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Minister of Trade and Commerce.

CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

CENSUS OF INDUSTRY

MINING, METALLURGICAL & CHEMICAL BRANCH

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

1938

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THE NON-FERROUS SMELTING and REFINING INDUSTRY IN CANADA, 1938.

The Non-Ferrous Smelting and Refining Industry, as defined by the Dominion Bureau of Statistics, Ottawa, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The value added by the industry in the processing of crude or semi-crude material during 1938 totalled $87,091,374 compared with the all-time high record of $101,807,865 in the preceding year. Refined products included gold, silver, copper, lead, zinc, aluminium, cobalt, cadmium, selenium, tellurium, radium salts, uranium compounds and sulphur; other end products of individual plants or companies were copper-nickel matte, cobalt salts, nickel salts, nickel and cobalt oxides, arsenious oxide, sulphuric acid, platinum metals residues, silver sulphide, silver-lead-bismuth bullion, zinc dust, zinc oxide, blister and anode copper and copper matte.

The cost of ores, concentrates and other material treated during 1938 was estimated at $173,070,377 as against a corresponding value of $191,303,251 in 1937; fuels and purchased electricity consumed totalled $15,233,547 and the value of chemicals and various other process supplies used amounted to $11,900,435.

Capital employed by the industry in 19[illegible]as reported at $184,337,126, which figure includes value of land, plant, mater[illegible] on hand and in process, finished products and operating funds. Employees [illegible]alled 12,788 and salaries and wages paid aggregated $19,549,963 compared wit[illegible]1,570 and $17,990,947, respectively, in 1937.

Primary commodity price indexes showed considerable recessions compared with manufactured goods indexes during 1938. The average annual Canadian prices for the major non-ferrous metals copper, lead and zinc were all considerably lower than in the preceding year. However, the improved industrial situation combined with heavy rearmament orders had an especially stimulating effect on base metals during the latter months of the year. The average price of silver in 1938 showed relatively little change from 1937 while the average price of gold in Canadian funds realized an increase of 18.5 per fine ounce.

Table 1 - PRINCIPAL STATISTICS OF THE NON-FERROUS METALLURGICAL INDUSTRY IN CANADA, 1936, 1937 and 1938.

		1936	1937	1938
Number of companies		11	10	10
Number of plants		14	13	13
Capital employed	$	143,858,717	162,696,595	184,337,126
Number of salaried employees		863	1,003	1,063
Salaries	$	2,176,110	2,575,849	2,612,284
Number of wage-earners		9,152	10,567	11,725
Wages	$	12,169,940	15,415,098	16,937,679
Value of plant products (gross) (/)	$	229,737,420	318,278,251	287,295,733
Estimated cost of ores, concentrates, etc., treated (a)	$	137,857,432	191,303,251	173,070,377
Cost of fuel and purchased electricity (b)	$	12,613,763	14,607,421	15,233,547
Process supplies other than items (a) and (b)	$	7,989,580	10,559,714	11,900,435
Value added by smelting (net)	$	71,276,645	101,807,865	87,091,374

(/) The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industry (smelting, refining, etc.) end products (blister, copper matte, etc.), and in this sense is a duplication of values.

Table 2. - NUMBER OF WAGE-EARNERS, BY MONTHS, 1932 and 1936-1938.

MONTH	1932	1936	1937	1938
January	5,496	8,660	9,814	11,677
February	5,400	8,544	9,842	11,707
March	5,355	8,665	9,966	11,830
April	4,750	8,694	10,153	12,089
May	4,297	8,858	10,458	12,052
June	4,475	8,912	10,814	11,934
July	4,205	9,406	11,047	11,814
August	4,160	9,606	11,172	11,744
September	4,198	9,626	11,031	11,594
October	4,326	9,623	10,895	11,625
November	4,316	9,542	10,868	11,377
December	4,274	9,669	10,749	11,250
AVERAGE	4,604	9,152	10,567	11,725

Table 3. - FUEL AND ELECTRICITY USED IN THE NON-FERROUS SMELTING AND REFINING INDUSTRY, 1937 and 1938.

Kind	Unit of measure	For light and power		For metallurgical purposes	
		Quantity	Cost	Quantity	Cost
			$		$
1937					
Bituminous coal -					
Canadian	short ton	7,947	39,846	551,908	3,375,925
Imported	short ton	26,210	160,840	75,508	445,617
Anthracite coal -					
United States	short ton	19	286	...	...
Other	short ton	33	521	...	...

Table 3. - FUEL AND ELECTRICITY USED IN THE NON-FERROUS SMELTING AND REFINING INDUSTRY, 1937 and 1938. (Concluded)

