces of silver.

The following table is a comparative summary of the work performed in 1961 and in 1960:

Ore mined	1961		1960	
A Zone	1,953,577	tons	1,507,862	tons
B Zone	450,198	"	535,865	"
C Zone	1,253,039	"	1,309,748	"
Total	3,656,794	tons	3,353,473	tons
Drifts	8,672	feet	10,443	feet
Raises	1,796	"	1,948	"
Inclined roadways	2,642	"	1,727	"

There are two main ore deposits in the Gaspé Copper property: Needle Mountain and Copper Mountain. Some work was done to

join the latter to the underground workings of the Needle Mountain deposit: a drift on the 1,500-foot level. This opening will be used as a diamond-drill base. On surface, a certain amount of rock was mined from the ore outcropping on the side of Copper Mountain, and it was sent to the mill for research purposes.

Most of the operations are centered in the "A", "B" and "C" zones, in the Needle Mountain deposit. The first zone is located between elevations 2,200 and 2,600 feet above sea level; the "B" zone, between 1,400 and 2,000 feet and the "C" zone, between 1,000 and 1,800 feet above sea level. These zones supplied respectively 35, 18 and 40 per cent of the ore treated; the remaining 7 per cent came from development headings.

In the "A" zone, mining is done by open-pit methods; in the other zones, by diesel-powered trackless machinery.

Mining in the "A" zone is done by benching at the following elevations: 2,420, 2,460 and 2,500 feet. The tonnage of broken rock increased considerably: from 1,507,862 tons in 1960 to 1,953,557 tons in 1961, a 30 per cent increase.

Although mining in the "B" zone continued on a regular basis, it supplied only 450,198 tons, a 16 per cent decrease compared with that of the previous year.

Ore extraction in this zone will be on a diminishing return basis as the other zones will become able to supply the required tonnage.

Some development work, mostly drifts and ventilation raises, was done in this zone to get some secondary ore lenses ready for mining.

Stope mining in the "C" zone contributed some 1,253,039 tons, 4 per cent less than a year ago.

The main development work undertaken in this zone was the continuation of the main inclined roadway between the 1,700- and 1,800-foot levels, the driving of secondary drifts leading to the stoping areas and ventilation drifts and raises.

Crushing plant No. 3 on the 1,800-foot level became operative in June. Mining preparation was continued in the "East Shoulder" deposit of the "B" zone. This deposit is the eastward extension of the "B" and "C" zones. The work included mining drifts, together with ventilation drifts and raises. The development programme is aimed at placing this deposit in readiness to supply the tonnage of ore now coming from the "B" zone.

The Gaspé Copper Mines smelter processed concentrates shipped from Telt Cove and Atlantic Coast Copper.

GHISLAU MINING CORPORATION LIMITED

and

LAVIOLETTE MINING AND METALLURGICAL CORPORATION

Montauban Township - Portneuf

Producer: lead, zinc, copper, gold, silver

The concentrator operated by these two companies began its regular operations at the end of May. Mill feed is supplied by the old tailings of the former Tétreault mine.

Approximately 700 tons of tailings was treated daily; recovery was 6 tons of lead concentrates and 15 tons of zinc concentrates. Work was suspended November 1st, 1961, and will be resumed about May 15th, 1962.

THE HILTON MINES

Bristol Township - Pontiac

Producer: iron concentrate

Mining took place on the following levels of the open pit of the Hilton Mines, near Shawville: the 1,118-, 1,151-, 1,184-, 1,217-, 1,250- and 1,280-foot levels.

During the first eleven months of 1961, a total of 4,642,540 long tons of rock and ore was mined from the open pit. Of this total, 2,661,285 tons was sent to the crushing plant; a first magnetic separation brought the mill feed down to 1,363,922 tons. Production for this period amounted to 690,271 long tons of concentrates grading 66.07 per cent iron. Total production for 1961 should reach 750,000 tons of concentrates.

In the pelletizing plant, the capacity of each of the three furnaces was raised to 45 tons per hour, by increasing the volume of air needed to oxidize and harden the pellets.

In the open pit work was carried out on the 1,280-foot bench to extend mining operations eastwards. Two new benches were started during the year: one at elevation 1,151 feet and, near the end of the year, the other at elevation 1,118 feet.

IRON ORE COMPANY OF CANADA

Duplessis County - New Quebec

Producer: iron ore

In 1961, a total of 3,016,928 long tons of ore was mined from the open pits around Schefferville. This is a 63 per cent decrease, compared with the 1960 tonnage.

Production from the various open pits, in 1961, is summarized in the following table.

Open Pits	Material Stripped (Cubic Yards)	Ore Stock-piled (Cubic Yards)	Ore Mined (Long Tons)
Gagnon A and C ...	4,064,669	6,345	2,476,134
French	868,874	8,774	445,804
Burnt Creek	541,500	1,300	94,990
Ferriman	355,269	-	-
Totals	5,830,312	16,419	3,016,928

Near the end of the year, foundations for the new crushing plant of the French open pit were started. The plant will be moved from the centre of the open pit, on the 1,975-foot level, to the eastern end of the lower level at elevation 1,850 feet.

Preparations for mining in the Ferriman open pit were resumed in mid-November; no work had been done during the ore mining season.

LAMAQUE MINING COMPANY LIMITED

Bourlamaque Township - Abitibi-East

Producer: gold, silver

The tonnage of ore treated during the year 1961, in the Lamaque mill reached 767,800 tons, the equivalent of 2,105 tons per day. In 1960, the corresponding figures were 759,200 tons and 2,078 tons.

The ore came from stopes located on almost every level of the main mine. Stopes located between the 1,200- and 3,600-foot levels supplied the bulk of the mill feed. About 1 1/2 per cent of the total production was derived from No. 3 mine.

In the main mine, lateral development work was pushed on the 1,200-foot level, in the Northwest zone to explore the possible

extension of the Sigma mine ore body; Sigma is adjacent to Lamaque to the east. On the 3,200-foot level, the main haulageway to the East lens has been completed; from this same level, ore passes were driven up to the 2,900-foot level to serve the "Lower C" zone. Between these same two levels, the "Lower E" zone is being prepared for mining. Finally, routine development work was carried out on a few other levels.

The No. 3 mine shaft was completed, in mid-year, to a depth of 727 feet and stations were cut at the following elevations: 125, 300, 450, 575 and 700 feet.

Drifting has begun on all these levels. On the 125- and 300-foot levels, the drifts are in a gold vein which assays higher on the average than the main mine veins. On the 300- and 700-foot levels, the driving of long crosscuts is in progress; these will explore No. 4 and No. 5 lenses respectively.

At December 31st, 1961, the company estimated its ore reserves at 2,335,000 tons assaying 0.186 ounce of gold per ton, figures almost identical to those of 1960.

The mine manager is Mr. A.W. Foley; in 1961, the mine employed 600 people.

LES MINES ROY ET ROSS INC.

Seigniory Nicolas Rioux - Rimouski

Underground exploration: barytine, lead

The work done by Les Mines Roy et Ross Inc. on its Nicolas Rioux Seigniory was aimed at developing a barytine and lead deposit, The company built a power-plant, a pilot-plant, a repair shop, a laboratory and an office.

The exploration work consisted in surface trenching and in slashing the 6- by 6-foot adit to an 8- by 8-foot section over a length of 150 feet located on lot 149. The pilot-plant can treat 100 tons of ore per day.

MALARTIC GOLD FIELDS LIMITED

Fournière Township - Abitibi-East

Producer: gold, silver

In 1961, the mill of Malartic Gold Fields treated 279,385

tons of ore assaying an average of 0.163 ounce of gold per ton. In the preceding year, 404,186 tons having the same value had been treated. However, this mill treated 550,256 tons of ore, if custom-milled material is taken into account.

The No. 2 mine of this company was exhausted by December 1961. During 1961, mining produced 102,000 tons of ore, mostly salvaged material, from the 150-foot level and from almost every elevation between the 1,650- and 2,400-foot levels. In the No. 1 mine, the ore mined was taken from the "C" and "F" zones mostly, between the 1,200- and 1,800-foot levels and from the East zone, between the 1,950- and 2,400-foot levels.

Development work in the East zone was done on the 1,800-foot level, and, on the 1,650-foot level, in the "Q" zone. A few drill holes were bored in each place.

Ore reserves, on December 31st, 1961, were estimated at 191,500 tons grading 0.16 ounce of gold per ton.

Mr. R.W. Dempsey was the mine manager; in 1961, there were 260 persons employed at the mine.

MALARTIC HYGRADE GOLD MINES LIMITED

Malartic Township - Abitibi-East

Underground development: gold

Early in 1961, this company was called Lavandin Mining Company Limited.

A 436-foot vertical shaft, begun in August, was completed in October. Two shaft stations were cut: one at 252 feet, the other at 407 feet below the collar.

On the 250-foot level, a 340-foot drift was driven to reach and follow the No. 2 gold-quartz vein.

There was no surface diamond drilling during the year; underground, drilling on both levels was aimed at locating No. 2 vein only. Two other veins, No. 1 and No. 3, have been located through previous surface drilling.

On December 31st of the year reviewed, approximately 1,000 tons of ore, assaying nearly 1.0 ounce of gold per ton, had been stock-piled on surface waiting to be trucked to the Malartic Gold Fields mill for treatment.

Construction of the surface mining plant took place during 1961. Of a total of 18 employees, 10 worked underground; Mr. O. Hamel is the general superintendent.

MANITOU-BARVUE MINES LIMITED

Bourlamaque Township - Abitibi-East

Producer: gold, silver, lead, zinc, copper

Of the 461,245 tons of ore treated, in 1961, in the Manitou-Barvue mill, 298,385 tons was copper ore grading 1.18 per cent copper and 0.024 ounce of gold per ton. The remainder, 162,860 tons, was zinc ore containing 5.9 per cent zinc, 0.76 per cent lead, 0.031 ounce of gold and 5.7 ounces of silver per ton. This can be compared with 292,065 tons of copper ore and 164,690 tons of zinc ore milled in 1960.

The copper ore is still coming from the sector located between the 210- and 1,870-foot levels and the zinc ore, from stopes located between the 2,330- and 3,240-foot levels.

Deepening of the internal shaft was completed, in mid-year, to a depth of 4,200 feet. Shaft stations now exist down to the 4,160-foot level and the ore-pass and waste-pass systems have been completed down to a depth of 3,990 feet. Crosscuts have been pushed to the southern boundary of the ore.

Development in the copper zone consisted in pursuing the diamond drilling programme and in driving lateral openings on the 660-, 810-, 1,720- and 2,180-foot levels.

In the zinc ore zone, similar work was done on the 2,640, 3,240 and 3,390-foot levels to determine the extension of this ore zone.

The company sets its proven zinc ore reserves at 309,636 tons grading 7.45 per cent zinc, 0.03 ounce of gold and 5.25 ounces of silver per ton, as at January 1st, 1962. The copper ore is estimated at 758,845 tons grading 1.31 per cent copper, 0.016 ounce of gold and 0.26 ounce of silver per ton.

Compared with the 1960 figures, the zinc ore reserves have decreased by 66,230 tons and the copper ore reserves, by 74,657 tons.

Mr. S.A.J. Hopper was the mine manager; 370 people worked there in 1961.

MARBAN GOLD MINES LIMITED

Dubuisson Township - Abitibi-East

Producer: gold

Marban Gold Mines began its ore shipments to the Malartic Gold Fields mill on July 1st, 1961. On December 31st, 41,635 tons assaying 0.13 ounce gold per ton had been shipped.

This total includes 18,000 tons of development ore stock-piled on surface, while the rest was extracted from a stope, in the "C" zone above the 650-foot level and through development work in the "D" and "F" zones on the 650- and 800-foot levels.

On surface, a few drill holes were bored southeast of the shaft near the collar of the emergency exit. Some holes were drilled underground in the known ore zones to study the economic potential of the ore.

Ore reserves have been estimated at 221,500 tons assaying 0.18 ounce of gold per ton.

Mr. R.W. Dempsey is the mine manager; there were 20 people employed in 1961.

MARBRIDGE MINES LIMITED

LaMotte Township - Abitibi-East

Underground development: nickel

Between the months of March and July 1961, a vertical shaft was sunk on the property of Marbridge Mines Limited to a depth of 809 feet, with stations at 150, 300, 450, 600 and 750 feet.

On the first four levels, crosscuts have been pushed to the nickel ore zone, and development work was done in the zone itself. Ventilation raises were driven up to the surface and a crosscut was advanced on the 750-foot level.

At Canadian Malartic Gold Mines, the mill was expanded and most of the equipment needed to treat the Marbridge ore was installed. Development ore from Marbridge has been shipped and stock-piled at Canadian Malartic.

Development and regular mining work were awarded by contract to R.F. Fry and associates who employed 42 men during 1961. Mr. R.C. Staveley, superintendent, manages the property for Falconbridge Nickel Mines, the controller.

MOLYBDENITE CORPORATION OF CANADA LIMITED

Lacorne Township - Abitibi-East

Producer: molybdenite, molybdic oxide, bismuth

In 1961, the mill of Molybdenite Corporation treated 238,214 tons of ore for a daily average of 653 tons. This tonnage does not include 15,405 tons of near-waste material sorted at the crushing plant. Average grade of the ore was 0.302 per cent molybdenite and 0.038 per cent bismuth. In 1960, the average grade was 0.337 per cent molybdenite and 0.042 per cent bismuth.

The fact that virtually no ore is coming from the rich North-south structures explains the drop in grade during 1961. In the East-west structures, mining of No. 29 vein was progressing at every level. Veins Nos. 25, 27, 28, 62, 78, 82, 83, 87 and 89 were also mined between the 250- and 750-foot levels.

Development work was carried out on every level in vein No. 29; in addition, veins Nos. 28 and 62 were developed on the 750- and 500-foot levels.

Diamond drilling was mainly used to outline stoping areas, but,on the 250-foot level, the western part of the mine was explored in search of new North-south structures

Tonnage milled was increased in October following some changes in the flotation circuit and the addition of a Wilfley table to obtain a better bismuth recovery. During the same period, the production of lubricant-grade molybdenite was discontinued. Efforts are now being made to sell all the molybdenum as molybdic oxide.

At December 31st, 1961, outlined ore reserves stood at 269,482 tons, compared with 246,350 tons on December 31st, 1960.

The mine manager is Mr. G. Langlois. Of the 185 persons employed by the company in 1961, 100 worked underground.

