

and other chemicals and materials, estimated at 100,000 tons annually. The plant is expected to be in operation and turning out refined nickel in the autumn of the present year.

The second refinery is that of the British America Nickel Corporation, Limited, a company controlled and largely financed by the British government, which has purchased the large Murray mine, the Whistle, and other deposits in the Sudbury region. This refinery will probably be erected at the Murray mine, which is about three miles from Sudbury. The refining process employed will be the electrolytic, otherwise known as the Hybinette process, from the name of the inventor who uses it in the Norwegian works. This plant will have a capacity at the beginning of 5,000 tons of nickel per annum.

As to compulsory measures for ensuring that the whole of the nickel output of Ontario should be refined within her borders, the commissioners say they are advised that the provincial legislature has not power to prohibit export or to impose an export tax directly, and that the power of the province in effect to regulate export by differential taxation in favor of nickel refined within the province, is a matter of grave doubt. The completion and operation of these plants, in the view of the commissioners, especially because of the probable extension of the facilities now being provided, will go far towards a solution of the question of home refining, which has so long exercised the public mind. The output of these refineries, added to the nickel now being produced in England from Ontario matte, will fully meet, if not surpass, the entire requirements of the British Empire.

A custom smelter for nickel ore has sometimes been suggested by individual owners of nickel deposits or small companies. The report states that the British America Company are prepared to consider this question and that if such an arrangement could be effected it would answer all probable requirements.

Canada Has Advantages, Not Monopoly.

The commissioners conclude that while it is true Ontario has no monopoly of nickel, it possesses many advantages over all competitors, even under the present conditions of the market as to prices and trade connections. In any keen competition as to prices it is doubtful whether any locality at present known or suggested could compete with Ontario. It is a matter of record that at one time of low prices the leading New Caledonia company was compelled to suspend its dividends. It may be doubtful, further, whether anything but an arrangement of the market between the great interests can prevent the complete domination of the world's trade by the nickel industry of Ontario making the best use of its exceptional resources.

Prior to the war, nickel, in whatever country produced, was sold like any other metal wherever there was a market for it, and was treated solely as an article of commerce without regard to international relations. A schedule is given showing the countries in which the shares of the International Company are held. This covers 89,126 shares of preferred stock and 1,673,384 shares of common stock. The great bulk of the shares are held in the United States, Canada and Great Britain coming next. Only 256 shares of preferred and 452 shares of common stock are held in Germany and Austria.

Full details are given of the reorganization of the International Company in 1912, and the absorption of other companies in Ontario and New Caledonia. On 31st December, 1916, the common stock stood at \$41,834,600,

and the preferred at \$8,912,600, making a total share liability of \$50,747,200. Another table shows common stock dividends paid from 1910 to 1916, a total of \$30,942,238.

The profits from 1903 to 1916 aggregated \$39,850,356; total assets, \$61,230,813. Little further allusion is made to the question of any possible exports of nickel to Germany during the war, the commissioners stating that this question was not within their jurisdiction.

The Mond Nickel Company operates on a smaller scale than the Canadian Copper Company. It works the Garson, Worthington, Levack, Victoria and Kirkwood mines, the ore from which it smelts at the plant at Coniston, erected two or three years ago. The matte is sent to Clydach in Wales, where it is refined by the Mond process, invented by the late president of the company, Dr. Ludwig Mond. The products of the refinery are metallic nickel, nickel salts, and copper sulphate. The market for the latter is in the vine-growing countries of Europe, where it is used to combat the enemies of the grape.

By-products from Sudbury Ores.

Some space is devoted in the report to a possible product from the Sudbury ores or slags, namely, nickel-copper steel. There has been a prejudice against the presence of copper in steel, but much recent experimentation has tended to show that this prejudice is unfounded, if the copper is not too high; indeed, there is reason to believe that the presence of a limited proportion of copper in steel is beneficial, and also that it is capable of replacing a proportion of the nickel in nickel-steel up to at least one-third of the combined quantities of nickel and copper. Experiments made for the commission by Professor Guess, of Toronto University, fully confirmed these conclusions. Copper also appears to assist steel in resisting corrosion.

The production of nickel as a by-product was investigated by the commission. Such production is of considerable importance. By-product nickel comes mainly from the electrolytic refining of Blister copper, copper ores almost invariably carrying a small proportion of nickel. About 815 tons of nickel were obtained in 1915 from the refining of copper from the United States, and the tremendous production of copper going on in the States will largely increase this quantity. In addition, scrap metal containing nickel is continually being re-treated and the nickel recovered. The production of by-product nickel, though small in comparison with the output of ores worked for that metal, has much bearing upon possible supplies of non-Canadian nickel for export to enemy or other countries.

Precious Metal Contents of Sudbury Ores.

The commissioners point out that the importance of the precious metal contents of the Sudbury ores has not in the past been fully recognized. These consist of gold, silver, platinum, iridium and other rare elements. The proportions of these metals which the ores carry are minute and appear to vary in the several deposits. Roasted matte from one of the companies showed .1235 ounce platinum and .119 palladium, .027 gold and 1.84 ounces silver, while the other company's mattes were: platinum, .988 ounce; palladium, .984 ounce; gold, .256 ounce, and silver, 6.155 ounces per ton. Platinum is at present very scarce and the price unusually high; palladium is being substituted for it wherever suited. Both these metals are now worth at least five times as much per ounce as gold.