CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

THE COPPER MINING INDUSTRY

IN

CANADA

1933

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DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH
OTTAWA - CANADA

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COPPER, 1933

Production of new copper in Canada during 1933 totalled 299,982,448 pounds valued at $21,634,853 as compared with 247,679,070 pounds at $15,294,058 in 1932, according to finally revised statistics issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. The 1933 output of copper represents an increase of 21.1 per cent over the preceding year and is the largest copper production recorded since the high record quantity in 1930. The average price for the year, based on the London market and transposed into Canadian funds, was 7.4548 cents per pound, an increase of 1.0746 cents per pound over the corresponding price of 1932. It is encouraging to note that the high quality of Canadian electrolytic copper is finding ever growing recognition in world markets, a fact that is reflected in the important exports of this commodity since the commencement of electrolytic copper refining in Canada during 1930 and 1931.

Primary copper production in Quebec in 1933 comprised the metal contained in concentrates exported from Eustis by the Consolidated Copper and Sulphur Company, Ltd., and that contained in anodes produced at the Noranda smelter by Noranda Mines Ltd. During 1933 the Noranda smelter treated 1,010,629 tons of ore, concentrate and refinery slag and produced 65,337,559 pounds of anodes, the average analysis of which was 99.36% copper, 8.70 ounces gold per ton and 15.61 ounces silver per ton; 65,008,731 pounds of fine copper were produced in 1933 as against 63,013,485 pounds in 1932; gold production totalled 284,675 ounces as compared with 341,350 ounces during 1932; the output of silver in 1933 amounted to 510,739 ounces as compared with 619,597 ounces in 1932. Ore shipments from the Horne mine to smelter were 26.5 per cent in excess of 1932 and the tonnage of ore reserves realized a very material increase over the preceding year. Noranda's subsidiary, Canadian Copper Refiners Ltd., operated its electrolytic copper refinery at Montreal East continuously throughout 1933 and an addition was being made for the purpose of producing selenium and tellurium. The refinery treated blister copper made at Flin Flon, Manitoba, by the Hudson Bay Mining and Smelting Co. Ltd., and anode copper received from Noranda; scrap copper was also refined at this plant. Copper products included wire bars, ingot bars, small ingots and cathodes. Gold, silver and selenium were also recovered in the refining operations.

Production of new copper in Ontario in 1933 came almost entirely from the nickel-copper ores mined in the Sudbury area. The International Nickel Company of Canada, Ltd., reports that copper sales, inclusive of copper in sulphate produced in Wales, increased from 57,662,789 pounds to 113,682,312 pounds or 97 per cent. The Copper Cliff smelter produced 53,186 tons of bessemer matte and 61,385 tons of blister copper. Operations at the Copper Cliff plant of the company's subsidiary, Ontario Refining Company, Ltd., were governed entirely by the tonnage of blister copper received from the Copper Cliff smelter as no outside copper was refined. The operations were increased from 4,000 tons of blister copper per month at the beginning of the year to 6,500 tons per month during the last quarter. The total

output for 1933 was 58,098 tons of refined copper and the substantial increase in production resulted in lower refining costs. The refinery was in continuous operation during 1933 and production included wire bars, ingot bars, cathodes, phosphorized copper, and gold, silver and selenium. The entire reduction plant of Falconbridge Nickel Mines Ltd. was in operation at Falconbridge, Ontario, a total of 324 days during 1933; 232,661 short tons of ore were treated and 8,297 short tons of matte produced, the copper content of matte totalled 2,103.5 short tons. The grade of ore treated in 1933 contained .986% copper as compared with 1.045 per cent in 1932. Falconbridge matte is treated in the company's refinery located in Norway. During the year shipments to consumers totalled 3,405,980 pounds of copper for Falconbridge account and the company reports that at one stage sales were actually lost from lack of stock to fill them and production efforts were then consistently directed towards building up refined inventory so that customers' demands could be met. Precious metal sales took care of the whole of their production.

More detailed information relating to the mining of nickel-copper ores is contained in the Bureau of Statistics bulletin "The Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1933."

Production of new copper from ores mined during 1933 in Manitoba and Saskatchewan consisted of the metal contained in blister made at Flin Flon by the Hudson Bay Mining and Smelting Company Ltd. The copper smelter of this company was operated continuously during the year. From the Flin Flon concentrates and other products, there was produced and shipped, blister copper containing 41,148,717 pounds of copper, 1,222,895 ounces of silver and 94,745 ounces of gold. Sales during 1933 as reported by the company comprised 94,745 ounces of gold, 1,210,666 ounces of silver, 40,941,102 pounds of copper and 46,305,736 pounds of zinc.

