

TR7. 49-54

12. BLACK'S MANGANESE DEPOSITS, DIAL RANGE

by S. M. Rowe

INTRODUCTION

From the 2nd to 13th July, 1962, the author examined Black's manganese deposit in the Dial Range. The purpose of the examination was to determine whether drilling was justified to test the continuation in depth of the deposit.

LOCALITY AND ACCESS

The deposit is located on the northern slopes of Mt Duncan near the headwaters of Dial Creek, approximately 5½ miles SSW of Penguin. The best access is along Dial Road which runs south from Penguin around the eastern slopes of Mt Montgomery, drops down to Dial Creek and follows up this creek to the deposit. The last 2½ miles of this road have been repaired by the leaseholder and this section is now trafficable for 4-wheel drive vehicles in dry weather.

HISTORY AND PREVIOUS LITERATURE

A mining tenement was first granted as a Manganese Reward Lease for five years to R. O. Jones in 1908. In 1915 a 63 acre lease 7162M was taken out in the names of J. Paynton and J. Revell and continued till cancellation in 1922. Little work had been carried out when Twelvetrees examined the prospect in 1919. An open drive had been put in for ½ chain 5 to 6 feet in depth (Trench No. 4 on Figure 15). Twelvetrees stated that the ore deposit runs up the hill a little E of S, appears stratified, is of fair size and consists of low medium grade manganese and manganiferous iron ore.

A lease of 10 acres in extent, No. 71M/38, was granted to A. G. Black and J. F. Debbins in 1938 and expired in 1946. A report by Blake in 1940 showed that Trenches Nos. 1, 2 and 3 and Shafts Nos. 1, 2 and 3, as shown on Figure 15, had been completed by this time. Blake suggested the deposit was of secondary origin by decay of underlying rocks and concentration of manganese by ground water in residual clays. A sample parcel of manganese, weighing 0.581 tons and valued at £2.7 was forwarded to the mainland by A. G. Black in 1941. When Thomas and Henderson examined the prospect in 1943, No. 1 Adit had been completed. These authors regarded the deposit as localized concentrations near the base of Cambrian breccia-conglomerate with no extension in depth. The only work completed since this date is Trench No. 5 which has the appearance of a collapsed adit. Hughes (1953) regarded the prospect as occurring on the northern side of a brecciated fault zone striking 110°, the grade becoming poorer with depth.

TOPOGRAPHY AND VEGETATION

The topography in this area is in a youthful stage of degradation. The streams are still actively eroding along V-shaped valleys with steep grades and waterfalls. The vegetation consists of eucalypt forest and heavy undergrowth mainly of bracken on the ridges and tree ferns along the streams.

DESCRIPTION OF WORKINGS

Trench No. 1 extends 79 feet at 150° and is $3\frac{1}{2}$ to 4 feet wide. It is partially filled in where crossed by the road 23 feet from the southern end of the trench and now has a maximum depth of 7 feet. The ore exposed is poor with small patches of "psilomelane" and manganese "wad" in ferruginous clay. At 23 feet north of the road a hard band is exposed at the base of the main ore body which pitches gently to the north with minor buckling. It overlies a weathered breccia consisting of clay and chert fragments in a soft clay matrix with little mineralization. At 41 feet north of the road hard unaltered breccia is exposed. At 50 feet NW of the end of the trench and 25 feet vertically below, mudstone is exposed at the base of an uprooted tree.

Trench No. 2 commences 25 feet NNE of the southern end of Trench No. 1 and extends 50 feet at 157° . It is 5 feet wide for 34 feet, then broadens out irregularly to the southern end, attaining a maximum width of 10 feet and a maximum depth of 14 feet. Two small pits in the bottom of this trench reported by Blake are now filled in. This trench, along with Trench No. 4, exposes the best ore, consisting of abundant fragments to 3 feet in diameter of "psilomelane", "wad" and limonite with small inclusions of yellow clay and chert set in a matrix of dark coloured ferruginous clay.

Shaft No. 1 is $3\frac{1}{2}$ feet wide by $6\frac{1}{2}$ feet long and lies 10 feet at 135° from the southern end of No. 2 Trench to which it is joined by a shallow trench 5 feet deep. The shaft is partly filled in and is now 11 feet deep and exposes ore of quality comparable to No. 2 Trench. A shallow trench 3 feet wide and 4 feet deep extends 37 feet from the shaft at 173° terminating 16 feet north of Trench No. 3.

