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THE SILVER MINING INDUSTRY IN CANADA
(Including the Silver-Cobalt Mining Industry and the Silver-Lead-Zinc Mining Industry).

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1. Definition of the Industry - Silver mining is not a distinct industry in Canada as silver is found only in association with other metals such as lead and zinc, particularly in the West, with cobalt in northern Ontario, and with lode and placer gold, copper and other metals in various localities. Industrial reviews concerning the production of silver must therefore be limited to a discussion on the sources of supply and to general statistics on each of the contributing sections of the mining industry. Silver-lead-zinc mining is a very important industry in British Columbia, the Yukon Territory, Quebec and to a less extent in Ontario, whereas the mining of silver-cobalt ores is carried on in Canada only in the province of Ontario. While silver is the predominating metal in some ores of the silver-lead-zinc group there are other mines which yield an ore carrying lead and zinc in greater values so that the silver content is of secondary importance. Silver values are the governing feature in the silver-cobalt ores of Ontario. Alluvial and lode gold and ores containing copper and gold usually contain commercial values in silver also, but in these ores, the metals other than silver are generally of greater importance.

2. Historical - Silver production in Canada dates back many years, the earliest account being that of the finding of argentiferous-lead on the Quebec side of Lake Temiskaming about 1686; it is

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somewhat remarkable that the cobalt area lying within a short distance of this property, and now one of the richest silver camps in the world was not known until 1903. In 1868, Thomas McFarlane, working on a rock about 80 or 90 feet in diameter, off Thunder Cape in Lake Superior, discovered a vein containing galena and silver which was afterwards worked as the Silver Islet mine; this property yielded about 3.5 million dollars' worth of silver before it was flooded by the waters of the lake. Then in 1903 the next big find was made. Long Lake, later called "Cobalt Lake" was the centre of the area which became known as the "Cobalt-Silver camp." This camp and the allied camps of Gowganda and South Lorrain have been in continuous operation since that time and at the end of 1925 had yielded upwards of 364 million ounces of silver.

In British Columbia the main source of silver for many years was from the silver-lead-zinc ores of the east and west Kootenay districts. These ores were complex and because of the finely-disseminated sulphides, were very hard to treat. The Consolidated Mining and Smelting Company of Trail, B.C., has been the pioneer in Canada in the treatment of these ores. For years the zinc content of British Columbia ores was regarded as detrimental, and treatment of these ores by the smelter could only be carried on profitably by the imposition of penalty charges based on the zinc content. But as the result of an exhaustive research covering a period of years, a method of concentrating and treatment was evolved whereby the ores could be handled more economically. Enhanced prices of lead and zinc in the last few years also proved to be the means of bringing back into a paying position many mines that formerly had been unable to operate at a profit.

In the Yukon, the rich silver-lead ores of the Keno Hill district provide the principal source of the silver production from that section of Canada. Quebec province also, in the last few years, has added its quota in the output of these metals; considerable work is being done on prospects in the Gaspé peninsula.

Nova Scotia and the prairie provinces have yielded only small quantities of these metals up to the present time, but development and investigational work is being carried on at a zinc property in Cape Breton island and it is anticipated that Nova Scotia will soon be a contributing factor in Canada's zinc production.

3. Sources of Silver, Lead, Zinc and Cobalt - In 1925 the total production of silver from Canadian ores of all kinds, amounted to 20,228,988 fine ounces and included (a) silver contained in silver and gold bullion produced, 10,219,359 fine ounces or 50.5 per cent of the total, (b) silver contained in blister copper or lead bullion made, 6,179,238 fine ounces or 30.5 per cent, and (c) silver estimated as recoverable from ores of all kinds exported for treatment in foreign smelters, 3,830,391 fine ounces or 19 per cent.

The production of lead during the same year amounted to 253,590,578 pounds, an advance of 44.5 per cent above the previous high record of 175,485,499 pounds set up in 1924. Of the total the Trail smelter provided 206,071,014 pounds of refined lead or 81.5 per cent; the remaining 18.5 per cent of the output, or 47,519,564 pounds included lead estimated as recoverable from silver-lead-zinc ores shipped from the mines of the Yukon, and from the lead-zinc properties of Quebec, and pig lead made at Galetta in Ontario with also small quantities of lead contained in silver-lead-bismuth bullion recovered by the smelters treating cobalt ores.

