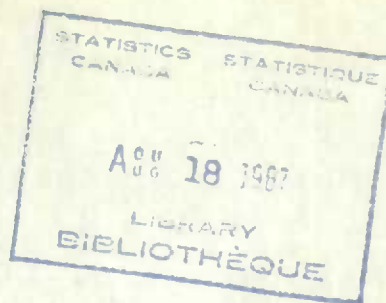


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THE SMELTING AND REFINING INDUSTRY 1956



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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 Iron Mining Industry, 25¢
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- T – The Sand and Gravel Industry, 25¢
- U – The Stone Industry, 25¢
- V – Contract Drilling in the Mining Industry, 25¢

THE SMELTING AND REFINING INDUSTRY 1956

This report was formerly published under the title

THE NON-FERROUS SMELTING AND REFINING INDUSTRY

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 1956 totalled \$511,018,353 compared with \$443,805,081 in 1955. Refined products included gold, silver, nickel, copper, lead, zinc, aluminum, 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, copper salts, 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 for the years 1941-1954.

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 1956 cost \$64,942,503 including 13,981,373,631 k.w.h. of purchased electricity at \$34,973,417.

The value of process supplies consumed during the year amounted to \$74,686,862 and the cost of ores and raw materials was \$745,917,460.

The industry employed an average of 30,788 persons to whom \$130,139,944 were paid in salaries and wages.

There were 23 plants, of which 22 were producing, owned by 15 firms. The names of the operators and the plant locations are given in the directory on the last page of this report.

TABLE 1. Principal Statistics of the Smelting and Refining Industry, Significant Years, 1921-1956

Year	Establishments	Employees	Salaries and wages	Cost of fuel and electricity at works	Cost of process supplies and containers	Gross value of products shipped ¹ during year, including containers (f.o.b. works)	Net ² value of production
	No.	No.	\$	\$	\$	\$	\$
1921	14	3,682	4,406,957	N.A.	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	6,360	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	15,891,301	11,773,863	262,602,495	80,057,833
1941	13	16,014	27,482,689	26,771,807	19,272,162	379,322,270	119,736,294
1944	16	23,927	44,536,901	36,907,623	32,730,138	474,206,801	123,303,038
1946	15	14,546	30,648,361	22,287,572	16,000,964	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
1951	17	22,814	75,474,505	44,684,200	46,411,504	861,315,930	262,972,789
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	55,225,387	52,933,522	922,578,998	352,037,956
1955	24	28,606	118,189,378	57,148,510	60,874,175	1,211,716,481	443,805,081
1956	23	30,788	130,139,944	64,942,503	74,686,862	1,396,565,178	511,018,353

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 for 1941-1954 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, 1952-1956

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Administration		Workmen		Total		Adminis- tration	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
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
1955	3,954	647	23,956	49	28,606	65,152,159	23,771,907	94,417,471	118,189,378
1956	4,297	1,053	25,389	49	30,788	68,369,251	25,950,477	104,189,467	130,139,944

TABLE 3. Number of Workmen, by Months, 1953 and 1956 (Administrative and office employees not included)

Month	1953			1956		
	Male	Female	Total	Male	Female	Total
January	22,813	51	22,864	23,171	46	23,217
February	22,880	50	22,930	23,394	46	23,440
March	23,062	50	23,112	23,421	47	23,465
April	23,030	51	23,081	23,874	46	23,920
May	23,754	46	23,800	25,265	50	25,315
June	24,344	50	24,394	26,518	51	26,569
July	24,741	53	24,794	26,822	52	26,874
August	24,824	48	24,872	27,013	52	27,065
September	24,964	49	25,013	26,668	50	26,716
October	24,588	49	24,637	26,428	49	26,477
November	24,413	49	24,462	26,215	49	26,264
December	24,009	48	24,057	25,878	48	25,926
Average	23,966	49	24,005	25,389	49	25,438
Man-hours worked			54,622,669			56,259,780