Trench No. 3 extends 45 feet at 180° with a shaft at each end. It is 7 feet wide at the northern end and 4 feet at the southern end with a maximum depth of 8 feet. A shallow trench $2\frac{1}{2}$ feet wide by 4 feet deep extends 26 feet at 185° from the southern end.

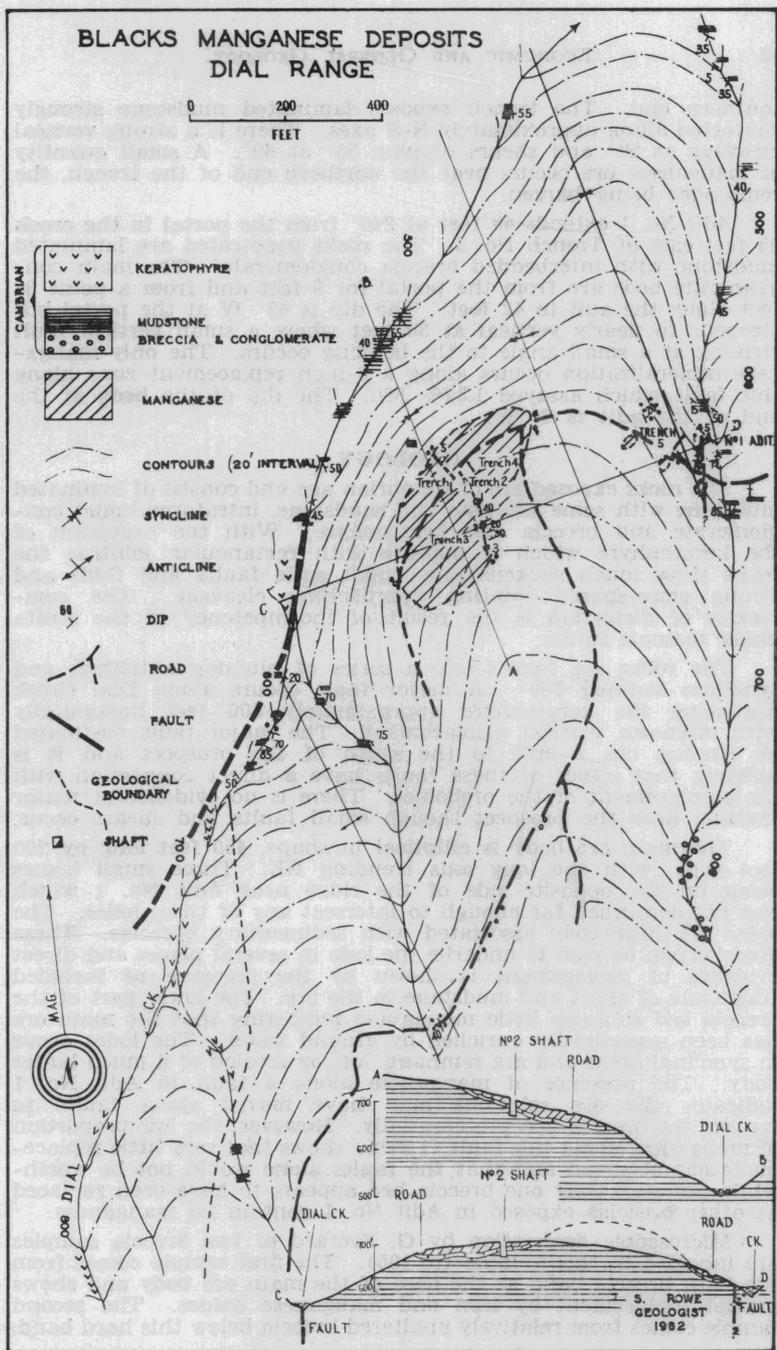
Shaft No. 2 at the northern end of Trench No. 3 was reported by Blake to be 27 feet deep and to enter mudstone at 18 feet.

Shaft No. 3 at the southern end of Trench No. 3 was also reported to enter mudstone. These shafts are now filled with water and cannot be examined.

