CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

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MINING, METALLURGICAL & CHEMICAL BRANCH

THE NICKEL, COPPER MINING, SMELTING AND REFINING INDUSTRY IN CANADA 1936

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Dominion Statistician: R. H. Coats, LL.D., F.R.S.C., F.S.S. (Hon.)
Chief - Mining, Metallurgical and Chemical Branch: W. H. Losee, B.Sc.
Mining Statistician: R. J. McDowall, B.Sc.

THE NICKEL-COPPER MINING, SMELTING AND REFINING INDUSTRY IN CANADA, 1936.

In 1936 a new all-time high record in Canadian nickel production was established for the third successive year. Finally revised statistics show an output during the last calendar year of 169,739,393 pounds valued at $43,876,525 as compared with 138,516,240 pounds worth $35,345,103 in 1935. Production as recorded came entirely from the province of Ontario and included the nickel in matte exported, metal electrolytically refined at Port Colborne, Ontario, and the nickel contained in oxides and salts produced in Canadian metallurgical plants.

Practically all of the nickel produced in Canada is derived from the copper-nickel bearing deposits of the Sudbury district, Ontario. Two companies operate mines and metallurgical plants in this area. The International Nickel Company of Canada, Limited, conducts smelting operations 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. This last named company treat their matte in a refinery located at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntington, West Virginia, and at Port Colborne and Copper Cliff, Ontario. Nickel-copper matte was also made and exported during 1936 by Cuniptau Mines Ltd.; this company operated a mine and smelter near Goward in the Temagami district of Northern Ontario. In British Columbia a relatively small tonnage of crude nickel ore was mined for export by the B. C. Nickel Mines, Ltd.

During the first six months of 1937 Canadian nickel production totalled 111,610,392 pounds valued at $29,218,283, or an increase over the corresponding months of 1936 of 34 per cent in quantity and 36 per cent in value.

The first major discovery of nickel-copper ores (Murray mine) in the Sudbury district was reported in 1883; the following year witnessed the discovery of the now famous Frood deposit and the first Canadian smelter to treat copper-nickel ores was blown in at Copper Cliff, Ontario, in 1888. Since these early years the development of the industry has been truly remarkable, for today Canada produces from Sudbury ores approximately 88 per cent of the world's nickel, 49 per cent of its platinum metals, and 8 per cent of the copper.

The relative status of the nickel-copper mining, smelting and refining industry as an economic factor of increasing importance in the development of our mineral resources is distinctly reflected in the mineral production statistics of the past decade. In 1926 the value of Canadian nickel output was $14,374,163, or 5.9 per cent of that of the entire Canadian mining industry, by 1936 Canadian nickel production had increased in value to $43,876,525 and its percentage of the total value of our national mineral output had risen to 12.1. Copper recovered from Sudbury ores in 1936 totalled some 287,914,000 pounds or 68.4 per cent of the entire Canadian copper production whereas in 1926 production from this source amounted to only 40,905,171 pounds or 30.7 per cent of the Dominion copper output.

In addition to production of nickel, copper and the platinum metals there is an increasing output from these ores of the associated metals -- silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also recovered in the gaseous state from waste smelter gases. The total gross value of the various products of the Canadian industry, considered as a whole, was estimated at $77,593,731 in 1936 compared with a corresponding value of $58,996,451 in the preceding year. It is also interesting to note that silver recovered from the Sudbury nickel-copper ores totalled 2,484,568 fine ounces in 1936, a recovery that was some 240,000 ounces in excess of the total silver produced in 1936 from silver-cobalt ores mined in the noted Cobalt and Gowganda camps; silver recovered from nickel-copper ores during 1936 amounted to 13.6 per cent of the total silver produced by the entire Canadian mining industry. Gold recovered from Canadian nickel-copper ores totalled 73,377 fine ounces in 1936 or 1.95 per cent of that produced by all Canadian mines; in 1926 the corresponding percentage of this metal recorded as being recovered from this source was less than half of one per cent.

