

6.—Cobalt.

The major portion of the world's supply of cobalt has for almost two decades been derived from the silver-cobalt-nickel arsenides of the Cobalt district, the silver refineries at Thorold and Deloro in Ontario having practically controlled the world's production in recent years.

The ore bodies at Cobalt, discovered in 1902, carry silver, cobalt, nickel and arsenic. About 82 p.c. of the productive veins occur in the Cobalt series (conglomerate, greywacke, etc.), about 11 p.c. in the Keewatin, the basic igneous rocks underlying the Cobalt series, and the remaining 7 p.c. in the Nipissing diabase.

The Coniagas and Delora smelters treat ores and residues and dispose of cobalt oxide, metallic oxide and unseparated oxides of nickel and cobalt. The cobalt residues from the cyanide process are for the most part treated in Canada, though some are shipped abroad for treatment. The smelter output of cobalt, computed as the metallic contents of cobalt oxide, nickel oxide and mixed oxides, together with the cobalt in cobalt ores exported from the mines, and including cobalt in speiss residues exported, amounted in the first half of 1924 to 481,411 lb. as against 538,018 lb. in the same period of 1923. For total 1923 production and values see Table 2 of this section.

7.—Zinc.

The zinc-mining industry of Canada has recently made rapid strides, largely on account of the application of the electrolytic method to treating the lead-zinc ores of British Columbia. The metallic recoveries from Canadian ores were about 60,400,000 lb. in 1923, as compared with 5,500,000 lb. in 1913. From an insignificant position in 1913, the country advanced to the eighth rank among the world's producers in 1923, with an output of about 2.8 p.c. of the world total.

British Columbia.—The principal zinc-mining regions are situated in the Kootenay district of British Columbia, where there are large deposits of silver-lead-zinc ore. The chief producing mine is the Sullivan in the Fort Steele division, where the ore worked is a replacement deposit of considerable size. Other active mines are located at Ainsworth and Slocan in the West Kootenay district and at Omineca in the Cariboo district.

Before the war the industry was greatly retarded by unsatisfactory marketing conditions. The majority of the mines were essentially producers of silver and lead, and zinc-blende occurred as an accessory ore. Until local smelting proved successful, practically all the British Columbia ores were treated at seven or more smelters in the United States, but the cost of freight to these, although covered by a combined "freight and treatment rate", was necessarily an important charge against the ore. The high tariff on zinc ores exported to the United States was also a consideration. The smelter at Trail, originally intended, on its erection in 1895, for the treatment of gold- and silver-bearing copper ores, was made ready for the treatment of silver-lead ores at a later date. The electrolytic zinc plant was added for regular commercial operations early in 1916; its capacity is rated at 100 tons per day.

The higher prices paid for silver during the period of the war led the producers of silver-bearing ores to expedite shipments, disregarding the increased quantity of zinc middling. No zinc is recovered in lead blast-furnace smelting, and it is detrimental to operation, causing losses, slow running and high cost. The treatment charges of the Trail smelter were altered in January, 1918, with the object of bringing about an increase of the ratio of slag-forming elements to zinc in all ores requiring it, through the elimination of some of the zinc. No lead ore containing more than 20 p.c. of zinc was accepted, and for lead ores containing 4 p.c. of zinc or over, the