MATTAGAMI LAKE MINES LIMITED

Galinée Township- Abitibi-East

Underground development: zinc, copper, gold, silver

In 1960, at Mattagami Lake mines, a six-compartment vertical shaft was sunk to a depth of 1,185 feet and stations were cut at the following elevations below surface: 150, 350, 550, 750 and 1,000 feet.

In 1961, development work was confined to the four upper levels. A crusher room was excavated on the 870-foot level and the crusher foundations were poured.

Emergency exits were completed from surface to the pumping, or 1,000-foot,level. Ore- and waste-passes were completed and stope preparation was initiated on the 350-, 550- and 750-foot levels. During 1961, 14,502 feet of lateral openings and 4,552 feet of raises were driven.

A 17,297-ton stock pile of ore was built on surface with material obtained through development and stope preparation work.

Underground exploratory diamond drilling was kept up throughout the year; a total of 78,297 feet of drill holes was completed.

A heating plant was constructed to warm the air ventilating the mine in winter time. A temporary trailer village of some 31 units was established near the property to house the personnel.

The company has not reported any change in the ore reserves published at the end of 1960. These stood at 21,000,000 tons grading 12.76 per cent zinc, 0.68 per cent copper, 0.018 ounce of gold and 1.31 ounces of silver per ton in the main orebody. A second orebody was reported to contain 2,000,000 tons grading 12.86 per cent zinc, 0.86 per cent copper, 0.013 ounce of gold and 0.99 ounce of silver per ton.

Mr. M.W. Airth, mine manager, directed a crew of 156 persons.

MERRILL ISLAND MINING CORPORATION LIMITED

Obalski Township - Abitibi-East

Producer: copper, gold, silver

In 1961, Merrill Island mined 154,301 tons of ore having an average content of 23 per cent copper, 0.01 ounce of gold and 0.50 ounce of silver per ton.

The mill produced, as concentrates, 7,189,918 pounds of copper, 1,520 ounces of gold and 61,980 ounces of silver. During the preceding year, the 158,899 tons of ore treated produced 6,621,235 pounds of copper, 1,210 ounces of gold and 53,530 ounces of silver.

Most of the mill feed came from cut-and-fill stopes above the 150-foot level in the "A" zone and between the 300- and 150-foot levels in the "B" zone.

Development work was completed during the year 1961 in the "A", "B", "C" and "D" zones; it amounted to 1,870 feet of drifting and 2,183 feet of raising. Lateral advances were located on the 300-, 150-, 625- and 925-foot levels.

A total of 2,127 feet of diamond-drill holes were bored on surface and 29,611 feet of drilling took place underground.

In mid-July 1961, a shaft deepening programme was started. From an initial depth of 1,043 feet, it is planned to go down to 2,300 feet below surface. At the end of December, sinking had progressed 890 feet. Eight new stations will be cut at 150-foot intervals, below the 925-foot level.

Ore reserves, as reported by the company, stood at 353,255 tons assaying 2.21 per cent copper, 0.01 ounce of gold and 0.45 ounce of silver per ton.

Mr. E.W. Watt is the mine manager; the labour force totalled 125 people in 1961.

NEW CALUMET MINES LIMITED

Ile du Grand-Calumet Township - Pontiac

Producer: zinc, lead, gold, silver

During its fiscal year ending September 30th, 1961, New Calumet Mines treated 96,872 tons of ore grading 7.31 per cent zinc, 2.0 per cent lead, 0.015 ounce of gold and 4.08 ounces of silver per ton. The average tonnage milled daily was 317 tons. The annual report of the company sets the ore reserves at 310,468 tons.

Mill feed came from stopes and headings located in the Nos. 3 and 4 shaft areas.

During the first ten months of the year, holes totalling 10,140 feet were drilled underground and 1,331 feet, from surface.

Drifts and crosscuts driven totalled 2,810 feet, most of them in the No. 4 shaft area, on the 1,350-, 1,925- and 2,050-foot levels.

NORANDA MINES LIMITED

Rouyn Township - Rouyn-Noranda

Producer: copper, gold, silver, pyrite

The Horne mine delivered 1,340,000 tons of ore to the Noranda Mines smelter and concentrator, a total slightly superior to the 1960 tonnage. From the 961,500 tons of ore treated in the concentrator, the company obtained 173,000 tons of copper-gold concentrate and 200,000 tons of pyrite concentrate.

The copper-gold concentrate was sent to the smelter, whereas the pyrite concentrate was treated by cyanidation to extract its gold and silver content. After drying, 185,500 tons of pyrite concentrate was shipped mostly to sulphuric acid producers.

In addition to the copper concentrate, the smelter processed 378,500 tons of Horne mine ore, 169,800 tons fluxing ore from the Don Rouyn section, and 834,700 tons of concentrates, scrap and slag on a custom basis.

The Horne mine ore was mined from stopes spread between the surface and the 2,975-foot level. Nearly all mining operations consisted in pillar recovery by the cut-and-fill method.

The most notable development and exploration work done during the year reviewed was the sinking of a vertical three-compartment shaft. Collared on the 6,000-foot level, the bottom of this entry will be 8,000 feet below surface. At year end, sinking had progressed 1,150 feet and shaft stations had been cut at 6,500 and 7,00 feet below surface.

The mining of 1,340,000 tons of ore reduced the reserves by 881,000 tons.

Mr. C.E. Anderson was the mine manager.

NORLARTIC MINES LIMITED

Vassan Township - Abitibi-East

Producer: gold, silver

In 1961, Norlartic Mines shipped 149,671 tons of ore assaying 0.13 ounce of gold per ton to the Malartic Gold Fields plant. This total represents shipments averaging 410 tons daily, compared with 360 tons the preceding year; the ore then graded 0.14 ounce of gold per ton.

The bulk of the shipments was extracted from the Main zone stopes, between the 100- and 875-foot levels; the remainder came from the North zone, below the 250-foot level.

Lateral development drives were pushed on the 750-foot level, both east and westwards, following the extension of the Main zone, and, on the 500-foot level, in the "B" zone. Raises were driven in both zones.

There was no surface diamond drilling done during the year; underground drilling was confined to outline stoping limits.

On December 31st, 1961, the company estimated its ore reserves at 574,000 tons of ore grading 0.16 ounce of gold per ton.

In 1961, 50 persons were employed at the mine managed by Mr. R.W. Dempsey.

NORMETAL MINING CORPORATION LIMITED

Desmeloizes Township - Abitibi-West

Producer: zinc, copper, gold, silver, pyrite

In 1961, the Normetal Mining concentrator handled 355,001 tons of ore for a daily average of 973 tons, compared with 949 tons in 1960. The average grade of the milled ore was 3.10 per cent copper, 4.54 per cent zinc, 0.026 ounce of gold and 2.15 ounce of silver per ton.

The concentrates produced by the mill contained 20,711,602 pounds of copper, 24,937,976 pounds of zinc, 6,899 ounces of gold and 584,452 ounces of silver. Pyrite shipments to chemical plants and pulp mills reached 30,927 tons.

About 80 per cent of the milled ore came from No. 4 shaft, some 3,000 feet from the surface. The remainder was mined in stopes scattered between surface and the 3,070-foot level.

No. 4 internal shaft was deepened 586 feet; the bottom is now at a depth of 6,811 feet below surface. Three new levels were established at 6,365 feet, 6,565 feet and 6,765 feet. This programme started in February and was completed in October. Drifting was begun on the 6,765-foot level. Ore passes were driven from the 5,960-foot up to the 5,365-foot level. Other raises were driven to improve ventilation on levels below the 4,765-foot level. In all, 3,500 feet of drifts and 1,311 feet of raises were driven during 1961.

The search for other ore deposits and the outlining of ore zones between levels required the boring of 21,623 feet of diamond-drill holes. From surface, footage drilled amounted to 8,161 feet.

At the end of the year reviewed, the company estimated its ore reserves at 1,325,000 tons assaying 3.71 per cent copper and 5.32 per cent zinc.

Mr. R.J. Allen was the mine manager; in 1961, 535 people were employed by the company.

OPEMISKA COPPER MINES (QUEBEC) LIMITED

Lévy Township - Abitibi-East

Producer: copper, gold, silver

Mining operations at Opemiska Copper Mines were temporarily suspended when a strike broke out on October 20th, 1961; this disruption terminated at the end of March 1962. From January 1st to October 20th, the mill processed 599,015 tons of ore grading 2.88 per cent copper, 0.029 ounce of gold and 0.41 ounce of silver per ton.

Recovery of metals was as follows: copper, 94.4 per cent; gold, 83.6 per cent; and silver, 80.3 per cent. These percentages are equivalent to 32,638,030 pounds of copper, 13,977 ounces of gold and 203,446 ounces of silver.

Springer Mine

The No. 3 vein of this mine supplied the bulk of the mill feed. The remainder came from veins Nos. 2, 1, 4, and 5.

Development was undertaken in zones Nos. 2, 3, 8 and 7;on the 2,000-foot level, a drift was pushed to the east end of No. 2 zone, while, in the Perry mine, a drive was advanced westwards on the 1,825-foot level to reach the east end of the same zone.

In zone No. 3, drifts were lengthened on the 1,825- and 525-foot levels where an off shoot of No. 3 vein has been labelled No. 8 vein.

On the 975-foot level, drifting was started in No. 7 vein from the south end of this level crosscut. This vein and other parallel systems were explored by diamond drilling from drifts in the No. 3 vein on the 1,125- and 1,475-foot levels.

At the end of the year, development work amounted to 6,934 feet of drifts, 2,792 feet of raises, and 27,579 feet of underground diamond-drill holes; there was no drilling from surface.

Perry Mine

In 1961, nearly all the mining activity in this mine centered on development and exploration work. Attention was given to the development of the "B" deposit, on every elevation between the 150- and the 1,825-foot levels. Development of the 275-, 975- and 1,125-foot levels in this deposit was nearly completed.

Horizontal drilling on the 1,300- and 1,475-foot levels has established the limits of the "B" deposit. Other holes drilled towards the extension of this deposit at depth have intersected it at 1,650- and 1,825 feet.

On the 1,300-foot level a drift extended towards the north-east end of the "B" deposit encountered a new copper zone, which was called deposit "J".

All this development work comprised 6,426 feet of drifts plus 717 feet of raises. Diamond drilling operations processed 34,610 feet of holes bored underground and 11,453 feet, on surface.

A company's report established its ore reserves, at the close of the year 1961, at 6,031,300 tons of ore assaying 3.14 per cent copper.

The 591 persons employed in 1961 were under the direction of Mr. F.G. Cooke, mine manager.

ORCHAN MINES LIMITED

Galinée Township - Abitibi-East

Underground development: zinc, copper, gold, silver

Early in the year, Orchan Mines reached the decision to proceed with the underground development of a drill-indicated zinc-copper zone in order to start mining operations in the near future. Therefore, a surface mining plant was built and sinking of a three-compartment vertical shaft begun at the end of October.

At the end of December 1961, the shaft had reached a depth of 460 feet, and two shaft stations had been cut at 150 and 350 feet below surface. The shaft-sinking was done by Evert Ross and Associates Limited.

The company reports its ore reserves at 4,600,000 tons grading 12.41 per cent zinc, 1.29 per cent copper, 0.015 ounce of gold and 1.29 ounce of silver per ton.

PREISSAC MOLYBDENITE MINES LIMITED

Preissac Township - Abitibi-East

Underground development: molybdenum, bismuth

Sinking of a vertical three-compartment shaft, started at the end of 1960, was completed to a depth of 675 feet, on about March 28th, 1961. Shaft stations were cut at 200, 325, 450 and 575 feet below surface.

Lateral development work first started on the 575- and 450-foot levels, and, at the end of September, on the 325-foot level. The total advance amounted to 7,467 feet of drifts and crosscuts. At the close of the year reviewed, a raise started from the 575-foot level had reached a height of 25 feet on December 31st. All development ore, 17,953 tons, was stock-piled on surface.

Exploration diamond drilling was done only underground at depths of 450 and 575 feet; a total of 23,695 feet of holes was drilled.

Mr. B. Joyal had charge of this development.

QUEBEC CARTIER MINING COMPANY

Conan Township - Duplessis

Producer: iron ore concentrates

The concentrator of Quebec Cartier produced 1,341,388 tons of concentrates in 1961; average iron content was 65.9 per cent.

From the open pit, 3,436,070 tons of iron ore grading 31.7 per cent iron was extracted; in addition, 652,100 cubic yards of overburden and 1,793,000 tons of waste rock were removed.

In early March 1961, the first ore train left Lake Jeannine for Port-Cartier. A few months later, ore loading facilities at the Port-Cartier were given a trial run when the ore carrier S.S. Ore Transport took on a small load of concentrate. During the winter, gale-force winds, coupled with extremely high tides, caused severe damage to the port installations, thus postponing completion of the project. The Lake Jeannine open pit is mined through ten 40-foot-high benches. Extraction took place mostly at the east end.

In the concentrator, tune-up work lasted part of the year 1961 to balance each of the twelve concentration circuits.

QUEBEC IRON AND TITANIUM CORPORATION

Parker Township - Duplessis

Producer: ilmenite

The Havre-Saint-Pierre open-pit mine of Quebec Iron and Titanium achieved another record in 1961 when it shipped 1,113,000 long tons of ore to the Sorel smelter of the company. This is 198,000 tons above the total recorded in 1960.

From the open pit, 1,226,500 long tons of ore was mined from benches located at the following elevations: 610, 645, 680 and 755 feet. In addition, a total of 383,300 long tons of low-grade ore and waste was mined and removed.

During the shipping season, two ore boats, one a 19,000-ton vessel and the other a 14,000-ton, plied the St. Lawrence between Sorel and Havre-Saint-Pierre, every other day.

QUEMONT MINING CORPORATION LIMITED

Rouyn Township - Rouyn-Noranda

Producer: copper, zinc, gold, silver, pyrite

In 1961, the Quemont mill processed a daily average of 2,253 tons of ore, in comparison with 2,341 tons in 1960. The grade of the mill feed was about the same as it had been the previous year: 1.32 per cent copper, 2.51 per cent zinc, 40.3 per cent pyrite, 0.173 ounce of gold and 0.85 ounce of silver per ton.

The copper concentrate was sent to the Noranda smelter, whereas the zinc concentrate was shipped to plants in the United States. After cyanidation to extract the precious metals they contained, 236,241 tons of pyrite concentrate was shipped to chemical plants.

In the mine, ore extraction took place in stopes located between the 200- and 3,240-foot levels. About 24 per cent of the ore came from stopes between the 200- and 560-foot levels; 54 per cent, between the 560- and 2,340-foot levels; and the remainder, from below the 2,340-foot level.