TABLE 4. Fuel and Electricity Used in the Smelting and Refining Industry, 1956

Kind	Unit of Measure	Quantity	Cost at plant
Bituminous coal (a) From Canadian mines	short ton	414, 208	5, 591, 587
(b) Imported	"	41, 283	528, 130
Sub-bituminous coal (from Alberta mines only)	"	42	610
Anthracite coal	"	620, 715	6, 998, 981
Lignite coal	"	—	—
Coke (for fuel only)	"	320, 237	6, 802, 958
Gasoline, (includes gasoline used in cars and trucks)	Imp. gal.	765, 994	261, 023
Kerosene or coal oil	"	176, 270	34, 644
Fuel oil	"	89, 737, 085	9, 350, 514
Wood (cords of 128 cubic feet of piled wood)	cord	1, 452	38, 820
Gas (a) Liquefied petroleum gases (propane, etc.)	Imp. gal.	68, 724	10, 709
(b) Other manufactured gas	M cu. ft.	98, 217	98, 846
(c) Natural gas	"	1, 952, 752	232, 109
Other fuel	—	...	20, 155
Electricity purchased for power and lighting	k.w.h.	2, 206, 367, 656	7, 216, 473
Electricity purchased for other purposes	"	11, 775, 005, 975	27, 756, 944
Total (cost only)	64, 942, 503
Electricity generated (a) For own use	k.w.h.	1, 121, 430, 109	...
(b) For sale	"	12, 219, 100	37, 036

TABLE 5. Estimated Capital and Repair Expenditures in the Smelting and Refining Industry, 1951-1956

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								
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	19, 522	27, 712	47, 234	7, 334	33, 333	40, 667	26, 856	61, 045	87, 901
1955	34, 273	40, 485	74, 758	6, 948	36, 314	43, 262	41, 221	76, 799	118, 020
1956 ¹	48, 419	45, 597	94, 016	8, 016	45, 460	53, 476	56, 435	91, 057	147, 492

1. Preliminary estimate.

TABLE 6. Average Annual Metal Prices, in Canadian Dollars, 1947-1956

Year	Gold	Silver	Copper	Lead	Zinc
	Troy oz.	Troy oz.	Pound	Pound	Pound
	Dollars				
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
1955	34. 52	0. 8818	0. 3687	0. 1438	0. 1365
1956	34. 45	0. 8968	0. 4141	0. 1551	0. 1484

TABLE 7. Production of New Gold and Silver, 1952-1956 (From all types of ores)

Year	Gold		Silver	
	Fine ounces	\$	Fine ounces	\$
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
1955	4,541,962	156,788,528	27,984,204	24,676,472
1956	4,383,863	151,024,080	28,431,847	25,497,681

TABLE 8. Source of Canadian Gold Production, 1952-1956

Source	1952	1953	1954	1955	1956
	Per cent				
In alluvial gold	2.08	1.91	2.05	1.73	1.71
In crude gold bullion produced at mines	83.22	84.11	83.14	83.10	83.66
In base bullion produced at lead smelters	0.39	0.25	0.34	0.16	0.17
In blister copper	11.37	9.77	11.18	12.15	12.88
In ores, matte, slags, etc., exported	2.94	3.96	3.29	2.86	1.58

TABLE 9. Source of Canadian Silver Production, 1952-1956

Source	1952	1953	1954	1955	1956
	Per cent				
In silver-cobalt ores	19.21	12.50	11.99	14.53	16.61
In base bullion ¹	48.01	45.65	38.53	37.41	37.08
In gold bullion and placer	2.83	2.21	2.16	2.38	2.17
In blister and anode copper	18.66	14.32	15.61	18.73	19.14
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores)	11.29	25.32	31.71	26.95	25.00

1. Includes silver bullion from silver-lead ores.

TABLE 10. Production of Copper, 1952-1956 (From all types of ores)

Year	Copper in all forms ¹		Refined copper ²
	Tons	\$	Tons
1952	258,038	146,679,040	196,320
1953	253,752	150,953,742	236,966
1954	302,732	175,712,693	253,365
1955	325,994	239,756,455	288,997
1956	354,880	292,958,091	328,458

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 11. Production of Copper, by Sources, 1955 and 1956

Source	1955		1956	
	Tons	Value	Tons	Value
		\$		\$
In blister and anode copper produced ¹	283,559	209,124,633	312,952	259,187,514
In ores, concentrates and any copper matte exported	28,238	20,774,461	25,574	21,108,874
In nickel-copper matte exported	13,198	8,974,691	14,967	11,524,438
In copper salts and powder	999	882,670	1,367	1,137,265
Total	325,994	239,756,455	354,860	292,958,091

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

TABLE 12. Production¹ of Nickel, 1952-1956

Year	Tons	\$
1952	140,558	151,349,438
1953	143,693	160,430,098
1954	161,279	180,173,392
1955	174,928	215,866,007
1956	178,565	222,204,860

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

TABLE 13. Production of Lead, 1952-1956

Year	Lead in all forms ¹		Refined lead ²
	Tons	\$	Tons
1952	168,842	54,671,021	182,943
1953	193,706	50,076,822	165,752
1954	218,495	58,250,831	166,005
1955	202,762	58,314,500	148,811
1956	188,854	58,582,651	147,865

