

IRON ORE AT HAMPSHIRE

Magnetite deposits have been known at Hampshire for many years and the first leases covering the deposits were taken out in 1923, but it is only within the last few years that any ore has been produced. The leases, totalling 90 acres are now held by Mr. A.J. Pearson, who produces a limited quantity of the ore for use in heavy media separation.

These deposits are distant about 6 miles from Hampshire Railway Station and can be reached by branching south from the Upper Natone Road about 2 miles from the station and following a fair cart road for a mile and a rough lorry track, which leads to Cumming's Mill for another 3 miles.

The rock outcropping in the immediate vicinity is granite, although within a few chains to the south west is a series of Cambrian quartzites and hornfels. A mile and a half to the north-west is an intrusion of a basic igneous rock, consisting of hornblende and felspar and which may be termed an amphibolite.

Scattered here and there over the area of the leases (90 acres) are boulders and pebbles of magnetite. These are not continuous but appear as patches or lenses, having a general north-south trend, among granite outcrops. In order to gain some idea of the quantities of magnetite available, it is necessary to examine the genesis of the iron. Unfortunately no actual outcrop (apart from the granite) is visible in the area, but boulders of the supposed country rock were sectioned. One slide shows a quartz-tourmaline rock with magnetite (in part altered to limonite) intimately associated with the tourmaline. The other is a garnet rock. A.M. Reid (in 1924) and Thomas and Henderson (1943) reported on this area and whereas Reid considered the magnetite was formed by the alteration of limestone beds by magmatic solutions, the latter authors said "the deposits are an isolated occurrence of altered, silicified and carbonated basic..... dyke-like bodies, intrusive into the granite". They give no reason for these assumptions however.

There are many theories advanced as to the formation of magnetite deposits. Usually they are associated with some basic igneous rock, but although basic rocks do occur in this locality they are younger than the granite (which has altered them to some degree) and so cannot be regarded as the source of the magnetite. Sometimes magnetite may be formed as the result of magmatic differentiation - that is the formation of magnetite crystals early in the solidification of the magma and their sinking through the still liquid portion to form aggregates at or near the bottom of the mass. Here, however, the magnetite deposits are formed near the top of the magma. Sometimes deposits may be formed by the contact metamorphism of ferruginous sediments near the edge of an intrusive rock or again by hot mineralising solutions, rich in iron being deposited in or reacting with sediments near an intrusion.

Sample	1.	2.	3.
Position	Black Powdery Sample in open cut	Over 10 feet in open cut.	Grab Sample north of area.
Insol.	10.8	17.3	4.7
FeO	18.8	12.2	21.9
Fe ₂ O ₃	56.1	52.0	67.7
Magnetite	60.7	40.0	70.7
Limonite	16.6	28.5	22.2
Magnetic Concentrate	{ %Weight FeO Magnetite Limonite	{ 68.3 45.9 27.2 84.5 88.0 15.5 12.0	{ 82.0 26.5 85.5 14.5
Magnetic Limonite	8.2	7.1	11.9
Non-Magnetic Limonite	8.4	21.4	10.3

The quality of the individual lumps of magnetite is high. Near the surface it is oxidised in part to limonite and the open cut (to 10 feet below the surface) shows that it is mixed with clay. A sample taken from various places in the north of the area showed 71% of magnetite and 22% of limonite (and this compares with samples taken by A.M. Reid) but this sample cannot be considered representative of a mineable product unless hand picked. A sample taken over the 10 feet of the open cut from which the ore has been obtained shows 40% magnetite and 28% limonite. A sample of a fine black powdery portion, occurring as pockets, showed 61% magnetite and 17% limonite. The results of analyses, which may be tabulated as follows are interesting :-

The intimate association of magnetite with tourmaline as seen in the boulder of quartz-tourmaline rock suggests that it was formed from hot solutions emanating from the granite magma. It seems that erosion has proceeded to about the roof of the magma in this area and that the iron was formed in small roof-pendants of either siliceous or calcareous sediments (I have found no evidence to be sure of the composition of the original sediments). This being so, it would appear that the magnetite deposits are of no great depth, although laterally they appear to cover an area of at least 20 acres, but divided into several lenses.

3.

Apparently it is the magnetic concentrate which is sought in the process in which the magnetite is used and if this is based on the amount of magnetite present (calculated from the FeO content) it shows less than the correct amount. This is because quite an amount of limonite is present in the magnetic portion but whether this limonite is inherently magnetic, or whether it is the intimate association with the magnetite, is a laboratory question.

The present workings are situated in the south-eastern portion of the deposits. It would appear that a better place to open a face is at the extreme northern end. Besides saving cartage for about a mile on a rough road, about 30 feet of backs could be obtained over a distance of 150 feet. The quality of the ore, while probably not as good as the samples selected should be quite comparable with that at present mined.

The extent of these deposits while not large, should be quite adequate for the purposes required in the near future. Any tonnage figures could only be obtained by means of geophysical survey. This area should lend itself admirably to a short accurate survey by magnetometer and results would indicate, not only the lateral extent of the lenses but also their thickness.

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1st September, 1952.