Zinc production during the same year amounted to 109,268,511 pounds, an increase of 10.4 per cent over the Canadian production of 98,903,077 pounds in 1924. Most of Canada's zinc output is in the form of metallic zinc produced by the Consolidated Mining and Smelting Company at Trail, B.C. The remainder represents zinc estimated as recoverable from ores and residues exported for treatment in foreign smelters.

Computed as the sum of the cobalt contained in metal, oxides, salts, ores, concentrates and residues marketed in 1925, the production of cobalt amounted to 1,116,423 pounds valued at $2,328,517.

4. Importance of these Metals - Lead production in Canada holds third place, silver seventh place and zinc ninth place in point of value among the metals and minerals produced. In 1925, Canada ranked fourth among the world's silver-producing countries: Mexico produced 92 million ounces; United States, 61 million ounces; and Peru, 31 million ounces. In the production of lead Canada was surpassed by United States, Mexico and Spain. In smelter output of zinc, the United States had the highest production of any country, being followed by Belgium, Germany, Australia, Great Britain, and Canada in the order named.

For the past two decades Canada has been the main source of the world's supply of cobalt. It is reported that the Union Miniere de Haut Katanga of South Africa is now also producing cobalt and it is probable that this production will have some effect on world prices and sales of this metal.

5. Production by Areas - (a) Ontario - Ontario with its wonderful silver deposits at Cobalt, South Lorrain and Gowganda, continues to lead among the silver-producing provinces and at the end of 1925 was still the largest producer of cobalt in the world. Some of the older properties around Cobalt have been worked out but new discoveries in the South Lorrain field and further developments in the Gowganda district assist in keeping production fairly constant.

After the remarkable Silver Islet production, comparatively little silver was produced in Ontario until the discovery of the mineral wealth of the Cobalt area in 1903. From 1905 when the output of silver was over 3,000,000 ounces, the production increased rapidly until the peak year of 1911 was reached. In that year the recorded production was 30,540,754 ounces. It dropped down to 23,000,000 ounces in the following year and followed a generally downward trend until 1921 when less than 10,000,000 ounces was reported; there has been little change in the volume of output during recent years. In 1925, in the Cobalt area there were 18 producing mines; in the South Lorrain field, 4 mines, were on the producing list; and in Gowganda, 4 mines. The Nipissing mine was the principal

silver producer in these districts. Other large mines in order of production were Keeley, Frontier Lorrain, Castle Tretheway, Mining Corporation, O'Brien Mine, Lorrain, Trout Lake and McKinley-Darragh-Savage.

Production of cobalt from Canadian ores rose steadily from 1904 to 1909, reaching a maximum of 3,066,000 pounds in that year. Thereafter production declined sharply. In recent years, production has ranged between 500,000 pounds and 1,000,000 pounds. In 1925, the output was 1,116,492 pounds valued at $2,328,517.

Mining and milling only are being considered in this review; smelting of the cobalt ores in so far as Canadian operations are concerned will be reviewed in the bulletin on the metallurgical industry. Only the two largest companies, namely, the Mining Corporation of Canada, Ltd., and the Nipissing Mining Company, Ltd., produced refined silver bullion in 1925. Other mines shipped ore either to one of these companies or to the Deloro Smelting and Refining Company or to foreign smelters. The greater part of the silver from the ores and concentrates treated by the two companies mentioned above is extracted by cyanidation and the residues which may contain arsenic, cobalt, nickel and some silver, are either sent to the Deloro Smelting and Refining Company or are exported for treatment to foreign smelters. There were 26 shipping mines in the silver-cobalt industry in 1925. The output of ore was 357,029 tons, the quantity milled amounted to 359,788 tons, and the concentrates produced totalled 6,449 tons. There were 176,511 tons of material cyanidated. Silver bullion production amounted to 6,079,142 ounces.

Shipments of ores and concentrates to points outside the camp amounted to 8,086 tons in 1925 as against 7,231 tons during 1924.

Salaried officials numbered 136 in 1925 as against 132 in 1924. Wage-earners increased in number to 1,936 persons from the total of 1,637 in the previous year. Salaries and wages totalled $2,576,414. Fuel used cost $498,874 at the mines; this sum included $258,000 spent for electric power. Equipment employed consisted of 225 units having a total rating of 8,897 h.p.

Although a small amount of lead is produced from the silver-cobalt ores, the greater part of Ontario's lead production is derived from the lead mine at Galetta in Carleton county. The ore of this mine carries no silver and only a small amount of zinc. A separation is made of the zinc and lead concentrates, the zinc concentrates being accumulated for shipment to foreign smelters; the galena is smelted to high-grade pig lead on the property.

