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MINING.

SOME NOTES ON THE DISTRIBUTION OF IRON ORES IN BRITISH NORTH AMERICA.

(Concluded.)

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C. OCHILTREE-MACDONALD.

Limonite.—Canadian Limonites have a geological range over the upper silurian and lower carboniferous. The ores usually occur in veins. As a general rule this is evidently the alteration of ankerite or other in situ ores, and unlike the bog iron ores limonites contain very little organic matter. Geographically their range—as far as any deposits of technical or economic importance are concerned—is confined to the Maritime Provinces, and as such they are suitably alluded to in "Several Horizons of Iron Ore in Nova Scotia."

Bog Iron Ores.—The Bog iron ores of Canada are among the youngest ores of iron upon the American Continent. At times pulverulent, such as ochres, more valuable as a pigment than for smelting and at other times in concretionary pieces scattered through the soil or in continuous layers varying from several inches to 8 feet in thickness, these ores are practically restricted in geographical and geological range to the alluvial of the Catholic Province of Quebec. There is a distinct opening for these ochres as a pigment, and from this point of view the pulverulent are at present of distinctly greater economic value than the concretionary deposits. As a general rule the Canadian people are realizing this. Native ochres are now exported to Great Britain and South America, and the progress of the pigment division of the Canadian bog iron ore industry may be summarized thus: Production and value—1887 385 tons, £446; 1888 397 tons, \$1 530; 1889 794 tons, £3,150; 1890 275 tons, £1,025. This, however, is not at all proportioned to the native demand. The salient features of imports of ochres during the past 10 years are: Imports and value—1880 255 tons, £1,309; 1885 440 tons, £2 556, 1890 620 tons, £2,800. Capital and skillful enterprise are alone required to improve the present rate of quality and production. Concretionary bog iron ores, dull, earthy or lustrous in appearance are of common occurrence in the sandy tracts which frequently flank the Laurentian Hills of Quebec. At St Maurice, Vaudreuil, St. Vallier—(breadth of deposits 28 yds, length 380 yds, depth 20 feet—and 1,200 x 24 yds. x 12 to 20 feet thick); Villeray—where the ore bearing belt 6—12 feet thick comprises an area 24 miles from east to west x 4 to six miles north to south and innumerable other places of minor importance. The S. Maurice and Vaudreuil areas repay some cursory notice. Specimens from the former which has supplied ore for 150 years contain on an average 50 per cent. of iron, although owing to tenacity of the associated sand the furnace yield was only 30 to 40 per cent. This furnace—at present idle—was built in 1737. It was operated with charcoal fuel and limestone flux from the Trenton formation. The usual charge was 600 lbs. of bog iron, 45 lbs. of limestone and 16 bushels of charcoal and an excellent pig, admirably suited for car wheels was obtained, besides small quantities of wrought iron. The analysis of this ore is peroxide of iron 64.80 to 77.60 per cent.; sesquioxide of manganese 0.30 to 5.50 per cent.; silica 3.60 to 5.40 per cent.; phosphoric acid 1.80; volatiles 17.25 to 23.65 and metallic iron 45.36 to 54.32. The Vaudreuil deposit is 3 feet thick varying to 4 feet, and is worked for the Drummondville furnace. The analyses are 74.50 per cent. of peroxide of iron; alumina 0.30, 0.80; silica 1.50 to 7.10; phosphoric acid 1.52; volatiles 18.95 to 19.80 per cent.

Spathic Iron Ore.—Of all the ores of iron of Canada this is the least important from an economic point of view. The ore is composed of crystalline carbonate of iron and occurs as far as I am aware in the form of veins say 4 inches thick in the Huronian and Devonian rocks of the Province of New Brunswick only.

Clay Iron Stone.—This is an earthy ore which varies in shade according to the presence of organic matter or peroxidation owing to atmospheric action, and consists of carbonate of iron mixed with clay and other impurities. Geologically it ranges over the Devonian, Carboniferous, Jurassic, Cretaceous and Tertiary rocks, and geographically over British Columbia, North-west Territories, New Brunswick and Nova Scotia. The British Columbian deposits are of little importance by comparison, but the ore is encountered in two places in the prairies, and in something approaching economically important quantities. The ironstones of the lignites or poor brown coal bearing strata west of the Red River are said by Dr. Dawson to occur in close proximity to the coal in nodular sheets scattered through beds of sand and argillaceous sands. Considerable quantities of this ore, (which rings beneath the hammer) can be gathered from the surface in certain localities and abundance of adjacent flux is obtainable from the rocks of silurian age which lie scattered over the plain. Without a doubt the ore will be utilized at no distant date. It is of course not possible that it could form the basis of great industries, but the experience of this country readily teaches what can be done by prudent treatment of the humbler ores. Generally speaking this ore is widely distributed in the North-west Territories associated with the coals, lignites and lignite fuels of the cretaceous and larawic formations. The average percentage of iron in samples from deposits near Edmonton is 34.98, and another specimen from Dr. Hills contained 41.49 per cent. of iron, 1.18 of protoxide of manganese .087 of phosphorous and .068 of sulphur. Very little is of course known of the New Brunswick deposits, but very considerable quantities must exist at the Salmon River coal field, for out of a total bore hole depth of 402 feet 9 inches as much as 69 feet consisted of clay iron stone, the iron of "The Great L. no Land."

An interesting note has been made concerning the probabilities of finding rich deposits of magnetic iron ore in the northern regions of the Dominion.

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