Development took place in the Western sector of the mine, on the 2,520-, 2,670-, 2,970-, 3,120-, 3,420- and 3,570-foot levels; and, in the Eastern sector, on the 3,270- and 3,870-foot levels. All raises driven, whether for ventilation or for ore and waste passes, were located between the 2,520- and 3,570-foot levels. In all, lateral drives totalled 4,840 feet, and raises, 1,264 feet.

There was some exploration diamond drilling done on nearly every elevation between the 200- and 3,870-foot levels. An important part of this exploration programme was concentrated on the 3,270 and 3,870-foot levels. A total of 58,023 feet of diamond-drill holes was bored underground. On surface, exploration drilling in the north end of the property was continued and required 33,122 feet of drill holes.

According to a company statement, ore reserves, on December 31st, 1961, stood at 4,650,000 tons of ore assaying 1.28 per cent copper, 2.82 per cent zinc, 48.0 per cent pyrite, 0.168 ounce of gold and 1.04 ounces of silver per ton.

Mr. A.G. Ballachey was the mine manager; the labour force totalled 617 employees.

SOLBEC COPPER MINES LIMITED

Stratford Township - Wolfe

Underground development: copper, zinc, lead, gold, silver

During 1961, Solbec Copper Mines sank a three-compartment shaft to a depth of 1,250 feet on its property in Stratford township. In addition, eight shaft stations were cut and the drifts and raises necessary for mining were advanced on the first five levels. The first station was cut at 205 feet below surface; the next three, at 125-foot intervals, and the others, at 150-foot intervals.

A mill having a daily capacity of 1,000 tons was built and placed in operation at the end of the year under review. Flotation concentrates obtained contain copper, zinc, lead and pyrite.

The sinking of another three-compartment vertical shaft to a proposed depth of 1,600 feet was started on the property of Cupra Mines Limited, located two miles west of Solbec Copper mines. Work was suspended when the opening had reached a depth of 60 feet; it will be resumed after a headframe and hoistroom have been built.

SIGMA MINES (QUEBEC) LIMITED

Bourlamaque Township - Abitibi-East

Producer: gold, silver

In 1961, the tonnage of ore milled in the Sigma Mines plant reached 436,712 tons, an average of 1,196 tons per day; these figures compare favourably with 430,136 tons and 1,175 tons per day in 1960. Grade of the mill feed was 0.186 ounce of gold per ton.

There are stopes in operation down to the 3,150-foot level, although the bulk of the ore was mined above the 2,250-foot level. Ninety-four per cent of the ore came from the 2,250-foot level, and the remainder was supplied by development headings.

Lateral development was done between the 1,225- and 4,050-foot levels. Crosscuts and drifts were driven on each of the levels serviced by the new internal shaft, from the 3,300-foot level downward.

A total of 33,227.5 feet of diamond-drill holes was bored for exploratory purposes and for help in the development programme. Of this total, 1,203 feet of drilling was done from surface.

Sinking of No. 3 internal shaft was completed early in the year to a depth of 4,280 feet; footage sunk in 1961 attained 290 feet. Shaft stations were cut at 4,050 and 4,240 feet. In addition, a sump and a loading pocket were excavated below the 4,050-foot level.

By company estimates, ore reserves, at December 31st, stood at 1,389,500 tons; 800,500 tons of these are well outlined. They assay 0.226 ounce of gold per ton.

The mine employed 383 persons under Mr. F.J. O'Connell, mine manager.

ST. LAWRENCE COLUMBIUM AND METALS CORPORATION

L'Annonciation Parish - Two Mountains

Producer: columbium pentoxide

At the end of August 1961, St. Lawrence Columbium and Metals completed the construction of its concentrator and ancillary buildings. Since then, the plant has produced 310,000 pounds of concentrates containing over 50 per cent columbium pentoxide (Cb_2O_5). By-products of the flotation process include magnesite, pyrite, calcite and apatite.

In the open pit, mining took place on the 30-foot bench. During 1961, 50,870 tons of ore was mined; in addition, a total of 39,600 tons of overburden and 41,400 tons of waste rock was removed.

SULLIVAN CONSOLIDATED MINES LIMITED

Dubuisson Township - Abitibi-East

Producer: gold, silver

Averaging 692 tons per day, the Sullivan Consolidated mill treated 252,644 tons of ore in 1961; the average grade of the mill feed was 0.211 ounce of gold per ton. The difference between the tonnage of ore mined and milled is represented by the 32,154 tons of near-waste rock that was sorted at the crushing plant. Both tonnage and grade of ore were slightly superior to the figures obtained in 1960.

The mill feed came mostly from Nos. 4 and 16 veins between the 2,000- and 2,375-foot levels, from Nos. 9 and 14 veins, between the

1,250- and 1,900-foot levels and above the 950-foot level, respectively, and from the new vein (No. 94) above the 650-foot level.

Lateral development work was done in Nos. 4 and 5 veins, chiefly on the lower levels, namely those at 2,500, 2,600 and 2,750 feet. Some development headings were advanced also on the 850- and 1,650-foot levels, in the same vein systems, on the 550-foot level in No. 84 vein, and on the 3,100-foot level in the possible extension at depth of the favourable mineralized area.

Most of this work was completed by diamond drilling, mainly on the 2,500 and 3,100-foot levels.

On December 31st, 1961, ore reserves were estimated at 651,450 tons assaying 0.235 ounce of gold per ton, compared with 640,000 tons the year before.

The total labour force numbered 275 persons, 175 of them having been underground workers; Mr. J.P. Bonneville was the mine manager.

VAUZE MINES LIMITED

Dufresnoy Township - Rouyn-Noranda

Producer: copper, zinc, gold, silver

The name of this company was changed in September 1961 from Consolidated Vauze Mines, Limited, to Vauze Mines Limited.

Early in 1961, the company reached the decision of bringing its property into production and of building a mill.

Started early in May, the construction of the mill was completed at the end of September and milling began on October 3rd, 1961. From that date until December 31st, 22,301 tons of ore was treated. The ore assayed an average of 5.98 per cent copper, 5.59 per cent zinc, 0.046 ounce of gold and 2.31 ounces silver per ton.

This ore was extracted from the South, or "B-1", zone. Development work in the North, or "B-2", zone supplied only a minor amount.

During 1961, while mill construction was in progress, development work was carried out at a slower pace, in both the South and North zones, on the 65-, 225-, 375- and 550-foot levels. Nearly half of the 2,603 feet of drifts and 1,072 feet of raises driven were located in the North zone.

For exploration purposes, 3,056 feet of diamond drilling was done on surface and 11,122 feet, underground.

The company reported its ore reserves at 184,000 tons grading 5.24 per cent copper, 3.68 per cent zinc, 0.042 ounce of gold and 1.75 ounces of silver per ton, as at December 31st, 1961.

At the end of the year, the mine was employing 95 men under Mr. E.P. Graham, mine manager.

WAITE-AMULET MINES LIMITED

and Subsidiary

AMULET DUFAULT MINES LIMITED

Dufresnoy Township - Rouyn-Noranda

Producer: copper, zinc, pyrite, gold, silver

In 1961, the Waite-Amulet mill treated an average of 682 tons of copper-zinc ore per day, compared with 813 tons from the Waite-Amulet and Amulet Dufault sectors in 1960. Average grade of the mill feed was 5.72 per cent copper, 2.71 per cent zinc, 0.039 ounce of gold and 1.06 ounces of silver per ton. By way of comparison, the grade in 1960 was 4.68 per cent copper, 3.48 per cent zinc, 0.039 ounce of gold and 0.95 ounce of silver per ton.

Most of the ore came from the recovery of No. 40 pillar; lesser quantities came from the East Waite No. 3 and Amulet Dufault sector. During the month of April 1961, the East Waite No. 3 orebody was depleted.

Stoping preparations necessitated the driving of 834 feet of drifts and of 902 feet of raises. The greater part of this work was done in the Amulet Dufault and in the A-11 Winze sectors. There was no exploratory diamond drilling done during the year.

On December 31st, 1961, ore reserves were estimated to be sufficient to maintain the 1961 rate of mining until October 1962.

Mr. T.E. Little was the mine manager; the mine employed 199 persons during the year reviewed here.

NON-METALLIC

INDUSTRIAL MINERALS

ALUMINUM COMPANY OF CANADA

Hull Township - Gatineau

Producer: magnesium oxide, lime

Aluminum Company of Canada did not operate its Maxwell deposit at Wakefield except for a period of two weeks in 1961. Mining produced 15,000 tons of ore.

From the Cross deposit, where operations began two years ago, extraction is now conducted at the rate of 25,000 tons of ore and waste per month.

Mining operations were conducted on the 500-, 475- and 450-foot benches. Ore is loaded with a 2 1/2-cubic-yard shovel. Five trucks are used to haul the ore to the concentrator three miles distant.

ARMAND SICOTTE ET FILS LTEE

Howick Parish - Chateauguay

Producer: silica

From June to October 1961, the quarry of Armand Sicotte et Fils produced 1,100 tons of crushed silica per day.

ASBESTOS CORPORATION LIMITED

Thetford Township - Mégantic

Producer: asbestos

In 1961, Asbestos Corporation operated, at full capacity, its three mines: King-Beaver, British Canadian and Normandie.

The tonnage milled was 2.6 per cent, or 111,014 tons, more than in 1960.

The following table summarizes the company's mining activities in 1961 and in 1960.

	1961		1960	
Rock broken	14,961,986	tons	14,620,382	tons
Ore milled	4,275,948	"	4,164,934	"
Ore milled daily	15,381	"	15,182	"

Sorting before treatment eliminated 406,979 tons of waste rock. In addition, 2,505,000 cubic yards of overburden was removed, compared with 1,064,258 cubic yards in 1960. This increase was due to an expansion programme at the Normandie mine, which entailed the removal of over 1,000,000 cubic yards of overburden.

An accurate survey of the ore reserves was undertaken during the year reviewed in order to carry out selective mining in the various deposits and to improve the quality of the different types of fibres marketed. At the end of 1961, the total ore reserves amounted to 98,780,000 tons distributed as follows: King-Beaver mine, 13,870,000 tons; British Canadian, 48,760,000 tons; Normandie, 23,250,000 tons; and 12,900,000 tons in various other properties.

One important improvement has been the substitution of oil for coal in the asbestos rock drying plants of both the King-Beaver and British Canadian mines.

At the Normandie mine, a pilot-plant has been set up to recuperate, by a new process, the fine asbestos fibres used as filler material.

Experiments are underway to assess the value of asbestos in road paving mixtures.

BAKER TALC LIMITED

Potton Township - Brôme

Producer: soapstone, talc

Baker Talc Limited mines a soapstone and talc deposit located on cadastral lots 606 and 607, range V, Potton township.

Approximately 10,000 tons of ore is mined every year. Ore is extracted in stopes serviced by an adit and processed at the company's mill located in Highwater, 14 miles from the mine.

During October of the year reviewed, the sinking of a 45°, inclined, two-compartment shaft was started. Its collar is near the mouth of the adit and it will go under the present underground workings.

BELL ASBESTOS MINES LIMITED

Thetford Township - Mégantic

Producer: asbestos

Bell Asbestos mined seven per cent more ore in 1961 than in 1960: a total of 669,150 tons for a daily average of 2,040 tons.

Sorting eliminated seven per cent of the above total before the ore entered the mill.

Ore was extracted by block-caving from blocks Nos. 2, 3, 4, 5 and 6, above the 650-foot level. Some development was done in blocks Nos. 5 and 6 above that same level; drifts and raises were driven. Work was completed in block No. 5 and almost finished in block No. 6.

BLACKBURN BROS. LIMITED

Hull Township - Gatineau

Producer: mica

Mining operations were conducted in two places during 1961 by Blackburn Bros. From June to December, an old working, formerly flooded and located 300 feet west of the main mine, was in operation.

This working was made up of a 75-foot shaft and a 20-foot-long drift. During the summer, the drift was lengthened an additional 30 feet to the north. At the end of the drift, a 45° raise was pushed through to surface. Three tons of mica per month was extracted from this mine.

During the rest of the year, mining took place in a stope of the Carey vein on the 100-foot level of the main mine.

The year's production amounted to 60 tons.

BROUGHTON SOAPSTONE AND QUARRY COMPANY LIMITED

Leeds Township - Mégantic

Producer: soapstone and talc

Broughton Soapstone and Quarry operates a processing plant

in Leeds township and owns quarries in Leeds, Broughton and Thetford townships. Only the quarries located in the last two townships were operated in 1961.

Production for the year amounted to 15,000 tons. Part of it was cut and sold in different shapes, but most of it was ground and bagged for sale.

CANADIAN JOHNS-MANVILLE COMPANY LIMITED

Shipton Township - Richmond

Producer (underground and open pit): asbestos

In 1961, the programme aimed at shifting from underground to open-pit mining was continued by Canadian Johns-Manville Company. It requires the extension of the open pit both east and west and the installation of skipways. A complex of two bins and four 48-inch by 60-inch jaw-crushers was set up on the south side of the open pit. On the west side of the pit, two skips travelling on an inclined skip way will be installed to remove waste rock from the pit. The work on this last set-up has already started.

A total of 7,213,000 tons of rock was broken, of which 5,904,000 was treated in the mill; this represents an increase of ten per cent over the tonnage milled in 1960. This ore was supplied by both open-pit and underground mining operations.

Thirty-three per cent of the ore came from underground stopes in blocks Nos. 5, 7, 9, 11 and 13, above the 750-foot level. The tonnage mined is slowly decreasing; at the end of the year, only ten per cent of the ore came from underground.

In the open pit, mining was carried out on the following benches, identified by the elevations above sea level, namely: 335, 405, 440, 475, 510 and 540. About 925,000 cubic yards of overburden was removed from the east and west sides of the pit to allow for its deepening.

CANADIAN REFRACTORIES LIMITED

Grenville and Harrington Townships - Argenteuil

Producer: magnesitic dolomite

In 1961, 125,096 tons of ore was extracted from the underground workings by Canadian Refractories, at the rate of 546 tons per day.

Of this total, 91,025 tons was sent to the No. 1 plant of Canadian Refractories at Kilmar.

About 85 per cent of the ore was shipped from underground workings serviced by No. 2 shaft. In this section of the mine, stopes Nos. 4310, 8335 and 8320 were in operation. Only stope No. 308 was operated in the No. 1 shaft area.

