MINING.

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

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In British America iron ores have a wide geological and geographical range. All through the various provinces we find the ferriferous mineral scattered at intervals, sometimes as in Nova Scotia and Ontario, in rich deposits which intrinsically repay prudent exploitation, and at other places such as parts of the Western Provinces or in the metamorphic rocks of British Columbia in more restricted quantities. The processes by which these ores, widely differentiating in chemical composition and physical features, have been formed are in themselves a sufficiently interesting and instructive study, for from the Laurentian Epoch upwards chemical and mechanical concentration have been assiduously blended to form seams, and beds of ore which have evidently been subject to agencies subsequent to their original deposition which have in many cases deprived the ores of their original character. Professor Harrington has classified these in the following manner:—

ANHYDROUS OXIDES.

Magnetic Iron Ore or Magnetite.
Hematite, including crystalline and earthy varieties.
Titanic Iron Ore.

HYDROUS OXIDES.

Limonite or Brown Hematite.
Bog Ore.

CARBONATES.

Spathic Ore.
Clay Iron Stone.

In briefly considering the most important of these ores, the Nova Scotian deposits will not be alluded to, such being comprehensively treated by Dr Gilpin.

Magnetic Iron Ore.—Geologically this ore ranges over the Laurentian, Huronian, Silurian, Devonion and Trias rocks, and occurs at more recent date as iron sand upon the northern shores of the Gulf of St. Lawrence. These late deposits have, however, been pronounced economically useless by the analyst in the Ottawa laboratory. The origin of the important deposits of magnetic iron ore, sometimes in interstratified beds, and at other places in true veins in such rocks as crystalline limestone, greenish epidotic and chloritic rock is wrapt in some obscurity. Unlike some of the rich magnetites of the Ural Mountains and Sweden or Norway which are supposed to be of eruptive origin the Canadian deposits are said by Harring on to presumably owe their origin to the bog ores or substance similar to those out of which these were formed. The following experiment with bog ores containing 22 per cent. of water and organic matter lends some strength to this view A pulverized sample of bog ore heated in a platinum crucible for one hour at 190° F. parted with sufficient of its combined water to change from brown to a bright red color. The organic matter remaining unchanged the powder was re-heated in a closed crucible at a temperature much below redness until a reduction of the peroxide ensued and a black strongly magnetic oxide was obtained. When the temperature was raised to bright redness, however, the powder became strongly magnetic and this suggests that the internal heat of the earth playing upon the reduction, assisting organic matter of the bog or similar ores, has produced the deposits of magnetic iron ore in Canada. As in Norway and Sweden these are associated with many other minerals, apatite, graphite, hematite, limonite, etc., and cannot be economically worked—that is in the strict application of the term economic—where these are moderately associated. The geographical range of Canadian magnetites is from (1) British Columbia on Texada Island. There the ore is of an iron gray color 20 ft to 25 ft. thick in a lineal deposit of at least one mile, in which there is a continuous exposure for two hundred and fifty feet, from 1 to 10 feet thick. The ore when mixed with red bog ore from Puget Sound, yields a good pig iron. As regards smelting, mining or shipment the position of the deposit is favorable for industral activity. Magnetic iron ore is encountered in other parts of British Columbia and an approximate average analysis is metallic iron 61.30. The shipments were 190 tons in 1885, 3,941 tons in 1886, 1,410 tons in 1887 and 7,300 tons in 1888 (2) Ontario at Wollaston. There the vein, 19 feet wide, cuts a rock of red orthoclase and black mica. Work was commenced in 1881, and in the following year the construction of the Central Ontario Railway from the mine to Trenton on the Bay of Quinte, Lake Ontario, was undertaken, distance 90 miles. This and other relative matters cost the operators $400,000. The ore is largely used in Ohio. On an average the vein is worked for a width of 20 feet, though some of the slopes in No. 1 ore have been as wide as 40 feet. As an instance of the impediments associated with these magnetic iron ores, and alluded to above, I may relate that the vein worked at this mine is so thickly mixed with sulphides and rock in some places that it cannot be profitably mined. The shipments were 30,000 tons in 1884 and 15,000 tons in 1885 plus 30,000 tons in stock at the end of the latter year owing to dullness of trade. (3) Quebec at Bristol. This is a rich, dense magnetite, low in phosphorous, but with a sufficiently high percentage of sulphur to render roasting necessary This, however, decreases according to depth and cannot be considered a grave drawback. The precise dimensions of the deposit are unknown, but judging from the quantity of ore taken out it must be considerable in thickness. The following are the salient features of the analysis —Peroxide of iron 65.44; protoxide of iron 14.50; bisulphide 2.74; silica 11.45; water 0.14, total metallic iron 58.37; specific gravity 4.32. Another important deposit which, however, should perhaps be classed with ilmenite, owing to the large percentage of contained titanic acid, occurs