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[illegible]

COPPER, 1932.

Copper production in Quebec in 1932 came from the metal contained in concentrates exported from Eustis by the Consolidated Copper and Sulphur Co. Ltd., and the metal contained in blister or anode copper produced by Noranda Mines Ltd. The latter company increased gold production and decreased copper production owing to the unprecedented low prices of copper. Early in 1932 operations at the Waite-Ackerman-Montgomery mines, the controlling share interest of which is held by Noranda, ceased and it is expected the mine will remain closed until copper prices materially increase. During 1932 the Noranda smelter treated 918,567 tons of ore, concentrates and refinery slag and produced 63,422,518 pounds of anodes, the average analysis of which was 99.36 per cent copper, 10.76 oz. gold and 19.54 oz. silver per ton. The Montreal East refinery of Canadian Copper Refiners, a subsidiary of Noranda, was in continuous operation throughout the year producing electrolytic copper from primary metal recovered in Quebec and Manitoba; scrap copper was also treated in this plant. The precious metal division of the refinery was being doubled in 1932 in order to expedite the handling of the precious metals input; Canada Wire and Cable Company, allied to Noranda Mines, operates a rolling mill and wire drawing plant adjacent to the Montreal East refinery. This works produces round rods, drawn copper for shaped or round trolley wire and a wide range of cables and wires.

Copper production in Ontario during 1932 came almost entirely from the copper-nickel deposits of the Sudbury district. The Copper Cliff smelter of the International Nickel Company of Canada, Ltd., treated 336,215 tons of dry concentrates and produced 27,033 tons of bessemer matte and 27,770 tons of blister copper. The new Orford process plant started in March and produced 2,249 tons of blister copper; the Coniston smelter of the same company reported an output of 9,679 tons of bessemer matte for the year. In consequence of the reduced rate of world consumption of copper the refinery of the Ontario Refining Co. Ltd. (associated with International Nickel Co.) located at Copper Cliff, operated throughout the year at a greatly reduced rate even as compared with that of 1931. Nevertheless it was possible to hold the cost of copper refining at a level only slightly above that of 1931. Refined copper was shipped from the refinery to practically all copper consuming countries. Falconbridge Nickel Mines Ltd. reported its smelter in operation 341 days during the year; 123,306 tons of ore were smelted and 4,947.6 tons of matte produced. The company states that its Norwegian refinery operated satisfactorily without close down during the year and with a somewhat increased production. For the year 1932 the amount of copper produced in marketable form totalled 2,288,897 pounds with 334,958 pounds in process at end of year. The new replacement rolling mill erected at Brockville, Ontario, by the Eugene F. Phillips Electrical Works Ltd., was placed in operation at the beginning of 1932; the mill itself consists of three main units, a roughing mill, an intermediate

mill, and a finishing mill (all machines are motor driven). It is interesting to note that negotiations concluded in 1931 by this company have resulted in the production of asbestos-insulated wires and cables in a new works located at Montreal. Copper products manufactured by the Eugene F. Phillips Electrical Works include electrolytic copper rods, power cables, flexible armoured cables and a variety of other copper manufactures.

Copper is also rolled in mills operated at New Toronto by the Anaconda American Brass Ltd. This company manufactures copper plates, rods, sheets, etc.

The Hudson Bay Mining and Smelting Co. Ltd., conducting mining and smelting operations at Flin Flon, Manitoba, mined and milled 1,439,651 tons of ore averaging .085 ounces of gold, 1.13 ounces silver, 1.98 per cent copper and 3.7 per cent zinc, and from this ore produced 82,565 ounces of gold, 933,983 ounces of silver and 42,158,235 pounds of copper and 41,736,000 pounds of zinc. The copper smelter of the company operated continuously during the year. There were smelted in the reverberatory furnace in 1932, 241,432 tons of Flin Flon ore and concentrates; in addition 23,711 tons of customs ore and concentrates were smelted, all of the company's production for the year was sold. Sherritt-Gordon Mines Ltd., operating at Sherridon, Manitoba, decided with the steady drop in the price of copper that the mine be shut down until a better price for copper be obtained. In accordance with this decision all operations ceased in June, 1932. During the six months 9,929,182 pounds of electrolytic copper were produced at a cost of 6.195 cents per pound after crediting 0.893 cents for gold and silver values. Sherritt-Gordon concentrates were smelted by the Hudson Bay Mining & Smelting Company and the resultant blister was treated by the Ontario Refining Company.