Development work, in 1961, was limited to No. 2 shaft area. Diamond drilling totalled 672 feet. Stope preparation for stopes Nos. 4295 and 8320 required the driving of 2,311 feet of drifts, 1,814 feet of crosscuts and 1,523 feet of raises.

At the end of September of the year reviewed, the company began the construction of a plant to treat asbestos ore mined from stope No. 308. This asbestos is reported to be of exceptional quality.

CANADIAN SILICA CORPORATION

Lac-des-Deux-Montagnes Seigniory - Deux-Montagnes

Producer: sand and silica flour

The production of Canadian Silica Corporation quarry averaged 450 tons of crude stone per day.

When the new milling plant now under construction is completed, production capacity by this company will probably be tripled.

CAREY CANADIAN MINES LIMITED

Broughton Township - Beauce

Producer: (open pit) asbestos

During 1961, Carey Canadian Mines treated 814,000 tons of asbestos ore in its mill, an increase of 13 per cent over the quantity processed in 1960. The tonnage of waste rock mined rose to 917,000 tons.

The "C" deposit was mined by oepn-pit method; benches mined were at the following elevations: 1,215, 1,250 and 1,280 feet.

A large amount of overburden was removed from the southwest and northeast sides of the open pit to permit mining at depth.

DOMINION LIME LIMITED

Dudswell Township - Wolfe

Producer (open pit): limestone

There was a slight increase in the activities of Dominion Lime in 1961, owing to the new crushing complex installed to produce aggregates. Another annex to this plant was built to produce agricultural lime.

There is only one 60-foot-high bench in the quarry operated by the company.

The tonnage of rock extracted amounted to 219,136 tons, of which 116,485 tons was crushed to produce aggregates and agricultural lime. A total of 102,651 tons of limestone was processed into ordinary lime.

DOMINION SILICA CORPORATION

Lussier Township - Montcalm

Producer: crushed silica

The St. Donat quarry of Dominion Silica produced a daily average of 600 tons of crushed silica during 1961.

FLINTKOTE MINES LIMITED

Thetford Township - Mégantic

Producer (open pit): asbestos

In 1961, 1,251,779 tons of rock was mined in the Flintkote open pit; of this quantity, 784,584 tons was waste rock. The bulk of the waste rock was removed from the south side of the pit to allow for its extension at depth, as the orebody dips 55° to the south.

The tonnage of ore milled was only 467,195 tons, a ten per cent decrease compared with that of 1960. The ore to waste ratio is 1: 1.7.

In July, a two-bin inclined skipway was placed in operation at the east end of the pit. A primary crushing plant is located at the top of the skipway.

The ore is hauled from the bottom of the pit to a bin above the crushing plant, a distance of 200 feet. A conveyor brings the crushed material to the mill.

GOLDEN AGE MINES LIMITED

Rigaud-Vaudreuil Seigniory - Beauce

Exploration: asbestos

During 1961, Golden Age Mines, whose property is located in the Rigaud-Vaudreuil Seigniory, was engaged in research work. Its pilot-plant was operated during the first three and the last four months of the year.

In August, a new building was constructed near the mill. A rotary dryer and a larger-capacity crusher were housed in it.

The total quantity of rock treated was 3,975 tons; open pits Nos. 3 and 9 supplied 2,428 and 1,547 tons respectively. Work at the first pit was suspended during the summer of the year reviewed, whereas the second was still in operation in late December.

INTERNATIONAL MINERALS AND CHEMICAL CORPORATION

Buckingham and Derry Townships - Papineau

Producer: potassic feldspar, quartz

The Buckingham plant of International Minerals and Chemical treated a monthly average of 810 tons of feldspar and 150 tons of quartz in 1961.

The feldspar and a small tonnage of quartz are extracted from the semi-underground workings of the Buckingham and Smith Lake mines located in Derry township. The latter mine was in operation only during the first three months of the year.

Most of the quartz came from a quarry in Baskatong township, operated by Baskatong Mining Corporation.

An annex was built to the Buckingham grinding plant, at the end of the year. This annex will be used for silica crushing and grinding operations only.

JOHNSON'S ASBESTOS COMPANY

Coleraine Township - Mégantic

Producer (open pit): asbestos

In 1961, the Johnson's Asbestos open pit, in Black Lake,

produced 2,337,490 tons of rock; of this total, 977,640 tons was ore that was milled at a rate of 4,000 tons per day. The tonnage of rock mined was 24 per cent larger than it had been in 1960, whereas the ore extracted increased by 21 per cent. The ore to waste ratio was 1: 1.4.

Mining took place on three benches located at 1,000, 1,060 and 1,100 feet above sea level. The average height of the benches ranges from 45 to 55 feet.

JOHNSON'S COMPANY LIMITED

Thetford Township - Mégantic

Producer (underground and open pit): asbestos

In 1961, the underground and the open-pit mines operated by Johnson's Company supplied 630,110 tons of rock, 16 per cent more than during the previous year. The mill treated 490,180 tons of ore at the rate of 2,034 tons per day, which was ten per cent less than that milled in 1960.

Thirty per cent of the ore was supplied by the open pit and 70 per cent, by the underground mine.

In the open pit, located on lot 461, Thetford township, mining operations were carried out on the first bench. The total quantity of rock broken was 270,230 tons, which included 130,300 tons of ore.

The underground workings supplied 359,880 tons of ore, which was extracted from Blocks 11 and 18, above the 1,100-foot level, and from Block 2, above the 700-foot level.

Development work, consisting of ventilation drifts and raises, was done in Blocks 12 and 17.

LAKE ASBESTOS OF QUEBEC LIMITED

Ireland Township - Mégantic

Producer (open pit): asbestos

During 1961, Lake Asbestos of Quebec extracted 7,202,543 tons of rock from its Black Lake property.

The mill treated 1,746,122 tons of ore, six per cent more than during the previous year. Mining operations were conducted in the three deposits known as "A", "B" and "C".

A total of 1,442,490 tons of overburden was removed from the former bed of Black lake.

NATIONAL ASBESTOS MINES LIMITED

Thetford Township - Mégantic

Producer (open pit): asbestos

During 1961, National Asbestos extracted 1,500,000 tons of rock from the one bench it mined in its open pit; this bench is located 1,150 feet above sea level.

The quantity of ore treated amounted to 602,000 tons, this being a daily average of 3,000 tons. This tonnage represents a seven per cent increase over last year's production. The ore to waste ratio is 1: 1.5.

NICOLET ASBESTOS MINES LIMITED

Tingwick Township - Arthabaska

Producer (open pit): asbestos

The mill of Nicolet Asbestos treated an average of 1,600 tons of ore per day during 1961. A sorting system eliminates about ten per cent of waste rock before milling.

Ore is extracted from benches Nos. 1 and 2 at the east end of the open pit. The ore to waste ratio is 3: 1.

Modifications were made in the asbestos milling process to improve the quality of the fibre.

QUEBEC LITHIUM CORPORATION LIMITED

Lacorne Township - Abitibi-East

Producer: lithium oxide and lithium carbonate

During 1961, the Quebec Lithium mill treated 39,505 tons of ore grading 1.44 per cent lithium oxide. Part of the concentrate obtained was used in the company refinery to produce 1,125,425 pounds of lithium carbonate.

Production of ceramic-grade spodumene concentrate was suspended near the end of the year reviewed. All the production of the mill, which operates intermittently at a daily rate of 675 tons, will be sent to the refinery.

At December 31st, 1961, 4,745 tons of spodumene concentrate was stock-piled on surface. Underground, there is an estimated 216,841 tons of broken ore and more than 1,000,000 tons of ore ready to be mined. The blasting of 4,000 tons of ore in 2VIE stope was the only mining operation carried out in 1961.

A new building was added to the refinery, where lithium hydroxide will be produced. At the end of the year, half of the equipment needed was already installed. A few modifications were made in the lithium carbonate circuit in order to increase production.

The mine employed an average of 90 men during 1961. Only three miners were needed underground to supply the necessary mill feed: Mr. L. Béliveau is the general manager.

UNION CARBIDE CANADA LIMITED

St-Clément parish - Beauharnois

Producer: quartzite

The Union Carbide quarry was operated for a period of only ten days in 1961, producing nearly 6,000 tons of crushed quartzite in all.

BUILDING MATERIALS

CARRIÈRE ANDORNO LIMITÉE: Cap St-Martin - Laval

Producer: building limestone

The average production of Carrière Andorno was 15 tons of rough stone per day during 1961.

JEAN BÉDARD LIMITÉE: Caughnawaga Reserve - Laprairie

Producer: crushed limestone

The Jean Bédard quarry produced roughly 2,500 tons of crushed limestone per day during the year reviewed.

A. BILLET LIMITÉE: Canton Bélanger - Laval

Producer: crushed limestone

In 1961, the daily production of crushed limestone varied between 2,400 tons and 3,600 tons at the A. Billet quarry.

BRIQUE CITADELLE LIMITÉE: Boischatel and Beauport-Est - Quebec

Producer: bricks

The monthly production by Brique Citadelle Limitée was 1,500,000 bricks at Beauport and 2,000,000 bricks at Boischatel in 1961.

BRODIE'S LIMITED: Campbell Township - Labelle

Producer: building granite

The production of cut stone by Brodie's Limited was roughly 200 tons during the year reviewed.

CANADA CEMENT COMPANY: Montreal East - Laval

Producer: limestone for cement

The Montreal East quarry had a production varying between 5,000 and 10,000 tons daily of crushed stone throughout 1961.

CANADA CEMENT COMPANY: Hull - Gatineau

Producer: cement

The limestone and clay quarries were operated intermittently in 1961 by Canada Cement Company. After a six-week work stoppage in the spring, operations were resumed on a two- to three-day a week schedule during part of the summer of the year reviewed.

The limestone quarry produced 187,713 tons of rock; the clay pit, 37,981 tons; and the cement plant, 856,607 barrels of cement.

CANADIAN PINK GRANITE: Campbell Township - Labelle

Producer: building granite

Canadian Pink Granite's average production was 150 tons of rough stone weekly during 1961.

CARRIÈRE BEAUDRY LIMITÉE: Ville Duvernay - Laval

Producer: crushed limestone

The average production by Carrière Beaudry was 3,000 tons of crushed stone per day throughout the year reviewed here.

CARRIÈRE BERNIER LIMITÉE: Paroisse St-Jean - St-Jean

Producer: crushed limestone

In 1961, the average production of Carrière Bernier Limitée was 2,000 tons of crushed stone per day.

LES CARRIÈRES ET EXCAVATIONS BONNEAU LIMITÉE: Ville Laflèche - Chambly

Producer: crushed schist

The average production by Les Carrières et Excavations Bonneau was 1,000 tons of crushed schist per day during 1961.

CARRIÈRE DU CAP ST-MARTIN LIMITÉE: Cap Saint-Martin - Laval

Producer: crushed limestone

Carrière du Cap St-Martin was in operation only 180 days in 1961. The average production was 1,000 tons of crushed stone per day.

CARRIÈRE L. CHARBONNEAU LIMITÉE: Ville Saint-François - Laval

Producer: building limestone

The quarry of L. Charbonneau Limitée produced an average of 4 to 5 tons of crushed stone per day during the year under study.

CARRIERE CHUTE-DU-DIABLE: Taillon Township - Lac Saint-Jean

Producer: building granite

Carrière Chûte-du-Diable's annual production for 1961 was roughly 2,100 tons of rough stone.

CARRIÈRE CÔTEAU-DU-LAC INC.: Paroisse Saint-Ignace du Côteau-du-Lac - Vaudreuil-Soulanges

Producer: crushed limestone

In 1961, the production varied between 2,000 and 2,500 tons of crushed stone per day at Côteau-du-Lac quarry.

DESCHENES CONSTRUCTION LIMITED: Hull - Gatineau

Producer: crushed stone

The name of this company was changed in 1961, from Western Quebec Construction Limited to Deschenes Construction Limited.

Crushed stone production, during the year studied here, amounted to 480,000 tons. This stone was used for building purposes and the manufacture of asphalt. Toward the end of the year, the company completed the installation of a second crushing plant, bringing the combined capacity of the two plants from 200 to more than 400 tons of crushed stone per hour.

CARRIÈRE DULUDE LIMITÉE: Saint-Bruno Parish - Chambly

Producer: crushed silicious limestone

The average production of Carrière Dulude Limitée was 1,600 tons of crushed stone per day during 1961.

DUMAS ET VOYER: Bois Township - Portneuf

Producer: building granite

The total production of the Dumas et Voyer quarry was roughly 260 tons in 1961.

CARRIÈRE FORTIN ET FRÈRES: Saint-Louis de Gonzague - Beauharnois

Producer: crushed limestone

The average production of the Fortin et Frères quarry was 1,500 tons of crushed stone per day during 1961.

CARRIÈRE ROLAND GAUTHIER: Hull - Gatineau

Producer: limestone

During the first three months of 1961, the quarry of Roland Gauthier produced roughly 16 tons of stone daily. Work was discontinued for the rest of the year. The production was destined for the paper mills of the Hull region.

CARRIÈRE GOUIN LIMITÉE: Saint-Marc-des-Carrières - Portneuf

Producer: crushed limestone

The production by Carrière Gouin Limitée was roughly 125 tons per day for paper mills during the year reported on.

CARRIÈRE ELIE GRENIER ENRG.: Shawinigan Township - Saint-Maurice

Producer: crushed granite

The production varied between 25 and 30 tons of crushed granite per day during the summer months only of 1961 at the quarry operated by Elie Grenier Enrg.

CARRIÈRE GOYER: (Division of Dominion Lime Limited) Saint-Bruno Parish-Chambly

Producer: crushed silicious limestone

The Goyer quarry's average production during 1961 was 3,200 tons of crushed stone per day.

CARRIÈRE JOLIETTE LIMITÉE: Sainte-Thérèse Parish - Joliette

Producer: crushed limestone

The quarry operated by Carrière Joliette Limitée had an average production of 1,000 tons of crushed stone per day throughout the year 1961.

LES CARRIÈRES LAGACÉ LIMITEE: L'Abord à Plouffe - Laval

Producer: crushed limestone

Les Carrières Lagacé Limitée operates three quarries:

1 - The Back River Quarries at Cap Saint-Martin, which produced a daily average of 3,000 tons of crushed limestone in 1961;

2 - The Lagacé quarry at Saint-Martin, which produced between 3,500 and 4,000 tons of crushed limestone per day throughout the year;

3 - The Terrebonne quarry at Saint-François-de-Sales, where production averaged 3,000 tons per day of crushed stone per day in 1961.

