

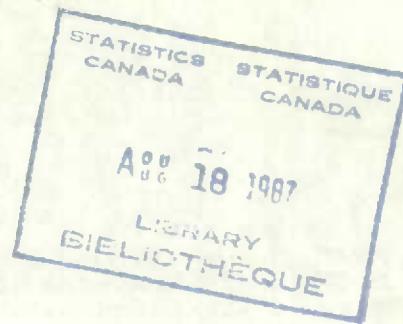
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# THE SMELTING AND REFINING INDUSTRY

1958



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# THE SMELTING AND REFINING INDUSTRY

## 1958

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 1958 totalled \$378,451,364 compared with \$450,666,165 in 1957. Refined products included gold, silver, nickel, copper, lead, zinc, aluminum, magnesium, calcium, barium, titanium, zirconium, indium, 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, antimonial lead and sulphur. 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 Canada as a whole is not affected by these arbitrary internal evaluations.

The average number of employees in the industry was 26,959 persons to whom \$131,081,250 were distributed as salaries and wages.

Fuel and electricity used in 1958 cost \$63,522,398, this figure included 15,081,229,595 kwh. of purchased electricity at \$40,081,679. The value of process supplies consumed amounted to \$66,061,292 and the cost of ores or raw materials was \$627,735,452.

**TABLE 1. Principal Statistics of the Smelting and Refining Industry, Significant Years, 1921 - 1958**

YEAR	Estab- lish- ments	Em- ployees	Salaries and wages	Cost of fuel and electricity at works	Cost of process supplies and containers	Gross value of products shipped <sup>1</sup> during year, including containers (f.o.b. works)	Net <sup>2,3</sup> value of production
number							
1921 .....	14	3,682	4,406,957	..	..	23,732,277	..
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	14,807,421	10,559,714	318,278,251	101,807,865
1939 .....	13	12,449	19,372,119	15,891,301	11,773,863	262,802,495	80,057,833
1941 .....	13	18,014	27,482,689	28,771,807	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	30,648,381	22,287,572	18,000,964	304,718,524	69,565,922
1949 .....	16	19,150	55,133,085	37,004,311	31,816,028	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
1957 .....	23	29,613	134,775,206	59,474,791	79,529,766	1,280,145,652	450,666,165
1958 .....	25	26,959	131,081,250	63,522,398	66,061,292	1,135,770,506	378,451,364

<sup>1</sup> 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.

<sup>2</sup> See preceding Text.

<sup>3</sup> Gross value of production less fuel, electricity, process supplies and cost of ores.

.. Not available

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, 1954-1958**

Year	Employees						Man-hours worked (all employees)	Earnings		
	Administration		Workmen		Total	Administration		Workmen	Total	
	Male	Female	Male	Female						
number						dollars				
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	
1957 .....	4,716	692	24,152	53	29,613	65,661,725	29,413,697	105,361,509	134,775,206	
1958 .....	4,773	744	21,391	51	26,959	56,197,677	33,398,402	97,682,848	131,081,250	

**TABLE 3. Number of Workmen, by Months, 1957 and 1958 (Administrative and office employees not included)**

Month	1957			1958		
	Male	Female	Total	Male	Female	Total
January.....	25,138	47	25,185	25,112	51	25,165
February.....	24,730	52	24,782	24,385	51	24,436
March.....	24,350	53	24,403	23,778	51	23,829
April.....	25,054	53	25,107	23,603	52	23,655
May.....	25,838	54	25,892	23,604	52	23,656
June.....	20,674	56	20,730	23,667	55	23,722
July.....	20,980	55	21,035	23,664	58	23,722
August.....	20,964	56	21,020	23,280	55	23,335
September.....	25,467	56	25,523	22,133	51	22,184
October.....	25,789	55	25,844	14,567	47	14,614
November.....	25,543	53	25,596	14,226	44	14,270
December.....	25,274	53	25,327	14,327	44	14,371
Average .....	24,152	53	24,205	21,391	51	21,442
Man-hours worked .....			52,198,148			43,326,890