In British Columbia all sales of copper from Britannia Mining and Smelting Co. Ltd., were suspended early in March, 1932, because of the marked decline in the price of the metal and thereafter all mine operations were curtailed. Due to the import duty of 4 cents per pound on copper, included in the United States Revenue law effective June 21, 1932, the copper thereafter produced at Britannia, when sold, must be marketed abroad and arrangements for such disposal of the production have been perfected on a basis which it is believed will be as satisfactory in operation as that governing the company's sales of lead and zinc produced in Mexico.

Continuous operations were conducted by the Granby Consolidated Mining, Smelting and Power Co. in the Hidden Creek and Bonanza mines at Anyox, B.C. Milling of about 5,000 tons a day was maintained or about the same as in 1931. The United States copper tariff and low copper prices necessitated curtailment of the usual shipments. However, metallurgical innovation made possible the shipment of about 300 tons of high grade gold copper blister per month. The usual grade blister-copper was stored awaiting an improvement in copper price. Production shows a slight increase in copper and a slight decrease in gold and silver as compared with 1931 but with the bulk of the 1932 production not marketed.

GENERAL ITEMS

A correspondent of "The Mining Journal" London, reports that the Portuguese government have agreed to find capital necessary for the building of a railroad from the well-known copper deposits at Bembe, West Africa, in the northern area of the colony, to the port of S. Antonia de Zaire. The Bembe Copper Mine (a Portuguese company) has combined with the well known firm of Lever Bros. to supply working capital to develop the mine. The extraction at first will be limited to about 80,000 tons of ore per annum; samples from the deposits assay up to 43 per cent copper.

The same Journal in a review on copper in 1932 states that one of the most important developments of the year was the gradual abandonment by the leading copper producers of co-operation as regards output under the auspices of the Copper Producers Association; the price understandings were, of course, impossible as soon as the American tariff went on. During 1932 the leading world producers appear to have worked in harmony with the agreement arrived at toward the end of 1931 to restrict to around 26 per cent of capacity. However, in September, the period for which Roan (Rhodesia) had agreed to work to this curtailment expired, and thereafter they ceased to be a member of the Association. By the end of the year the period of agreement lapsed for other members also, and though every effort was made to arrive at some fresh understanding during the important conference held in New York in December, the attempt was in vain, and the Association stood dissolved as from the beginning of 1933.

The Indian Copper Corporation Ltd. reports that its mine again yielded a much increased output, nearly 25 per cent higher than in 1931, while mine costs were lower by just under one pound a ton. The estimated ore reserves at December 31, 1932, amounted to 700,466 short tons or 3.05 per cent copper; the output of the company's refinery rose to 4,443 long tons of refined copper as compared with 4,069 tons in 1931. Operating costs in the rolling mill fell from three pounds, 15 shillings, eleven and three-quarters pence per ton finished sheet to two pounds, fourteen shillings, three pence. This reduction was largely due to the substitution of an electric induction furnace for eight of the coke-fired crucible furnaces.