Employees in the industry in 1936 totalled 8,762 and salaries and wages paid amounted to $13,659,972 as compared with 7,009 employees and $11,275,650 and 3,291 employees and $4,853,978 in 1935 and 1926, respectively; the data for 1936 represent an increase over 1926 of 166 per cent in number of employees and 181 per cent in salaries and wages. The combined value of fuel and purchased electricity consumed in 1936 totalled $5,679,676 while explosives, chemicals and various other process supplies used were evaluated at $8,669,422.

Canadian exports of nickel in all forms in 1936 totalled 173,637,500 pounds valued at $44,594,296 as compared with 142,726,500 pounds worth $36,285,482 in 1935; of the 1936 exports, 50,273,800 pounds were consigned to the United Kingdom and 94,231,000 pounds to the United States.

The International Nickel Company of Canada, Limited, reported in February, 1937: "Ore requirements in 1936 of 4,299,329 tons were extracted from the Frood and Creighton mines, which were operated continuously throughout the year; the former furnished 3,408,956 tons and the latter, 890,373 tons. Development work at the Frood mine was carried on in step with production requirements. The footage advance was 30,628 feet, thus bringing the total underground workings to approximately 50 miles. There are now sufficient stopes in operation, or in readiness, to yield a daily output of 13,000 tons. In the Creighton mine development work was adjusted to ore requirements. An advance of 8,656 feet was made and the total footage of development is now about 45 miles. The new shaft and surface plant have been completed; the shaft is 4,075 feet deep and will be used in extracting a substantial tonnage of ore from recently developed reserves. There were milled and concentrated 3,317,988 tons of ore; the plant can now treat 11,000 tons of ore per day, an increase of

one-third over its former capacity. The Copper Cliff smelter produced 149,000 tons of bessemer matte and 139,796 tons of blister copper; this plant was extended during the year and two reverberatory furnaces and seven converters installed, thus bringing the total smelter equipment to seven reverberatory furnaces and nineteen converters; these additional facilities increase productive capacity by one-third. At the Coniston smelter the four blast furnaces and five converters were operated throughout the year; ore to the amount of 834,314 tons was processed and 56,827 tons of bessemer matte produced. The Port Colborne refinery (Ontario) operated at capacity throughout 1936 and produced 103,860,757 pounds of nickel; an addition to this plant, which increased capacity by 50 per cent, was completed during 1936.

"In Wales (The Mond Nickel Company Ltd.) the output, at the Clydach nickel refinery, of nickel in the form of pellets was 36,303,494 pounds comparable with 28,579,015 pounds in the previous year. In addition 2,561,722 pounds of metal were absorbed in the production of 12,229,332 pounds of nickel salts; during the year the production capacity was increased to 42,000,000 pounds of metallic nickel per annum, and extensions to the pressure plant will eventually bring the capacity to 50,000,000 pounds.

"In conformity with the increased output of the copper and nickel refineries the output of the Acton, England, refinery (Mond Nickel Co. Ltd.) increased by 22 per cent over 1935 and reached a record level at 232,343 ounces of platinum metals and 10,210 ounces of gold.

"To effect further economies in operation certain existing equipment was modernized and relocated in the Huntington plant (International Nickel Co. Inc.) West Virginia, U.S.A.; there was added another 25 ton open hearth furnace, and various new machine tools and items of finishing equipment were installed.

"The total number of employees of the International Nickel and associated companies at the end of 1936 was 15,433 distributed as follows - Canada, 9,837, Great Britain, 3,124; United States, 2,417, other countries, 55. Employees on December 31st, 1935, numbered 12,452.

"The proven ore reserves of the International Nickel Company of Canada, Ltd., at December 31, 1936, were reported by that company at 205,482,000 tons; additional ore proven during 1936 amounted to 4,381,000 tons."

Falconbridge Nickel Mines Ltd. reported: "The ore dressing plant, mill and smelter were extended during the year to take care of a 25 per cent increase in production. In connection with the new shaft there was built a new ore dressing plant containing some new features for preparing and grading the ore for further steps in the mill and smelter; handsorting is practically done away with; the new plant will permit treatment of lower grade ore.