CARRIÈRE D. LAMOTHE: Argenteuil Seigniory - Argenteuil

Producer: crushed stone

Carrière D. Lamothe operates a granite quarry for the Hydro-Quebec Commission. The crushed stone is used exclusively as aggregate for the concrete used in the building of a dam across the Ottawa river, near Carillon.

In 1961, the crushing plant had an output of 3,500 tons per day; the crushed stone was transported to the dam site by rail.

In the quarry, drilling and blasting takes place on a single bench ranging in height from 45 to 80 feet.

LES CARRIÈRES LAURENTIENNES INC.: Saint-Antoine des Laurentides - Terrebonne

Producer: crushed limestone

Production by Les Carrières Laurentiennes Inc. averaged 1,000 tons of crushed stone daily throughout the year reviewed here.

CARRIÈRE ANTOINE LLORCA: Letellier Township - Duplessis

Producer: rough granite

This quarry Antoine Llorca, in operation for only part of the year 1961, produced 3,000 tons of granite per day. This rough granite was used in the building of two jetties which will serve as foundations for two docks to be built at Sept-Iles by British American Oil Company and Imperial Oil Company.

LES CARRIÈRES MARTINEAU ET DESCHAMBAULT INC.: Saint-Marc-des-Carrières - Portneuf

Producer: crushed and building limestone, granite

Rough limestone production by Martineau et Deschambault quarries averaged 1,200 tons per day at Saint-Marc-des-Carrières, whereas granite production at Notre-Dame-des-Anges averaged 40 tons a week during the summer of the year under study.

CARRIÈRE MONTRÉAL-EST LIMITÉE: Montreal-East - Laval

Producer: crushed limestone

The Montréal-Est quarry produced an average of 4,000 tons of crushed stone daily in 1961.

LES CARRIÈRES NORMONT LIMITÉE: Canton Bélanger - Laval

Producer: crushed limestone

Production at Les Carrières Normont averaged 1,500 tons per day during 1961.

CARRIÈRE POINTE CLAIRE INC.: Beaconsfield - Jacques-Cartier

Producer: crushed limestone

A daily average of 2,500 tons of crushed stone daily was produced by Carrière Pointe Claire in 1961.

LES CARRIÈRES DE ROBERVAL LIMITÉE: Roberval Township - Roberval

Producer: crushed limestone

Les Carrières de Roberval were in operation during seven months in 1961 and produced a total of 21,000 tons of crushed stone.

CARRIÈRE ST-BARTHÉLEMI LIMITÉE: Canton du Sable - Berthier

Producer: crushed limestone

A daily average of 1,000 tons of crushed stone was produced by Carrière Saint-Barthélemi during 1961.

CARRIÈRE ST-EUSTACHE LIMITÉE: Saint-Eustache Parish - Two Mountains

Producer: crushed limestone

Carrière Saint-Eustache began its operations on October 15th, 1961. Total production for the year reviewed was about 100,000 tons of crushed limestone. The crushing plant output is rated at 400 tons per hour.

CARRIÈRE ST-MAURICE INC.: Sainte-Marguerite Range - St. Maurice

Producer: crushed limestone

In 1961, the production by Carrière Saint-Maurice varied between 1,000 and 1,800 tons of crushed stone per day.

CARRIÈRE ST. REGIS QUARRY ENRG.: Saint-Régis Township - Laprairie

Producer: crushed limestone

On the average, 2,000 tons of crushed stone per day was produced at Saint Régis quarry during 1961.

CARRIÈRE J.-O. SAUVÉ: Hull Township - Gatineau

Producer: limestone

The production of the J.-O. Sauvé quarry, an average of 80 tons of limestone per day in 1961, was shipped to the paper mills of the Hull region.

CARRIÈRE SHAWINIGAN LIMITÉE: Shawinigan Township - St. Maurice

Producer: crushed granite

The 1961 production of Carrière Shawinigan Limitée amounted to about 100,000 tons of crushed stone.

LES CARRIÈRES VARENNES LIMITÉE: Butte aux Renards Range - Verchères

Producer: crushed gneiss

Production at Les Carrières Varennes averaged 2,000 tons of crushed stone daily throughout the year reported on here.

CIMENT QUÉBEC INC.: Auteuil Seigniory - Portneuf

Producer: crushed limestone for cement

A daily average of 1,500 tons of crushed stone was produced in 1961 by Ciment Québec Inc.

ST. LAWRENCE CEMENT COMPANY: Villeneuve - Quebec

Producer: crushed limestone for cement

The production of the quarry of St. Lawrence Cement varied between 2,000 and 2,500 tons per day in 1961.

COOKSVILLE-LAPRAIRIE BRICK LIMITED: Laprairie and Delson - Laprairie

Producer: bricks

In 1961, Cooksville-Laprairie Brick Limited operated two schist quarries: one at Laprairie where production averages 500 tons of schist per day and the other at Delson with a monthly output of 9,000 tons.

J.-O. GAUTHIER LIMITÉE: Saint-Marc-des-Carrières - Portneuf

Producer: limestone

The quarry of J.-O. Gauthier Limitée produced, from April to June 1961, 17,000 tons per month of agricultural limestone, 46,000 tons of limestone for paper mills and 60,000 tons of building stone during the year.

GINGRAS ET FRÈRES LIMITÉE: Saint-Marc-des-Carrières - Portneuf

Producer: building limestone

During 1961, production was at the rate of 48 tons of rough stone per week at the quarry of Gingras et Frères.

GRANIT NATIONAL LIMITÉE: Signay Township - Lac St-Jean

Producer: building granite

Total granite production in 1961, for the Saint-Gédéon and Alma Island quarries amounted to 7,400 tons of rough stone. In addition, 469 tons was produced at the Simard Township quarry of Granit National Limitée.

GYPSUM, LIME AND ALABASTINE LIMITED: Saint-Pierre and Sainte-Emélie - Joliette

Producer: crushed limestone and sand

The limestone quarry of Gypsum, Lime and Alabastine produced a weekly average of 10,500 tons of crushed stone in 1961.

The Sainte-Emélie sand pit produced 2,500 tons of sand and 40 tons of gravel per day during the year.

GYPSUM, LIME AND ALABASTINE LIMITED: Saint-Marc-des-Carrières - Portneuf

Producer: crushed limestone

Production by Gypsum, Lime and Alabastine averaged 400 tons per day during 1961.

MELROSE GRANITE LIMITED: Campbell Township - Labelle

Producer: building granite

Production at the quarry of Melrose Granite Limited amounted to 100 tons of rough stone per week in 1961.

COMPAGNIE MIRON LIMITÉE: Ville Saint-Michel - Laval

Producer: crushed limestone

During the year reported on here the quarry production of Compagnie Miron Limitée varied between 40,000 and 90,000 tons per week.

MOUNT ROYAL PAVING AND SUPPLIES LIMITED: Clarendon Township - Pontiac

Producer: crushed gravel

The quarry production of Mount Royal Paving and Supplies averaged 1,800 tons of sand and 1,200 tons of crushed gravel per day during 1961. The finished product is shipped by rail to asphalt plants in Montreal and Ottawa.

MOUNT ROYAL PAVING AND SUPPLIES: Brandon Township - Berthier

Producer: sand

The Saint-Gabriel-de-Brandon sand pit of Mount Royal Paving and Supplies produced 5,000 tons of sand per day during 1961.

NATIONAL QUARRIES LIMITED: Ville Saint-Michel - Laval

Producer: crushed stone

In 1961, production by National Quarries Limited varied between 3,000 and 12,000 tons of crushed stone per day.

PLOURDE ET PLOURDE LIMITÉE: Tremblay Township - Chicoutimi

Producer: crushed limestone

Total production by Plourde et Plourde Limitée, in 1961, amounted to 68,600 tons of crushed stone.

QUEBEC READY MIX: Charlesbourg West - Quebec

Producer: crushed limestone

The quarry of Quebec Ready Mix produced a daily average of 3,000 tons of crushed stone and 1,200 tons of gravel throughout 1961.

RED GRANITE QUARRY LIMITED: Grenville Township - Argenteuil

Producer: granite

Red Granite Quarry Limited operated a granite quarry at Rawcliffe during the summer months of 1961. The dressed granite blocks produced were for a building at Saint-Benoit-du-Lac. A few tombstones were also cut during the year.

SABLES DES MILLE-ILES LIMITÉE: L'Assomption and Joliette Counties

Producer: sand

Sables des Mille-Iles Limitée operated three sand pits; at Saint-Henri de Mascouche it produced 600 tons per day in 1961; at Mascouche, 400 tons per day; and at Notre-Dame de Lourdes, 400 tons per day.

SALABERRY CALCAIRE INC.: Saint-Jacques-le-Mineur - Laprairie

Producer: limestone

The quarry of Salaberry Calcaire Inc. was in production from the beginning of September to the end of November 1961. During that period, it produced 50,000 tons of crushed stone, 35,000 tons of which was transformed into agricultural limestone.

ST. FRANCIS ROCK PRODUCTS AND EQUIPMENT LIMITED: Ville Saint-Laurent - Jacques-Cartier

Producer: crushed limestone

The quarry of St. Francis Rock Products and Equipment Ltd. produced 800 tons of crushed stone per day during 1961.

ST. LAWRENCE BRICK COMPANY: Ville Laprairie - Laprairie

Producer: bricks

The schist quarry of St. Lawrence Brick Company produced 250 tons of schist per day throughout the year reviewed here.

UNION CONSTRUCTION LIMITÉE: Baronnie de Longueuil - St-Jean

Producer: crushed limestone

Production at the quarry of Union Construction was 1,200 tons of crushed stone per day in 1961.

UNION DES CARRIÈRES ET PAVAGES LIMITÉE: Charlesbourg West - Quebec

Producer: crushed limestone

Union des Carrières et Pavages produced 2,700 tons of crushed stone and 1,000 tons of gravel per day throughout 1961.

UNITED STONE PRODUCTS: Sainte-Geneviève Parish - Jacques-Cartier

Producer: crushed limestone

Production averaged 1,000 tons of crushed stone per day during 1961 at the quarry of United Stone Products.

ELZÉAR VERREAULT LIMITÉE: Giffard - Quebec

Producer: crushed limestone

In 1961, production by Elzéar Verreault Limitée ranged between 1,000 and 1,200 tons of crushed stone per day.

PAUL VIAU CONSTRUCTION: Nouveau Salaberry de Valleyfield Township - Beauharnois

Producer: crushed limestone

From the beginning of September to the end of October 1961, the quarry of Paul Viau Construction produced crushed stone at the rate of 1,000 tons a day.

Table 45. - General Mining Operations in the Province of Quebec in 1961

(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 Ltd.	-	-	-	-
Barnat Mines Limited	2,863	5,381	-	46,777
Bevcon Mines Ltd.	-	-	-	-
Campbell Chibougamau Mines Ltd...	18,163	4,218	196)a)	180,697
Canadian Malartic Gold Mines Ltd.	7,303	3,982	-	44,214
Coniagas Mines Ltd. (The	707	1,960	-	10,554
Copper Rand Chibougamau Mines Ltd.	6,339	4,855	682	43,368
East Malartic Mines Ltd.	20,274(b)	-	337	40,156
Elder Mines and Developments Ltd.	-	-	-	-
Eldrich Mines Ltd.	1,797	599	-	7,976
Gaspé Copper Mines Ltd.	-	-	-	-
Lamaque Mining Co. Ltd.	12,511	6,236	762	66,110
Malartic Gold Fields Ltd.	-	-	-	-
Manitou Barvue Mines Ltd.	-	-	-	-
Marban Gold Mines Ltd.	7,525	-	-	21,720
Marbridge Mines Ltd.	4,090	636	883	6,559
Merrill Island Mining Corp. Ltd..	1,221	1,907	1,300	23,590
Molybdenite Corp. of Canada Ltd..	8,736	1,620	-	22,157
New Calumet Mines Ltd.	4,172(b)	-	-	15,628
Noranda Mines Ltd.	-	-	1,150	-
Norlartic Mines Ltd.	-	-	-	-
Normetal Mining Corp. Ltd.	3,500	1,311	586	29,784
Opemiska Copper Mines (Quebec) Ltd.	13,360	3,509	-	62,384
Quebec Lithium Corporation	-	-	-	-
Quemont Mining Corp. Ltd.	4,841	1,265	-	91,145
Sigma Mines Ltd.	10,957	4,303	291	33,228
Solbec Copper Mines Ltd.	2,737	1,287	674	5,055
Sullico Mines Ltd. (c)	5,868(b)	-		15,433
Sullivan Consolidated Mines Ltd..	6,996	-	-	34,463
Vauze Mines Ltd.	3,020	1,137		11,122
Waite-Amulet Mines Ltd.	200	254	-	-

(a) Includes shaft stations

(b) Includes raises

(c) Formerly East Sullivan mine

Table 46. - Production from Gold Mines in the Province of Quebec in 1961

(As reported in annual reports of mining companies when available)

Mine	Ore Treated (Tons)	RECOVERY		Gold Recovered Per Ton of Ore Treated (Ounces)
		Gold (Ounces)	Silver (Ounces)	
Akasaba Gold Mines Ltd.	91,315	15,526	4,193	0.17
Barnat Mines Ltd.	608,063	71,179	-	0.117
Bevcon Mines Ltd.	222,350	28,068	7,689	0.126
Canadian Malartic Gold Mines Ltd.	472,797	40,548	35,639	0.086
East Malartic Mines Ltd.	547,877	107,237	-	0.196
Elder Mines and Developments Ltd.	144,433	-	-	-
Eldrich Mines Ltd.	119,125	15,217	-	0.128
Lamaque Mining Co. Ltd.	763,320	133,052	21,760	0.174
Malartic Gold Fields Ltd.	279,395	45,744	-	0.163
Marban Gold Mines Ltd.	41,635	5,078	507	0.122
Norlartic Mines Ltd.	149,671	18,450	2,045	0.123
Sigma Mines (Quebec) Ltd.	436,712	77,914	-	0.178
Sullivan Consolidated Mines Ltd.	164,893	34,634	8,172	0.210

Table 47. - Ore Reserves of Producing Gold Mines in the Province of Quebec in 1961

(As reported in annual reports of mining companies when available)