Mount Lyell Mining and Railway Co. Ltd. reports that for the fiscal year ending September 30, 1932, the company's concentration plant in Tasmania treated 348,903 tons of ore, an increase over the previous year of 65,641 tons. The blister copper output was 11,059 tons with a metal content of copper, 10,956 tons; silver, 162,858 ounces; gold, 4,769 ounces. The production of cathode copper was steadily maintained throughout the year for a total tonnage of 11,051 tons. Copper values in ore were 3.11 per cent as against 3.50 per cent during the preceding year; recovery was 94.23 per cent and treatment costs showed a further reduction. Ore reserves were estimated at 4,285,653 tons containing 2.74 per cent copper and 0.28 ounces silver and 0.020 ounces gold per ton.

Imports of copper into the United Kingdom in 1932 showed a small increase with a total of 165,623 tons against 161,659 tons in 1931. There was a marked decline in receipts from the United States but with Northern Rhodesia coming in on an extensive scale, shipments from "other countries" were about 40,000 tons higher at 70,136. Arrivals of copper ore and residues were 29,070 tons against 35,651 tons in 1931. Exports of United Kingdom copper were 18,311 tons compared with 19,414 tons in 1931.

A report (Reuter) from Stockholm says that the plants both at the Boliden mine and at the Roennskaer smelting works are now practically completed, only the plant for secondary products remaining to be constructed. The capacity of the plant as completed in March, 1933, corresponds to an output of 350,000 to 375,000 tons of ore per year; output on this scale was reached in the latter half of 1932. During 1932 Boliden mine produced 242,000 tons of ore of which 229,000 tons went to the Roennskaer smelting works for treatment. After completing certain additional plants in 1933 the company will principally sell electrolytic copper in the shape of wire bars, metallic gold and silver. It is estimated that at the end of 1932 there were over 6,500,000 tons of ore left in the deposits.

The new copper refinery of the British Copper Refiners Ltd., at Prescott, England, started operations on January 4, 1933, producing fire-refined metal. The product of the refinery is reported to comply, in all respects with British Engineering standards requirements.

According to the United States Consul at Frankfort on the Main, plans to develop the mineral resources of Anatolia have been completed by a Turkish-German syndicate. The copper deposits at Argana Maden, Turkey, are expected to yield between 18,000 and 20,000 tons of the metal a year. A loan is being proposed by the Turkish government by which it is hoped that a railway can be completed to the property in about two years.

Union Miniere du Haut Katanga report that it was considered to the best of their interests to maintain their copper production to a level commensurate with consumption. Future production of the Society will be governed by the activity of the metal markets. Union Miniere extracted from its various mines 720,000 tons of ore during 1932, and the Elizabethville and Jadotville plants produced the following tonnages of copper:

| | |
|---------------------------------|--------------------|
| Elizabethville Lubumbashi | 27,000 tons |
| Jadotville Panda | 15,200 tons |
| Jadotville Chituru | <u>11,800 tons</u> |
| Total | <u>54,000 tons</u> |

The Society's copper production during the past ten years was as follows:

| | |
|------------|--------------|
| 1923 | 57,886 tons |
| 1924 | 85,570 tons |
| 1925 | 90,104 tons |
| 1926 | 80,639 tons |
| 1927 | 89,155 tons |
| 1928 | 112,455 tons |
| 1929 | 136,992 tons |
| 1930 | 138,949 tons |
| 1931 | 120,000 tons |
| 1932 | 54,000 tons |

Rhodana Corporation Ltd. commenced smelting operations in Rhodesia on March 17, 1932; during the period ended June 30, 1932, 15,812 long tons of blister copper were produced and during the three months ended September 30, 1932, 12,739 long tons. The average cost of production during the three months ended June 30, 1932, was 25.92 pounds per long ton of copper contained in blister delivered London or European port. This figure was calculated from the actual cost for the period of each process of production to which was added royalties, freight, selling and London charges. Debenture interest and depreciation were not included. Since June 30 costs were considerably reduced. The ore reserves of the various deposits owned by the corporation remain at 270,780,000 short tons averaging 4.3 per cent copper.