"Mine development replaced the tonnage of ore extracted during the year, and in addition disclosed over one million tons more, so that ore reserves now stand at over five million tons (averaging 1.81% nickel and 0.88% copper). It also showed ore-existence at 1,750 feet in depth, or over 500 feet deeper than the lower horizon at which present ore-extraction is being carried out. Work in 1937 is scheduled to develop this deeper level, as also to sink the No. 1 shaft to 2,200 feet depth, and investigate the ore-occurrence at that horizon ... The refinery (Norway) was extended during the year for ample capacity to handle the 25 per cent increase in smelter capacity ... At Falconbridge 327,783 tons of ore was treated during 1936 of which 126,782 tons was milling ore and 201,001

tons smelting ore; 10,244.2 short tons of matte was produced containing 5682.5 short tons of nickel and 2644.4 short tons of copper."

A rather interesting feature of the industry in 1936 was the shipment of a relatively small tonnage of nickel ore from the old Alexo nickel mine; this was made by Cuniptau Mines Ltd. and was in the nature of a sample; the property is located near Porquis Junction, Ontario.

During 1937 considerable work of an exploratory nature was conducted underground at the Denison nickel property located at Worthington in the Sudbury district.

In British Columbia steady development work was carried on throughout 1936 by B. C. Nickel Mines Ltd.; operations at the mine, located at Choate, were conducted both underground and on the surface. The annual report for 1936 as issued by the B. C. Department of Mines contains the following information relating to this property: "No. 1 tunnel, which is about 4,700 feet long, extends through the mountain. The entrance is on the Texas Creek side and the exit on the Emory Creek side. There are four crosscuts off this tunnel on the north side and two on the south side. Six raises have been put up from these crosscuts, averaging from 150 to 350 feet. Extensive diamond-drilling has also been carried out. During 1936 approximately 2,000 tons of ore has been shipped to Japan, all of this being stoped from the 1,600 crosscut." In the same province the Western Nickel Corp. Ltd. reported that prospecting operations were conducted near Yale from May to September inclusive.

A report issued by the Bureau of Mines, Ottawa, states that interesting and possibly important discoveries of nickel-copper deposits, apparently similar in composition to those of Sudbury, were made during 1936, one near Dryberry Lake, about 40 miles southeast of Kenora in the Lake of the Woods District, Ontario; another at Dinty Lake, about 23 miles northeast of Lake Athabaska, in northern Saskatchewan.

Table 1 - PRINCIPAL STATISTICS OF THE NICKEL-COPPER MINING, SMELTING AND REFINING INDUSTRY IN CANADA, 1934-1936.(x)

	1934	1935	1936
Number of firms	4	4	5
Number of mines	7	7	9
Number of smelters	3	3	4
Number of refineries	1	1	1
Capital employed	$ 88,574,427	87,015,617	97,838,133
Number of employees - On salary	223	245	293
On wages	5,394	6,764	8,469
Total	5,617	7,009	8,762
Salaries and wages - Salaries	$ 740,191	800,700	922,545
Wages	$ 8,124,581	10,474,950	12,737,427
Total	$ 8,864,772	11,275,650	13,659,972
Fuel and purchased electricity used(c).	$ 4,202,810	4,735,768	5,679,673
Process supplies used (b)	$ (a)	7,181,698	8,669,422
Estimated gross value of matte exported and Canadian refinery products	$ 52,906,920	58,996,451	77,593,731
Value of production less items (b) and (c)	$ (a)	47,078,985	63,244,633

(x) Does not include data for copper refineries.
(a) Information not available.

Table 2 - NUMBER OF WAGE-EARNERS EMPLOYED, BY MONTHS, 1931 - 1936.

