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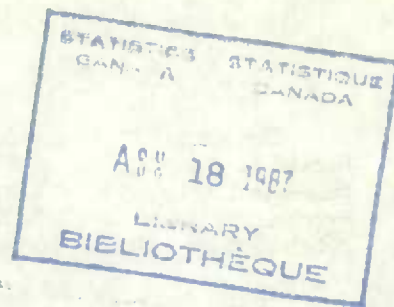
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THE SMELTING AND REFINING INDUSTRY

1954



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NOTICE

The annual reports prepared by the Industry and Merchandising Division of the Bureau of Statistics are divided into 3 volumes, as follows: **Volume I** - The Primary Industries, including mining, forestry and fisheries; **Volume II** - Manufacturing; **Volume III** - Merchandising and Services. The volumes are made up of parts, and the parts in turn are subdivided according to the industries which they comprise.

Volume I consists of the following parts:

- Part I - Mineral Statistics
- Part II - Forestry Statistics - Operations in the Woods
- Part III - Fisheries Statistics

Part I includes the following reports which constitute the complete series on Mineral Statistics of Canada. Individual reports are issued as the information becomes available; they are arranged in a form suitable for binding.

- A - General Review of the Mining Industry, 50¢
- B - The Gold Mining Industry, 50¢
- C - The Silver-Lead-Zinc Mining Industry, 25¢
- D - The Nickel-Copper Mining, Smelting and Refining Industry, 25¢
- E - The Miscellaneous Metal Mining Industry, 25¢
- F - The Smelting and Refining Industry, 25¢
- G - The Coal Mining Industry, \$1.00
- H - The Crude Petroleum and Natural Gas Industry, 25¢
- I - The Asbestos Mining Industry, 25¢
- J - The Feldspar and Quartz Mining Industry, 25¢
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- L - The Peat Industry, 25¢
- M - The Salt Industry, 25¢
- N - The Talc and Soapstone Industry, 25¢
- O - The Miscellaneous Non-metal Mining Industry, 25¢
- P - The Cement Manufacturing Industry, 25¢
- Q - The Clay and Clay Products Industry, 25¢
- R - The Lime Industry, 25¢
- S - The Sand and Gravel Industry, 25¢
- T - The Stone Industry, 25¢
- U - Contract Drilling in the Mining Industry, 25¢

THE SMELTING AND REFINING INDUSTRY

1954

The Smelting and Refining Industry, as defined for statistical purposes, includes only those firms engaged primarily in the smelting of non-ferrous ores or concentrates and in the refining of metals recovered therefrom. The smelting of imported ores is included. Secondary smelters, which treat scrap metals only, are not included.

The net value added by the industry in the processing of crude or semi-crude materials during 1954 totalled \$352,037,956 compared with \$310,207,228 in 1953. Refined products included gold, silver, nickel, copper, lead, zinc, aluminum, tin, magnesium, calcium, barium, titanium, zirconium, antimony, bismuth, cobalt, cadmium, selenium and tellurium. Other end-products of individual plants or companies were copper-nickel matte, cobalt salts, cobalt oxide, nickel oxide, nickel salts, bauxite concentrates, arsenious oxide, sulphuric acid, platinum metals residues, zinc oxide, zinc dust, blister and anode copper, titanium dioxide slag, iron ingots, columbium oxide and tantalum oxide. Statistics relating to the production of pitchblende products at the refinery at Port Hope, Ontario, are not included in this report.

It should be noted, in a study of these data, that firms which operate both mines and smelters may vary from year to year the nominal values placed on crude ores, etc., shipped from their mines to their own smelters, with the result that in some years the mining industry proper may be favoured statistically at the expense of The Smelting and Refining Industry and vice versa. However, the total annual net value of commodity production for the Dominion as a whole is not affected by these arbitrary internal evaluations.

Fuel and electricity used by the industry in 1954 cost \$55,225,387, including 2,690,206,646 k.w.h. of purchased electricity at \$30,423,265.

The value of process supplies consumed during the year amounted to \$52,933,522 and the cost of ores and raw materials was \$462,382,133.

The industry employed an average of 26,048 persons to whom \$102,595,970 were paid in salaries and wages.

The 13 firms in this industry operated 22 smelters or refineries. The names of the operators and the plant locations are given in the directory on the last page of this report.