The United States Bureau of Mines report the smelter output of copper in 1932 from domestic sources decreased 48 per cent and refinery primary production from domestic and foreign sources 55 per cent. The average price of copper delivered during the year was 6.3 cents per pound, the lowest on record, and 31 per cent below that in 1931. As a result the value of smelter production decreased 64 per cent. The consumption of copper in the United States showed another large decrease in 1932; withdrawals from the total supply on domestic account declining 42 per cent from those in 1931. The efforts of producers to bring production into line with consumption were more successful in 1932 than in 1931 or 1930 and total stocks of blister and refined copper (exclusive of consumers' stocks) increased only 9 per cent compared with increases of 19 per cent and 32 per cent in 1931 and 1930, respectively.

The Mining Journal, London, comments on the Russian copper situation as follows: "According to the Russian press the Five-Year Plan for copper production has

largely failed. Requirements for 1932 were estimated at 90,000 tons but it seems doubtful if the production of primary copper exceeded the total of 31,097 tons recorded for 1931 as the total to the end of August was only 21,355 tons. Unless the Five-Year-Plan is going to fail altogether, copper is perhaps the most necessary ingredient at the present time. Consequently if the Russian programme makes progress, very large amounts of copper will have to be purchased."

The Soviet Union report that during the past fifteen years very rich copper deposits have been discovered at Kounrad on the north shore of Lake Balkhash in Kayakstan, containing about 60 per cent of the entire copper resources of the U.S.S.R. Here, it is stated, the largest copper mining works and smelter in the world are under construction.

According to Dr. F. Gerber writing in "Metallborse" the attractive physical and chemical properties of copper are again arousing interest in German building circles, particularly in connection with the small and medium sized types of houses. The cost of a two-storied seven-roomed house is declared to be 16,850 marks, inclusive of foundations, central heating installation, sanitary fittings, and built-in cupboards. For a three-roomed house a figure of 8,970 marks is quoted. Suitable insulating devices enable the heating costs of the copper house to be reduced by 50 per cent as compared with an ordinary brick house.

Recent trials in the United States are reported to have shown that red copper oxide is an efficient fungicide for young vegetables and for certain seeds. Under comparable conditions the black oxide exerts only a very slight fungicidal action.

It is interesting to note that "The Copper Development Association" was incorporated in England during September, 1933, as a company with offices at Thames House, Millbank, London, S.W. 1. Sir Auckland Geddes, Mr. A. Chester Beatty, and Sir Harry D. McGowan are Honorary Presidents of the new Association, which will be directed by a council of which Mr. D. Owen Evans, M.P., is Chairman and Lt.Col. the Hon. R.M.P. Preston, D.S.O., is Vice-Chairman. The conduct of the detailed business will be vested in a management committee of which Mr. A. D. Storke will be Chairman and on which most of the important copper interests, including trade associations, will be represented. It is proposed for the present to concentrate on development of the extended uses of copper rather than research work as it is felt that this is far behind research.

Production of Primary Copper in Canada, by Provinces and by Sources, 1931 and 1932.

| | 1 | 9 | 3 | 1 | 1 | 9 | 3 | 2 |
|------------------------|-------------|---|------------|---|-------------|---|------------|---|
| | Pounds | | | | Pounds | | | |
| | \$ | | | | \$ | | | |
| By Provinces - | | | | | | | | |
| Quebec | 68,376,985 | | 5,723,154 | | 67,336,692 | | 4,296,216 | |
| Ontario | 112,882,625 | | 9,096,463 | | 77,055,413 | | 4,407,928 | |
| Manitoba | 45,821,432 | | 3,835,254 | | 52,706,861 | | 3,362,803 | |
| British Columbia | 65,223,348 | | 5,459,194 | | 50,580,104 | | 3,227,111 | |
| TOTAL | 292,304,390 | | 24,114,065 | | 247,679,070 | | 15,294,058 | |

