EXTRACT FROM MINERAL RESOURCES NO. 6.

# IRON ORE IN THE BEACONSFIELD DISTRICT.

## GEOLOGY.

In accordance with the nature of this report, the geological features of the area will only be referred to in a general way. The geology of the Beaconsfield district, it may be mentioned, is very varied, and deserves a report devoted exclusively to it. Perhaps it may be possible in the near future for the Geological Survey to undertake a complete examination of the geology and topography of the entire district, and elucidate the various bearings and effects of these features on the economic deposits and the mineral industry generally. The gold, iron, asbestos, and limestone resources of the district, even making allowance for all that has been done in the way of gold-mining, still, it may confidently be affirmed, await their full development, and will no doubt sooner or later receive the attention to which they are entitled, by reason of their intrinsic value.

The country from the Tamar River to a line some 5 or 6 miles west of Beaconsfield ranges itself in a general way into separate zones of industrial geology. Speaking broadly, there is the gold belt of Beaconsfield, succeeded by the asbestos belt of the serpentine rocks bordering Anderson's Creek; associated with the serpentine is a chromiferous ironstone zone; and, finally, the lofty Asbestos Range, which forms a majestic line of mountaine heights bounding the western horizon, and terminating to the north at Badger Head, on Bass Strait, it is the imperfectly prospected home of copper ores.

## IRONSTONE HILLS.

These are two in number - Scott's Hill (named after Robert Scott); and Mt. Vulcan. The former occupies Section 7707-M, 20 acres, west of and adjoining 36 acres 1 rood purchased and in the name of W.E. BAker (now owned by Mr. Williams). Mt. Vulcan is between 20 and 30 chains S.S.E., and occupying the 10 acre Section 6143-M.

Mt. Vulcan - This hill supplied practically all the iron ore for the old furnace at Port Lempriere, very little, if any, having been used from Scott's Hill. The whole width of the belt

of red soil which indicates the iron formation is about 1500 feet, and it continues through the entire section of 10 acres. At the foot of the northern slope is the principal quarry, which has been cut into the hill for a little over a chain, showing a fence 170 feet in lenght. A chain and a half east of this is a smaller quarry in the same formation.

All the evidence points to the deposit being a residual mantle of ore resulting from the decay of the serpentine rock in situ. In this process the iron ores in the parent rock were in the main converted into limonite, some of them, however, surviving as -- hematite and magnetite. The chrome contents have been derived from the serpentinised rock, in which chromite is an original rock-forming constituent, Some dehydrating action has induced the formation of concretionary and cemented masses within the deposit, met with as boulders or flat tabular bodies harder that the surrounding unconsolidated granular pulverulent or clay-like material.

In some parts of the serpentine area, especially in the parts where asbestos is abundant, veins of fibrous magnetite are very frequent. Sometimes magnetite and chrysotile asbestos are present, intimately associated in the same vein, leading the casual observer to conclude that one material is a replacement form of the other. Minutely examined, however, the connections are seen to be abrupt, and cases of partial substitutions are absent. The identical habit of the two minerals in such veins suggests that the fibrous crystallisation of both was contemporaneous. Other veins consist of pure fibrous magnetite. These veins exist from the size of mere threads to a width of inches. The veins both of chrysotile and magnetite in all probability were genetically associated with the serpentinisation of the peridotite rock.

The present quarry is in a semi-ruined state owing to its long abandonment and the walls having fallen in to some extent.

About 170 feet south of the main quarry is a small shaft some 20 feet deep in the soft limonite and ochreous formation of which the hill consists; and 120 feet still farther south is Scott's shaft, on the crown of Mt. Vulcan. In this belt boulders of loose, and embedded boulders of consolidated, -- limonite, with enclosed fragments of fibrous (needle iron) magnetite, are plentiful.

The summit of Mt. Vulcan is 200 feet above creek-level. As regards the persistence of the ore in depth down to the level of the creek, the old bores are really the only data which can be produced. Three bores were put down at the time of the British and Tasmanian Charcoal Iron Company - two on the hill and a third one somewhere at its base. The No. 1 or Scott's bore at the shaft was put down 176 feet, and the serpentine bedrock struck at 52 feet from surface. The register is as follows:-