MINERAL STATISTICS

TABLE 1. Principal Statistics of the Smelting and Refining Industry, Significant Years, 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity at works	Cost of process supplies and containers	Gross value of products shipped during year, including containers (f.o.b. works)	Net value of production
	No.	No.	\$	\$	\$	\$	\$
1921	14	3,632	4,406,957		N.A.	23,732,277	N.A.
1929	10	8,119	13,772,393	6,208,733	"	109,854,468	"
1931	14	7,860	13,245,327	6,053,398	"	98,565,755	"
1933	14	6,350	8,403,181	7,809,936	"	100,561,297	"
1937	13	11,570	17,990,947	14,607,421	10,559,714	318,278,251	101,807,865
1939	13	12,449	19,372,119	15,391,301	11,773,863	262,602,495	80,057,833
1941	13	16,014	27,482,639	26,771,807	19,272,162	379,322,270	119,736,294
1944	16	23,937	44,536,901	36,907,623	32,730,138	474,206,801	123,303,038
1946	15	14,546	30,646,361	22,287,572	16,030,964	304,718,524	69,565,922
1949	16	19,150	55,133,065	37,004,311	31,816,026	599,188,135	181,907,847
1950	17	19,863	58,748,362	38,473,238	31,207,564	669,882,006	202,711,781
1951	17	22,814	75,474,505	44,684,200	46,411,504	861,315,930	262,972,789
1952	18	24,608	87,964,295	50,571,452	52,575,625	837,074,065	266,721,382
1953	18	25,115	94,545,611	52,594,155	51,448,147	870,918,142	310,207,228
1954	22	26,048	102,595,970	55,225,337	52,933,522	922,578,998	352,037,956

1. The gross value of production should not be interpreted as the ultimate sales value of finished metals only, as it represents the combined figure for smelters and refineries, and the usual duplication occurs when the product of one plant is shipped to, and becomes the material for, another plant. For example, blister copper is given a value at the smelter since it is the final product for that works; it is then shipped to the refinery for which it is the principal material, where values are placed on the refined products.

2. See preceding text.

3. Gross value of production less fuel, electricity, process supplies and cost of ores.

Note. Data in this report do not include those relating to Eldorado Mining and Refining Ltd., which mines and refines pitchblende products.

TABLE 2. Employees and Their Earnings in the Smelting and Refining Industry, 1950-1954

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Administration		Workmen		Total		Adminis- tration	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
1950	2,652	482	16,662	67	19,863	44,928,298	10,940,723	47,807,639	58,748,362
1951	3,193	555	19,005	61	22,814	53,031,620	13,816,942	61,857,563	75,474,505
1952	3,468	598	20,474	68	24,608	55,188,884	16,290,926	71,673,369	87,964,295
1953	3,558	566	20,942	49	25,115	55,971,128	17,530,010	77,015,601	94,545,611
1954	3,604	578	21,817	49	26,048	56,970,642	20,171,958	82,424,012	102,595,970

TABLE 3. Number of Workmen, by Months, 1953 and 1954 (Administrative and office employees not included)

Month	1953			1954		
	Male	Female	Total	Male	Female	Total
January	20,510	49	20,559	20,621	47	20,668
February	20,486	49	20,535	20,614	46	20,660
March	20,482	49	20,531	20,887	46	20,933
April	20,605	49	20,654	21,074	47	21,141
May	20,924	50	20,974	21,433	47	21,480
June	21,159	52	21,211	21,751	49	21,800
July	21,372	53	21,425	22,453	54	22,507
August	21,298	48	21,346	22,822	51	22,873
September	21,193	48	21,241	22,616	51	22,667
October	21,133	48	21,181	22,562	50	22,612
November	21,059	48	21,107	22,503	50	22,553
December	20,968	47	21,015	22,455	49	22,504
Average	20,942	49	20,991	21,817	49	21,866
Man-hours worked			46,031,046			47,841,658

TABLE 4. Estimated Capital and Repair Expenditures in the Smelting and Refining Industry, 1950-1954

Year	Capital expenditures			Repair expenditures			Capital and repair expenditures		
	Con- struction	Machinery	Sub- total	Con- struction	Machinery	Sub- total	Con- struction	Machinery	Total
Thousands of dollars									
1950	6,744	9,438	16,182	2,839	19,679	22,518	9,583	29,117	38,700
1951	20,599	19,811	40,410	5,330	24,047	29,377	25,929	43,858	69,787
1952	32,573	29,689	62,262	7,007	26,850	33,857	39,580	56,539	96,119
1953	33,426	33,702	67,128	7,739	29,404	37,143	41,165	63,106	104,271
1954	20,095	29,874	49,969	9,188	27,580	36,768	29,283	57,454	86,737