Kind	Unit of measure	For light and power		For metallurgical purposes	
		Quantity	Cost	Quantity	Cost
1937 (Con.)			$		$
Coke	short ton	345	3,500	331,776	3,320,298
Gasoline	Imp. gal.	95,682	18,306	14,009	3,645
Fuel oil and diesel oil	Imp. gal.	171,222	17,334	20,308,735	1,092,436
Kerosene or coal oil	Imp. gal.	2,490	503	4,278	904
Wood (cords of 128 cubic feet)	Cord	...	...	16,930	78,648
Gas - Manufactured	M cu.ft.	...	...	29,949	4,489
Natural	M cu.ft.	...	...	119	96
Other fuel	$	...	...	...	5,076
Electricity purchased	K. W. H.	1,105,813,182	3,534,091	1,259,810,494	2,505,060
TOTAL	$	...	3,775,227	...	10,832,194
Electricity generated for own use	K. W. H.	28,806,400	...	210,455,752	...
Process supplies used, chemicals, etc.	$	...	10,559,714		
1938					
Bituminous coal - Canadian	short ton	12,381	57,618	492,575	3,070,329
Imported	short ton	30,005	187,559	154,579	901,511
Anthracite coal - United States	short ton	...	...	...	...
Other	short ton	51	821	...	...
Coke	short ton	318	3,281	290,999	2,740,630
Gasoline	Imp. gal.	90,721	16,583	13,534	3,301
Fuel oil and diesel oil	Imp. gal.	177,521	17,828	20,399,780	1,066,141
Kerosene or coal oil	Imp. gal.	6,018	1,195	1,430	329
Wood (cords of 128 cubic feet)	cord	...	...	13,731	70,143
Gas - Manufactured	M cu.ft.	...	...	3,986	5,085
Natural	M cu.ft.	...	...	300	297
Other fuel	$	...	...	...	2,327
Electricity purchased	K. W. H.	1,056,888,725	3,686,404	1,827,992,887	3,402,165
TOTAL	$	...	3,971,289	...	11,262,258
Electricity generated for own use.	K. W. H.	30,545,374	....	234,906,198	...
Process supplies used, chemicals, etc.	$	...	11,900,435		

Table 4 - POWER EMPLOYED IN THE NON-FERROUS SMELTING AND REFINING INDUSTRY, 1938.

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total horse power	Number of units	Total horse power
1. Steam engines and steam turbines ...	25	9,421	3	1,134
2. Gasoline, gas and oil engines	10	437	...	...
3. Hydraulic turbines or water wheels..	11	51,125	...	...
4. Electric motors - (a) Operated by purchased power	6,319	315,574	713	34,930
Total (1), (2), (3) and (4)	6,365	376,557	716	36,064
(b) Operated by power generated by the establishment	430	5,750	36	408
Stationary boilers	31	19,108	6	2,067

Table 5 - METAL PRICES, 1934 - 1938.

Metal	Market	Unit of Measure	1934	1935	1936	1937	1938
			$	$	$	$	$
Arsenic (AS_2O_3) ..	New York	Lb.	0.04	0.035	0.035	0.03	0.03
Copper ...	New York	Lb.	0.08428	0.08649	0.09474	0.13167	0.1000
Copper ...	London	Lb.	0.074193(a)	0.07795(a)	0.09477(a)	0.13078(a)	0.09972
Lead	London	Lb.	0.024364(a)	0.03133(a)	0.03913(a)	0.05110(a)	0.03344(a)
Silver ...	New York	Oz.	0.474609(a)	0.64790(a)	0.45126(a)	0.44881(a)	0.43477(a)
Zinc	London	Lb.	0.030436(a)	0.03099(a)	0.03315(a)	0.04902(a)	0.03073(a)
Gold	World	Fine oz.	34.50(a)	35.19(a)	35.03(a)	34.99(a)	35.175(a)

(a) Canadian funds.

Table 6 - AVERAGE MONTHLY PRICE OF GOLD, SILVER, COPPER, LEAD and ZINC, IN CANADIAN FUNDS, 1938, and JANUARY 1 to JULY 31, 1939.

Month	GOLD (a) Dollars per fine ounce		SILVER (b) Cents per fine ounce		COPPER (c) Cents per pound		LEAD (c) Cents per pound		ZINC (c) Cents per pound	
	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939
January ..	34.99	35.298	44.754	43.087	10.131	10.174	3.592	3.042	3.338	2.865
February.	35.00	35.194	44.736	42.959	9.756	9.959	3.440	2.994	3.218	2.833
March....	35.05	35.129	44.569	42.924	9.725	10.041	3.559	3.052	3.196	2.856
April....	35.15	35.155	42.983	42.966	9.701	10.045	3.474	3.003	3.060	2.815
May.....	35.22	35.134	43.091	42.906	9.162	9.977	3.171	3.029	2.961	2.867
June.....	35.36	35.068	43.213	42.044	8.832	9.956	3.125	3.043	2.881	2.928
AVERAGE - 6 Months	35.13	35.163	43.891	42.802	9.551	10.014	3.3935	3.025	3.109	2.859
July.....	35.24	35.064	42.972	34.990	9.846	10.228	3.290	3.081	3.119	2.971
August...	35.12		42.893		10.034		3.131		2.933	
September	35.12		43.022		10.184		3.293		3.027	
October..	35.32		43.149		11.002		3.462		3.228	
November.	35.25		43.060		10.801		3.396		3.029	
December.	35.28		43.146		10.310		3.171		2.877	
AVERAGE - YEAR....	35.175		43.477		9.972		3.344		3.073	

(a) World market. (b) New York market. (c) London market.

In 1938 the capacity of Canadian Copper Refiners Ltd., refinery at Montreal East, Quebec, was increased by 6,000 tons of copper to a total of 81,000 tons per annum and plans were in course of preparation to provide for a total refining capacity of approximately 100,000 tons of copper a year.

During 1938 the Noranda Smelter, located at Noranda, Quebec, treated 1,291,692 tons of ore, concentrate and refinery slag and produced 99,139,734 pounds of anodes; the estimated production of new metals was 96,966,169 pounds of fine copper, 337,024 ounces of gold and 975,623 ounces of silver; these figures include the production from 221,498 tons of customs ore and concentrate; the estimated recovery from Horne mine ores being 76,358,442 pounds of fine copper, 299,033 ounces of gold and 607,447 ounces of silver.