Month	1931	1932	1933	1934	1935	1936
January	4,726	3,014	1,822	4,811	5,666	8,076
February	4,656	3,019	1,957	4,876	5,804	8,044
March	4,641	3,039	2,036	5,048	6,077	8,103
April	4,620	2,577	1,976	5,189	6,277	8,191
May	4,597	2,379	2,034	5,409	6,446	8,257
June	4,422	2,434	3,001	5,622	6,573	8,411
July	4,324	2,235	3,957	5,658	6,733	8,653
August	4,262	1,672	4,523	5,566	7,253	8,804
September	3,657	1,628	4,775	5,500	7,500	8,606
October	3,068	1,580	5,050	5,722	7,714	8,700
November	3,195	1,490	4,968	5,707	7,632	8,735
December	3,094	1,551	4,762	5,609	7,489	9,050

Table 3 - NUMBER OF WAGE-EARNERS IN MONTH OF HIGHEST EMPLOYMENT DURING 1936 WITH REGULAR HOURS WORKED PER WEEK.

Hours per week	Number	Hours per week	Number
40 or less	6	51 - 53	3
41 - 43	1	54	178
44	159	55	3
45 - 47	913	56 - 59	626
48	7,362	60	43
49 - 50	3	60 plus	44

Table 4 - FUEL AND ELECTRICITY USED FOR HEAT AND POWER, 1935 and 1936.

Kind	Unit of measure	1935 Quantity	1935 Cost at works	1936 Quantity	1936 Cost at works
			$		$
Bituminous coal - Canadian	short ton	1,373	8,369	4,512	25,435
Imported	short ton	12,250	77,843	14,591	87,826
Anthracite coal	short ton	166	2,666	133	1,886
Coke	short ton	637	6,955	957	10,701
Gasoline (exclusive of motor vehicles)	Imp. gal.	28,397	6,525	40,824	8,721
Kerosene	Imp. gal.	5,676	1,210	3,480	721
Fuel oil and diesel oil	Imp. gal.	127,735	12,311	191,953	19,104
Wood	cord	1,458	4,139	3,415	10,976
Gas - Natural	M cu.ft.	131	107	370	260
Other fuel	xxx	...	2,498	...	882
Electricity purchased	K.W.H.	308,706,482	857,441	358,962,015	918,962
TOTAL	xxx	...	980,064	...	1,085,470

Table 5 - FUEL AND ELECTRICITY USED FOR METALLURGICAL PURPOSES, 1935 and 1936.

Kind	Unit of measure	1935 Quantity	1935 Cost at works	1936 Quantity	1936 Cost at works
			$		$
Bituminous coal - Canadian	short ton	167,299	963,457	233,479	1,331,448
Imported	short ton	66,961	358,527	37,255	210,549
Anthracite coal	short ton	46	334	...	...
Coke	short ton	170,866	1,713,065	204,984	2,052,769
Gasoline (except for motor vehicles)	Imp. gal.	...	...	2,358	680
Kerosene	Imp. gal.	...	...	4,371	870
Fuel oil and diesel oil	Imp. gal.	8,440,512	380,961	10,749,876	500,710
Wood	cord	5,868	51,230	6,631	56,565
Other fuel	xxx	...	3,287	...	7,882
Electricity purchased	K.W.H.	86,643,652	284,843	115,218,696	432,733
TOTAL	$	...	3,755,704	...	4,594,206

Table 6 - OUTPUT FROM CANADIAN NICKEL-COPPER MINES AND SMELTERS, 1932 - 1936.
(short tons)

	1932	1933	1934	1935	1936
Ore shipped from mines	790,614	1,533,887	2,903,310	3,608,437	4,634,434
Ore and concentrates treated	793,552	1,523,814	2,896,959	3,616,223	2,725,775(/)
Blister copper produced in Ontario (a)	29,682	60,398	95,826	119,720	137,369
Nickel produced in Ontario (b)	7,063	20,748	35,487	40,191	51,952
Matte exported (c)	21,778	43,315	46,755	46,371	50,644
Nickel content of matte exported	8,608	25,811	28,771	28,949	32,766
Copper content of matte exported	8,825	12,323	6,692	6,272	6,495

(/) Represents crude ore and concentrates smelted and is not comparable with figures for previous years which represented the tonnage of crude ore smelted together with the tonnage of ore milled; also in addition to the total recorded for 1936 a relatively small tonnage of nickel-bearing ore was exported from a property located in British Columbia.

(a) Copper content.