TABLE 5. Average Annual Metal Prices, in Canadian Dollars, 1945-1954

Year	Gold	Silver	Copper	Lead	Zinc
	Troy oz.	Troy oz.	Pound	Pound	Pound
Dollars					
1945	38.50	0.4700	0.1255	0.0500	0.0644
1946	36.75	0.8365	0.1280	0.0675	0.0781
1947	35.00	0.7200	0.2039	0.1367	0.1123
1948	35.00	0.7500	0.2235	0.1804	0.1393
1949	36.00	0.7425	0.1997	0.1580	0.1325
1950	38.05	0.8082	0.2342	0.1445	0.1565
1951	36.85	0.9455	0.2770	0.1840	0.1990
1952	34.27	0.8352	0.2854	0.1619	0.1746
1953	34.42	0.8401	0.2994	0.1293	0.1196
1954	34.07	0.8326	0.2916	0.1333	0.1198

TABLE 6. Production of New Gold and Silver, 1950-1954 (From all types of ores)

Year	Gold		Silver	
	Fine ounces	\$	Fine ounces	\$
1950	4,441,227	168,988,687	23,221,431	18,767,561
1951	4,392,751	161,872,873	23,125,825	21,865,467
1952	4,471,735	153,246,359	25,222,222	21,065,599
1953	4,055,723	139,597,985	28,299,335	23,774,271
1954	4,366,440	148,764,611	31,117,949	25,907,870

TABLE 7. Source of Canadian Gold Production, 1950-1954

Source	1950	1951	1952	1953	1954
Per cent					
In alluvial gold	2.43	2.49	2.08	1.91	2.05
In crude gold bullion produced at mines	81.51	81.86	83.22	84.11	83.14
In base bullion produced at lead smelters	0.38	0.33	0.39	0.25	0.34
In blister copper	12.26	12.20	11.37	9.77	11.18
In ores, matte, slags, etc., exported	3.42	3.42	2.94	3.96	3.29

TABLE 8. Source of Canadian Silver Production, 1950-1954

Source	1950	1951	1952	1953	1954
	Per cent				
In silver-cobalt ores	12.68	12.80	19.21	12.50	11.99
In base bullion ¹	53.05	51.84	48.01	45.65	38.53
In gold bullion and placer	3.06	3.21	2.83	2.21	2.16
In blister and anode copper	22.04	21.93	18.66	14.32	15.61
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores)	9.17	10.22	11.29	25.32	31.71

1. Includes silver bullion from silver-lead ores.

TABLE 9. Production of Copper, 1950-1954 (From all types of ores)

Year	Copper in all forms ¹		Refined copper ²
	Tons	\$	Tons
1950	264,209	123,211,407	238,204
1951	269,971	149,026,216	245,466
1952	258,038	146,679,040	196,320
1953	253,752	150,953,742	236,966
1954	302,732	175,712,693	253,365

1. Blister copper plus recoverable copper in concentrates and matte exported.

2. Does not include a small tonnage recovered from scrap in secondary smelters.

TABLE 10. Production of Copper, by Sources, 1953 and 1954

Source	1953		1954	
	Tons	Value	Tons	Value
		\$		\$
In blister and anode copper produced ¹	206,848	123,860,140	257,162	149,976,271
In ores, concentrates and any copper matte exported	36,111	21,535,098	32,619	18,936,565
In nickel-copper matte exported	10,293	5,558,504	12,783	6,698,390
In copper salts	-	-	166	101,467
Total	253,252	150,953,742	302,732	175,712,693

1. Includes a small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

TABLE 11. Production¹ of Nickel, 1950-1954

Year	Tons	\$
1950	123,654	112,104,685
1951	137,903	151,269,994
1952	140,558	151,349,438
1953	143,693	160,430,098
1954	161,319	180,173,393

1. Includes nickel in matte exported, refined nickel produced in Canada and nickel in oxides and salts sold or produced.

TABLE 12. Production of Lead, 1950-1954

Year	Lead in all forms ¹		Refined lead ²
	Tons	\$	Tons
1950	165,697	47,886,452	170,023
1951	158,231	58,229,146	162,000
1952	168,842	54,671,021	182,943
1953	193,706	50,076,822	165,752
1954	218,495	58,250,831	166,005

1. Lead content of base bullion produced from Canadian ores plus recoverable lead in ores exported.

2. Includes some lead refined from foreign ores; does not include a small tonnage recovered from scrap in secondary smelters.