The International Nickel Company's Smelter at Copper Cliff, Ontario, produced 182,904 tons of bessemer matte and 158,912 tons of converter copper in 1938. The Coniston Smelter of the same company was operated continuously, processing 823,906 tons of ore and producing 48,608 tons of bessemer matte; the Port Colborne nickel refinery of the company produced 124,233,682 pounds of refined nickel. The Copper Cliff refinery of the Ontario Refining Co. Ltd. received 158,793 tons of converter copper, transferred in a molten state from the Copper Cliff Smelter and produced 145,141 tons of refined copper. At Deloro, Ontario, the Deloro Smelting and Refining Co. Ltd. treated silver-cobalt ores from Northern Ontario, while at Port Hope, Ontario, the Eldorada Gold Mines Limited recovered radium, uranium and silver from argentiferous pitchblende ores mined in the Northwest Territories.

The ore dressing plant, mill and smelter of Falconbridge Nickel Mines Limited operated at full capacity throughout the year. Ore treated totalled 490,938 tons and 14,779.1 short tons of matte was produced, containing 8,012.7 short tons of nickel and 4,108.5 short tons of copper.

In Manitoba the Flin Flon Smelter of the Hudson Bay Mining and Smelting Company Limited smelted a total of 335,834 tons of Flin Flon mine concentrates and ore and 58,003 tons of custom concentrates and ore; there were shipped 42,527 tons of blister copper containing gold, 132,340 ounces; silver, 2,061,163 ounces; copper, 84,095,070 pounds; selenium, 101,686 pounds and tellurium, 11,658 pounds. There was treated in the Flin Flon Zinc Plant a total of 109,166 tons of zinc concentrates from which was produced for sale 76,827,172 pounds of slab zinc; metallic cadmium production for the year amounted to 188,796 pounds.

Once again in 1938 new all-time records were made in ore extracted from the Sullivan Mine of the Consolidated Mining and Smelting Company of Canada Limited. Production of the Company at Trail, British Columbia, in 1938 was as follows: lead, 201,574 tons; zinc, 149,071 tons; copper, 850 tons; gold, 56,951 ounces; silver, 9,815,434 ounces; cadmium, 255 tons; sulphuric acid, 134,469 tons; and sulphur and fertilizer, 170,108 tons.

Table 7 - CAPACITIES OF CANADIAN COPPER SMELTING AND REFINING WORKS, 1938 (a)

Company	BLAST FURNACES Number	BLAST FURNACES Annual capacity - tons of ore and concentrates	REVERBERATORIES Number	REVERBERATORIES Annual capacity - tons of ore and concentrates	CONVERTERS Number	CONVERTERS Annual capacity - tons of ore and concentrates
Consolidated Mining & Smelting Co. of Canada Ltd. (b)	...	...	1	75,000	2	16,000
Falconbridge Nickel Mines Ltd.	1	275,000	...	...	3	25,000
Hudson Bay Mining & Smelting Co. Ltd.	...	...	1	420,000	2	...
Noranda Mines Ltd.	...	...	2	1,060,000	4	230,000
International Nickel Co. of Canada, Ltd.	4	800,000	7	2,800,000	24	...

(a) American Bureau of Metal Statistics.
(b) Idle.

ELECTROLYTIC COPPER REFINERIES	ANNUAL CAPACITY - short tons
Canadian Copper Refiners Ltd.	81,000
Ontario Refining Company, Ltd.	120,000

Table 8 - PRODUCTION (/) OF NEW COPPER IN CANADA, FROM ALL SOURCES, 1927 - 1938.

Year	Pounds	$	Year	Pounds	$
1927	140,147,440	17,195,487	1933	299,982,448	21,634,853
1928	202,696,046	28,598,249	1934	364,761,062	26,671,438
1929	248,120,760	43,415,251	1935	418,997,700	32,311,960
1930	303,478,356	37,948,359	1936	421,027,732	39,514,101
1931	292,304,390	24,114,065	1937	530,028,615	68,917,219
1932	247,679,070	15,294,058	1938	571,249,664	56,554,034

(/) Including copper in ores and matte exported and in blister and anode copper made in Canada.

Table 9. - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF COPPER, 1937 and 1938.

	1937 Pounds	1937 Value $	1938 Pounds	1938 Value $
PRODUCTION				
By Provinces -				
Nova Scotia	180,609	23,620	...	...
Quebec	94,653,132	12,378,737	112,645,797	11,233,039
Ontario	322,039,208	41,716,364	309,030,106	30,405,500
Manitoba	44,920,835	5,874,747	65,582,772	6,539,914
Saskatchewan	22,436,843	2,934,290	18,156,157	1,810,532
British Columbia	45,797,988	5,989,461	65,759,265	6,557,514
North West Territories	...	...	75,567	7,535
TOTAL	530,028,615	68,917,219	571,249,664	56,554,034

Table 9 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF COPPER, 1937 and 1938. (Con.)