TABLE 4. Fuel and Electricity Used in the Smelting and Refining Industry, 1958

Kind		Quantity	Cost at plant
Bituminous coal (a) From Canadian mines .....	short ton	386,337	\$ 5,440,773
(b) Imported .....	"	337,901	4,146,530
Sub-bituminous coal (from Alberta mines only) .....	"	9	135
Anthracite coal .....	"	53,867	761,553
Lignite coal .....	"	—	—
Coke (for fuel only) .....	"	225,352	5,070,644
Gasoline, (includes gasoline used in cars and trucks) .....	Imp. gal.	774,703	269,579
Kerosene or coal oil .....	"	33,011	9,792
Fuel oil .....	"	72,425,670	7,326,409
Wood (cords of 128 cubic feet of piled wood) .....	cord	2,476	53,753
Gas (a) Liquefied petroleum gases (propane, etc.) .....	Imp. gal.	45,168	16,816
(b) Other manufactured gas .....	M cu. ft.	117,354	78,420
(c) Natural gas .....	"	1,909,312	249,789
Other fuel .....	—	...	16,526
Electricity purchased for power and lighting .....	kwh.	3,565,553,882	11,316,974
Electricity purchased for other purposes .....	"	11,515,675,713	28,764,705
<b>Total (cost only)</b> .....	—	...	<b>63,522,398</b>
Electricity generated (a) For own use .....	kwh.	1,038,454,749	
(b) For sale .....	"	33,201,800	83,868

... Not applicable.

TABLE 5. Power Equipment Used in the Smelting and Refining Industry, 1958

Type of equipment	Driving generators	Not driving generators
horsepower		
A. Prime movers:		
Steam engines .....	250	—
Steam turbines .....	36,753	6,705
Diesel engines .....	7,700	1,200
Gasoline, gas and oil engines, other than diesel engines .....	953	11,164
Hydraulic turbines or water wheels .....	—	—
<b>Total</b> .....	<b>45,656</b>	<b>19,069</b>
B. Electric motors (one-quarter horsepower and over) .....	100,575	823,541

TABLE 6. Estimated Capital and Repair Expenditures in the Smelting and Refining Industry, 1954 - 1958

Year	Capital expenditures			Repair expenditures			Capital and repair expenditures		
	Con- struc- tion	Machinery	Sub- total	Con- struc- tion	Machinery	Sub- total	Con- struc- tion	Machinery	Total
thousands of dollars									
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 .....	53,663	45,654	99,317	10,161	43,574	53,735	63,824	89,228	153,052
1957 .....	63,611	61,696	125,307	7,366	46,720	54,086	70,977	108,416	179,393
1958 <sup>1</sup> .....	37,967	31,706	69,673	7,998	42,285	50,283	45,965	73,991	119,956

<sup>1</sup> Preliminary estimate.

TABLE 7. Average Annual Metal Prices, in Canadian Dollars, 1949 - 1958

Year	Gold	Silver	Copper	Lead	Zinc
	Troy oz.	Troy oz.	Pound	Pound	Pound
dollars					
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
1957 .....	33.55	0.8737	0.2895	0.1396	0.1209
1958 .....	33.98	0.8681	0.2542	0.1136	0.1088

TABLE 8. Production of New Gold and Silver, 1954 - 1958 (From all types of ores)

Year	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value
		\$		\$
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
1957 .....	4,433,894	148,757,143	28,823,298	25,182,915
1958 .....	4,571,347	155,334,370	31,163,470	27,053,007

TABLE 9. Source of Canadian Gold Production, 1954 - 1958

Source	1954	1955	1956	1957	1958
per cent					
In alluvial gold .....	2.05	1.73	1.71	1.72	1.57
In crude gold bullion produced at mines .....	83.14	83.10	83.66	83.98	84.06
In base bullion produced at lead smelters .....	0.34	0.16	0.17	0.32	0.20
In blister copper .....	11.18	12.15	12.88	12.40	12.84
In ores, matte, slags, etc., exported .....	3.29	2.86	1.58	1.58	1.53

TABLE 10. Source of Canadian Silver Production, 1954-1958

Source	1954	1955	1956	1957	1958
per cent					
In silver-cobalt ores.....	11.99	14.53	16.61	14.98	19.39
In base bullion <sup>1</sup> .....	38.53	37.41	37.08	39.29	40.84
In gold bullion and placer .....	2.16	2.38	2.17	2.31	2.32
In blister and anode copper.....	15.61	18.73	19.14	20.56	23.77
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores)	31.71	26.95	25.00	22.86	13.68

<sup>1</sup> Includes silver bullion from silver-lead ores.