The copper output in British Columbia in 1933 came chiefly from the ores mined by the Britannia Mining and Smelting Co. Ltd., Britannia Beach, and the Granby Consolidated Mining, Smelting and Power Co. Ltd., Anyox. The Department of Mines of British Columbia reports that in 1933 the former company operated on a curtailed basis with the object of giving employees sufficient work to support them and keep the organization intact as far as possible. There were 622,718 tons of ore milled (compared with a tonnage of 1,920,339 in 1929) from which about 8,000,000 pounds of copper (including precipitates), 12,819 ounces of gold and 42,799 ounces of silver were recovered. The pyrite-concentrate production of the company amounted to 16,629 short tons; copper concentrates of this company are exported to foreign smelters.

Ore milled during 1933 by the Granby Consolidated Mining, Smelting and Power Co. Ltd. totalled 1,534,200 tons having an average copper content of 1.31 per cent as compared with 1,740,300 tons with a copper content of 1.27 per cent in 1932. The net cost per pound of refined copper produced after allowing credits for gold and silver values and miscellaneous income, but exclusive of depreciation and depletion, was 6.74 cents. As forecast in last year's report of the company, at the present rate of extraction and unless new ore is found, the recoverable ore reserves of the Anyox mines will be exhausted in about two years.

The Consolidated Mining and Smelting Co. of Canada, Ltd., states that the Rossland properties of the company were operated under a system of leasing during 1933, resultant shipments totalled 10,834 tons, which were smelted at Tadanac, one of the lead furnaces being adapted to the purpose there being insufficient supply to warrant the operation of a copper furnace.

More complete details relating to the mining of copper ores and including data pertaining to employment, etc., are contained in the Bureau of Statistics bulletin on the Gold Mining Industry of Canada, 1933.

GENERAL ITEMS

"Metal and Mineral Markets", New York, announced in April, 1934, that under the plan written into the code by N.R.A. in the United States an allocation of 20,500 tons of copper a month, with domestic sales quotas for all the primary producers in the industry, based on their relative annual production capacities, had been established as follows:-

	Capacity Tons per year	Monthly percentage sales quotas
Kennecott	366,500	1.67
Anaconda	225,000	1.67
Phelps Dodge	168,000	1.67
United Verde Copper	68,000	1.90
Calumet & Hecla	50,000	2.20
Miami	36,000	2.30
Magma	25,000	2.50
United Verde extension	24,000	2.50
Cons. Copper Mines	21,000	2.70
Copper Range	17,500	3.00

By some equitable method to be determined by code authority, secondary producers will be allocated a sales quota of 9,500 tons a month. Producers of custom and by-product copper may apply for a sales quota and temporarily will have a quota of 50 per cent of their current production.

The Department of Commerce, Washington, D.C., include in "Russian Economic Notes" (December, 1933), the following information relating to copper in the Russian Soviet Union (Oct. 1933): "The copper industry of the Soviet Union has failed to keep pace with the other branches of heavy industry. Hundreds of millions of rubles have been invested, the equipment has been improved, new furnaces and concentration plants installed, and the technical conditions created for a rapid increase of production. Yet these facilities are all working below capacity, production is insufficient to satisfy the needs of the copper-using plants, and complaints are general that this industry is not equal to the task that has been set ... In 1928 there were only 5 refineries in operation, 2 more have been added since then. The whole industry has been reconstructed by the adoption of the flotation system, the substitution of electric power for steam, etc... the copper industry possesses all necessary facilities for an immediate improvement of its work, in response to a constantly increasing demand for the metal from Soviet industry."