	1937		1938	
	Pounds	Value	Pounds	Value
		$		$
By Sources -				
In blister and anode copper produced	463,025,584	60,554,486	475,611,107	47,427,940
In ores, concentrates and copper matte exported (a)	54,010,039	7,063,434	81,810,070	8,158,100
In nickel-copper matte exported	12,992,992	1,299,299	13,828,487	967,994
TOTAL	530,028,615	68,917,219	571,249,664	56,554,034
IMPORTS -				
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories	1,048,800	158,528	1,111,000	146,771
Copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor	7,400	825	5,500	667
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured	333,500	61,180	200,600	31,666
Copper in blocks, pigs or ingots	15,500	1,941	12,200	1,441
Copper, scrap, cathode plates, etc.	4,600	455	87,800	8,434
Copper in strips, sheets or plates not polished or coated	707,300	155,463	166,200	36,813
Copper tubings in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured	675,896	193,637	343,071	93,255
Copper wire	37,576	6,831	16,352	3,351
Copper wire cloth, or woven wire of copper	...	7,523	...	3,284
Copper, manufactures of, n.o.p.	...	536,135	...	402,293
Copper, precipitate of, crude	246	33	2,075	193
Anodes of nickel, zinc, copper, silver or gold	...	7,098	...	8,432
Copper, sub-acetate of, or verdigris, dry	...	...	3,505	771
Copper, sulphate of (blue vitriol)	5,665,495	258,636	4,454,073	160,032
Copper rollers adapted for use in calico printing	...	124,315	...	65,525
TOTAL	...	1,492,600	...	962,928
EXPORTS -				
Copper, fine, contained in ore, matte, regulus, etc.	73,767,600	7,409,381	109,806,100	7,637,581
Copper, blister	10,884,300	1,333,073	30,527,300	3,056,241
Copper, old and scrap	5,551,000	549,638	3,437,400	205,059
Copper in ingots, bars, cakes, slabs and billets	296,141,300	38,705,380	363,528,700	35,858,006
Copper in rods, strips, sheets, plates, and tubing	51,224,800	7,310,329	53,512,900	5,767,622

(a) Contains a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

(b) Data not yet available.

Table 9 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF COPPER, 1937 and 1938. (Con.)

	1937		1938	
	Pounds	Value	Pounds	Value
		$		$
Copper wire and cable	...	436,834	...	435,784
Copper manufactures, n.o.p.	...	410,647	...	354,509
TOTAL	...	56,155,282	...	53,314,802
Copper coin, foreign	...	2,382	...	6,693
Copper coin, Canadian	...	113	...	347

Table 10 - PRODUCTION OF REFINED COPPER IN CANADA, 1931 - 1937.

Year	Short tons	Year	Short tons
1931	92,183	1935	173,290
1932	90,077	1936	191,818
1933	112,245	1937	215,080
1934	149,261	1938	227,240

Table 11 - PRODUCTION OF COPPER IN CANADA, JANUARY 1 TO JUNE 30, 1938 and 1939.

	1938		1939	
	Pounds	Value	Pounds	Value
		$		$
PRODUCTION -				
By Provinces -				
Nova Scotia	...	...	285,274	28,567
Quebec	54,121,838	5,169,177	44,415,680	4,447,786
Ontario	163,897,090	15,492,188	163,677,920	16,131,394
Manitoba	33,791,190	3,227,396	34,561,983	3,461,037
Saskatchewan	7,365,050	703,436	7,408,288	741,866
British Columbia	33,221,703	3,173,005	35,880,113	3,593,035
Northwest Territories	...	...	12,983	1,300
TOTAL	292,396,871	27,765,202	286,242,241	28,404,985
By Sources -				
In blister and anode copper produced	245,141,550	23,413,470	239,925,147	24,026,104
(x) In ores shipped and concentrates exported	40,919,622	3,908,233	37,713,491	3,776,629
In copper-nickel matte exported	6,335,699	443,499	8,603,603	602,252
TOTAL	292,396,871	27,765,202	286,242,241	28,404,985

(x) Includes copper in matte exported from British Columbia.

Table 12 - COPPER PRODUCTION OF THE WORLD ON SMELTERY BASIS (a). (In tons of 2,000 Lb.)
(This statement taken from the Year Book of the American Bureau of Metal Statistics)

	1929	1932	1937	1938
United States	1,179,269	309,160	996,996	683,722
Whereof from scrap	47,628	18,183	89,292	55,620
Whereof from foreign ore	105,293	35,468	72,872	74,672
Mexico	63,795	37,440	49,115	40,870
Canada	79,186	106,050	227,332	238,052
Chile	333,296	107,242	437,000	372,046
Peru	59,527	22,910	37,547	39,230
Austria	4,293	1,703	2,283	2,315 *
Finland	...	...	11,464	13,034
Germany	59,083	56,107	72,201	73,854
Great Britain	14,440	8,267	4,409	4,409
Norway	2,633	5,937	9,402	11,572
Russia	28,443	33,816	101,963	108,025
Spain	22,215	9,998	10,200	10,100
Sweden	5,271	7,016	9,966	11,759
Yugoslavia	22,790	33,244	43,442	46,288
Other Europe	10,498	5,658	8,500	11,000
Japan	83,189	79,230	96,561	111,332
India	1,976	4,976	7,650	6,000
Other Asia	2,000	1,000	4,500	7,000 *
Australasia	13,907	16,472	18,308	19,105
Africa	159,250	145,931	411,511	386,042
Whereof, Belgian Congo	...	59,522	165,993	136,685
Whereof, Rhodesia	...	75,403	234,405	237,362
Totals	2,145,061	992,247	2,560,350	2,195,755
Deduct, U. S. scrap	47,628	18,183	89,292	55,620
TOTAL NEW COPPER	2,097,433	974,064	2,471,058	2,140,135

(a) The above table gives only the copper that is smelted, including direct production by electrolysis, and does not break down to origin back of the place of beneficiation; every effort has been made to eliminate secondary copper so far as possible.
(*) Conjectural.