Mine	RESERVES		Tons Treated in 1961	Tenor of Mill Heads Oz./Ton	Commencement of Operations
	Tons	Gold Content Oz./Ton			
Akasaba Gold Mines Ltd.	-	-	91,315	0.185	1960
Barnat Mines Ltd.	1,714,572	0.12	608,063	0.123	1938
Bevcon Mines Ltd.	320,312	0.14	222,350	0.141	1952
Canadian Malartic Gold Mines Ltd.	810,000	0.102	472,796	0.096	1935
East Malartic Mines Ltd.	1,294,561	0.172	547,877	0.206	1938
Elder Mines and Development Ltd.	-	-	144,433	-	1946
Eldrich Mines Ltd.	-	-	119,125	-	1956
Lamaque Mining Co. Ltd.	2,360,420	0.186	763,320	0.182	1935
Malartic Gold Fields Ltd.	191,500	0.16	279,395	0.163	1939
Marban Gold Mines Ltd.	221,500	0.18	41,635	-	1961
Norlartic Mines Ltd.	574,000	0.16	149,671	-	1960
Sigma Mines (Quebec) Ltd.	1,389,500	0.276	436,712	0.187	1937
Sullivan Consolidated Mines Ltd.	652,595	0.233	164,893	0.224	1934

Table 48. - Production of Base-metal Mines in the Province of Quebec in 1961

(As reported in annual reports of mining companies when available)

Mining Company	Tons Treated	PRODUCTION					
		Copper (Pounds)	Zinc (Pounds)	Lead (Pounds)	Gold (Ounces)	Silver (Ounces	Pyrite (Tons)
Campbell Chibougamau Mines Ltd.	704,565	28,902,554	-	-	21,338	223,132	-
Coniagas Mines Ltd. (The	79,826	-	23,389,861	1,329,623	639	524,149	-
Copper Rand Chibougamau Mines Ltd...	604,480	28,704,988	-	-	32,281	104,218	-
Gaspé Copper Mines Ltd.	2,589,000	64,000,000	-	-	-	-	-
Manitou Barvue Mines Ltd.	461,245	6,743,419	17,712,965	2,012,447	10,120	735,982	-
Merrill Island Mining Corp. Ltd. ...	152,945	6,878,365	-	-	1,379	60,165	-
New Calumet Mines Ltd.	96,872	-	13,633,399	3,753,565	1,037	307,486	-
Noranda Mines Ltd.	1,340,276	50,376,000	-	-	194,700	-	200,000
Normetal Mining Corp. Ltd.	355,001	20,711,603	29,937,976	-	6,889	584,452	31,026
Opemiska Copper Mines (Quebec) Ltd..	599,015	32,638,030	-	-	13,977	203,446	-
Quemont Mining Corp. Ltd.	822,275	19,843,108	30,526,132	-	15,693	84,252	238,943
Sullico Mines Ltd.	674,802	8,664,550	3,725,762	-	3,302	98,651	-
Vauze Mines Ltd.	22,301	1,962,808	404,800	-	751	31,648	-
Waite-Amulet Mines Ltd.	248,829	27,059,364	9,019,908	-	6,958	173,432	32,030

Table 49. - Ore Reserves of Base-metal Mines in the Province of Quebec in 1961

(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 1961	Commencement of Operations
Campbell Chibougamau Mines Ltd. ...	3,314,608	2.22	-	0.55	-	704,565	1956
Coniagas Mines Ltd. (The	338,445	-	15.24	-	7.10	79,826	1961
Copper Rand Chibougamau Mines Ltd..	2,006,800	2.48	-	0.022	-	604,480	1960
Gaspé Copper Mines Ltd.	58,608,000	1.27	-	-	-	2,589,000	1955
Manitou-Barvue							
Copper ore	758,845	1.31	-	0.016	0.26	298,385	1942
Zinc ore	309,636	-	7.45	0.030	5.35	162,860	
Merrill Island Mining Corp. Ltd. ..	178,660	2.26	-	0.01	0.45	152,945	1958
New Calumet Mines Ltd.	310,468	-	7.15	0.019	3.11	96,872	1943
Noranda Mines Ltd. .							
Sulphide ore	8,007,000	2.33	-	0.18	-	1,340,776	1927
Fluxing ore	557,000	-	-	0.16			
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.	1,325,800	3.71	5.32	-	-	355,001	1937
Opemiska Copper Mines (Quebec) Ltd.	5,088,600	3.03	-	-	-	599,015	1954
Quemont Mining Corp. Ltd.	4,650,000	1.28	2.82	0.168	1.04	822,275	1949
Sullico Mines Ltd.	2,550,000	0.91	0.47	0.007	0.27	674,802	1943
Vauze Mines Ltd.	184,000	5.24	3.68	0.042	1.75	22,301	1961
Waite-Amulet Mines Ltd.	121,000	4.66	5.02	0.027	0.92	248,829	1937

Table 50. - Production of Various Mines in the Province of Quebec in 1961

(As reported in annual reports of mining companies when available)

Mining Company	Tons Treated	Bismuth (Pounds)	Molybdenite (Pounds)	Lithium Oxide (Pounds)
Molybdenite Corporation of Canada Limited	226,294	132,246	788,757	-
Quebec Lithium Corporation	-	-	-	-

Table 51. - Ore Reserves of Various Mines in the Province of Quebec in 1961

(As reported in annual reports of mining companies when available)

Mining Company	Reserves	Molybdenite (Per Cent)	Lithium (Per cent)	Tons Treated in 1961	Commencement of Operations
Molybdenite Corporation of Canada Limited	260,477	0.34	-	226,294	1942
Quebec Lithium Corporation	-	-	-	-	1955

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961

(Locality means township except when otherwise stated; symbols "C", "P", "T" signify county, parish and territory.)

Locality	Mine	Mine (Feet	Total (Feet)
Baie St-Paul (P)	Holannah Mines Ltd.	2,900	2,900
Barraute	Triform Explorations Ltd.	1,507	1,507
Beauchastel	Elder Mines and Developments Ltd.	1,708	
	Fontana Mines (1945) Ltd.	1,000	2,708
Bellechasse	Black River Mining Ltd.	325	325
Berthiaume	Mile 18 Mines Ltd.	1,000	1,000
Boisbuisson	Noranda Mines Ltd.	686	686
Bourlamaque	Lamaque Mining Company Ltd.	55,654	
	Manitou Barvue Mines Ltd.	49,983	
	Sigma Mines (Quebec) Ltd.	33,227	
	Sullico Mines Ltd.	18,238	
	Sullivan Bourlamaque Gold Mines Ltd. ..	1,004	
	Villemaque Gold Mines Ltd.	426	158,532
Boyvinet	Asarco Exploration Company of Canada Ltd.	4,793	
	Denison Mines Ltd.	2,458	7,251
Bristol	The Hilton Mines	25,227	25,227
Cadillac	Canadian Malartic Gold Mines Ltd.	601	601
Township 1219	Sirmac Mines Ltd.	3,370	3,370
Townships 1222 and 1223	Canadian Nickel Company Ltd.	2,548	2,548
Chester	Noranda Mines Ltd.	649	649
Cléricy	Obalski (1945) Ltd.	1,510	
	Ross M. Miller	613	2,123
Clermont	Area Mines Ltd.	264	264
Clinton	Moneta Porcupine Mines Ltd.	20,642	20,642
Coleraine	Lake Asbestos of Quebec Ltd.	28,726	
	Patino Management Services Ltd.	2,583	31,309
Courville	Big Town Copper Mines Ltd.	6,385	6,385
Dalet	Ventures Ltd.	1,436	1,436
Daniel	Bosada Syndicate	8,573	
	New Hosco Mines Ltd.	1,207	
	Newlund Mines Ltd.	9,181	
	The Mining Corporation of Canada Ltd...	4,778	23,739
Dasserat	Bordulac Mines Ltd.	2,839	2,839
Daubrée	Chiboug Copper Corporation Ltd.	256	
	Coniska Copper Mines Ltd.	504	760
De Sales	Quebec North Mines Ltd.	1,000	1,000

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
Desmazures	Chimo Gold Mines Ltd.	3,100	3,100
Desmeloizes	Area Mines Ltd.	197	
	Minca Explorations Ltd.	636	
	Normetal Mining Corporation Ltd.	24,481	
	The Mining Corporation of Canada Ltd.	1,442	26,756
Destor	East MacDonald Mines Ltd.	1,000	
	Elk Lake Mines Ltd.	1,895	
	Lyndhurst Mining Company Ltd.	2,500	
	Nova Beaucage Mines Ltd.	2,781	8,176
Dolomieu	Prospectors Airways Company Ltd.	1,604	1,604
Dubuisson	Kiena Gold Mines Ltd.	700	
	North Sullivan Contact Mines Ltd.	2,667	
	Ventures Ltd.	2,067	4,734
Dufresnoy	Acadia Uranium Mines Ltd.	2,500	
	Black Bay Uranium Ltd.	1,855	
	Con-Key Mines Ltd.	3,000	
	Daering Explorers Corporation Ltd.	1,015	
	Lake Dufault Mines Ltd.	18,572	
	Lake Osu Mines Ltd.	1,485	
	Norque Copper Mines Ltd.	4,970	
	Opemisca Explorers Ltd.	503	
	Paramaque Mines Ltd.	2,008	
	Vauze Mines Ltd.	16,278	
	Wiltsey-Coghlan Mines Ltd.	2,686	54,872
Duparquet	Area Mines Ltd.	229	
	Consolidated Mogul Mines Ltd.	2,201	
	Garney Mines Ltd.	5,041	
	Parquet Mines Ltd.	1,801	9,272
Duprat	Ansil Mines Ltd.	3,581	
	Area Mines Ltd.	465	
	Augustus Explorations Ltd.	1,502	
	Bourbon Mining Company Ltd.	1,584	
	D'Eldona Gold Mines Ltd.	856	
	Eldrich Mines Ltd.	7,976	
	New Davies Petroleums Ltd.	2,207	
	New West Amulet Mines Ltd.	18,500	
	Springhole Mines Ltd.	1,388	
	Sunburst Exploration Ltd.	1,187	
	Waite Lake Mines Ltd.	7,495	46,741

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
Duverny	Bonwitha Mining Company Ltd.	626	626
Estrées	Leitch Gold Mines Ltd.	2,736	2,736
Fiedmont	Canadian Shield Mining Corporation	8,500	
	Tri-Cor Mining Company Ltd.	2,285	10,785
Figuery	Copperstream Mines Ltd.	3,232	3,232
Fournière	Barnat Mines Ltd.	46,777	
	Canadian Malartic Gold Mines Ltd.	3,761	
	East Malartic Mines Ltd.	40,156	
	Malartic Gold Fields Ltd.	3,776	
	Marban Gold Mines Ltd.	21,722	
	Porcupine Prime Mines Ltd.	2,055	78,247
Franquet	Standard Gold Mines Ltd.	845	845
Galinée	Bell Allard Mines Ltd.	8,958	
	Camflo Mattagami Mines Ltd.	3,368	
	Conagami Mines Ltd.	2,535	
	Galinée Mattagami Mines Ltd.	1,157	
	Kusten Mines Ltd.	2,523	
	Mattagami Lake Mines Ltd.	84,359	
	Norgold Mines Ltd.	2,429	
	Orchan Mines Ltd.	25,400	
	Revere Mining Corporation	2,000	
	Taché Lake Mines Ltd.	502	
	Waco Petroleum Ltd.	2,100	135,331
Garthby	Terra Nova Properties Ltd.	1,005	1,005
Gayhurst	Frontenac Mining Corporation	1,189	1,189
Grand-Calumet	Grand Calumet Mining Company Ltd.	1,989	
	New Calumet Mines Ltd.	13,070	15,059
Guillet	Rouanda Mining Company Ltd.	399	399
Harrington	Canadian Refractories Ltd.	672	672
Hartwell	Dumont Nickel Corporation	1,402	1,402
Hébécourt	Area Mines Ltd.	526	526
Holland	Gaspé Copper Mines Ltd.	71,377	71,377
Huddersfield	Hupon Mining and Exploration Corp.	445	445
Isle-Dieu	Amagami Mines Ltd.	945	
	Les Mines Dumagami Limitée	5,758	
	Radiore Uranium Mines Ltd.	20,221	26,924
Joannès	Monitor Gold Mines Ltd.	700	700
Joutel	Canadian Dyno Mines Ltd.	1,359	
	Chesterville Mines Ltd.	4,748	
	Glenburk Mines Ltd.	2,267	

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
	Iso Mines Ltd.	6,401	
	Prospectors Airways Company Ltd.	48,961	
	Southwest Potash Corporation	4,236	67,972
Julien	McIntyre Porcupine Ltd.	549	549
Lacorne	Denison Mines Ltd.	3,009	
	Molybdenite Corporation of Canada Ltd.	22,225	25,234
LaMotte	Lamaque Exploration Company Ltd.	1,301	1,301
Landrienne	Duvan Copper Company Ltd.	3,000	3,000
La Pause	Southwest Potash Corporation	802	802
La Peltrie	Paudash Mines Ltd	4,512	4,512
La Sarre	Barnat Mines Ltd.	958	958
Lavergne	Hudson Bay Exploration and Development Company Limited	644	644
Lesueur	Chesbar Chibougamau Mines Ltd.	3,004	
	Sturgeon River Mines Ltd.	10,529	
	The Coniagas Mines Ltd.	10,554	24,087
Le Tac	Lichen Lake Mining Company Ltd.	4,196	4,196
Le Tardif	Terra Nova Properties Ltd.	347	347
Lévy	Chiboug Copper Corporation	8,611	
	Olympia Mining Exploration Ltd.	5,131	
	Opemiska Copper Mines (Quebec) Ltd.	73,639	87,381
Louvicourt	Akasaba Gold Mines Ltd.	5,295	
	Bevcon Mines Ltd.	40,704	
	Camflo Mattagami Mines Ltd.	1,003	
	Sullico Mines Ltd.	636	47,638
McKenzie	Bruneau Mines Ltd.	9,868	
	Campbell Chibougamau Mines Ltd.	57,125	
	Copper Rand Chibougamau Mines Ltd.	54,993	
	O'Leary Malartic Mines Ltd.	1,852	123,838
McCorkill	McAdam Mining Corporation Ltd.	7,001	7,001
Malartic	Burbank Minerals Ltd.	1,707	
	Canadian Malartic Gold Mines Ltd.	43,353	
	National Malartic Gold Mines Ltd.	902	
	Norlartic Mines Ltd.	13,721	
	Terra Nova Properties Ltd.	1,508	64,191
Marceau	Sogemines Development Company Ltd.	491	491
Marrias	Dumont Nickel Corporation	2,905	
	Sullico Mines Ltd.	2,068	4,973
Marston	Moneta Porcupine Mines Ltd.	410	410
Mistassini (T)	Chibougamau Mining and Smelting Co. Inc.	5,121	5,121