By Sources -

| | | | | |
|----------------------------------------------------------|-------------|------------|-------------|------------|
| In blister copper produced | 243,805,331 | 20,434,685 | 211,005,663 | 13,462,583 |
| In ores, concentrates and copper matte exported | 35,258,939 | 2,951,174 | 19,023,221 | 1,213,719 |
| In nickel-copper matte exported ... | 13,240,120 | 728,206 | 17,650,186 | 617,756 |
| TOTAL | 292,304,390 | 24,114,065 | 247,679,070 | 15,294,058 |

Production of Copper from Canadian Ores, 1922-1932.

| 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 |

PRICES - In no previous year has the price of copper been so low as in 1932; the average for the year in New York was 5.555 cents per pound; the price ranged from 7.060 cents in January to 4.813 cents in December. In January the London price of copper was 46.200 pounds sterling per long ton; the low point was reached in July when the price for the month averaged 29.107. The September quotation stood at 38.318 which fell to 34.344 in December. The average price of copper in London for the year, transposed to Canadian funds, was 6.3802 cents per pound.

Imports into Canada and Exports of Copper, 1931 and 1932.

| | 1 | 9 | 3 | 1 | 1 | 9 | 3 | 2 | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|---|---------|----|---------|---|--------|----|
| | Pounds | | | | \$ | Pounds | | | \$ |
| <u>IMPORTS</u> | | | | | | | | | |
| 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 | 9,339,200 | | | 960,190 | | 466,400 | | 5,487 | |
| Copper in bars or rods, in coil or other- wise, in lengths of not less than 6 feet, unmanufactured | 348,200 | | | 52,552 | | 169,200 | | 26,471 | |
| Copper in blocks, pigs or ingots | 965,500 | | | 97,526 | | 264,000 | | 18,366 | |

Imports into Canada and Exports of Copper, 1931 and 1932. concluded.

| | 1 | 9 | 3 | 1 | 1 | 9 | 3 | 2 | |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|---|------------|----|-------------|---|--------------|----|
| | Pounds | | | | \$ | Pounds | | | \$ |
| IMPORTS - continued | | | | | | | | | |
| Copper, old and scrap | 753,400 | | | 73,289 | | 9,800 | | 627 | |
| Copper, ore and concentrates | ... | | | ... | | ... | | ... | |
| Copper in strips, sheets or plates not polished or coated | 1,074,600 | | | 181,782 | | 286,500 | | 49,578 | |
| Copper tubing in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured.. | 1,874,087 | | | 353,685 | | 1,135,966 | | 209,165 | |
| Copper wire | 144,125 | | | 30,961 | | 44,526 | | 7,804 | |
| Copper wire cloth, or woven wire of copper | ... | | | 7,947 | | ... | | 3,416 | |
| Copper wire, single, or several, covered with cotton, linen, silk, rubber or other materials, in- cluding cable so covered | ... | | | 85,094 | | (x) | | ... | |
| Copper, all other, manufactures of, n.o.p. | ... | | | 483,203 | | ... | | 350,422 | |
| Copper, precipitate of, crude ... | 9,237 | | | 1,239 | | 20,303 | | 1,749 | |
| Anodes of nickel, zinc, copper, silver or gold | ... | | | 4,377 | | ... | | 2,737 | |
| Copper, sub-acetate of, or verdi- gris, dry | 2,081 | | | 586 | | 2,209 | | 318 | |
| Copper, sulphate of (blue vitriol) and copper sulphate of, dehydrated, for agricultural or spraying purposes | 5,231,723 | | | 210,328 | | 5,174,057 | | 164,693 | |
| Copper rollers adapted for use in calico printing | ... | | | 87,965 | | ... | | 59,066 | |
| TOTAL | ... | | | 2,630,724 | | ... | | 899,899 | |
| EXPORTS - | | | | | | | | | |
| Copper, fine, contained in ore, matte, regulus, etc. | 48,761,200 | | | 3,891,045 | | 37,964,900 | | 1,915,096 | |
| Copper, blister | 37,697,700 | | | 3,597,146 | | 21,994,500 | | 1,233,090 | |
| Copper, old and scrap | 5,127,000 | | | 298,228 | | 5,887,600 | | 269,118 | |
| Copper, pig | ... | | | ... | | ... | | ... | |
| Copper in bars, rods, strips, sheets, plates and tubing | 105,203,200 | | | 9,278,441 | | 62,346,700 | | 4,673,447(b) | |
| Copper in ingots, bars, cakes, slabs and billets | ... | | | ... | | 119,060,000 | | 6,795,581 | |
| Copper in rods, strips, sheets, plates and tubing | ... | | | ... | | 19,516,900 | | 1,185,702 | |
| Copper wire and cable | ... | | | 52,463 | | ... | | 134,932 | |
| Copper manufactures, n.o.p. | ... | | | 38,390 | | ... | | 25,252 | |
| TOTAL | ... | | | 17,155,713 | | ... | | 16,231,628 | |
| Copper coin, foreign | ... | | | 32,653 | | ... | | 66,231 | |
| Copper coin, Canadian | ... | | | 72 | | ... | | 537 | |