Table 13 - AVAILABLE STATISTICS ON THE CONSUMPTION OF COPPER IN SPECIFIED CANADIAN INDUSTRIES, 1936 and 1937.

Industry	Item (Used)		1936	1937
Brass and copper Products (a)	(Ingots, wire bars, slabs, etc.	lb.	99,560,824	110,573,509
	(Scrap	lb.	5,574,612	4,864,385
	(Rods	lb.	42,556	13,004
	(Pipe and tubing	lb.	39,888	98,254
	(Plates and sheets	lb.	640,597	889,449
	(Wire	lb.	196,768	323,266
	(Castings	lb.	4,679	5,324
	(Other	lb.	71,062	97,103
White Metal Alloys	(Scrap	lb.	1,831,095	2,029,900
	(Copper bars, sheets, etc.	lb.	57,378	51,253

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable; duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 13 - AVAILABLE STATISTICS ON THE CONSUMPTION OF COPPER IN SPECIFIED CANADIAN INDUSTRIES, 1936 and 1937. (Con.)

Industry	Item (Used)		1936	1937
Electrical Apparatus and Supplies	Castings	lb.	99,137	165,963
	Ingots, slabs, wire bars, etc.	lb.	25,702,675	866,281
	Rods	lb.		34,367,135
	Scrap	lb.	51,964	170,463
	Tubing and pipe	lb.	655,102	427,010
	Sheets and plates	lb.	304,733	570,893
	Wire, bare	lb.	3,956,581	5,357,119
	Wire, enamelled	$	369,796	546,076
	Wire, other insulated	$	637,391	954,553
Iron and Steel and Their Products	Copper sheets, bars, etc.	lb.	7,609,365	7,696,884

Note: Corresponding data for 1938 not yet complete.

Table 14 - LEAD SMELTING CAPACITY OF CANADA.

Company	Situation of plant	Number of blast furnaces	Annual Capacity (tons of charge)
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail, B.C.	5	700,000

LEAD REFINING CAPACITY OF THE WORLD, 1938.
(American Bureau of Metal Statistics)

The lead refining capacity of the world, as at the end of 1938, aggregated about 1,072,000 short tons in the United States and about 2,173,000 elsewhere, a grand total of about 3,245,000 tons.

Probably not more than 950,000 tons of the listed capacity in the United States and 1,550,000 tons elsewhere, a total of 2,500,000 tons, is to be rated as useful and effective, the remainder being obsolete, incapable of economical ore supply, or otherwise useless. These accountings are exclusive of capacity in Russia, and also of a few thousand tons in Greece.

Table 15 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF LEAD, 1937 and 1938.

	1937		1938	
	Pounds	Value	Pounds	Value
		$		$
PRODUCTION -				
Nova Scotia	418,086	21,364	...	...
Quebec	1,521,182	77,732	...	...
Ontario	29,849	1,525	22,363	748
Manitoba	...	...	...	...
British Columbia	403,589,913	20,623,445	413,706,307	13,834,339
Yukon	6,440,454	329,107	5,198,990	173,854
TOTAL	411,999,484	21,053,173	418,927,660	14,008,941

Table 15 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF LEAD, 1937 and 1938. (Con.)

	1937		1938	
	Pounds	Value	Pounds	Value
		$		$
IMPORTS -				
Old and scrap, pig and block	79,327	6,148	56,416	3,235
Bars and sheets	45,694	3,391	54,507	2,948
Litharge	2,560,500	194,421	2,125,900	143,597
Acetate of lead	177,352	13,552	245,949	14,493
Nitrate of lead	312,776	23,739	285,303	16,250
Other manufactures	...	88,183	...	67,228
Pipe lead	9,061	1,488	28,333	1,671
Shots and bullets	3,327	350	9,023	634
Tea lead	1,000	85	...	...
Lead arsenate	237,992	19,565	496,387	41,620
Lead tetraethyl, compounds of	4,518,567	2,032,333	5,486,418	2,485,032
Lead capsules for bottles	...	90,644	...	65,029
Lead pigments -				
Dry white lead	42,818	3,360	91,025	5,592
White lead, ground in oil	15,116	1,499	9,928	916
Dry red lead and orange mineral	679,276	53,805	453,721	31,593
TOTAL	...	2,532,563	...	2,879,838
EXPORTS -				
Lead, contained in ore	16,529,600	862,850	7,162,300	345,394
Pig lead	353,139,600	16,978,147	309,864,100	8,637,797
White lead	217,000	17,842	70,400	5,712
TOTAL	369,886,200	17,858,839	317,096,800	8,988,903

Table 16 - AVAILABLE STATISTICS ON THE CONSUMPTION OF LEAD IN SPECIFIED CANADIAN MANUFACTURING INDUSTRIES, 1936 and 1937.

Industries	Items Used	1936	1937
		Lbs.	Lbs.
Brass and copper products	(Pig lead	611,911	804,379
	(Scrap and other lead	141,644	306,379
Paints and pigments	(Pig lead *	15,648,292	14,442,025
White metal alloys	(Pig lead	9,624,097	10,818,139
	(Scrap lead	11,654,207	12,082,034
Electrical apparatus	(Pig lead	18,753,513	21,054,881
	(Scrap lead	160,456	129,400
	(Lead sheets, etc.	821,732	798,603
Iron and steel	Lead	1,150,749	1,810,495
GRAND TOTAL		58,566,601	62,246,335

(*) Some products such as lead oxides made from pig lead by the paints and pigments industry are sold to other industries for the manufacture of such products as storage batteries.