(b) British Columbia - British Columbia which holds second place among the silver-producing provinces, and first place among the provinces producing lead and zinc contributes about 42.5 per cent of the Dominion total of silver, 96 per cent of the lead, and 90.7 per cent of the zinc; most of this yield being obtained from the smelting of silver-lead-zinc ores. In this province, production of these three metals has increased remarkably during the past three years. With the early development of the silver-lead ores of the Kootenays, silver production reached about the 5 million-ounce mark in 1887, only to fall away to about 3 million ounces in 1899. Again, in 1901, the 5 million mark was reached but by 1911 production had fallen to less than 2 million ounces. From that time forward, the output increased; first, through the demand created by the war, and later as a result of the development of the Premier mine in Northern British Columbia, and also because of the application of flotation methods in the treatment of silver-lead-zinc ores. Another factor contributing to the growth was the rise in the prices of lead and zinc and the maintenance of the prices at generally high levels. Increased production of the famous Sullivan lead and zinc mine also aided appreciably to the silver output; indeed, this mine, though nominally a lead-zinc property was in 1925, the largest silver-producing mine in Canada.

The Trail smelter buys silver-lead-zinc ores but much silver and some lead are contained in ores exported by the mines on the coast; most of these ores are mined primarily for their copper and gold values but the other associated metals, including silver, are recovered in the smelting process.

(c) Yukon - In the Yukon, the Keno Hill district is the principal producer of silver and lead. According to a report given to the Mining Lands Branch of the Department of the Interior by the Gold Commissioner of the Yukon it has been shown that ore values continue with depth. The Treadwell Yukon Company, Limited, is the largest producer in this district, having shipped 1,457 tons of ore and concentrates during 1925. The mill which was completed in the summer of 1925 has worked to full capacity since it was started and has treated ores from other mines in addition to those from the company's own mines. This has been of great assistance to the smaller operators who have thus been enabled to continue development work with the proceeds.

(d) Quebec - Production of silver-lead-zinc ores in Quebec is carried on in the vicinity of Notre Dame des Anges where ore was discovered in 1910. Several early attempts to concentrate this ore failed but more recently, as the result of a selective flotation process, worked out by the Mines Branch, Ottawa, about the end of 1924, production has been carried on successfully and about four times as much ore was shipped in 1925 as in 1924.

6. General Statistics on the Silver-Lead-Zinc Mining Industry - Producing, concentrating, smelting and refining of ores of the silver-lead-zinc group is an industry that is fairly well confined to the province of British Columbia. But as already noted there are lead-zinc properties in the Yukon, the Galetta property in Ontario and the Tetreault mine at Notre Dame des Anges in Quebec.

As thus defined the silver-lead-zinc industry represented 94 mines operated by 89 concerns in 1925. Ore raised from these mines totalled 1,474,764 tons, of which 1,392,892 tons were milled, yielding 173,865 tons of lead concentrates and 173,894 tons of zinc concentrates. Shipments of lead ores, lead concentrates, zinc ore, zinc concentrates and dry ore from the mines during the year totalled 381,760 tons valued at $21,902,686. As determined by settlement assay the total metal contents of these shipments included 2,358 ounces of gold, 6,701,313 ounces of silver, 250,184,565 pounds of lead and 177,401,660 pounds of zinc.

Comparable statistics for 1924 show that 94 mines operated by 82 concerns raised ore totalling 1,200,039 tons, of which 1,087,583 tons were milled, yielding 133,984 tons of lead concentrates and 130,365 tons of zinc concentrates. Shipments of lead ores, lead concentrates, zinc ore, zinc concentrates and dry ore from the mines during 1924 totalled 344,785 tons valued at $18,600,970. As determined by settlement assay the total metal contents of these shipments included 1,691 ounces of gold, 5,096,395 ounces of silver, 302,559,745 pounds of lead and 147,395,308 pounds of zinc.

Capital employed in this industry in 1925 was $15,735,930 including over 11 million dollars in costs of buildings, plant, machinery and tools, about 1 million dollars for costs of supplies and stocks on hand, and 3.4 million dollars in cash, trading and operating accounts. Salaries totalling over $328,000 were paid to 150 people, and wages amounting to over 3.5 million dollars were distributed among 2,388 workers. Fuel used during the year cost $584,000 of which $307,000 was paid out for electric power. Of the total capital invested, over 9 million dollars was employed in British Columbia; and of the total wages, more than 3 million dollars were paid out in the same province, thus lending emphasis to the statement made above regarding the importance of silver-lead-zinc mining in British Columbia.
