TR8-51-55

8. MAGNETOMETER SURVEY, HAMPSHIRE IRON ORE DEPOSIT

by R. Jack.

INTRODUCTION

A magnetometer survey was carried out over the Hampshire iron ore deposits to delineate areas suitable for further prospecting and to give an estimate of the tonnage of ore available. (Figure 37).

The deposits occur approximately six miles by road SE of the Hampshire Railway Station which is about 16 miles from Burnie. Leases 53M/50 of 60 acres and 54M/50 of 30 acres are held by A. and D. D'O. Pearson of Ulverstone, who have produced a limited quantity of ore from a quarry in the SW of the leased area.

A Jalander Model 1957 magnetometer was used for the survey. The instrument reads from minus 250,000 gammas to plus 250,000 gammas and has an accuracy of ± 10 gammas on scale one (0-250 gammas). Drift of the instrument due to temperature variation was found to be negligible. As this fully portable magnetometer weighs only 3 lbs. and does not require to be accurately levelled on a tripod before reading, it is eminently suitable for traversing roughly cut tracks and steep terrain.

To cover the main deposits a N-S base line was laid out for 3,400 feet using a theodolite and tracks were cut at right angles to this line every 200 feet. Later, to delineate the magnetic anomalies further, some additional lines were put in at 100 feet

intervals. A connecting traverse was carried from the main deposits to smaller deposits south of the leases. Magnetometer readings were taken along the cut traverses including the base line at 25 feet intervals. On most lines the readings were extended until definite outcrop of country rock was reached.

GEOLOGY

The country rock in the area is Silurian quartzite and impure calcareous sediments which have been intruded by Devonian granite. Locally the granite appears to dome up the sediments and has altered the more susceptible sediments to a skarn type rock. The granite is a medium to coarse grained alkaline type containing abundant quartz and a little biotite, but in the vicinity of the iron deposits it appears deficient in ferromagnesian minerals.

The quartzite outcropping on the margin of the granite is a coarse grained saccharoidal type with some interbedded sandy shale. No fossils were found though fossils of Silurian age have been found in similar rocks to the south of this area. The presence of impure calcareous rocks is inferred from the calcium rich skarn rock in the contact metamorphic zone. The minerals present are andradite, diopside, epidote, clinozoisite, vesuvianite and chlorite; silicification of the rock is seen in the thin sections. Outcrops of the skarn rock are rarely seen and it is thought that much of the area covered by button grass is underlain by this rock, a theory supported by the different magnetic intensity found over the area.

In the past the age of the sediments was thought to be Cambrian, because of a basic igneous rock (amphibolite) which intrudes the sediments about 1½ miles NW of the leases. However, reexamination of this occurence of "amphibolite" has shown it to be a skarn type contact metamorphic rock consisting of clinozoisite, dravite, quartz and a little feldspar. This now removes the necessity of putting the sediments in the Cambrian to conform with the Cambrian amphibolite intrusives described elsewhere in Tasmania.

Structurally the major iron deposit is shown to be a roof pendant in the granite; this is probably also the environment of the deposit to the east of the leases. The minor deposits south of the leases occur within the contact metamorphic zone of the granite. The iron ore is probably a contact metasomatic deposit formed by the replacement of favourable carbonate rich rocks. The roof pendants were the most favoured loci and the deposits in the contact metamorphic zone probably resulted from emanations escaping along faults or shears induced in the sediments during the emplacement of the granite.

PROSPECTING

The areas of highest magnetic intensity are outlined on the accompanying plan of the area (Figure 17). Two areas warrant further prospecting at this stage. The other deposits in the contact metamorphic zone south of the leased area are probably small narrow lenses with very limited tonnage available. Traversing of the main ore zone shows that it consists of a number of isolated lenses of high magnetic intensity randomly distributed along the margin of the granite. To provide an accurate estimate of the width and length of these lenses costeans are needed at

MAGNETOMETER SURVEY
HAMPSHIRE IRON DEPOSIT

MAG. N

0 100 200 300 FT.

5 cm

- GREATER THAN 50,000 GAMMAS
- 40,000 – 50,000 GAMMAS.
- 30,000 – 40,000 GAMMAS.
- 20,000 – 30,000 GAMMAS.
- 10,000 – 20,000 GAMMAS.
- LESS THAN 10,000 GAMMAS.
- GRANITE OUTCROP.

9N
8N
7N
6A N
6N
5A N
5N
4N
3N
2N
1
2S
3S
4S
5S
6S
7S
8S

TO HAMPSHIRE.

53 M
50

A. & D.D'O. PEARSON.

M. L.

54 M
50

A. & D.D'O. PEARSON.

M. L.

TO UPPER NATONE.

TO QUARRY.

TO OLD MILL.

QUARRY

FIGURE 37.

