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FERRUGINOUS MANGANESE DEPOSITS, TEANO RANGE,
NORTH WEST DIVISION, WESTERN AUSTRALIA.

by

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SUMMARY

Superficial deposits of ferruginous manganese ore occur on the southern end of the Teano Range, Peak Hill Goldfield, Western Australia at about 160 miles by road north-north-west from Meekatharra.

The deposits are in two groups of small bodies. One group contains about 14,200 tons of ore which averages about 25 per cent manganese and 32 per cent iron, and the other group 4,000 tons of marginal grade containing about 46 per cent manganese and 3.5 per cent iron.

The former group is not of marketable quality and the other is too small and too remote to be of commercial value.

INTRODUCTION

During the course of an investigation of new manganese discoveries in north-west Western Australia by L.E. de la Hunty of the Geological Survey of W.A. and the writer, the opportunity was taken to inspect two groups of small deposits in the Teano Range. These deposits are not newly found - they were visited by T. Blatchford 25 years ago (Blatchford, 1928) - but no previous attempt has been made to estimate their tonnage and grade.

Blatchford's report contains many inconsistencies but is generally unfavourable; he expressed the opinion that thousands of tons of marketable ore could be picked from the surface or broken from the outcrops. He quotes no assays of the ore and apparently did not take any samples for chemical analysis. In the absence of this information his statement that some of the ore "could be well classed as high-grade chemical ore" is rather rash.

Lack of cheap transport and the insufficient quantity of ore rendered the deposits valueless at the time of Blatchford's visit, and these limitations apply equally well today.

During the present examination the deposits were inspected jointly, and then sampling was carried out by de la Hunty, and mapping by compass, tape and pacing by the writer. The samples were assayed at the Government Chemical Laboratories, Perth.

LOCALITY AND ACCESS.

Both groups of deposits are on the Teano District, North West Division within Peak Hill Goldfield.

The group on Woodlands Station is at Latitude 24°38'S and Longitude 118°04'E approximately, and that on the adjoining Mulgul (or Mogul) Station is about 19 miles farther east.

Access to either locality by station roads and tracks is good to within three or four miles of each, but the remaining distance is across rough hilly terrain.

Road distance to Meekatharra the nearest point on the State railway system is approximately 160 miles from either deposit via Horseshoe and Peak Hill. It is possible that road haulage to Meekatharra by heavy diesel trucks could be accomplished for between £5/10/- and £6 per ton, compared with £2/15/- to £3 per ton for cartage of manganese ore from Horseshoe to Meekatharra. The additional cost involved could only be offset by cheaper mining, larger scale of operations and higher grade of ore, than at Horseshoe. Unfortunately none of these factors are likely to operate, on the other hand the grade of ore is much lower, and mining would have to be conducted

selectively on more than a dozen ~~separate~~ separate small bodies.

GEOLOGY

According to the Geological Sketch Map of Western Australia, 1950, the region surrounding the manganese deposits is occupied by metamorphosed rocks of the Archaeozoic "Whitestone series", but appreciable areas of outlying undisturbed sedimentary rocks occur, particularly in the immediate vicinity of the deposits on Woodlands Station, and extending north-westerly to form Teano Range.

On Woodlands the sediments, which include quartzite and dolomitic limestone, are flat or gently folded and bear a very strong resemblance to the Nullagine beds of the Gregory Range, east of Nullagine. The resemblance is heightened by the similar mode occurrence of the manganese ore which lies on the bedding of limestone and partly fills joints.

At the easterly deposits on Mulgul Station the manganese occurs on vertical slate which strikes easterly. At about $\frac{1}{2}$ mile to the north the metamorphic rock is overlain by quartzite and limestone which dip north at a low angle. The manganese has replaced and stained favourable narrow bands in the slates thus presenting a superficial appearance which could be mistaken for the outcrops of fissure lodes.

THE MANGANESE DEPOSITS

Woodlands Station. The deposits are contained in Mineral Claim 51P held in the name of R.A. Grant of 144 South Terrace, South Perth.

The deposits form a discontinuous capping on three knolls of a ridge trending a little north of east and known locally as Three Hills. The total length of the ridge is approximately 1700 feet but minor bodies of manganese ore occur over a length of about 4,000 feet.

A large amount of limonite, manganiferous limonite, and manganese ore occurs as boulders scattered down the southern flank of the ridge and about the base. Fibrous and botryoidal forms of limonite are fairly common.

The easternmost knoll is crowned with two thin irregular manganese ore bodies with surface areas of 5,300 and 2,900 square feet, and ten small lenticular bodies which total about 3,500 square feet in area. The ore contains narrow veins and patches of fibrous limonite and rests upon a limonitic base overlying dolomitic limestone. A chip sample of several pounds weight taken from the largest body and representing apparently good ore yielded on assay:

Manganese (Mn)	23.6 per cent
Iron (Fe)	34.5 " "
Silica (SiO ₂)	2.9 " "
Phosphorus (P)	0.02 " "

On the assumption that the manganese ore averages 3 feet thick the reserves contained in the two larger bodies are estimated at 2,700 long tons.