TABLE 11. Production of Copper, 1954-1958 (From all types of ores)

Year	Copper in all forms <sup>1</sup>		Refined copper <sup>2</sup>
	Tons	Value	Tons
		\$	
1954 .....	302,732	175,712,693	253,365
1955 .....	325,994	239,756,455	288,997
1956 .....	354,860	292,958,091	328,458
1957 .....	359,109	206,897,988	323,540
1958 .....	345,114	174,430,930	329,239

<sup>1</sup> Blister copper plus recoverable copper in concentrates and matte exported.

<sup>2</sup> Does not include a small tonnage recovered from scrap in secondary smelters.

TABLE 12. Production of Copper, by Sources, 1957 and 1958

Source	1957		1958	
	Tons	Value	Tons	Value
		\$		\$
In blister and anode copper produced <sup>1</sup> .....	317,365	183,754,562	319,424	162,372,246
In ores, concentrates and any copper matte exported ....	24,547	14,167,931	9,550	4,795,774
In nickel-copper matte exported .....	15,716	8,172,266	16,140	7,262,910
In copper salts and powder .....	1,481	803,229	—	—
Total .....	359,109	206,897,988	345,114	174,430,930

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

TABLE 13. Production<sup>1</sup> of Nickel, 1954 - 1958

Year	Tons	Value
		\$
1954 .....	161,279	180,173,392
1955 .....	174,928	215,866,007
1956 .....	178,565	222,204,860
1957 .....	187,958	258,977,309
1958 .....	139,559	194,142,019

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

TABLE 14. Production of Lead, 1954 - 1958

Year	Lead in all forms <sup>1</sup>		Refined lead <sup>2</sup>
	Tons	Value	Tons
		\$	
1954 .....	218,495	58,250,831	166,005
1955 .....	202,762	58,314,500	148,811
1956 .....	188,854	58,582,651	147,865
1957 .....	181,484	50,670,407	142,935
1958 .....	186,680	42,413,805	132,987

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

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

TABLE 15. Production of Zinc, 1954 - 1958

Year	Zinc in all forms <sup>1</sup>		Refined zinc <sup>2</sup>
	Tons	Value	Tons
		\$	
1954 .....	376,491	90,207,285	213,775
1955 .....	433,357	118,306,466	256,542
1956 .....	422,632	125,437,344	255,564
1957 .....	413,741	100,042,533	247,316
1958 .....	425,099	92,501,496	252,093

<sup>1</sup> Refined zinc produced in Canada plus recoverable zinc in ores exported.

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

TABLE 16. Production<sup>1</sup> of Bismuth and Cadmium, 1954-1958

Year	Bismuth		Cadmium	
	Pounds	Value	Pounds	Value
		\$		\$
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
1957 .....	319,941	584,917	2,368,130	4,025,821
1958 .....	412,797	771,267	1,756,050	2,669,195

<sup>1</sup> Includes refined metal and recoverable metal in concentrates shipped.

TABLE 17. Production of Selenium and Tellurium, 1954-1958

Year	Selenium		Tellurium	
	Pounds	Value	Pounds	Value
		\$		\$
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
1957 .....	321,392	3,535,312	31,524	55,167
1958 .....	306,990	2,302,426	38,250	65,025

TABLE 18. Production (Shipments) of New Aluminum and Magnesium, 1954-1958

Year	Aluminum <sup>1</sup>	Magnesium	
	Tons	Pounds	Value
			\$
1954 .....	557,897		Not available for publication
1955 .....	612,543		
1956 .....	620,321	19,212,298	6,079,890
1957 .....	556,715	16,770,371	5,254,896
1958 .....	634,102	13,591,705	4,064,825

<sup>1</sup> All from imported ores.

TABLE 19. Production of New Antimony and Tin, 1954 - 1958

Year	Antimony <sup>1</sup>		Tin <sup>2</sup>	
	Pounds	Value	Pounds	Value
		\$		\$
1954 .....	1,302,333	349,249	333,788	263,359
1955 .....	2,021,726	563,345	492,781	408,030
1956 .....	2,140,432	687,527	756,934	670,441
1957 .....	1,360,731	370,442	709,102	580,342
1958 .....	858,633	284,208	795,496	625,260

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

TABLE 20. Production (Shipments) of Molybdenum Concentrates and Tungsten Concentrates, 1954 - 1958