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
Montbeillard	Odyno Exploration and Development Limitée	203	203
Montigny	Grand Manitou Mines Ltd.	410	410
Nicolet (c)	Senneterre Metals, Gas and Oil Ltd.	703	703
Normanville	Kelly-Desmond Mining Corporation Ltd.	1,005	1,005
Obalski	Campbell Chibougamau Mines Ltd.	113,015	
	Merrill Island Mining Corp. Ltd.	32,184	145,199
Oka (P)	Columbium Mining Products Ltd.	8,227	
	Consolidated Pershcourt Mining Ltd.	170	
	General Managers Inc.	1,789	
	Quebec Columbium Ltd.	9,035	
	St. Lawrence Columbium and Metals Corporation	3,369	22,590
Pershing	Camflo Mattagami Mines Ltd.	1,509	
	Hudson Bay Exploration and Development Company Inc.	4,230	
	Twentieth Century Mining Company Ltd.	2,692	8,431
Poirier	Bonwitha Mining Company Ltd.	1,697	
	Broulan Reef Mines Ltd.	2,127	
	Southern Union Oils Ltd.	1,493	5,317
Preissac	Anglo-American Molybdenite Mining Corp.	7,337	
	Canadian Shield Mining Corp.	337	
	Lamaque Exploration Company Ltd.	633	
	Preissac Molybdenite Mines Ltd.	23,852	32,159
Quévillon	Sullico Mines Ltd.	7,048	7,048
Rainboth	Baska Uranium Mines Ltd.	3,027	3,027
Raudin	Denison Mines Ltd.	328	328
Rolette	Territory Mining Company Ltd.	3,000	3,000
Roquemaure	Area Mines Ltd.	3,406	3,406
Roux	Black Hawk Mining Ltd.	1,577	1,577
Rouyn	Du Maurier Mines Ltd.	829	
	Powell Rouyn Gold Mines Ltd.	4,301	
	Quemont Mining Corporation Ltd.	95,400	
	Sogemines Development Company Ltd.	695	
	The Consolidated Zinc Corporation of Canada Ltd.	3,527	
	Tribag Mining Company Ltd.	10,946	115,698
Roy	Grandroy Mines Ltd.	950	950
Ste-Hélène	Iso Mines Ltd.	800	
	Newlund Mines Ltd.	1,995	2,795

Table 52. - Exploratory Diamond Drilling in the Province of Quebec in 1961 (Cont'd.)

Locality	Mine	Mine (Feet)	Total (Feet)
Saguenay (C)	Mineral Ventures	12,659	
	Quebec Cartier Mining Company	19,137	31,796
Sauvé	Hudson Bay Exploration and Development Company Ltd.	882	882
Senneterre	Consolidated Mogul Mines Ltd.	2,928	2,928
Stratford	Cupra Mines Ltd.	4,450	
	Hastings Mining and Development Company Ltd.	4,750	
	Solbec Copper Mines Ltd.	29,004	
	Sullico Mines Ltd.	4,703	42,907
Tiblemont	Valiant Gold Mines Ltd.	9,457	9,457
Thetford	Asbestos Corporation Ltd.	142,797	
	Empire Asbestos Ltd.	1,152	
	Johnson's Company Ltd.	18,950	162,899
Urban	Monitor Securities Inc.	5,220	5,220
Ungava (T)	Falconbridge Nickel Mines Ltd.	1,053	
	Hollinger North Shore Exploration Company Ltd.	5,700	
	Iron Ore Company of Canada	9,710	
	Keewa Quebec Mines Ltd.	11,736	
	Raglan Quebec Mines Ltd.	17,146	
	Sogemines Development Company Ltd. ...	881	46,226
Valrennes	Massval Mines Ltd.	1,905	1,905
Vassan	Nemrod Mining Company Ltd.	300	300
Vauquelin	Leitch Gold Mines Ltd.	1,499	1,499
Weedon	Sullico Mines Ltd.	5,488	5,488
Wexford	Drummond Copper Corporation Ltd.	189	189
Woburn	Moneta Porcupine Mines Ltd.	340	
	Sullico Mines Ltd.	1,016	4,356
York	Lowlands Exploration Ltd.	3,712	3,712
	Grand total		1,992,070

EMPLOYMENT, WAGES AND ACCIDENTS IN MINES AND QUARRIES IN 1961

EMPLOYMENT

During the year 1961, the mining industry of the Province of Quebec provided employment for 31,898 men, a decrease of 347 compared with the figure of the preceding year.

In the mines, the number of men employed in the development and production of metallic substances increased by 523, compared with that of 1960. In the quarries, there was a decrease of 870 men. The total number of man-hours was 62,269,254.

Employment was distributed among 493 mines, mining contractors and exploration companies, 175 quarries, 3,175 sand and gravel pits of which 1,707 were operated by the Quebec Department of Roads and 642 by the Quebec Department of Colonization, 33 diamond drilling contractors and numerous claim holders who carried out statutory assessment work.

Table 53. - Men Employed in Mines and Quarries in the Province of Quebec from 1955 to 1961

	1955	1956	1957	1958	1959	1960	1961
Number of men employed	31,103	31,743	34,726	31,927	32,984	32,245	31,898
Number of million man-hours worked	61.940	63.919	65.962	61.203	63.250	60.984	62.269

Table 54 shows the distribution of personnel among the different branches of the mining industry.

Table 54. - Personnel Employed by the Mining Industry of the Province of Quebec in 1961

Substance	Number of Employees	Salaries and Wages	Number of Hours Worked	Number of 300-day Workers (a)
METALLICS				
Columbium and uranium	97	$ 305,687	154,544	65
Copper (includes sulphur and selenium)	6,962	31,650,536	14,263,234	5,943
Gold	3,076	11,703,205	6,814,878	2,840
Iron and titanic iron (includes titanium dioxide)	3,758	21,135,849	8,432,646	3,514
Molybdenum	285	970,416	543,854	227
Nickel	118	276,506	112,325	47
Zinc and lead	908	3,703,159	1,964,677	819
Sub-totals	15,204	$ 69,745,358	32,286,158	13,455
NON-METALLICS				
1.- Industrial Minerals				
Asbestos	6,136	$ 30,623,413	12,723,462	5,301
Feldspar	41	98,551	67,131	28
Lime	299	1,290,162	669,670	279
Lithium	107	368,739	232,028	97
Magnesitic dolomite and brucite	354	1,574,529	727,618	303
Mica	69	55,589	48,902	20
Mineral water	17	24,673	25,187	10
Ochre and iron oxide	18	38,365	29,990	12
Petroleum	33	92,637	47,578	20
Peat	553	966,446	980,866	409
Quartz and industrial sand	162	473,118	273,380	114
Soapstone and talc	25	61,667	48,864	20
Others (graphite, kaolin, marl)	18	44,339	33,487	13
Sub-totals	7,832	$ 35,712,228	15,908,163	6,626
II.- Building Materials				
Cement	797	$ 4,138,082	1,777,883	741
Clay products	874	3,223,769	1,661,039	692
Granite	877	2,329,951	1,488,772	620
Limestone	1,576	5,290,391	3,294,145	1,373
Marble	74	182,655	133,025	55
Sand and gravel	3,984	5,368,843	4,375,681	1,823
Sandstone	75	137,122	116,095	48
Slate and shale	9	15,704	11,000	5
Sub-totals	8,266	$ 20,686,517	12,857,640	5,357
Diamond drilling contractors	596	$ 2,132,167	1,217,293	507
TOTALS	31,898	$128,276,270	62,269,254	25,945

(a) Number of hours divided by 2,400.

WAGES

Wages paid to mine and quarry workers in the Province in 1961 totalled $128,276,270, compared with $122,632,206 in 1960.

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 $107,589,753, and quarry workers, $20,686,517, compared with $101,878,370 and $20,753,836 respectively in 1960.

The average wage per man per 300 days of work in the mining industry was $5,226, compared with $5,142 for the previous year.

The average wage per man per 300 days of work in the quarrying industry was $3,862, compared with $3,707 in the previous year.

Table 55. - Employees in the Mining Industry of the Province of Quebec in 1961

	Number of Employees	Salaries and Wages	Number of Man-hours of Work	Number of 300-day Workers
Producing mines	21,917	$101,859,307	46,341,600	19,309
Non-producing mines	1,119	3,598,279	1,852,721	772
Quarries and sand and gravel pits	8,266	20,686,517	12,857,640	5,357
Diamond drilling contractors	596	2,132,167	1,217,293	507
Total	31,898	$128,276,270	62,269,254	25,945

ACCIDENTS

During the year 1961, the Department of Natural Resources received reports of 841 accidents that occurred in mines, quarries, peat bogs, and sand and gravel pits in Quebec, compared with 848 accidents reported in the previous year.

Included in these figures are 19 fatalities and 822 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 Sorel refinery are not included in the accident statistics that follow.

Table 56. - Summary of Fatal Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1961

No.	Date	Mine or Quarry	Employer	Locality	Victim	Age	Marital Status	Occupation	Place	Cause of Accident
1	Jan. 11	Portage Island Mine	Copper Rand Chibougamau Mines Limited	Chibougamau	Clément Therrien	23	Bachelor	Miner	Stope (East section)	Fall of rock
2	Jan. 18	Mattagami Lake Mines Ltd.	Patrick Harrison and Co. Ltd.	Matagami	Gerald Sullivan	36	Married 3 children	Miner	750 Ore Pass	Fall of person
3	Feb. 20	Mattagami Lake Mines Ltd.	Patrick Harrison and Co. Ltd.	Matagami	Nick Kolbun	40	Married 1 child	Miner	Ventilation Crosscut 150-E-39	Explosives
4	Apr. 22	Jeffrey Mine	Canadian Johns-Manville Co. Ltd.	Asbestos	Léo Morel	37	Married	Truck and tractor driver	Open pit	Crushed in the fall of a loader
5	May 10	Edgar Tremblay sand pit	Edgar Tremblay	Taché township	Fernand Angers	23	Married 1 child	Mechanical loader operator	West face sand pit, lot 18, range VI	Slide of ground
6	June 1	Henderson Mine	Campbell Chibougamau Mines Ltd.	Chibougamau	Bertrand Lord	53	Married 5 children	Mechanic	Stope No. 370	Flying object
7	June 16	Henderson Mine	Campbell Chibougamau Mines Ltd.	Chibougamau	François Morin	29	Bachelor	Ore-pass man	Main ore passes, 525-foot level	Crushed between a train and a gate
8	June 22	Quebec Cartier Mining Company	Quebec Cartier Mining Company	Gagnon	George Capraru	31	Married 1 child	Geologist	Moose Mountain Lake No. 1	Drowning
9	June 22	Quebec Cartier Mining Company	Quebec Cartier Mining Company	Gagnon	John Cook	30	Bachelor	Geologist	Moose Mountain Lake No. 1	Drowning
10	Aug. 12	Lake Asbestos of Quebec Ltd.	Lake Asbestos of Quebec Ltd.	Black Lake	Jeffrey Dubois	40	Married 7 children	Mechanic's helper	Mill tailings site	Electrocution
11	Aug. 16	A. Lagacé Ltée	A. Lagacé Ltée	Quebec	Philippe Ferland	25	Bachelor	Loader operator	Gravel pit at Beauport	Crushed by loader arm

Table 56. - Summary of Fatal Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1961 (Cont'd.)

No.	Date	Mine or Quarry	Employer	Locality	Victim	Age	Marital Status	Occupation	Place	Cause of Accident
12	Sept.27	Radiore Uranium Mines Ltd.	St. Louis Bergeron D.D. Co. Ltd.	Matagami	Florent Gagnon	29	Bachelor	Tractor operator	Isle-Dieu township	Crushed by tractor
13	Oct. 2	Quebec Cartier Mining Company	Quebec Cartier Mining Company	Gagnon	Hubert Tessier	21	Bachelor	Spiral operator	Concentrating plant	Fall of person
14	Oct. 26	Union des Carrières et Pavages Ltée.	Union des Carrières et Pavages Ltée.	Charlesbourg	Raymond Therrien	37	Married 3 children	Truck loader	Crushed stone silo	Crushed between truck and silo column
15	Nov. 21	National Quarries Ltd.	National Quarries Ltd.	Ville St-Michel	Luigi Vazzoler	49	Married 2 children	Truck spotter	Quarry	Crushed by truck
16	Nov. 22	Félicien Laroche	Félicien Laroche	Windsor, Que.	Guy Rivard	20	Bachelor	Loader operator	Sand pit	Slide of ground
17	Dec. 6	Gaspé Copper Mines Ltd.	Gaspé Copper Mines Ltd.	Murdochville	Léo Carbonneau	28	Married	Truck driver	Dumping area	Collision
18	Dec. 6	Cap-à-l'Aigle	Quebec Roads Department	Cap-à-l'Aigle	Félix Duchesne	20	Bachelor	Crusher feed operator	Crushing plant	Caught by driving shaft
19	Dec. 21	British Canadian	Asbestos Corporation	Black Lake	Gaston Tremblay	33	Married 7 children	Miner	Open pit	Fall of rock

The accident rate per million man-hours worked was 14.3 for the year 1961.

Accident prevention work was continued throughout the Province of Quebec and again resulted in a very low accident frequency rate.

In this respect, Sullivan Consolidated Mines Limited, Waite-Amulet Mines Limited, New Calumet Mines Limited and Quebec Lithium Corporation Limited, jointly with another mining company operating in British Columbia, won the John T. Ryan Safety Trophy; these companies did not have a single compensable accident during the year 1961.

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 Natural Resources. Active mine rescue personnel, distributed among 30 mines, numbers 362 men. Sixty-six certificates in mine rescue training were awarded to as many new recruits during 1961.

Mine Rescue Stations

A new mine rescue station was established at The Coniagas Mines Limited at Bachelor Lake. Following is the location of the mine rescue stations:

Noranda	Main station
Bourlamaque	" "
Thetford Mines	" "
Canadian Johns-Manville Company Limited (Asbestos)	Sub Station
Campbell Chibougamau Mines Limited	" "
Canadian Refractories Limited	" "
Copper Rand Chibougamau Mines Limited	" "
New Calumet Mines Limited	" "
Normetal Mining Corporation Limited	" "
Opemiska Copper Mines (Quebec) Limited	" "
The Coniagas Mines Limited	" "

Mine Rescue Competition

The annual provincial mine rescue competition was held at Asbestos in September 1961. The trophy for proficiency in mine rescue operations was won by a team from Gaspé Copper Mines Limited, which competed with eight other teams.