Table 17 - PRODUCTION OF REFINED LEAD IN CANADA, 1931 - 1938.

Year	Pounds	Year	Pounds
1931	278,448,457	1935	327,515,277 (f)
1932	253,136,522	1936	363,449,490 (f)
1933	254,565,861	1937	399,394,939 (f)
1934	314,457,735(f)	1938	400,763,914 (f)

(f) Primary lead only.

Table 18 - PRODUCTION (/) IN CANADA OF LEAD, JANUARY 1 TO JUNE 30, 1938 and 1939.

	1938		1939	
	Pounds	$	Pounds	$
Ontario	7,329	249	5,100	154
British Columbia	203,078,408	6,892,481	183,305,013	5,545,004
Yukon	1,875,384	63,650	2,444,350	73,942
TOTAL	204,961,121	6,956,380	185,755,363	5,619,100

(/) Includes lead in ores exported.

Table 19 - WORLD PRODUCTION OF LEAD (a). (Short tons)

Origin	1922	1929	1935	1936	1937	1938
North America	649,022	1,121,394	744,843	828,551	932,466	853,804
South America	6,547	34,038	9,658	24,300	44,200	50,500
Total Europe	314,647	458,279	449,503	447,198	522,365	571,349
Total Asia	53,441	100,743	92,579	96,469	107,640	117,828
Australia	118,064	195,403	243,046	221,121	258,415	259,771
Africa	37,419	22,663	27,987	23,696	30,405	26,208
GRAND TOTAL	1,179,140	1,932,520	1,567,616	1,641,335	1,895,491	1,879,460

(a) The world's production of lead as tabulated by the American Bureau of Metal Statistics is primarily on the basis of reports by smelters in respect of their production of base bullion, computing the lead content thereof, and of refined lead.

Of the output recorded for North America in 1938, Canada contributed 204,646 short tons, excluding lead in ores exported. As a world producer of lead, Canada ranked fourth in 1938.

Table 20 - CAPACITY and PRODUCTION OF ELECTROLYTIC ZINC PLANTS IN CANADA, 1936 - 1938.

Company	Maximum H.P. used	Estimated annual capacity for cathode zinc (short tons)	Actual production as ingot zinc (short tons)		
			1936	1937	1938
	(a)	(b)			
Consolidated Mining & Smelting Co. of Canada Ltd.	72,000	146,000	119,478	124,157	133,242
Hudson Bay Mining & Smelting Co. Ltd.	21,750	43,000	32,219	34,486	38,414

NOTE - This statement supplied by the American Bureau of Metal Statistics.

(a) Expressed as power in terms of direct current after transforming the alternating current in sub-station at the works.

(b) Capacity for ingot zinc may be reckoned at 95% capacity for cathode deposition.

The American Bureau of Metal Statistics estimates the capacity of American zinc metallurgical works at the end of 1938 as being nominally for the production of about 600,000 short tons of spelter per annum by distilling, including the capacity in continuously operating vertical retorts, and about 210,000 tons by electrolysis, a total of about 810,000 tons, but the first-class effective capacity is probably something less than that. The effective capacity outside the United States at the end of 1938 is estimated at about 1,200,000 metric tons whereof about 280,000 tons was in Australia, Canada and Mexico, and about 920,000 tons elsewhere. The estimate of 1,200,000 tons for foreign plants is exclusive of plants in Russia.

Table 21 - PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF ZINC, 1937 and 1938.

	1937		1938	
	Pounds	Value	Pounds	Value
PRODUCTION -		$		$
Nova Scotia	5,485,550	268,902	...	...
Quebec	8,566,927	419,951	5,315,852	163,356
Ontario	120,011	5,883	...	...
Manitoba	36,221,314	1,775,569	46,864,575	1,440,148
Saskatchewan	32,750,910	1,605,449	29,962,597	920,751
British Columbia	287,192,877	14,078,196	299,363,564	9,199,443
TOTAL	370,337,589	18,153,949	381,506,588	11,723,698
IMPORTS -				
Zinc dust	1,499,500	78,508	1,373,900	70,294
Zinc in blocks,pigs,bars and rods,and zinc plates,n.o.p.	19,400	2,805	5,900	643
Zinc in sheets and strips,and zinc plates for marine boilers	7,040,600	574,545	6,771,600	467,114
Zinc spelter	2,000	199	2,700	201
Zinc white (zinc oxide)	14,481,533	742,500	12,492,235	489,850
Zinc sulphate	976,592	19,064	585,362	8,977
Zinc, chloride of	1,284,296	44,703	1,252,081	48,720
Zinc,manufactures of n.o.p.	...	244,349	...	206,948
Lithopone	22,162,600	777,752	17,731,708	632,273
TOTAL - IMPORTS	...	2,484,425	...	1,925,020
EXPORTS -				
Zinc, contained in ore	65,695,800	2,618,641	45,841,000	1,154,812
Zinc, scrap, dross and ashes.	6,393,800	133,303	2,364,100	34,235
Zinc, spelter	268,378,000	12,739,242	264,424,100	8,626,961
TOTAL - EXPORTS	340,467,600	15,491,186	312,629,200	9,816,008

Table 22 - REFINED NEW ZINC PRODUCED IN CANADA, 1931 - 1938.