Union Minière du Haut-Katanga states in its annual report (1933):- The research for new deposits of copper and the development of those already known were conducted simultaneously at a reduced activity and the addition to our reserves of ore are at least equal to what was mined out during the year. The tonnage of ore mined from different deposits during the year was 695,000 tons. The concentration plants of Jadotville-Panda were re-opened during March, 1933, and have given the following tonnages:

1. Concentration by gravity: 31,400 tons of concentrate at a minimum percentage of 35.7 per cent of copper.

2. Concentration by flotation: 56,500 tons at a content of 35.9 per cent of copper. The metallurgical plants of Elisabethville and Jadotville have produced:-

Elisabethville-Lubumbashi	40,328 tons of copper
Jadotville-Shituru	26,268 tons of copper
TOTAL	66,596 tons of copper

Rhokana Corporation Ltd. operating in Northern Rhodesia reports the production of 48,579 tons of blister copper during the year ended June 30th, 1933. The company reports a total cost per long ton copper contained in blister produced during the last six months of the year specified at £21.584. All copper produced was sold either as blister or electrolytic. The company decided to erect an electrolytic refinery at N'Kana from which it is expected that production will begin about the middle of 1934. Production of concentrates at the Mulfulira copper mine started on October 1st, 1933; these will be smelted by Rhokana for a period of one year.

Tonnage mined at the Boliden mine in Sweden during 1933 is reported at 332,000 of which 322,000 tons were treated at the company's Roennskaer smelting works. Among the products obtained were 7,432 kilograms of gold, 14,853 kilograms of silver and 4,980,000 kilograms of copper.

The English Press announced in April, 1934, that British Copper Refiners, the new subsidiary of the British Insulated Cables located at Prescott, England, which treats Rhodesian copper, has found it necessary to increase its plant by practically 100 per cent. It was then turning out over 1,000 tons of finished copper bars weekly.

Wm. M. Crane,Jr., of the Copper and Brass Research Association, recently announced in the United States the development of a method for the artificial formation of natural patina on copper. "Our chemists" said Mr. Crane, "discovered after some study that natural patina is a basic sulphate. Prior to that it had been assumed it was a carbonate. This led to the development of a solution consisting mainly of ammonium sulphate. The coating formed by dipping copper into this solution was found to be identical in composition with natural patina."

"The Chemical Age" London, refers to a recent British patent as follows: "Hard copper alloys can be made by adding to copper a hardener alloy obtained by heating together iron, aluminum and copper to such a temperature that an exothermic reaction occurs. Other elements may be added, and the hardener may replace all or part of the tin in bronzes. The hardener may contain 10-50 per cent of iron and aluminum. An example of a final alloy consists of 80 per cent of copper, 1 per cent of iron, 2 per cent of aluminum, 13 per cent of zinc, and 4 per cent of tin (see specification No. 399,219 of N. D. Chopra)."

It has been reported within recent months in "Iron Age" that at least two companies producing rustless steels are using definite percentages of copper and that the metal is clearly retaining its place among useful alloying elements.

The Mining Journal, London, July 28, 1934, published (in part) under "Whither Copper?": "Copper production has been over-developed in relation, at any rate, to the former price structure. The developments of the last half dozen years have been based on sound economic achievement on the part of new producers, accentuated by the fact that other major producers have their field of operations

in countries where exchange is greatly depreciated, or where the copper industry constitutes one of the few major sources of employment and springs of industrial activity. The outstanding feature of the copper position is, without question, the steady increase in production and the prospect of further enlargement. This will be appreciated when we consider the programmes of the great producing units, regarding which we have been at some pains to collect data and statistics. In presenting such material, there is always an element of uncertainty. Programmes of expansion do not always take place contemporaneously or exactly in accordance with a time table, and there is always the possibility of their being modified as the result of unexpected developments. We know what the production was last year and we know more or less what is projected in the near future, but to assign a precise date to the latter figure is impossible, and the comparison which is made in the following table can only be said to represent the position which will probably be reached in the early part of next year. With this proviso, we give the following figures of last year's output and estimates based on the latest plans that we understand have been made:-

	1933 OUTPUT short tons	1935 ESTIMATE short tons
Katanga	72,000	120,000
Rhokana	61,501	80,000
Roan	54,898	70,000
Mulfulira	...	25,000(x)
International Nickel	61,385	100,000
Noranda	32,503	40,000
Cerro de Pasco	27,068	30,000
Braden	87,643	132,000
Chuquicamata	61,523)	120,000
Andes	17,880)	
TOTAL	476,402	717,000

(x) Rising eventually to say 50,000 - 60,000 short tons.

The mines enumerated comprise the big producers outside the United States, who so far as we can learn, for one reason or another are at present contemplating a programme of enhanced output ...