TR8_51_55

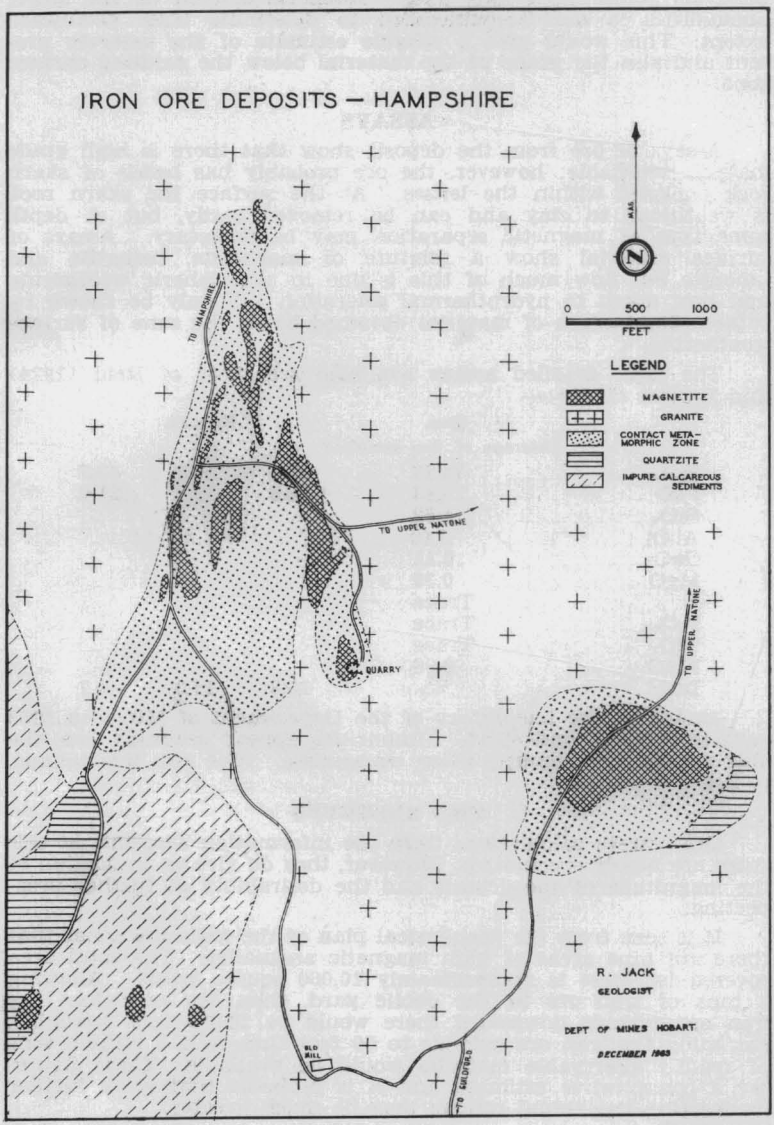

FIGURE 17.

5 cm

intervals across their long axes. Diamond drilling of the larger anomalities is also recommended to determine their downward extent. This would give a reliable estimate of the reserves present and also the grade of the material below the oxidized surface zone.

ASSAYS

Assays of ore from the deposit show that there is high grade material available; however, the ore probably has bands of skarn rock enclosed within the lenses. At the surface the skarn rock is weathered to clay and can be removed easily, but at depth some type of magnetic separation may be necessary. Assays of surface material show a mixture of magnetite, hematite and limonite but how much of this is due to atmospheric weathering and how much to hydrothermal alteration will only be shown by future examination of material obtained below the zone of surface weathering.

The most detailed assays available are those of Reid (1924) and Hughes (1952):—

	Reid. (average of five samples)	Hughes.		
Fe_2O_3	78.76	56.1	52.0	67.7
FeO	15.93	18.8	12.2	21.9
SiO_2	1.62	....	....	....
Al_2O_3	2.40	....	....	....
CaO	0.11	....	....	....
MgO	0.32	....	....	....
S	Trace	....	....	....
P_2O_5	Trace	....	....	....
TiO_2	Trace	....	....	....
MnO	0.96	....	....	....
Insol	....	10.8	17.3	4.7

Assays by the Laboratory of the Department of Mines in 1963 gave iron 52.9% and 69.5%. Impurities appear generally low, the only undesirable impurity being manganese. (See also this volume, p. 204).

ORE RESERVES

Ore reserve calculations from the information available at this stage are highly speculative. However, they do give an indication of the magnitude of the deposit and the desirability of further prospecting.

It is seen from the geophysical plan of the main ore zones that there are nine areas of high magnetic anomalies. The total area covered by these is approximately 10,000 square yards. Allowing 3 tons of iron ore to the cublic yard, then for each foot the iron ore extends downward there would be 10,000 tons available. Assuming the iron ore extends to 50 feet then half a million tons of readily quarryable material would be available. These figures are a conservative estimate and it is probable that after further prospecting the actual reserve may be much greater.

No reserves have been calculated on the other deposits as it is considered that insufficient information is available. However, it is probable that further substantial reserves will be found in the area to the east of the leases.

CONCLUSIONS AND RECOMMENDATIONS

The deposits occur in roof pendants and in the contact metamorphic zone around the granite. The size of the individual deposits is small but the amount of iron ore present is substantial, and access and conditions for quarrying the deposits are favourable. Further prospecting is warranted and this should consist of a first stage of costeaning all the anomalies and drilling the most favourable areas. From the magnetic anomalies it appears that a diamond drill hole sited on traverse 2S at approximate position 550 E and declined at 45° to the west would give an intersection of the ore body at about 100 feet. This should give much needed information and if the results are promising more holes would be needed to give an accurate estimate of the tonnage and grade of the ore available.

REFERENCES

HUGHES, T. D., 1952.—Iron Ore at Hampshire, *Rep. Dep. Min. Tas. (Unpublished)*.

REID, A. M., 1924.—Iron Ore at Hampshire Hills. *Rep. Dep. Min. Tas. (Unpublished)*.

THOMAS, D. E., and HENDERSON, Q. J., 1943.—Wollastonite at Hampshire. *Rep. Dep. Min. Tas. (Unpublished)*.