The central knoll has a flat summit 400 feet long from east to west by an average width of 100 feet. The first impression gained is that all manganese ore has been eroded and only the limonitic base remains, but an area of 11,400 square feet at the extreme western end of the knoll is occupied by ferruginous manganese ore with a maximum thickness of 10 feet. The remainder of the summit of the knoll is capped with manganese-stained ironstone of a somewhat deceptive appearance.

The underlying limestone, where it outcrops high on the slopes is also stained black with manganese oxide.

A sample taken from a vertical face^{to} represent a thickness of 8 feet assayed

Manganese (Mn)	23.0 per cent
Iron (Fe)	32.7 " "
Silica (SiO ₂)	2.0 " "
Phosphorus (P)	0.03 " "

Tonnage is estimated at 5,700 long tons.

Eight separate bodies totalling 9,900 square feet in area occupy the crest of the western hill, and one large body of approximately 4,600 square feet occurs on the western slope. The maximum thickness anywhere exposed is 10 feet and average thicknesses are believed to range between 3 feet and 5 feet. Some control of the shape of the orebodies has been effected by the jointing of the underlying limestone and it is possible that the ore under this control may extend to slightly greater vertical depths than have been assumed.

One sample taken from this group and a specimen of limestone from beneath the sampling point were tested with the following results :

	Ore	Limestone
Manganese (Mn)	27.3	0.31
Iron (Fe)	28.4	1.19
Silica (SiO ₂)	2.3	-
Phosphorus (P)	0.02	-
Lime (CaO)	-	27.13
Magnesia (MgO)	-	17.50

Total reserves contained in the western group are estimated at 5,800 long tons.

A small massive body of manganese ore with a maximum thickness of 10 feet and resting upon a ferruginous base occurs at about $\frac{1}{4}$ mile east of the eastern knoll. It is estimated to contain not less than six hundred (600) tons of ore, but was not sampled.

Reserves on Woodlands Station therefore total 14,200 long tons. The small bodies on the eastern knoll might add about 1,000 tons to this total.

Three samples, each of several pounds weight, and taken from sites chosen to avoid obviously ferruginous or siliceous material which would be rejected during mining operations, showed little range in composition and averaged 24.6 per cent manganese and 31.9 per cent iron.

Mulgul (or Mogul) Station. Two mineral claims 49P and 50P have been taken up by R.A. Grant to enclose an area containing numerous small manganese bodies and areas of manganese staining.

Fibrous limonite is very common and handsome stalactitic forms also occur.

Manganese occurs along a narrow strip extending easterly for a distance of about one mile from the principal deposit. This strip lies along the foot and lower southern slopes of a range approximately 200 feet in height which is composed of slaty rocks with steep southerly to vertical dip. The range is capped with

quartzite and interbedded dolomitic limestone which dip north at a low angle.

The principal deposit (M.C. 49P) consists a body with maximum length 250 feet by an average width of 40 feet capping a low slate knoll at the foot of the main range. From the centre of the deposit towards its north-western corner the manganese ore has been eroded to expose the usual ferruginous base and iron-stained slate. The body is elongate in the direction of the grain of the country and has probably been formed by the replacement to shallow depth of a favourable band in the country rock. The maximum observed thickness of 9 feet is exposed in a face at the eastern end, and there is a 6 feet face at the western extremity. The body thins towards the centre where the underlying rock is exposed in a flat depression which is only a foot or so lower than the upper surface of the manganese outcrop. Short narrow lenses of manganese ore occur on the northern slope of the knoll in two lines parallel to the main body, and a narrow stringer of manganiferous ironstone lies concordantly in the slaty cleavage a few feet from the southern edge of the deposit.

One sample from this deposit assayed

Manganese (Mn)	46.2 per cent
Iron (Fe)	3.5 " "
Silica (SiO ₂)	2.0 " "
Phosphorus (P)	0.03 " "

Reserves of ore of this grade are estimated at approximately 4,000 tons.

On the eastern claim (M.C. 50P) manganese reserves are negligible. Occurrences are very small amounting to a few tons only, or are merely stains. One apparently large body on the slope of the main range consists of iron- and manganese-stained slate.

At about one mile east of the main deposit three parallel very narrow lenses of ferruginous manganese ore were sampled to yield:

Manganese (Mn)	34.8 per cent
Iron (Fe)	16.5 " "
Silica (SiO ₂)	2.5 " "
Phosphorus (P)	0.06 " "

The sample taken was small and not truly representative of the bodies which contain siliceous patches avoided by the sampler. In any event the lenses which have widths of only about 2 feet contain negligible quantities of manganiferous material.

CONCLUSION

Ore containing less than 45 per cent manganese or more than 8.5 per cent iron is not acceptable to the steel industry except at penalty rates, therefore the deposits are of no commercial value at the present time and are unlikely to become so in the foreseeable future.

REFERENCE

Blatchford, T. 1928. Manganese deposits of the Teano Range and Mount Fraser, Peak Hill Goldfield.
Ann. Prog. Rep. Geol. Survey W.A. 1927. p.3.