Put in its most naked form it would seem that we must contemplate the possibility of something like a quarter of a million tons of copper over last year's production coming upon the world's market, which in effect today means London, less any quantity which may be withdrawn owing to the inability of the less economic producers to stand the strain and so be forced into closing down. Of this development, however, there is little sign as yet. If our computations as to enhancement of supply be approximately correct and nothing occurs to interfere with them, we find it difficult to resist the conclusion that the tendency in copper prices must still be downward, though, of course, speculative operations may be expected from time to time, on any favourable developments, to give the market an occasional lift.

PRODUCTION OF PRIMARY COPPER IN CANADA, BY PROVINCES AND BY SOURCES, 1932 and 1933.

	1932 Pounds	1932 $	1933 Pounds	1933 $
By Provinces -				
Quebec	67,336,692	4,296,216	69,943,882	5,214,177
Ontario	77,055,413	4,407,928	145,504,720	10,118,847
Manitoba	52,706,861	3,362,803	38,163,181	2,844,989
Saskatchewan	...	...	3,223,941	240,338
British Columbia	50,580,104	3,227,111	43,146,724	3,216,502
TOTAL	247,679,070	15,294,058	299,982,448	21,634,853
By Sources -				
In blister and anode copper produced	211,005,663	13,462,583	260,386,164	19,411,268
In ores, concentrates and copper matte exported	19,023,221	1,213,719	14,950,300	1,114,515
In nickel-copper matte exported	17,650,186	617,756	24,645,984	1,109,070
TOTAL	247,679,070	15,294,058	299,982,448	21,634,853

PRODUCTION OF COPPER FROM CANADIAN ORES, 1922 to 1933.

Year	Pounds	Value $
1922	42,879,818	5,738,177
1923	86,881,537	12,529,186
1924	104,457,447	13,604,538
1925	111,450,518	15,649,882
1926	133,094,942	17,490,300
1927	140,147,440	17,195,487
1928	202,696,046	28,598,249
1929	248,120,760	43,415,251
1930	303,478,356	37,948,359
1931	292,304,390	24,114,065
1932	247,679,070	15,294,058
1933	299,982,448	21,634,853

AVAILABLE STATISTICS ON THE CONSUMPTION OF COPPER IN SPECIFIED CANADIAN INDUSTRIES, 1931 and 1932.

Industries	Items (Used)	1931 Pounds	1932 Pounds
Brass and Copper Products(x)	Copper castings, ingots and bars	28,212,000	13,482,000
Brass and Copper Products	Copper plates, slabs and sheets.	211,000	339,000
Brass and Copper Products	Pipe	129,000	89,000
Brass and Copper Products	Rods	518,000	12,000
Brass and Copper Products	Tubing	47,000	45,000
Brass and Copper Products	Wire	309,000	1,065,000
Brass and Copper Products	Scrap	3,394,000	2,058,000
White Metal Alloys	Scrap	919,000	1,337,000
White Metal Alloys	Copper bars, etc.	48,000	31,000
Electrical Apparatus	Pig and scrap	438,000	224,000
Electrical Apparatus	Rods and bars	32,840,000	45,405,000
Electrical Apparatus	Tubes	201,000	278,000
Electrical Apparatus	Pipe	2,000	4,000
Electrical Apparatus	Sheets	310,000	191,000
Electrical Apparatus	Wire	7,624,000	4,239,000

AVAILABLE STATISTICS ON THE CONSUMPTION OF COPPER IN SPECIFIED CANADIAN INDUSTRIES, 1931 and 1932. (concluded)

Industries	Items (Used)	1931 Pounds	1932 Pounds
Iron and Steel	Copper	3,524,000	2,797,000
GRAND TOTAL		78,726,000	71,596,000

(x) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable and duplication to this extent results from the inclusion of these rods in the electrical apparatus industry. Corresponding data for 1933 not yet available

COPPER PRICES, BY MONTHS, 1932 and 1933.

Month	COPPER (ELECTROLYTIC) NEW YORK		LONDON	
	Cents per pound		In £ sterling per long ton	
January	7.060	4.775	46.200	33.244
February	5.965	4.775	41.381	32.556
March	5.763	5.011	36.786	32.370
April	5.565	5.395	34.190	33.681
May	5.237	6.698	32.833	38.163
June	5.145	7.773	30.841	41.000
July	5.053	8.635	29.107	41.524
August	5.219	8.768	34.784	40.227
September	5.978	8.753	38.318	38.339
October	5.733	7.950	36.190	36.977
November	5.131	7.881	36.568	33.898
December	4.813	7.885	34.344	34.329
AVERAGE	5.555	7.025	35.962	36.359

Transposed into Canadian funds the average price of copper based on the London market was 7.4548 cents per pound in 1933; the corresponding price in 1932 was 6.3802 cents per pound.