(b) Includes nickel content of salts and oxides produced.

(c) Less a relatively small tonnage of matte returned annually to Canada for retreatment since 1934.

Table 7 - PRODUCTION(x) IN CANADA, IMPORTS AND EXPORTS OF NICKEL, 1935 and 1936.

	1935		1936	
	Pounds	Value $	Pounds	Value $
PRODUCTION -				
Nickel in matte or residues exported(a) refined and electrolytic nickel produced; and nickel in oxides and salts sold	138,516,240	35,345,103	169,739,393	43,876,525
EXPORTS -				
Nickel, fine; nickel contained in ore, matte or speiss and nickel contained in oxide	142,726,500	36,285,482	173,637,500	44,594,296
To - United Kingdom	(49,184,600	12,572,741)	(50,273,800	14,115,970)
United States	(66,803,700	16,117,522)	(94,231,000	22,583,514)
IMPORTS (specified) -				
Nickel in bars or rods (not for anodes) and nickel in strips, sheets and plates	445,112	191,330	769,061	300,141
Nickel chromium in bars or rods (60% per cent Ni) - 75 inch diam. for electric resistance strip	43,434	41,381	52,825	51,170
Nickel, nickel silver and German silver in ingots or blocks,n.o.p.	3,643	959	10,008	2,603
Nickel-plated ware, n.o.p.	...	814,456	...	665,649
Nickel silver and German silver in bars, rods, sheets, plates or ahodes	79,978	19,615	101,585	27,920
Nickel, German, Nevada silver, manufactures of, not plated	...	127,831	...	126,081
Nickel-plated household hollowware	...	3,736	...	2,212
Nickel, kitchen or household hollowware	...	149	...	1,473
TOTAL NICKEL and ITS PRODUCTS	...	1,199,457	...	1,177,249

(x) Production entirely from Ontario; in addition to the production shown a relatively small tonnage of crude nickel ore was exported during 1936 from a nickel property being developed in British Columbia.

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

Table 8 - PRODUCTION OF NICKEL FROM CANADIAN ORES, 1925 - 1936.

Year	Pounds	Value $	Year	Pounds	Value $
1925	73,857,114	15,946,672	1931	65,666,320	15,267,453
1926	65,714,294	14,374,163	1932	30,327,968	7,179,862
1927	66,798,717	15,262,171	1933	83,264,658	20,130,480
1928	96,755,578	22,318,907	1934	128,687,340	32,139,425
1929	110,275,912	27,115,461	1935	138,516,240	35,345,103
1930	103,768,957	24,455,133	1936	169,739,393	43,876,525

Table 9 - WORLD PRODUCTION OF NICKEL ORE, 1932 - 1936. (/)
(in terms of metal)

Countries	1932	1933	1934	1935	1936
			(short tons)		
Canada (a)	15,164	41,632	64,344	69,258	84,870
New Caledonia (b)	3,200	4,900	5,500	6,200	5,000
Greece (d)	1,053	1,344	1,200	1,200	1,300(x)
India (c)	1,042	1,090	1,354	1,640	1,500
Norway	1,042	1,096	1,532	1,677	1,700(x)
Russia	...	...	951	1,500(x)	2,000(x)

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

(/) Production outside of these countries is very small.
(a) Production in all forms from Canadian ores.
(b) Exports of matte; content, estimated at 75%; estimated for 1936.
(c) Nickel content of speiss obtained as a by-product.
(d) Nickel and cobalt content beginning 1934.
(x) Conjectural.