Year	Short tons	Year	Short tons
1931	118,622	1935	149,523
1932	86,141	1936	151,103
1933	91,946	1937	158,542
1934	134,917	1938	171,932

Table 23 - WORLD'S PRODUCTION OF ZINC (a). (Short tons)

Country	1930	1936	1937	1938
United States	504,463	523,166	595,319	465,537
Mexico	41,066	35,506	40,364	41,338
Canada	121,467	151,697	158,643	171,656
Belgium	194,258	215,301	248,656	231,464
Czechoslovakia	13,904	8,667	7,956	9,784
France	100,030	59,084	66,611	68,532
Germany	107,254	150,354	180,006	212,173

Table 23 - WORLD'S PRODUCTION OF ZINC (a)(Con.)(in short tons - 2,000 pounds)

Country	1930	1936	1937	1938
Great Britain	54,427	68,086	69,597	61,938
Italy	21,235	29,790	41,868	37,550
Netherlands	25,634	17,006	27,166	27,888
Norway	38,152	49,631	45,492	51,257
Poland	192,598	103,921	120,512	122,119
Russia	4,772	71,650	77,161	88,184
Spain	11,790	8,601	5,819	8,435
Sweden	4,548	...	...	...
Yugoslavia	8,361	3,967	4,695	4,361
Australia	61,397	77,778	78,120	78,198
Japan	27,193	39,683	50,155	55,115
French Indo-China	4,253	4,528	4,633	4,900
Rhodesia	20,055	23,218	15,714	11,441
TOTALS, ex. U.S.A.	1,052,394	1,118,468	1,243,168	1,286,333
GRAND TOTALS	1,556,857	1,641,634	1,838,487	1,751,870

(a) The data as recorded in the table by the American Bureau of Metal Statistics are the summaries of production as made by the metallurgical works of the world whose principal business is the reduction of ore. Insofar as they produce slab zinc from secondary material, such is included. The production of zinc dust is excluded. The production figure for the United States includes a relatively small quantity of spelter derived from foreign ore. Excluded from above accounting is spelter produced by redistillers who treat nothing but old material.

Table 24 - AVAILABLE STATISTICS ON THE CONSUMPTION OF ZINC AND ZINC PRODUCTS IN SPECIFIED CANADIAN MANUFACTURING INDUSTRIES, 1936 and 1937.

Industry	Item used	1936	1937
	Metal	Lb.	Lb.
Brass and copper products	(Other zinc	345,537	271,312
	(Zinc ingots and slabs	4,922,432	5,938,523
	(Zinc scrap	158,239	71,137
White metal alloys	(Zinc spelter	2,091,999	2,422,336
	(Zinc scrap	590,639	951,995
Electrical apparatus	(Zinc ingots and bars	723,050	880,619
	(Zinc sheets	2,452,853	2,712,989
Acids, alkalies and salts	Zinc (1)	2,999,227	4,198,278
Iron and steel	Zinc	22,205,505	26,913,053
Miscellaneous chemicals	Zinc sheet	70,587	68,947
GRAND TOTAL - METAL		36,560,068	44,429,189
	Products		
Paints and pigments	(Zinc oxide	2,696,741	2,619,194
	(Leaded zinc oxides and zinc leads	2,784,332	3,538,049
	(Lithopone *	13,477,057	14,322,160
Electrical apparatus	Zinc chloride	356,105	423,498
Toilet preparations	(Zinc oxide	64,445	61,334
	(Zinc stearate	17,285	25,680

(1) Includes some zinc ore.

* A mixture of zinc sulphide and barium sulphate prepared by precipitation.

Table 25 - PRODUCTION OF ZINC IN CANADA, JANUARY 1 TO JUNE 30, 1938 and 1939.

	1938		1939	
	Pounds	$	Pounds	$
Quebec	...	...	7,966,614	227,766
Manitoba	25,030,307	778,192	19,739,801	564,361
Saskatchewan	12,957,584	402,851	17,734,522	507,030
British Columbia	159,963,332	4,973,260	133,311,240	3,811,368
TOTAL	197,951,223	6,154,303	178,752,177	5,110,525

Table 26 - WORLD PRODUCTION OF NICKEL ORE, 1935 - 1938. (*) (In terms of metal)

Country	1935	1936	1937	1938
	(short tons)			
Canada (a)	69,258	84,870	112,453 (e)	105,337
New Caledonia (b)	5,800	5,400	6,600	7,500
Greece (d)	1,200	1,380	1,160	(f)
Burma (c)	1,640	1,447	1,345	1,030
Norway	1,677	1,400	968	(f)
Russia	2,016	(f)	(f)	(f)

(a) Production in all forms from Canadian ores.
(b) Estimated content of ore and matte exported.
(c) Nickel content of speiss obtained as a by-product.
(d) Nickel and cobalt content beginning 1934.
(e) Not including production in British Columbia.
(f) Not yet reported.
(*) American Bureau of Metal Statistics.

Production of nickel in Canada during the first six months of 1939 totalled 110,465,309 pounds compared with 109,286,472 pounds in the first half of 1938.

Table 27 - WORLD PRODUCTION OF ALUMINIUM (Supplied by the American Bureau of Metal Statistics).