(x) Included in 1932 under item "Copper wire."

(b) For 1932 these figures are for January, February and March only.



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Copper Production and Consumption of the World, 1932. (In tons of 2,000 lb.)

| Country | P R O D U C T I O N | | | Deliveries for Consumption(b) |
|------------------------------------|---------------------|-----------|-------------|----------------------------------|
| | Mine(a) | Smeltery | Refinery(g) | |
| United States | 255,509 | 309,160 | 462,876 | 336,000 |
| Mexico | 37,588 | 37,440 | ... | ... |
| Canada | 125,370(e) | 107,213 | 89,261 | 26,500 |
| Chile | 114,175 | 108,175 | 101,813 | ... |
| Peru | 23,610 | 22,910 | ... | ... |
| Other | 9,141 | ... | ... | ... |
| Total N. and S. America | 565,393 | 584,898 | 653,950 | 362,500 |
| Deduct secondary | ... | 18,183 | 67,921 | 67,921 |
| New Copper | 565,393 | 566,715 | 586,029 | 294,579 |
| Germany | 30,864 | 56,107 | 171,077 | 151,200 |
| Other Europe plus Africa (f) | 236,280(e) | 201,208 | 145,474 | 420,600 |
| Russia | 35,300(c) | 35,300(c) | 54,187 | 48,500 |
| Japan | 77,873(d) | 77,873(d) | 77,873 | 79,600 |
| India | 9,500 | 4,976 | 4,976 | 5,100 |
| Other Asia | 1,000 | 1,000 | ... | 3,200 |
| Australasia | 16,510 | 16,472 | 14,904 | 6,600 |
| Total ex. Americas | 407,327 | 392,936 | 468,491 | 714,800 |
| Deduct secondary | ... | ... | 94,192 | ... |
| New Copper | 407,327 | 392,936 | 374,299 | 714,800 |
| Grand Totals, New and Secondary .. | 972,720 | 977,834 | 1,122,441 | 1,077,300 |
| Deduct secondary | ... | 18,183 | 162,113 | 67,921 |
| TOTALS, NEW COPPER | 972,720 | 959,651 | 960,328 | 1,009,379 |

- (a) Figures for the United States are the total smelters' production less what is known to have been derived from foreign and secondary material.
- (b) Excludes secondary except where deduction is shown.
- (c) Estimated the same as production of new refined copper.
- (d) Estimated same as production of refined copper which includes small quantity of secondary.
- (e) Includes copper in matte and precipitate passing directly to bluestone.
- (f) Africa is aggregated with "Other Europe" owing to interlocking of metallurgy.
- (g) Includes production of secondary by primary refiners.

NOTE:-- The above table on "Copper Production and Consumption of the World" was taken from the Year Book of the American Bureau of Metal Statistics, 1932.