| | ft. | in. |
|---|---|---|
| Ironstone | 24 | 0 |
| Hematite | 6 | 6 |
| Ironstone | 5 | 6 |
| Heavy black sand, mostly iron | 4 | 0 |
| Soft ironstone | 2 | 0 |
| Heavy hard ironstone | 2 | 6 |
| Brown hematite | 7 | 6 |
| Decomposed serpentine | 30 | 6 |
| Hard serpentine | 5 | 6 |
| Serpentine mixed with asbestos | 6 | 6 |
| Serpentine and asbestos with magnetite | 2 | 0 |
| Very hard serpentine and asbestos | 0 | 6 |
| Hard serpentine | 2 | 6 |
| Very hard serpentine | 1 | 6 |
| Very hard serpentine with magnetite veins | 9 | 0 |
| Ironstone | 5 | 6 |
| Greenstone | 14 | 0 |
| Serpentine with asbestos | 13 | 0 |
| Serpentine with asbestos and iron ore | 9 | 0 |
| Iron ore | 0 | 2 |
| Serpentine with veins of magnetite | 16 | 4 |
| Iron ore, very hard, dense and pure | 6 | 5 |
| Serpentine with asbestos | 1 | 6 |
| Serpentine | 2 | 1 |
| Total (feet) | 178 | 0 |

No. 2 bore, also put down by Mr. Scott showed much the same features.

Its register is the following:-

| Bore No. 2. | feet. | ins. |
|---|---|---|
| Ironstone | 19 | 0 |
| Sand with ironstone pebbles | 5 | 6 |
| Magnetite | 8 | 6 |
| Decomposed greenstone | 24 | 6 |
| Serpentine | 12 | 6 |
| Total (feet) | 70 | 0 |

Water prevented further boring.

| Bore No. 3. | | |
|---|---|---|
| Ironstone | 19 | 6 |
| Clay with iron pebbles | 19 | 0 |
| Oxidised conglomerate and magnetite | 10 | 6 |
| Pure magnetite | 1 | 6 |
| Decomposed greenstone | 29 | 0 |
| Hard rock, supposed to be ironstone, broke auger | 8 | 0 |
| Total (feet) | 87 | 6 |

These bores support the view that the brown iron ore-body consists of a mantle about 50 feet in thickness, lying at that depth on serpentine rock veined with magnetite, from which it has been derived by decomposition.

A good many fragments of fibrous magnetite can be picked up on the surface of these hills, and veins of the same mineral may be seen in the serpentine which has been worked for asbestos by Mr. W.B. Smith west of Mt. Nichols' Bridge over Anderson's Creek. Whether the magnetite veins below the ironstone deposit are sufficiently numerous or wide enough to permit of profitable working once the oxide mantle has been removed is, however, problematical. For the present, at all events, this mantle must be regarded as the commercial asset of the proposition.

The dimensions of this mantle, horizontal and vertical, need to be ascertained and verified before any sound calculation of quantities can be made. The surface indications on Mt. Vulcan embrace the whole of the area of the 10 acre section; and on -- Scott's Hill the whole of the original 40 acre section. But from the width of the belt along which the surface boulders are most numerous, one would judge that

the best part of the Mt. Vulcan deposit is from 200 to 300 feet wide - that is, if the boulder bearing part of the deposit is taken as being the most solid and concentrated. But it is very evident that the carrying out of a comprehensive boring scheme, which need not be very expensive, is necessary to define the limits of the whole deposit.

Scott's Hill - A small cut or two may be seen on the low elevation known as Scott's Hill, 30 chains north of Mt. Vulcan. These were only trial excavations, and it does not appear that any supplies from this hill were taken to the furnace.

The ore is red and yellow soft limonite, very little of it really hard. The hill is low, from 80 to 100 feet high, about 25 chains in length from north to south, and 10 chains wide. The general occurrence is similar to that on Mt. Vulcan, though the ore is generally softer and more inclined to be ochreous. On the west side is a long open drive, from which material has been taken by the Serpentine Paint Company for its factory in Launceston but this enterprise will be discussed later in the present report.

QUALITY OF ORE:

Samples of iron ore from Mt. Vulcan were submitted by the writer of 1903 to Mt. W.F. Ward, the Government Analyst, who reported as follows:-

| | Per cent |
|---|---|
| Iron as peroxide | 75.80 = 53.06 metallic iron |
| Silica | 5.40 |
| Sulphur | 0.13 |
| Phosphorous | minute trace |
| Chromium oxide | 5.90 |
| Alumina | 4.30 |
| Loss on ignition | 7.30 |
| Total..... | 98.83 per cent |