(in metric tons)

Country	1922	1929	1932	1936	1937	1938
United States	33,600	102,100	47,600	102,028	132,759	130,129
Canada	10,000	42,000	18,000	26,900	42,500	66,000
Europe (a)	48,200	137,198	87,769	233,081	304,521	367,468
Japan	...	...	...	6,664	10,000	20,000 (*)
TOTAL FOR WORLD	91,800	281,298	153,369	368,673	489,830	583,597

NOTE - Omitted from this table is a small production in Yugoslavia.
(a) German out put in 1938 (including Austria) was 165,700 metric tons.
(*) Conjectural.

Table 28 - SOURCE OF CANADIAN FINE GOLD PRODUCTION, BY PERCENTAGES, 1932, 1933, 1936-1938

	1932	1933	1936	1937	1938
	%	%	%	%	%
In alluvial gold	1.8	2.0	2.27	2.20	2.50
In crude gold bullion (*)	79.3	79.8	77.37	80.20	80.80
In base bullion (from silver-lead ores, etc.)	1.0	0.7	1.60	0.90	0.92
In blister and anode copper	15.1	14.2	13.80	11.70	11.24
In ores, matte, slags, etc., exported	2.8	3.3	4.96	5.00	4.54
	100.0	100.0	100.0	100.0	100.00

(x) Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Canadian gold production in 1938 totalled 4,725,117 fine ounces valued in Canadian currency at $166,205,990. Canada in 1938, as a gold producing country, was surpassed only by the Union of South Africa and Russia. The origin of Canadian production is shown in the above table.

Canadian silver production in 1938 totalled 22,219,195 fine ounces valued at $9,660,239. The Dominion in 1938 ranked third as a world silver producing country.

Table 29 - OTHER NON-FERROUS PRODUCTS PRODUCED IN CANADIAN SMELTERS and REFINERIES, 1937 and 1938.

	Unit	1937		1938	
		Quantity	$	Quantity	$
Arsenic (AS_2O_3)	lb.	1,389,426	41,032	2,175,646	56,538
Bismuth	lb.	5,711	5,654	9,516	9,754
Cadmium	lb.	745,207	1,222,140	699,138	561,799
Cobalt (a)	lb.	507,064	848,145	459,226	790,913
Palladium,rhodium,iridium,etc.(b)	oz.	119,829	3,179,782	130,893	3,677,342
Platinum (b)	oz.	139,355	6,751,750	161,326	5,196,794
Radium, uranium			(Data not published)		
Selenium	lb.	397,227	687,203	358,929	622,742
Tellurium	lb.	41,490	71,777	48,237	82,967
Sulphur (c)	ton	130,913	1,154,992	112,395	1,044,817

(a) Includes metal in ores exported, salts manufactured, and metal produced in Canada.
(b) Final refining conducted in Europe.
(c) Sulphur recovered from smelter gases as elemental sulphur and in sulphuric acid made, and ammonium sulphate. Also includes sulphur in iron pyrites exported.

DIRECTORY (1938)

Name of Company	Head Office Address	Canadian Plant Location
CANADIAN COPPER SMELTING COMPANIES		
Noranda Mines Ltd.	2 King St. E., Toronto, Ont.	Noranda, P.Q.
(a) International Nickel Co. of Canada, Ltd.	67 Wall Street, New York City, U.S.A.	Copper Cliff, Port Colborne and Coniston, Ont.
(a) Falconbridge Nickel Mines Ltd.	25 King St. W., Toronto, Ont.	Falconbridge, Ont.
Hudson Bay Mining & Smelting Co. Ltd.	14 Finkle St., Woodstock, Ont.	Flin Flon, Man.
(a) Smelt nickel-copper ores.		
CANADIAN ELECTROLYTIC COPPER REFINING COMPANIES		
Canadian Copper Refiners Ltd. (c)	2 King St. E., Toronto, Ont.	Montreal East, P.Q.
Ontario Refining Co. Ltd.(c)	Copper Cliff, Ont.	Copper Cliff, Ont.
(c) Produce refined copper, silver, gold, tellurium and selenium.		
CANADIAN LEAD SMELTING AND REFINING COMPANIES		
Consolidated Mining & Smelting Co. of Canada Ltd.(≠)	215 St. James St. W., Montreal, P.Q.	Trail, B.C.
(≠) Produce bismuth or bismuth-bearing bullion as by-products, also gold, silver, antimony and sulphur.		
CANADIAN ELECTROLYTIC ZINC REFINING COMPANIES (*)		
Consolidated Mining & Smelting Co. of Canada Limited.	215 St. James St. W., Montreal, P.Q.	Trail, B.C.
Hudson Bay Mining & Smelting Co. Ltd.	Woodstock, Ont.	Flin Flon, Man.
(*) Also produce cadmium.		

DIRECTORY (1938)
(Concluded)

Name of Company	Head Office Address	Canadian Plant Location
CANADIAN SMELTERS AND REFINERS OF COBALT-ARSENIC ORES		
Deloro Smelting & Refining Co. Ltd. (/)	Deloro, Ont.	Deloro, Ont.
CANADIAN REFINERS OF URANIUM-RADIUM ORES		
Eldorado Gold Mines Ltd.	Star Building, Toronto, Ont.	Port Hope, Ont.
CANADIAN PRODUCERS OF PRIMARY ALUMINIUM		
Aluminum Company of Canada, Ltd.	Canada Life Building, Toronto 2, Ont.	Arvida and Shawinigan Falls, P. Q.

(/) Produce silver, cobalt, arsenic, bismuth, nickel oxide and cobalt oxide and salts.

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NOTE - In addition to the companies listed above, the Chromium Mining & Smelting Corp. Ltd., treated foreign chromite ores at Sault Ste. Marie, Ontario.