TREATMENT OF BRITISH COLUMBIA ZINC ORES

In August, 1905, a Commission was appointed "to make an investigation of the zinc resources of British Columbia and their commercial possibilities. That Commission consisted of Mr. Walter Renton Ingalls, of New York City with Mr. Philip Argall, of Denver, Colorado, and Mr. A. C. Garde, of Nelson, British Columbia, as his assistants. This investigation was undertaken by the Government of Canada, in response to petitions from the Associated Silver-Lead Mines of British Columbia, and the Associated Boards of Trade of Eastern British Columbia. The letter of instructions from Dr. Eugene Haanel, then Superintendent (now Director) of Mines for the Dominion, included the following:

"This examination is to cover:

"1st. Examination of the present development of the mines to determine approximately the tonnage of zinc ore immediately available, its occurrence and character and the future prospects, together with the cost of mining.

"2nd. Examination of the present methods of milling.

"3rd. Investigation of the adaptability of the ores to the new methods of concentration (magnetic, electrostatic, etc.).

"4th. Study of the conditions affecting marketing of the concentrate, including the question of smelting in the Province or elsewhere in Canada.

"5th. Investigation of the possibility of special utilization of the zinc ore of high silver content."

Dr. A. E. Barlow and Mr. Joseph Keele, of the Geological Survey of Canada, were detailed to investigate the undeveloped zinc ore deposits, and Provincial Gold Commissioners supplied information relative to zinc ore occurrences in their respective districts. The metallurgical investigation of the samples of ore collected were conducted by Mr. Henry E. Wood, of Denver, Colorado, under the supervision of Mr. Argall and in consultation with Mr. Ingalls.

The report of the Commission, contained in a volume of nearly 400 pages, was submitted to the Minister of the Interior for Canada toward the end of September, 1906. The following "brief summary of some of the more important points brought out in the report," was printed in the "Report of the Minister of Mines for British Columbia, 1906:"

Present Possible Zinc Output.

"**East Kootenay.**—The two mines working are essentially lead mines, although containing considerable zinc—one of them has more developed zinc ore than any other mine in British Columbia—but the character of the ore is such that zinc extraction is almost hopeless (p. 47 of Report).

"**Ainsworth Mining Division.**—Assuming Blue Bell ore to contain 15 per cent. zinc mined en masse, then, if mined and concentrated at rate of 200 tons of ore a day, it might produce 39 tons a day of 50 per cent. concentrates. All other mines in the division might produce 15 tons a day of 50 per cent. concentrates.

"**Slocan.**—Mr. Ingalls says 15,000 tons per annum of concentrates (45 to 50 tons a day) would be a liberal estimate for Slocan, and this could only be produced as a by-product from the lead mining (p. 41-47).

"**Coast.**—The zinc deposits of the Coast are still of unknown magnitude; they are, in fact, nothing but prospects (p. 56).

Possibilities and Cost of Zinc Smelting in B. C.

"The ore must be taken to the coal, as the consumption of coal is 2 tons to 1 of ore; hence the only places adapted for zinc smelting in British Columbia are Crowsnest or Coast (pp. 51 and 52). Ore or concentrate must contain more than 40 per cent. metallic zinc. 'It is difficult to see how zinc smelting could be profitably carried on in British Columbia with coal at Crow's Nest Pass Coal Co.'s price'—$2 a ton (p. 52).

" 'The prospect for zinc smelting on the Coast, at least by the standard method, is too remote to merit detailed consideration at the present time' (p. 56).

"The estimated cost of smelting in British Columbia, given by Ingalls, for the running expenses of a perfectly equipped and economically run modern zinc smelter—with no allowance for interest on investment or legitimate profit—with coal at $1.50 a ton, and skilled labor at $3 a day of 10 hours, is $15 a ton (p. 54).

"(If we substitute in this estimate the lowest prices at present available, namely: Coal at $2 to $2.25 a ton, and skilled labor at $3.25 to $3.50 for 8 hours, it will make the estimated costs of operation about $18.75 a ton of 50 per cent. concentrates). Mr. Ingalls further estimates the cost of marketing the spelter produced from 1 ton of zinc concentrates at $8.50, which makes his total estimate $23.50 a ton of concentrates (or, if corrected as above noted, $26.75 a ton).

"The Report further estimates the cost of shipping the same concentrates to Europe for treatment would be $25.03 a ton, from which it would appear that zinc smelting is not at present feasible in British Columbia.

Electric Smelting of Zinc Ores.

"The following are the conclusions arrived at by the Commission as to electric smelting of zinc ores in British Columbia (pp. 132-133):

"(1) 'Electric smelting will never displace ordinary (fire) smelting, if it is necessary to generate the power from coal.

"(2) 'Electric smelting, may be, in the future economically conducted at places where very cheap hydro-electric power is available.' (By 'cheap' he means less than $15 per horse-power per annum. Nelson and Trail are now paying $45 per h.p.. (See p. 67).

"(3) 'Aside from the question of power, up to the present time, certain peculiar and serious metallurgical difficulties in electric smelting have not been satisfactorily overcome.'

" 'It is unlikely that electric smelting of zinc ores can ever be profitably carried on in the zinc-producing district of East and West Kootenay' (p. 133)."

INVESTIGATION OF PROCESSES FOR THE REDUCTION OF REFRACTORY ZINC ORES.

In the "Summary Report of the Mines Branch of the Canada Department of Mines" for 1910 (pp. 11-13), may be found a copy of a petition from the zinc producers of East and West Kootenay, B.C., addressed to the Dominion Minister of Mines, asking for an investigation of modern processes for the extraction of zinc from refractory ores. This petition reviewed the situ-