Table 10 - NICKEL CONTAINED IN PRINCIPAL NICKEL ALLOYS.
(Supplied by the International Nickel Company of Canada, Limited)

As guide to the part which nickel has in the industrial world through the alloys now being used in industry, the nickel content of the best known alloys is shown in the following table:-

	Per Cent Nickel
NON-FERROUS ALLOYS -	
Malleable Nickel	99 /
Monel Metal	67
Inconel	80
Heat Resistant Alloys (including Ferrous)	35 - 85
Cupro-Nickel Alloys	15 - 50
Nickel Silvers	10 - 30
Nickel Brasses and Bronzes	1/2 - 5
FERROUS ALLOYS -	
Nickel Steels	1/2 - 7
Stainless Steels (Nickel-Chromium)	7 - 35
Non-Magnetic Steels	10 - 25
Invar Type Steels	32 - 45
Nickel Wrought Iron	3
Nickel Cast Irons	1/2 - 5
Ni-Resist Types	14 - 20
Ni-Hard	4 - 6
Ni-Tensyliron	1 - 2½

The heat resisting alloys are practically all of a nickel-chromium-iron combination with small additions of other elements which impart special characteristics depending upon the type of application. There are a large number of these alloys, in which the nickel ranges from 10 to 80%, which may be divided into the following types:

Type	Nickel	Chromium
1	60-80	15-20
2	25-40	15-20
3	20-25	20-30
4	10-20	20-30

DEVELOPMENTS IN OTHER COUNTRIES.

UNION OF SOUTH AFRICA - "Promising deposits of nickel ore have been found in several localities in the Union, but their exploitation has not reached the producing stage. Prospecting in the Vlakfontein area of the Rustenburg district has proved bodies of nickeliferous pyrrhotite to a depth of 500 feet. The results of a preliminary geophysical survey of the area have been published and further survey work is in hand. Other deposits near Insizwa in the Mount Ayliff district, Cape Province, have also been described and are being prospected." (Imperial Institute, London).

NEW CALEDONIA - "In 1935 certain Japanese groups showed pronounced interest in New Caledonia nickel properties. The Japanese organization is reported to have a nickel mine on the eastern coast of Kua. The Karoola mine located near St. Louis, began operations during 1935. The ore from this property is reported to contain over 5 per cent nickel. The principal nickel deposits of New Caledonia are operated by the Societe Caledonickel, a company formed by the amalgamation of the Societe le Nickel and La Societe Caledonia. The deposits are in the N'Goye district, the smelter is at Noumea and the nickel matte is shipped to France and Belgium." (Minerals Year Book - U.S. Bureau of Mines).

JAPAN - "For several years the Japan Mining Co. has treated ferro-nickel, at its Henodi plant, but the amount of metal recovered from this source has been negligible. A new plant was erected at Saganoseki, where this type of ore will be treated. Two thousand tons of New Caledonia ore were imported during 1935 for treatment at a refinery at Omachi .." (Minerals Year Book - U. S. Bureau of Mines).

CHINA - "Nickel ores are claimed to exist in the four interior provinces of Szechwan, Yumman, Kweichow and Shensi but the commercial value of the various deposits does not yet seem to have been determined ... Although the actual figures are not shown separately in the Chinese trade returns, it is known that a very large volume of business was done in 1936 in nickel blanks, which were imported for China's new subsidiary coinage. Although these blanks were manufactured in the United States, the fact that the raw nickel undoubtedly originated in Canada lends at least an indirect interest to this business for the Dominion." (H. A. Scott - Canadian Government Trade Commissioner, Shanghai).

BRAZIL - "Nickel ores have been found in several parts of Brazil. The ores are in the form of garnierite, which is a hydrous silicate of nickel and magnesia.

"The nickel deposits in the State of Goyaz are reported as very large and only the reserve of the Burity mine is estimated at 2,000,000 tons of ore with a minimum tenor of 5 per cent. This Burity nickel mine belongs to the Empreza Commercial de Goyaz S.A. who, it is said, have already spent about one thousand and five hundred contos for the purchase of the property, general construction, reverberatory furnace, etc.

"In the State of Minas Geraes there are also large deposits of nickel ore in Livramento and Barro Branco, as well as in the states of Bahia, Rio de Janiero and Matto Grosso.

