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26-211 Nickel, Canada, Production

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THE NICKEL-COPPER MINING, SMELTING AND REFINING INDUSTRY IN CANADA, 1931.

Finally revised statistics on nickel production in Canada during 1931 as reported by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa, show an output of 65,666,320 pounds valued at \$15,267,453 as compared with 103,768,857 pounds worth \$24,455,133 in 1930. These production figures include the nickel in matte exported by the International Nickel Company of Canada, Ltd., and the Falconbridge Nickel Mines Ltd.; refined or electrolytic nickel produced at Port Colborne, Ontario, by the International Nickel Company and valued at the average price obtained for these products sold during the year, and nickel in nickel oxides shipped from the Deloro plant of the Deloro Smelting and Refining Company, and from the Port Colborne metallurgical plant of the International Nickel Company at its total selling value as oxides.

Canada produces approximately 87 per cent of the world's nickel. This production comes almost entirely from mines operating along or near the rim of the norite-micropegmatite eruptive of the Sudbury basin area in Ontario. Two companies have plants in this district for the treatment of nickel-copper ores. The International Nickel Company of Canada, Ltd., operate smelters at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. Nickel oxide is produced at Deloro, Ontario, from silver-cobalt-nickel ores mined in the silver camps of Northern Ontario; the Deloro Smelting and Refining Company operate this plant.

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Smelter matte produced at Sudbury is treated by the International Nickel Company at plants located at Clydach, Wales; Huntington, West Virginia, U.S.A.; and at Port Colborne, Ontario, Canada, the last named is a refinery and produces electrolytic nickel, nickel oxide, nickel shot, converter copper and anode slimes containing platinum group metals. The Port Colborne plant produced during 1931, 31,877,840 pounds of nickel, excluding sulphide for the Clydach refinery, as compared with 61,704,271 pounds in 1930. There were also produced 28,688 tons of blister copper as against 59,503 tons during 1930. The copper converters at the refinery were closed down in August and the cupolas in November, preparatory to transferring the Orford separation process to the new plant at Copper Cliff.

The Copper Cliff concentrator was operated at a rate of 120,000 tons monthly (capacity, 240,000 tons) from January to August and 83,000 tons monthly for the remainder of the year. During 1931 the International Nickel Company mined a total of 1,580,355 tons of ore made up as follows: Frood, 1,068,978 tons; Creighton mine, 301,394 tons; and Garson mine, 209,983 tons. The output of nickel in 1931 at the Clydach refinery was 16,546,740 pounds as compared with 25,406,746 pounds in 1930. In spite of the greatly reduced output, operating costs at this plant were not seriously affected, showing an increase of only 6 per cent with production off 35 per cent. Notwithstanding drastic curtailment in operations generally, the output of platinum metals at the Acton plant in 1931 was 91,644 ounces compared with 71,260 ounces in 1930, an increase of 22 per cent. Proven ore reserves of the International Nickel Company as at December 31, 1931, aggregated 205,606,715 tons. During the year 670,489 tons of additional ore were added to the reserves in the ordinary course of mining operations.

The Ontario Copper Refining Company, an organization associated with the International Nickel Company in the production of refined copper, and with new plants recently constructed at Copper Cliff, Ontario, operated at approximately 50 per cent capacity for the year; results obtained from the standpoint of operating

costs were very satisfactory. This refinery treated blister copper produced in British Columbia, Manitoba and Ontario, the nickel-copper ores of the Sudbury^{area} constituted the Ontario source of the metal.

Falconbridge Nickel Mines reported an ore production of 133,721 tons, the grade was held at 2.453 per cent nickel and 1.007 per cent copper, after picking out 17.8 per cent silicious material which was stockpiled for concentration. Ore reserves are reported as of December 31, 1931, as 2,725,382 tons averaging 2.31 per cent nickel and .94 per cent copper. The smelter was in operation a total of 336 days and smelted 109,520 tons of ore; 2,569.4 tons of nickel and 1,033.5 tons of copper were recovered and 4,363 tons of matte produced. The company state that the results of the year's operations, both with respect to underground development and smelting, have been very satisfactory.

The markets for copper, the platinum metals and silver, important products of the nickel mining industry, have been badly disrupted since 1929. The results are that prices have been abnormally low and earnings reduced.

Sales of nickel in all forms by the International Nickel Company during 1931 were largely in excess of similar sales in 1921, showing an increase of 104 per cent. This comparison is significant in that it clearly indicates that the consumption of nickel is increasing at a comparatively rapid rate.