Table 57. - Number of Victims of Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1961

	Fatal Accidents		Non-fatal Accidents		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Mines:						
Surface	3	0.3	195	23.2	198	23.5
Underground	6	0.7	284	33.8	290	34.5
Open pits	2	0.2	32	3.8	34	4.0
Totals	11	1.2	511	60.8	522	62.0
Quarries:						
Surface	6	0.7	136	16.2	142	16.9
Totals	6	0.7	136	16.2	142	16.9
Annexed plants:						
Repair shops	0	0.0	60	7.2	60	7.2
Crushing plants	1	0.1	42	5.1	43	5.2
Concentrators	1	0.1	25	3.0	26	3.1
Dressing plants	0	0.0	24	2.9	24	2.9
Warehouses	0	0.0	11	1.2	11	1.2
Lime kilns	0	0.0	6	0.7	6	0.7
Refineries	0	0.0	4	0.5	4	0.5
Construction	0	0.0	3	0.3	3	0.3
Totals	2	0.2	175	20.9	177	21.1
Grand Totals	19	2.1	822	97.9	841	100.0

Table 58. - Analysis of Fatal Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1961

Cause of Accident	Underground	Surface	Open Pits	Annexed Plants	Total	
					No.	Per Cent
Mines:						
Haulage and transportation	2	0	0	0	2	10.5
Drowning	0	2	0	0	2	10.5
Drilling	0	0	1	0	1	5.3
Diamond drilling	0	1	0	0	1	5.3
Explosives	1	0	0	0	1	5.3
Fall of rock	1	0	0	0	1	5.3
Fall of person	1	0	0	1	2	10.5
Machinery and tools	1	0	0	0	1	5.3
Mechanical shovel and travelling crane	0	0	1	0	1	5.3
Electricity	0	0	0	1	1	5.3
Total: mines	6	3	2	2	13	68.6
Quarries:						
Haulage and transportation	0	2	0	0	2	10.5
Slides of rock or other object	0	2	0	0	2	10.5
Gears and belting	0	1	0	0	1	5.2
Mechanical shovel and travelling crane	0	1	0	0	1	5.2
Total: quarries	0	6	0	0	6	31.4
Total: mines and quarries	6	9	2	2	19	100.0

The ages of victims of fatal accidents in mines, quarries and annexed plants are shown in the following table.

Table 59. - Fatalities According to Age Groups

17-20	21-25	26-30	31-35	36-40	41-45	46-50	Over 50	Total
2	4	4	2	5	0	1	1	19

The following table shows the accident frequency rate for the past ten years.

Table 60. - Accident Rates per 1,000,000 Man-hours

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Mines and annexed plants	17.5	16.7	13.5	15.7	17.0	15.5	12.0	14.2	14.2	13.8
Quarries and annexed plants	13.3	10.9	10.3	9.8	15.4	12.4	9.7	11.1	12.1	16.1
Mining Industry	16.6	15.4	12.8	14.3	16.7	14.8	11.9	13.5	13.9	14.3

Table 61 presents a summary of accidents in mines, quarries and annexed plants in 1961.

Table 61. - Summary of Accidents in Mines, Quarries and Annexed Plants in the Province of Quebec in 1961

	Number of Million Man-hours	Accidents			Per Million Man-hours
		Fatal	Non-fatal	Total	
Mines and annexed plants	45.993	13	621	634	13.8
Quarries and annexed plants	12.858	6	201	207	16.1
Totals ...	58.851	19	822	841	14.3

Non-fatal Accidents

Tables 62, 63 and 64 classify the non-fatal accidents as to cause.

Mines

In Quebec mines, statistics show that falls of persons are responsible for the largest number of accidents.

Table 62. - Non-fatal Accidents in Mines in 1961

Cause of Accident	Under-ground	Open Pits	Surface and Annexed Plants	Total	
				No.	Per Cent
Fall of person	24	3	53	80	12.9
Diamond drilling	18	0	52	70	11.3
Handling rock or other material	24	2	38	64	10.3
Machinery and tools	13	6	36	55	8.9
Fall of object	17	3	30	50	8.1
Haulage and transportation	23	7	13	43	6.3
Lifting heavy object	18	2	18	38	6.1
Fall of rock	33	2	1	36	5.8
Drilling	22	2	0	24	3.9
Flying rock or object	9	0	13	22	3.5
Scaffolding and ladders	12	0	8	20	3.2
Burns	1	0	13	14	2.3
Miscellaneous	4	0	9	13	2.1
Hand Tramming	11	0	0	11	1.9
Gears and belting, etc.	0	0	11	11	1.9
Mechanical shovel or travelling crane	7	3	1	11	1.9
Scaling	10	0	0	10	1.6
Loading pockets	7	0	3	10	1.6
Slide of rock or other material	9	1	0	10	1.6
Mucking	5	0	1	6	1.0
Scraping	6	0	0	6	1.0
Explosives	6	0	0	6	1.0
Nails	1	0	2	3	0.5
Timbering	2	0	0	2	0.3
Hoisting	2	0	0	2	0.3
Electricity	0	1	1	2	0.3
Sledging	0	0	1	1	0.2
Dust and ashes	0	0	1	1	0.2
Totals	284	32	305	621	100.0

For statistical purposes, non-fatal accidents are those involving a loss of at least five days of work or resulting in permanent disability.

Quarries

More than 52 per cent of the non-fatal accidents that occurred in quarries in the Province of Quebec were caused by machinery and tools, handling of rock or other materials and falls of persons.

Table 63. - Non-fatal Accidents in Quarries in 1961

Cause of Accident	Surface	Annexed Plants	Total	
			No.	Per Cent
Machinery and tools	23	19	42	20.9
Handling of rock or other material	27	11	38	18.9
Fall of person	17	10	27	13.4
Haulage and transportation	13	2	15	7.4
Fall of object	10	5	15	7.4
Fall of rock	11	1	12	6.0
Drilling	9	1	10	5.0
Gears, belting, etc.	3	5	8	4.0
Flying rock or object	4	4	8	4.0
Burns	3	5	8	4.0
Lifting heavy object	4	2	6	3.0
Mechanical shovel or travelling crane	6	0	6	3.0
Slide of rock or other object	2	0	2	1.0
Nails	2	0	2	1.0
Electricity	1	0	1	0.5
Miscellaneous	1	0	1	0.5
Totals	136	65	201	100.0

Annexed Plants

Machinery and tools, falls of persons, and handling of rock or other object rank first among the causes of non-fatal accidents in annexed plants; they are responsible for 54.1 per cent of these accidents.

Table 64. - Non-fatal Accidents in Annexed Plants in 1961

Cause of Accidents	Repair Shops	Crushing Plants	Concentrators	Dressing Plants	Warehouses	Lime Kilns	Refineries	Construction	Total	
									No.	Per Cent
Machinery and tools	15	12	1	7	0	0	1	0	36	20.5
Fall of person	8	7	7	3	4	2	0	0	31	17.6
Handling of rock or other object	10	5	3	8	1	0	0	1	28	16.0
Fall of object	12	3	0	1	3	1	1	1	22	12.5
Gears, belting, etc.	2	9	2	1	1	0	0	0	15	8.5
Lifting of heavy object	3	1	4	1	2	0	0	0	11	6.3
Burns	3	2	2	1	0	1	0	0	9	5.2
Flying rock or object	3	3	1	0	0	0	0	0	7	4.0
Miscellaneous	3	0	1	0	0	0	1	0	5	2.8
Haulage and transportation .	1	0	1	0	0	2	0	0	4	2.4
Drilling	0	0	0	1	0	0	0	0	1	0.6
Mucking	0	0	1	0	0	0	0	0	1	0.6
Loading bins	0	0	1	0	0	0	0	0	1	0.6
Sledging	0	0	0	0	0	0	1	0	1	0.6
Scaffolding and ladders	0	0	1	0	0	0	0	0	1	0.6
Fall of rock	0	0	0	1	0	0	0	0	1	0.6
Nails	0	0	0	0	0	0	0	1	1	0.6
Totals	60	42	25	24	11	6	4	3	175	100.0

The following table shows the frequency of injuries to various parts of the body in accidents that occurred in mines. It may be noted that 77.9 per cent of these injuries affected the hands, trunk, feet and legs.

Table 65. - Location of Injuries on Body in Mining Accidents in 1961

Parts of the body	Number of Accidents	Per Cent
Hands	169	26.1
Trunk	118	18.7
Feet	109	17.2
Legs	100	15.9
Head	45	7.1
Arms	33	5.3
Strained back	30	4.8
Eyes	17	2.8
General	13	2.1
Totals	634	100.0

The following table shows the frequency of injuries to various parts of the body in accidents which occurred in quarries. It will be noted that 77.3 per cent of these injuries involved hands, trunk, feet and legs.

Table 66. - Location of Injuries on Body in Quarrying Accidents in 1961

Parts of the body	Number of Accidents	Per Cent
Hands	59	28.6
Trunk	36	17.5
Feet	33	15.6
Legs	33	15.6
Head	16	7.8
Arms	14	6.8
Eyes	7	3.5
Strained back	6	3.1
General	3	1.5
Totals	207	100.0

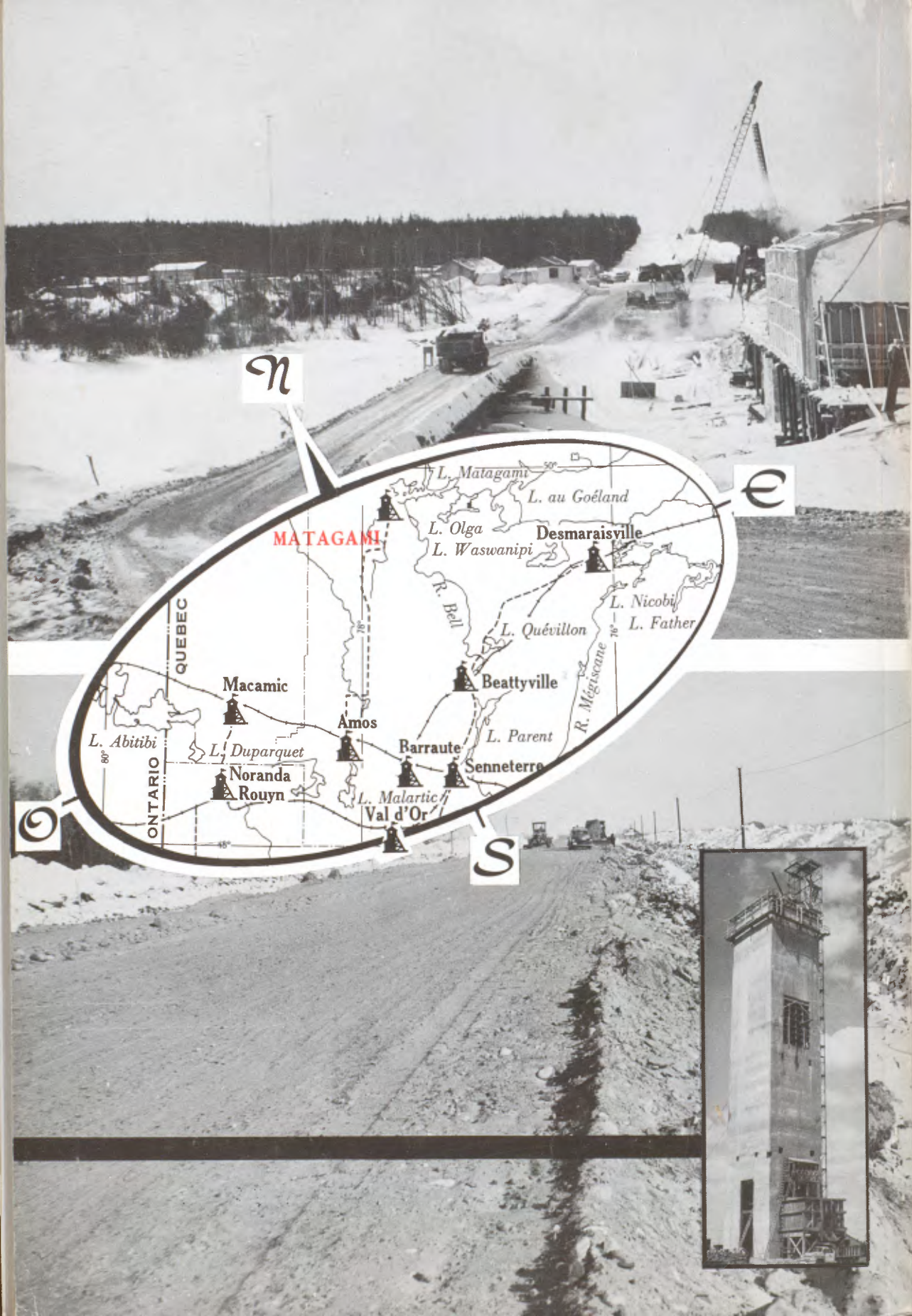
Table 67. - Employment and Accidents to Employees in Mines and Annexed Plants

Year	Number of Employees	Persons Injured			Number of Million Man-hours			Rate per Million Man-hours	
		Fatally	Non-fatally	Total	Producing Mines	Non-producing Mines	Total	Fatally	Non-fatally
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
1961	23,632	13	621	634	44.141	1.852	45.993	0.28	14
Totals	407,051	475	22,780	23,255	793.765	84.626	878.391	-	-
Average	19,383	23	1,085	1,108	37.798	4.030	37.660	0.56	28

Table 68.- Employment and Accidents to Employees in Quarries and Annexed Plants

Year	Number of Employees	Persons Injured			Number of Million Man-hours	Rate Per Million Man-hours	
		Fatally	Non-fatally	Total	Producing Quarries	Fatally	Non-fatally
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	0.20	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
1961	8,266	6	201	207	12.858	0.47	16
Totals	154,438	79	4,975	5,054	240.995	-	-
Average	7,354	4	237	241	11.476	0.35	21

ALPHABETICAL INDEX


N
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S
O
MATAGAMI
L. Matagami
L. au Goéland
L. Olga
L. Waswanipi
Desmaraisville
L. Nicobi
L. Father
R. Bell
L. Quévillon
R. Mégiscane
Beattyville
L. Parent
Barraute
Senneterre
Amos
Macamic
L. Abitibi
L. Duparquet
Noranda
Rouyn
L. Malartic
Val d'Or
QUEBEC
ONTARIO
50°
78°
76°
80°
48°