TABLE 13. Production of Zinc, 1950-1954

Year	Zinc in all forms ¹		Refined zinc ²
	Tons	\$	Tons
1950	313,227	98,040,145	204,367
1951	341,112	135,762,643	218,578
1952	371,802	129,833,285	222,200
1953	401,762	96,101,386	250,961
1954	376,491	90,207,285	213,775

1. Refined zinc produced in Canada plus recoverable zinc in ores exported.

2. Includes some refined zinc from foreign ores; does not include a small tonnage recovered from scrap in secondary smelters.

TABLE 14. Production ¹ of Bismuth and Cadmium, 1950-1954

Year	Bismuth		Cadmium	
	Pounds	\$	Pounds	\$
1950	191,621	431,147	848,406	1,968,302
1951	230,298	543,504	1,326,920	3,556,145
1952	162,373	347,224	948,587	2,086,891
1953	117,366	209,557	1,118,285	2,236,570
1954	258,675	572,183	1,086,780	1,847,526

1. Includes refined metal and recoverable metal in concentrates shipped.

TABLE 15. Production of Selenium and Tellurium, 1950-1954

Year	Selenium		Tellurium	
	Pounds	\$	Pounds	\$
1950	261,973	633,975	10,075	19,143
1951	382,603	1,239,633	8,913	16,400
1952	242,030	786,599	6,035	10,259
1953	262,346	1,101,854	4,694	8,215
1954	323,529	1,617,645	8,171	14,300

TABLE 16. Production of New Aluminum and Magnesium, 1950-1954

Year	Aluminum ¹	Magnesium	
	Tons	Pounds	\$
1950	396,882	Not available for publication	
1951	447,095		
1952	499,758		
1953	548,445		
1954	557,897		

1. All from imported ores.

TABLE 17. Production of New Antimony and Tin, 1950-1954

Year	Antimony (Content of antimonial lead)		Tin	
	Pounds	\$	Pounds	\$
1950	643,540	215,586	796,403	828,259
1951	6,702,164 ¹	1,436,713	346,718	494,073
1952	2,330,900 ²	601,484	212,113	253,581
1953	1,488,105 ²	291,862	643,254 ³	581,746
1954	1,302,333	349,249	333,788 ³	263,359

1. Includes antimony in flue dust produced in earlier years but not previously recorded.

2. Content of antimonial lead, Ore slag and flue dust.

3. Tin content of concentrates.

TABLE 18. Production (Shipments) of Molybdenite Concentrates and Tungsten Concentrates, 1950-1954

Year	Molybdenite concentrates			Tungsten concentrates		
	Gross weight	MoS ₂ content	\$	Gross weight	WO ₃ content	\$
	Tons			Tons		
1950	109	52	60,059	943	142	160,343
1951	241	191	228,958	2	1.4	7,098
1952	331	253	409,831	1,886	747	4,488,237
1953	184	162	215,527	3,154	1,223	5,689,160
1954	411	376	457,912	1,619	1,085	5,795,781

TABLE 19. Production of Cobalt and Arsenic, 1950-1954

Year	Cobalt ¹		Arsenious oxide ²	
	Pounds	\$	Tons	\$
1950	583,806	964,003	397	52,029
1951	951,607	1,999,612	1,177 ³	129,435
1952	1,421,923	3,226,903	854 ³	76,876
1953	1,602,545	4,013,077	702 ³	56,150
1954	2,252,965	5,912,997	590 ³	48,333

1. Content in metal and oxide produced in Canada and in ores exported.

2. Refined white arsenic produced in Canada plus arsenic content of crude arsenic exported. Excludes arsenic in ores exported from British Columbia as it is not paid for.

3. Includes some arsenic recovered from foreign ores.

TABLE 20. Platinum Metals ¹ Produced, 1950-1954

Year	Platinum		Palladium and other platinum metals	
	Ounces	\$	Ounces	\$
1950	124, 571	10, 255, 929	148, 741	7, 578, 144
1951	153, 483	14, 542, 515	164, 905	7, 950, 107
1952	122, 317	10, 916, 792	157, 407	7, 559, 379
1953	137, 545	12, 550, 981	166, 018	7, 494, 509
1954	154, 356	12, 950, 469	189, 350	7, 956, 087

1. Figures represent the metal content of concentrates produced from nickel-copper ores. Included are metals recovered from alluvial deposits.