IMPORTS INTO CANADA AND EXPORTS OF COPPER, 1932 and 1933.

	1932 Pounds	1932 $	1933 Pounds	1933 $
IMPORTS -				
(x) 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, also copper bars for use in manufacture of conductor rods	420,300	45,437	...	...
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured	169,200	26,471	305,900	38,736
Copper in blocks, pigs or ingots	264,000	18,366	17,200	1,603
(/) Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables for use only in manufacture of such articles in their own factories	14,100	1,484	97,400	12,084

IMPORTS INTO CANADA AND EXPORTS OF COPPER, 1932 and 1933. (continued)

	1932 Pounds	1932 $	1933 Pounds	1933 $
IMPORTS - (concluded)				
Copper, scrap and cathode plates	9,500	627	4,000	247
Copper in strips, sheets or plates not polished or coated	286,500	49,578	144,100	25,142
Copper tubing in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured	1,135,966	209,165	256,491	53,464
Copper wire, n.o.p.	44,526	7,804	22,355	3,997
Copper wire cloth, or woven wire of copper	...	3,416	...	4,304
(/) Copper bars for use in the manufacture of rods to be used exclusively in the manufacture of electrical conductors and copper rods for such electrical conductors not to exceed the area of No. 7-0 gauge conductor	32,000	3,683	4,000	300
Copper, all other, manufactures of, n.o.p.	...	350,422	...	249,680
Copper, precipitate of, crude	20,303	1,749	20	4
Anodes of nickel, zinc, copper, silver or gold	...	2,737	...	2,649
Copper, sub-acetate of, or verdigris, dry	2,209	318	210	45
Copper, sulphate of (blue vitriol) and copper sulphate of, dehydrated, for agricultural or spraying purposes	5,174,057	164,693	4,585,453	147,335
Copper rollers adapted for use in calico printing	...	59,066	...	51,115
TOTAL	...	945,016	...	590,703

(x) To October 12, 1932.
(/) From October 12, 1932.

EXPORTS -				
Copper, fine, contained in ore, matte, regulus, etc.	37,964,900	1,915,096	35,436,100	1,723,705
Copper, blister -				
To United States	21,994,500	1,233,090	15,136,000	1,250,750
Total	21,994,500	1,233,090	15,136,000	1,250,750
Copper, old and scrap	5,887,600	269,118	4,866,800	264,882
Copper in bars, rods, strips, sheets, plates and tubing (x)	62,346,700	4,673,447	...	...
Copper in ingots, bars, cakes, slabs and billets (/) -				
To United Kingdom	59,395,500	3,228,814	89,844,400	6,039,394
United States	36,425,500	2,231,263	...	...
British India	...	...	677,900	33,902
Denmark	190,700	10,301	1,606,700	115,532
France	9,074,000	536,178	16,349,800	1,038,237
Germany	3,545,100	191,840	15,182,000	1,098,594
Italy	3,174,800	186,194	1,076,500	73,989

IMPORTS INTO CANADA AND EXPORTS OF COPPER, 1932 and 1933. (concluded)

	1932		1933	
	Pounds	$	Pounds	$
EXPORTS - (concluded)				
Copper in ingots, bars, cakes, slabs and billets (/) - (concluded)				
To Japan	...	...	235,400	18,570
Netherlands	2,085,200	115,033	12,552,100	908,359
Poland and Danzig	...	...	235,400	18,570
Sweden	1,960,100	112,419	1,704,100	114,921
Belgium	3,208,900	183,532	11,997,300	749,805
Other countries	200	17	11,400	706
Total	119,060,000	6,795,591	153,348,300	10,346,590
Copper in rods, strips, sheets, plates and tubing (/)	19,516,900	1,185,102	38,700,600	3,061,014
Copper wire and cable, insulated.	...	134,932	...	122,260
Copper manufactures, n.o.p.	...	25,252	...	148,745
TOTAL COPPER AND ITS PRODUCTS -				
To - United States	...	7,953,261	...	2,158,259
United Kingdom	...	5,728,554	...	9,569,811
Other countries	...	2,549,833	...	5,189,876
GRAND TOTAL	...	16,231,628	...	16,917,946
Copper coin - Foreign	...	66,231	...)	22,866
Copper coin - Canadian	...	537	...	340

(/) From April 1 to December 31, 1932.
(x) From January 1 to March 31, 1932.

