

### BRITISH COLUMBIAN IRON ORES

The quality of the magnetite iron ores from which the above local pig-iron was produced, by analysis by the provincial government, gives as under:

Metallic iron	62.57 to 69.85 per cent.
Sulphur	0.103 to 0.50 per cent.
Phosphorus	0.021 to trace per cent.
Insolubles	5.51 to 2.75 per cent.

Titanium and other deleterious impurities absent.

The above samples roughly represent generally the other magnetite deposits of this province, lying in abundance along the sinuous coast line of her fjords and many inlets, and so affording the easiest of access for assembly from the mines to any given central smelting site.

The prolonged mooted question of securing an adequate supply of hematite, limonite, bog, waf, or other inferior peroxide iron ores, to mix with the superior magnetites in order to reduce the mean average of the otherwise high melting-point temperature of the whole charge in the furnace, has now been absolutely eliminated, since these additional inferior peroxide iron ores are unnecessary in the Duplex process, as well as being not so low in phosphorus contents as are the purer magnetites of higher iron tenor, so that the mixture of any deleterious tonnage in the furnace charge has depreciated the splendid high quality of the local pig-iron, produced from magnetite iron ore alone.

By using electrical smelting, instead of an expensive installation of blast furnaces with their accessories of hot stoves to heat the blast, blowers and other necessary parts, the magnetites have been more quickly reduced into superior pig-iron with the simple addition of limestone flux and charcoal fuel, while by this process the sulphur present in the ores has been completely volatilized during the first fusing.

Today, throughout Europe and on this North American continent, the costly erections of the now out-of-date blast furnace process are rapidly being superseded by electrical smelting, while the costs of this latter system are decreasing total expenses incurred by at least five dollars (\$5.00) per ton of pig-iron produced.

### THE HISTORY OF THE COMPANY

In March, 1917, the Vancouver Magnetite (Fe<sub>3</sub>O<sub>4</sub>) Iron & Steel Smelting Company, Limited, started experimenting on the iron ores of British Columbia at Ronaldsay, Howe Sound, with a firm belief that the iron ores of this province could be smelted with a suitable process and made into high-grade pig-iron. The company took over by lease, with option of purchasing, an old plant at Ronaldsay and started with the construction of, and operating with, a "Swansea" furnace, opening up an iron mine in the Lillocet district. The company was the first to ship 100 tons of iron ores over the Pacific Great Eastern Railway, then by barge to the plant at Ronaldsay.

### WORKS AND SITE

The site on which the Ronaldsay works are situated was most carefully chosen on account of its many advantages. It carries at present an area of one mile square, comprising 640 acres, with one mile of waterfront, facing a fine deep-water bay, well protected at all tides from all winds.

Timber and water are abundant for domestic uses and general utility. This site was held by lease up

till 1919, with option to purchase at a remarkably low price, considering its many advantages and water power included. A large three-storey rock plant is built, having bins constructed to store a thousand tons of ore, with large Samson rock crusher (36-inch jaw) and a smaller Samson rock crusher (11-inch jaw). In connection also are elevating belts, trommels, hoisting machinery, fire protection system, and all the requisites, with the 51-foot Pelton wheel mentioned above for power to run a complete plant, with wharf, blacksmith shop, offices, mess, bunk-houses (50 feet long), stable, storehouses and sufficient buildings for present use.

The furnace is built of common brick, lined with Clayburn fire brick. It is a good though small furnace of the Swansea type, constructed with a main smelting shaft, connected by an archway through the front wall with a fore-hearth. It carries a temporary iron stack, 36 feet high by 24 inches diameter to be rebuilt permanently, connecting with a main stack to serve all units. The inside measurements of the main smelting shaft are: Walls, 7 feet high; feed door, 36 by 18 inches, 48 inches above smelting floor, built in back wall; an arch connecting with fore-hearth through the front wall, 14 inches at butt, 22 inches at the spring, and 48 inches wide, being 24 inches long through front wall of furnace shaft. Outside measurements: Built on a foundation going down 7 feet deep into the ground, the outside walls stand 13 feet high; sides, 6 feet wide; front and back, 8 feet across. The fore-hearth: Extra construction on front of main shaft measures, outside, 36 inches; sides, 24 inches thick, like those of furnace; front wall, 18 inches thick for 8-foot wide front. On the inside it is 18 inches wide, stretching from side to side, holding in this measurement a well for the molten metal, 12 inches wide and 12 inches deep and 48 inches long, containing four cubic feet in capacity. The whole furnace on the outside is well braced by railway iron and buckstays. There are many other technical details that could be mentioned, but all minutely described in my former detailed report. That description includes account of oil burners, apparatus and accessories, blast blowers, steam boiler, pipes and appliances, and all the items of a complete smelting plant.

Its duty during every twenty-four hours consists of the smelting of one hundred and twenty (120) long tons of total charge (when the alterations mentioned in my former report are completed), and carries 50 tons of iron ores, averaging 50 per cent. metallic iron and better, producing therefore twenty-five (25) tons of pig-iron per diem.—Ronald Campbell Campbell-Johnston, mining and metallurgical engineer.