TABLE 21. Production of Titanium Dioxide and Iron (Remelt), 1950-1954

Year	Titanium dioxide in slag		Iron (remelt)	
	Tons	\$	Tons	\$
1950	1, 596	149, 563	1, 697	138, 284
1951	14, 123	738, 577	15, 554	777, 142
1952	30, 805	1, 238, 103	32, 422	1, 815, 007
1953	100, 527	4, 206, 496	107, 370	4, 064, 039
1954	82, 386	3, 680, 077	90, 562	2, 910, 663

TABLE 22. Capacities of Canadian Copper Smelting and Refining Works, 1954

Company	Blast furnaces		Reverberatories		Converters
	Number	Annual capacity — tons of ore and concentrates	Number	Annual capacity — tons of ore and concentrates	Number
Falconbridge Nickel Mines, Ltd.	2	600, 000	—	—	4
Hudson Bay Mining and Smelting Co., Ltd.	—	—	1	575, 000	3
Noranda Mines Ltd.	—	—	2	1, 300, 000	5
International Nickel Co. of Canada, Ltd.:					
Copper cliff	2	430, 000	9	3, 500, 000	20
Coniston	4	950, 000	—	—	5
Annual Capacity					
Short tons					
Electrolytic copper refineries:					
Canadian Copper Refiners, Ltd.			132, 000		
International Nickel Co. of Canada, Ltd.			166, 000		

TABLE 23. Lead Smelting Capacity of Canada, 1954

Company	Number of blast furnaces	Annual capacity
		Tons of charge
Consolidated Mining & Smelting Company of Canada, Limited, Trail, British Columbia	5	711, 000

TABLE 24. Capacity of Electrolytic Zinc Plants in Canada, 1954

Company	Estimated annual capacity for cathode zinc
	Short tons
Consolidated Mining & Smelting Company of Canada, Ltd.	200, 000
Hudson Bay Mining & Smelting Co., Ltd.	73, 000