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 14. Production of Zinc, 1952-1956

Year	Zinc in all forms ¹		Refined zinc ²
	Tons	\$	Tons
1952	371,802	129,833,285	222,200
1953	401,762	96,101,386	250,961
1954	376,491	90,207,285	213,775
1955	433,357	118,306,466	256,542
1956	422,632	125,437,344	255,564

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 15. Production¹ of Bismuth and Cadmium, 1952-1956

Year	Bismuth		Cadmium	
	Pounds	\$	Pounds	\$
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
1955	265,896	572,362	1,919,081	3,262,439
1956	285,861	544,900	2,339,421	3,977,016

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

TABLE 16. Production of Selenium and Tellurium, 1952-1956

Year	Selenium		Tellurium	
	Pounds	\$	Pounds	\$
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
1955	427,109	3,203,319	9,014	15,774
1956	330,389	4,460,252	7,867	13,767

TABLE 17. Production (Shipments) of New Aluminum and Magnesium, 1952-1956

Year	Aluminum ¹	Magnesium	
	Tons	Pounds	\$
1952	499,758	Not available for publication	
1953	548,445		
1954	557,897		
1955	612,543		
1956	620,321	19,212,298	6,079,890

1. All from imported ores.

TABLE 18. Production of New Antimony and Tin, 1952-1956

Year	Antimony (Content of antimonial lead)		Tin	
	Pounds	\$	Pounds	\$
1952	2,330,900 ¹	601,484	212,113	253,581
1953	1,488,105 ¹	291,862	643,254 ²	581,746
1954	1,302,333 ¹	349,249	333,788 ²	263,359
1955	2,021,726 ¹	563,345	492,781 ²	408,030
1956	2,142,432 ¹	657,527	755,934 ²	670,441

1. Content of antimonial lead, Doré slag and flue dust.
2. Tin content of concentrates and lead-tin alloy.

TABLE 19. Production (Shipments) of Molybdenite Concentrates and Tungsten Concentrates, 1952-1956

Year	Molybdenite concentrates			Tungsten concentrates		
	Gross weight	MoS ₂ content	\$	Gross weight	WO ₃ content	\$
	Tons			Tons		
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
1955	762	695	823,954	1,628	971	5,508,437
1956	704	702	955,828	1,701	1,136	6,362,368

TABLE 20. Production of Cobalt and Arsenic, 1952-1956

Year	Cobalt ¹		Arsenious oxide ²	
	Pounds	\$	Tons	\$
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
1955	3,296,270	8,510,314	786 ³	69,159
1956	3,516,670	9,065,493	895 ³	77,612

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 21. Platinum Metals¹ Produced, 1952-1956

Year	Platinum		Palladium and other platinum metals	
	Ounces	\$	Ounces	\$
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
1955	170,494	14,747,732	214,252	8,321,633
1956	151,357	15,725,992	163,451	6,681,098

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

TABLE 22. Production of Titanium Dioxide and Iron (Remelt), 1952-1956

Year	Titanium dioxide in slag		Iron (remelt)	
	Tons	\$	Tons	\$
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
1955	117,042	5,192,810	115,955	4,831,845
1956	157,374	7,682,911	159,874	7,996,897

TABLE 23. Capacities of Canadian Copper Smelting and Refining Works, 1956

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.	3	700,000	—	—	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.			192,000		
International Nickel Co. of Canada, Ltd.			168,000		

TABLE 24. Lead Smelting Capacity of Canada, 1956

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

TABLE 25. Capacity of Electrolytic Zinc Plants in Canada, 1956

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

Directory of Firms in the Smelting and Refining Industry, 1956

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
Canadian Copper Refiners Ltd.	1700 Bank of Nova Scotia Bldg., Toronto, Ontario	Montreal East Murdochville
Gaspé Copper Mines Ltd.	44 King St. W., Toronto, Ontario	
Noranda Mines Limited	1709 Bank of Nova Scotia Bldg., Toronto, Ontario	Noranda Sorel
Quebec Iron and Titanium Corp.	1510 Drummond St., Montreal	
Ontario:		
Deloro Smelting & Refining Co., Ltd.	Deloro	Deloro
Dominion Magnesium Ltd.	67 Yonge St., Toronto	Haley
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
Eldorado Mining & Refining Ltd.	Box 379, Ottawa	Port Hope
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	Kitchikan

Note: Information relating to operations of the Eldorado Mining and Refining Co. at Port Hope, Ontario, is excluded for the years 1941-1954.

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