CANADIAN COPPER ORE RESERVES (/) AS OFFICIALLY REPORTED. (American Bureau of Metal Statistics)

	Year	Province	Short tons Ore	Average grade %	Short tons Copper
Falconbridge	1933	Ontario	2,817,884	0.93	26,200
Granby Consolidated	1933	British Columbia	13,449,900	1.81	243,400
Hudson Bay	1930	Manitoba	18,000,000	1.71	307,800
International Nickel	1933	Ontario	204,783,399	2.00(x)	4,095,700
Noranda	1933	Quebec	23,345,000	2.65	618,300
Normetal	1933	Quebec	625,000	3.00	18,800
Sherritt Gordon	1932	Manitoba	4,799,175	2.41	115,900
Waite Amulet	1933	Quebec	1,067,350	6.00	64,000
Britannia		British Columbia	-	-	-
Consolidated Copper and Sulphur	-	Quebec	-	-	-

(x) Approximate.
(/) Producing or developed for production.

WORLD'S PRODUCTION OF COPPER, 1929, 1932 and 1933.(a)
(American Bureau of Metal Statistics)
(in short tons - 2,000 lb.)

Country	1929	1932	1933
United States	1,026,348	255,509	233,649
Mexico	86,759	37,588	44,742
Canada	121,151	125,370	148,501
Cuba	15,740	5,941	8,106
Total North America	1,249,998	424,408	434,998
Bolivia	7,700	3,000	2,100
Chile	349,221	114,175	180,018
Peru	59,980	23,610	27,327
Venezuela	...	200	...
Total South America	416,901	140,985	209,445
Austria	4,293	1,703	...
France	1,534	1,102(x)	1,102(x)
Germany	32,075	29,762	29,762
Jugoslavia	22,790	33,244	44,154
Norway	16,280	17,102	20,164
Finland	4,960	7,055	6,173
Russia	40,823	35,300	41,336(x)
Spain and Portugal	53,599	32,658	40,508
Sweden	3,500	4,038	5,622
Total Europe (b)	179,854	161,944	188,821
Japan	83,189	77,873	76,191
Other Asia	8,800	10,500	12,000
Total Asia	91,989	88,373	88,191
Belgian Congo	...	59,522	72,000
Rhodesia	...	80,456	116,400
Other Africa	...	15,206	9,721
Total Africa	172,561	155,184	198,121
Australasia	15,979	16,510	18,000
Other countries (b)	3,307(x)	6,834(x)	7,164(x)
GRAND TOTAL	2,130,589	994,238	1,144,740

(a) So far as possible, these statistics are based on blister copper, referred to countries wherein ore originated, with exclusion of copper derived from junk.
(b) The figures reported for "Other Countries" include some European production.
(x) Conjectural.

D I R E C T O R Y

Shippers of Copper Ores or Concentrates	Head Office	Location
QUEBEC -		
Aldermac Mines Ltd.	500 Dominion Square Bldg., Montreal	N. W. Quebec
Consolidated Copper & Sulphur Co. Ltd.	Eustis	S. E. Quebec
Noranda Mines Limited(x)	Royal Bank Bldg., Toronto, Ont.	N. W. Quebec
ONTARIO -		
Amity Copper & Gold Mines Ltd.	Boston Creek	Boston Creek
Falconbridge Nickel Mines Ltd.(x)	100 Adelaide St.W., Toronto	Sudbury area
International Nickel Co. of Canada, Ltd. (x)	Copper Cliff	Sudbury area
MANITOBA -		
Hudson Bay Mining & Smelting Co. Ltd. (x)	404 Dundas St., Woodstock, Ont.	Flin Flon
BRITISH COLUMBIA -		
Granby Consolidated Mining, Smelting & Power Co.Ltd.(x)	789 Pender St., Vancouver	Anyox
Britannia Mining & Smelting Co. Ltd.	Britannia Beach	Britannia Beach

(x)Operate smelters.

COPPER REFINERS -		
Canadian Copper Refiners Ltd.	2 King St. E., Toronto, Ont.	Montreal East, P.Q.
Ontario Refining Co. Ltd.	Copper Cliff, Ont.	Copper Cliff, Ont.

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