The International Nickel Company state that in spite of the depression, nickel products have more than retained their relative industrial position. This encouraging trend is especially reflected in the field of nickel steel where the amount of nickel used per ton of alloy steel produced in the United States increased about 25 per cent in 1931 as compared with 1930. One of the most interesting new nickel products introduced during the past year was nickel-clad steel plate; this has been introduced into several fields such as storage tanks and tank cars, evaporator bodies, chemical autoclaves, kettles, etc.

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The Mines Branch of the Dominion Department of Mines at Ottawa, report the successful production of a nickel-iron sponge at the Government laboratories by direct process from Sudbury ore, and the nickel steel production from this sponge is stated to compare favourably in physical or strength tests with nickel steels of similar S.A.E. specifications made in the ordinary way. As a result of this research work it appears that there are possibilities for commercial production of nickel steel direct from the nickel-copper ores of the Sudbury district of Ontario.

PRINCIPAL STATISTICS OF THE NICKEL-COPPER MINING, SMELTING AND REFINING INDUSTRY IN CANADA, 1930-1931.

	1930	1931
Number of firms	2	3
Number of mines	5	6
Number of smelters	3	3
Number of refineries	1	1
Capital employed	82,436,595	76,702,948
Number of employees -		
On salary	204	194
On wages	6,517	4,106
Total	<u>6,721</u>	<u>4,300</u>
Salaries and wages -		
Salaries	738,736	716,224
Wages	9,987,157	6,288,179
Total	<u>10,725,893</u>	<u>7,004,403</u>
Estimated value of matte exported and refinery products produced	41,645,744	27,709,254

OUTPUT FROM NICKEL-COPPER MINES AND SMELTERS, 1930 and 1931.

	1930	1931
Ore mined	2,127,043	1,714,075
Ore shipped	2,115,139	1,689,874
Content of ores, etc., shipped -		
Copper	142,948,534	123,641,190
Nickel	122,195,531	89,424,886
Ores, concentrates treated at smelters	2,357,154	1,884,959
Matte produced	166,703	100,273
Content of matte -		
Copper	141,600,753	77,321,143
Nickel	122,224,692	81,285,951
Matte shipped to Canadian refineries	137,364	63,076
Matte exported to foreign smelters	34,550	30,294

PRODUCTION IN CANADA AND EXPORTS OF NICKEL, 1930 and 1931.

	1 9 3 0		1 9 3 1	
	Quantity	Value	Quantity	Value
	lb	\$	lb	\$
<u>PRODUCTION</u>				
Nickel in matte or ores exported (a)	41,959,927	7,552,574	33,693,483	6,064,827
Refined and electrolytic nickel produced	57,478,651	15,485,381	28,972,201	8,087,271
Nickel in oxides and salts sold	4,330,279	1,417,178	3,000,636	1,115,355
T O T A L	103,768,857	24,455,133	65,666,320	15,267,453
<u>EXPORTS</u>				
Nickel, fine	43,122,500	11,262,512	27,132,700	7,140,420
Nickel contained in matte	44,890,400	8,142,794	33,287,600	6,048,508
Nickel oxide	3,733,000	1,100,018	3,108,300	992,637
T O T A L	91,745,900	20,505,324	63,528,600	14,181,565

(a) Nickel in matte exported valued at 18 cents per pound.

WORLD PRODUCTION

Short tons (in terms of nickel metal)

Country	1 9 2 9	1 9 3 0	1 9 3 1
Canada	55,137	51,884	32,833
New Caledonia (b)	4,500	5,600	5,000

(b) Exports of matte, expressed as content, estimated at 75 per cent.

Production outside of these countries is small, probably not exceeding 2,000 tons.

The American Bureau of Metal Statistics report the world consumption of nickel in all forms at 36,500 short tons in 1931; 44,000 in 1930; 68,000 in 1929; and 58,500 tons in 1928.

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1981	1980	1979	1978
14,281,882	14,281,800	14,281,800	14,281,800
388,888	388,800	388,800	388,800
2,000,000	2,000,000	2,000,000	2,000,000
20,000,000	20,000,000	20,000,000	20,000,000
20,000,000	20,000,000	20,000,000	20,000,000

(a) Amount in units reported valued at in base unit period.

UNITED STATES

(Enter value in base unit period)

Country	1981	1980	1979	1978
United States	28,888	28,888	28,888	28,888
Other	1,000	1,000	1,000	1,000

(b) Amount in units reported valued at in base unit period.

(c) Amount in units of base unit period, possibly not exceeding

The amount in units of base unit period, possibly not exceeding
the amount in units of base unit period, possibly not exceeding

Country	1981	1980	1979	1978
United States	28,888	28,888	28,888	28,888
Other	1,000	1,000	1,000	1,000