Mr. Just reports an analysis of the pig iron from Mt. Vulcan ore made by Dr. R. C. Moffatt as follows:-

| | No. 1. Per Cent. | No. 2. Per Cent. |
|---|---|---|
| Metallic iron | 89.72 | 97.82 |
| Metallic chromium | 9.27 | 1.43 |
| Sulphur and phosphorous | traces | traces |
| Nickel, cobalt, manganese | - | no traces |
| Tin, antimony, molybdenum | - | traces |

| | | |
|---|---|---|
| Nitride of titanium<br>Titanic acid<br>Silica<br>Oxides of vanadium and carbon | 1.01 | 0.75 |
| | 100.00 | 100.00 |
| Specific gravity | 7.55 | 6.10 |

The same year (1877) analyses of the Mt. Vulcan pig iron were also made by Mr. E. Riley, London, who was considered one of the best authorities on iron in England. The figures were as under:-

| | No. 1. Per Cent. | No. 2. Per Cent. |
|---|---|---|
| Carbon | 4.200 | 3.270 |
| Silicum | .976 | .124 |
| Sulphur | .207 | .562 |
| Phosphorous | .055 | .054 |
| Iron | 88.343 | 91.362 |
| Chromium | 6.287 | 4.143 |
| Manganese | nil | nil |
| Copper | traces | traces |
| | 100.068 | 99.515 |

Samples of the ore taken by the writer on this visit have been assayed by Mr. W.D. Reid in the Geological Survey Laboratory Launceston, as follows:-

| | Per Cent Mt. Vulcan (cemented material) | Per Cent Mt. Vulcan (loose material) | Per Cent Scott's Hill |
|---|---|---|---|
| Iron | 54.2 | 40.1 | 56.3 |
| Alumina | 6.93 | 19.22 | 5.87 |
| Silica | 3.30 | 7.60 | 2.96 |
| Chromic oxide | 2.53 | 2.71 | 1.80 |
| Sulphur | 0.16 | 0.09 | 0.12 |
| Phosphorous | trace | trace | trace |
| Loss on ignition | 9.80 | 13.30 | 8.60 |

BARNES' HILL:

This hill is on the 640 acre Lot No. 730, about 1½ mile south-east from Mt. Vulcan, and ½ mile east of Anderson's Creek. A fair bush road connects with the main road to Beaconsfield. All round the base of the hill, and ascending it's slopes, is the familiar red ironstone soil. The hill itself evidently has a substratum of serpentine rock, intersected here and there

by veins of asbestos and fibrous magnetite. It is flat-topped, and in the limonite soil, both on the hill flanks and at its summit, soft boulders of iron ore are abundant. The strongest line of these appears to run north and south for a distance of 1200 feet, with a width of 300 to 400 feet.

SUGAR LOAF:

Two miles south-east of the Barnes' Hill deposit is the Blue Peaked Hill, or Sugar Loaf, where there is a well known lode of brown hematite, which was worked in 1872-3 by the Ilfracombe Iron Company, and was known by the name of the Ilfracombe Iron Mine.

The old Ilfracombe Sawmill Company had a tramway passing this spot, and this probably gave rise to the name "Ilfracombe" being adopted by the mining company, and attaching to the ore. In Mr. J. Hines' field, on Lot 571, 640 acres, in the charted name of John Munro, is the shell of the company's blast furnace, which appears to have been the oldest furnace in the district. It was erected under the direction of a manager from Victoria, but it is said that as a consequence of faulty construction, the metal could not be got to flow. After abortive attempts, and spending nearly £10,000, the company suspended operations in 1873.

At the foot of the range is an old ore pile, indicating that open heap calcination of the ore was resorted to, with a view to driving off the contained water previous to smelting.

The lode courses up the hill in a direction N. 30 degrees E. and the outcrop shows some very large masses and boulders protruding through the rather dense scrub. The latter prevents the actual width of the lode from being ascertained on an ordinary visit of inspection.

SWIFT'S HEMATITE (NOW H.J. WINDRED).

This deposit is on a 14 acre section (No. 7988-M), east of Brandy Creek, Beaconsfield, held under lease by H.J. Windred.

In the eastern portion of the lease are the old excavations made by the Tamar Hematite Iron Company in 1874-5. The history of this undertaking is of interest as showing what was

done at that time in the way of smelting on a small scale for a short period.

The company extracted about 1000 tons of concretionary brown hematite and impure ironstone from shallow trenches and excavations in the surface beds, and smelted the ore in a charcoal furnace which was erected on the shore of Middle Arm (Swift's Jetty). The furnace was lighted on the 1st January, 1875, and after a few initial mishaps, was soon got into satisfactory running, showing an output capacity of about 5 tons of iron per day. Five hundred tons of excellent pig iron were produced during the first half of 1875.

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