TABLE 25. Estimated Capital and Repair Expenditures, 1950-1954

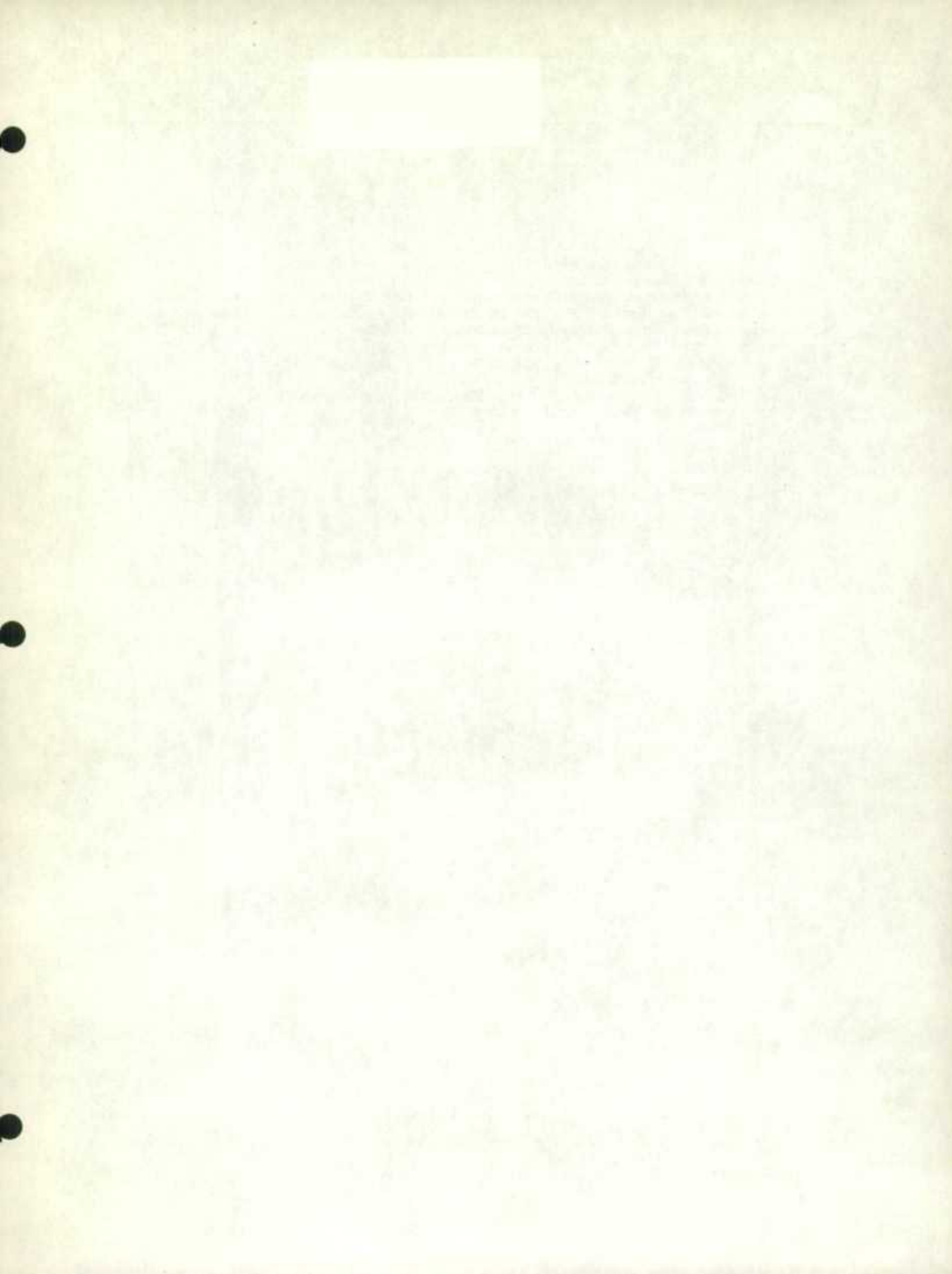
Year	Capital expenditures			Repair expenditures			Capital and repair expenditures		
	Construction	Machinery	Total	Construction	Machinery	Total	Construction	Machinery	Total
	thousands of dollars								
1950	6,744	9,438	16,182	2,639	19,679	22,518	9,583	29,117	38,700
1951	20,599	19,811	40,410	5,330	24,047	29,377	25,929	43,858	69,787
1952	32,573	29,689	62,262	7,007	26,850	33,857	39,580	56,539	96,119
1953	33,426	33,702	67,128	7,739	29,404	37,143	41,165	63,106	104,271
1954 ¹	20,095	29,874	49,969	9,188	27,580	36,768	29,283	57,454	86,737

1. Preliminary estimates.

Directory of Firms in the Smelting and Refining Industry, 1954

Name of firm	Head or executive office address	Location of plant
Quebec:		
Aluminum Company of Canada Ltd.	1700 Sun Life Bldg., Montreal	Arvida, La Tuque, Shawinigan Falls, Isle Maligne, Beauharnois
Boreal Rare Metals Ltd.	1610 Sherbrooke St. W., Montreal	Cap de la Madeleine
Canadian Copper Refiners Ltd.	1700 Bank of Nova Scotia Bldg., Toronto, Ontario	Montreal East
Noranda Mines Limited	1709 Bank of Nova Scotia Bldg., Toronto, Ontario	Noranda
Quebec Iron and Titanium Corp.	1510 Drummond St., Montreal	Sorel
Ontario:		
Deloro Smelting & Refining Co. Ltd.	Deloro	Deloro
Dominion Magnesium Ltd.	67 Yonge St., Toronto	Halifax
Falconbridge Nickel Mines Ltd.	44 King St. West, Toronto	Falconbridge
International Nickel Co. of Canada, Limited	Copper Cliff	Copper Cliff, Coniston, Port Colborne
Quebec Metallurgical Industries Ltd. (Cobalt Chemicals Division)	Box 931, Cobalt	Cobalt
Manitoba:		
Hudson Bay Mining and Smelting Co. Limited	500 Royal Bank Bldg., Winnipeg	Flin Flon
Alberta:		
Sherritt-Gordon Mines Ltd.	25 King St. W., Toronto, Ontario	Fort Saskatchewan
British Columbia:		
Consolidated Mining & Smelting Co. of Canada Limited	Trail	Trail
Aluminum Company of Canada Ltd.	1700 Sun Life Bldg., Montreal, Quebec	Kitimat

Note. Information relating to operations of the Eldorado Mining and Refining Co. at Port Hope, Ontario, is secret and therefore not included in this report.



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