"Only the Bom Jesus do Livramento mine in the state of Minas Geraes and the Burity mine, in the state of Goyaz, are exporting nickel ore. Almost all Brazilian exports of nickel ore are made to Germany, while small

quantities are shipped to Japan. The average price is 130 milreis or $8.45 per ton for the Bom Jesus/Livramento ore and 700 milreis or $45.50 per ton for the Burity ore. The difference in price is due to the difference in the tenor of nickel produced. Burity ore is reported to give an average of 14 per cent of nickel, while the Bom Jesus do Livramento ore produces only 5 per cent nickel. Brazilian exports of nickel ore from 1933 to 1936 amounted to 5,312 tons." (L. S. Glass - Canadian Government Trade Commissioner, Rio de Janeiro).

FINLAND - "In 1921 nickel ore was discovered in the Petsamo district on the Petsamo fells, this area having been acquired by Finland by the Treaty of Tartu (Dorpat), and this gave rise to extensive prospecting. When it was established that quantities worth quarrying were available, the deposits were leased by the Finnish Government in 1935 to Petsamon Nikkeli Oy., a company affiliated to the Mond Nickel Company in London. The company undertook, in addition to paying a royalty, to spend a certain minimum sum prospecting until quarrying could be started .... Since the spring of 1935 Petsamon Nikkeli Oy. has done careful prospecting on the spot under the supervision of Canadian mining geologists. The ore on the Kaulatunturi has proved with certainty that it comes up to the originally estimated quantity of about 5 million tons. The metal contents are approximately 3 per cent of nickel and ½ per cent of copper. In addition to prospecting, roads have been built and other preparatory work has been done that will still take several years to complete, so that ore cannot be quarried for some time. It has not yet been decided whether the ore willrbe smelted on the spot or shipped to England." (E. H. Kranck, Ph.D.) (Richard Grew - Canadian Government Trade Commissioner, Oslo, Norway).

GERMANY - "German nickel deposits are small and unimportant producers. Only one mine is operating (1936), the Frankenstein in Silesia, where 1 to 2 per cent nickel ore occurs in a weathered serpentine rock altered to an iron ocher with a spongy silica. A new plant was recently installed on the property to treat this low grade ore and the old mine dumps by the Krupp Rennverfahren which yields a nickel iron product. Production statistics are not available.

"A nickel refinery also at Frankenstein receives its chief supply of ore from Greece and this together with the product from the Rennverfahren plant supplies the Krupp works with their nickel requirements. Imports of nickel ore into Germany during the first six months of 1936 totalled 13,992 metric tons while those of nickel metal amounted to 2,146 metric tons." (C. W. Wright - U.S. Bureau of Mines).

RUSSIA - "The construction in Russia of a nickel smelting plant which can be moved from place to place has been completed at the Rezh nickel deposits, a distance of about 80 km. from Sverdlovsk is reported ...

"Comparatively small deposits of low content nickel ore (averaging about 1.5 per cent nickel) are scattered throughout the Urals. The erection of the movable plant was the result of considerable research in an effort to overcome the tremendous transportation expenditure..

"The Rezh nickel smelting plant will not produce metallic nickel but will smelt nickel stone. This stone will then be sent to the Ufalei nickel plant (Urals) for final extraction of metal. The first melt of matte was obtained at the new plant, which has been built close to the Rezh railway station in Sverdlovsk province, on November 14, 1936." (U. S. Department of Commerce).

D I R E C T O R Y

FIRMS IN THE NICKEL-COPPER MINING AND SMELTING INDUSTRY IN CANADA, 1936.

Name of Firm	Head Office Address	Location of Canadian plant
ONTARIO -		
Cuniptau Mines Ltd. (x)	27-38 King St. W., Toronto	Strathy Tp.
Falconbridge Nickel Mines Ltd.	25 King St. W., Toronto	Falconbridge Tp.
International Nickel Company of Canada, Limited	Copper Cliff	Smelters - Copper Cliff and Coniston Refinery - Pt.Colborne. Mines - Garson Tp., Levack Tp. Creighton, Frood.
BRITISH COLUMBIA -		
B. C. Nickel Mines Ltd.	808 Standard Bank Bldg., Vancouver	Choate
Western Nickel Corp.Ltd.(a)	425 Howe St., Vancouver	Yale.

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(x) Property now owned by Ontario Nickel Corp. Ltd., 38 King St. W., Toronto,Ont.

(a) Active but not producing.

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