Year	Molybdenite concentrates and Molybdic oxide			Tungsten concentrates		
	Gross weight	Mo. content	Value	Gross weight	WO <sub>3</sub> content	Value
	tons		\$	tons		\$
1954 .....	411	226	457,912	1,619	1,085	5,795,781
1955 .....	762	417	823,954	1,628	971	5,508,437
1956 .....	704	421	955,828	1,701	1,136	6,362,368
1957 .....	633	392	1,166,557	1,492	961	5,279,275
1958 .....	744	444	1,152,838	511	345	1,898,455

TABLE 21. Production of Cobalt and Arsenic, 1954 - 1958

Year	Cobalt <sup>1</sup>		Arsenious oxide <sup>2</sup> , <sup>3</sup>	
	Pounds	Value	Tons	Value
		\$		\$
1954 .....	2,252,965	5,912,997	590	48,333
1955 .....	3,296,270	8,510,314	786	69,159
1956 .....	3,516,670	9,065,493	895	77,612
1957 .....	3,922,649	7,784,423	1,849	137,112
1958 .....	2,436,064	4,866,267	1,162	34,542

<sup>1</sup> Content in metal and oxide produced in Canada and in ores exported.<sup>2</sup> 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.<sup>3</sup> Includes some arsenic recovered from foreign ores.

TABLE 22. Platinum Metal<sup>1</sup> Produced, 1954-1958

Year	Platinum		Palladium and other platinum metals	
	Ounces	Value	Ounces	Value
		\$		\$
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
1957 .....	199,565	17,835,124	216,582	7,896,209
1958 .....	146,092	9,481,371	154,366	4,840,072

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

TABLE 23. Production of Titanium Dioxide and Iron (Remelt), 1954-1958

Year	Titanium dioxide, etc.		Iron (remelt)	
	Tons	Value	Tons	Value
		\$		\$
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
1957 .....	186,422	9,740,570	187,529	10,083,434
1958 .....	...	6,575,077	...	5,120,620

... Not applicable.

TABLE 24. Capacities of Canadian Copper Smelting and Refining Works, 1958

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. ....	4	660,000	-	-	6
Hudson Bay Mining and Smelting Co., Ltd. ..	-	-	1	575,000	3
Noranda Mines Ltd. ....	-	-	3	1,600,000	5
International Nickel Co. of Canada, Ltd.:					
Copper Cliff .....	2	430,000	9	4,000,000	20
Coniston .....	4	800,000	-	-	5
Gaspé Copper Mines Ltd. ....	-	-	1	300,000	2
Annual capacity					
short tons					
Electrolytic copper refineries:					
Canadian Copper Refiners, Ltd. ....		240,000			
International Nickel Co. of Canada, Ltd. ....		168,000			

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TABLE 25. Lead Smelting Capacity of Canada, 1958

Company	Number of blast furnaces	Annual capacity tons of charge
Consolidated Mining & Smelting Company of Canada, Limited, Trail, British Columbia .....	4	623,000

TABLE 26. Capacity of Electrolytic Zinc Plants in Canada, 1958

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, 1958

Name of firm	Head or executive office address	Location of plant
<b>Quebec:</b>		
Aluminum Company of Canada Ltd. ....	1700 Sun Life Bldg., Montreal .....	Arvida, La Tuque, Shawinigan
Canadian British Aluminum Co., Ltd. ....	Baie Comeau .....	Falls, Isle Maligne, Beauhamois
Canadian Copper Refiners Ltd. ....	1700 Bank of Nova Scotia Bldg., Toronto, Ontario .....	Baie Comeau
Gaspé Copper Mines Ltd. ....	44 King St. W., Toronto, Ontario ...	Montreal East
Noranda Mines Limited ....	1709 Bank of Nova Scotia Bldg., Toronto, Ontario .....	Murdochville
Quebec Iron and Titanium Corp. ....	1510 Drummond St., Montreal .....	Noranda Sorel
<b>Ontario:</b>		
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
<b>Manitoba:</b>		
Hudson Bay Mining and Smelting Co., Limited	500 Royal Bank Bldg., Winnipeg ....	Flin Flon
<b>Alberta:</b>		
Sherritt-Gordon Mines Ltd. ....	25 King St. W., Toronto, Ontario ....	Fort Saskatchewan
<b>British Columbia:</b>		
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 excluded for the years 1941-1954.