Trench No. 3 exposes 4 feet of clay with some manganese and iron oxides overlying a hard band 1 foot thick consisting of angular fragments of white chert and silicified yellow clay up to $\frac{1}{2}$ inch in diameter in a matrix replaced by silica and iron and manganese oxides. The hard breccia band overlies at least 6 feet of soft weathered breccia with little mineralization. The hard breccia band is nearly horizontal with minor folds in the shallow trench south of Trench No. 3, dips at 30° N at Shaft No. 3, flattens out approaching Shaft No. 2 and then dips 40° N.

Trench No. 4 commences 25 feet NE of the entrance to Trench No. 2 and extends 12 feet at 160° . It is 5 feet wide by $5\frac{1}{2}$ feet deep and exposes best quality ore comparable with that in Trench No. 2.

Trench No. 5 has not been reported previously and has the appearance of a fallen in adit. It occurs on the opposite slope of the ridge to the above workings and extends from 10 feet below the road for 40 feet at 40° . It is $3\frac{1}{2}$ feet wide and 8 feet deep at the



southern end. The trench exposes laminated mudstone strongly contorted along approximately N-S axes. There is a strong vertical cleavage at 50° and shears dipping 35° at 60°. A small quantity of manganese ore occurs near the northern end of the trench, the remainder being barren.

Adit No. 1 extends 49 feet at 240° from the portal in the creek 65 feet east of Trench No. 5. The rocks penetrated are laminated mudstone with interbedded breccia conglomerate. The main conglomerate beds are from the portal for 9 feet and from a point 38 feet along the adit to 42 feet. The dip is 45° W at the portal but steepens to nearly vertical at 30 feet where a small vertical fault striking at a small angle to the bedding occurs. The only manganese mineralization occurs along a 3-inch replacement zone along this fault which assayed 1.37% Mn. The dip of the beds at the end of the adit is 70° W.

GEOLOGY

The rocks exposed are of Cambrian age and consist of laminated mudstone with some siltstone and sandstone, intraformational conglomerate and breccia and keratophyre. With the exception of the keratophyre which is massive with rectangular jointing the rocks show much slickensiding, small scale faults and folds and strong close-spaced jointing approaching cleavage. The complexity of distortion is the result of incompetency of the strata under tectonic forces.

The rocks are folded into a series of pitching anticlines and synclines striking 160°. A major fault occurs along Dial Creek displacing the keratophyre approximately 500 feet horizontally with unknown vertical displacement. The major fault postulated by Hughes lies $\frac{1}{2}$ mile to the south of the prospect and it is unlikely that either of these faults have a direct connection with the emplacement of the orebodies. There is no evidence of major faulting near the prospect though small faults and shears occur.

The main ore body is elliptical in shape, 450 feet long by 200 feet wide, with the long axis trending NE. Three small bodies occur on the opposite side of the ridge near Adit No. 1 which was not continued far enough to intersect any of these lodes. The lodes are intimately associated with sedimentary breccias. These breccias can be seen to underlie the lode in several places and direct evidence of replacement is shown by the presence of included fragments of chert and mudstone in the ore. The lower part of the breccia bed contains little manganese indicating that the main ore has been superficially enriched by ground water. The lodes occur in synclinal areas and are remnants left by erosion of a much larger body. The presence of manganese along a fault in Adit No. 1 indicates the ore solutions may have moved along faults to replace the breccia bed preferentially. However, the low proportion of manganese along this fault (1.37%) shows that very little replacement has occurred and that the faults alone would not be worthwhile targets. Only one breccia bed appears to have been replaced as other breccias exposed in Adit No. 1 contain no manganese.

Microscopic description by G. Everard of two breccia samples are included in this Volume (p. 105). The first sample comes from the hard breccia band at the base of the main ore body and shows partial replacement by iron and manganese oxides. The second sample comes from relatively unaltered breccia below this hard band.

TABLE I, ANALYSES, BLACK'S MANGANESE DEPOSIT—DIAL RANGE

Sample	Mn	Fe	SiO ₂	P ₂ O ₅	Al ₂ O ₃	TiO ₂	S	CaO	MgO	BaO	Mois- ture at 105°	Igni- tion Loss	Remarks
Twelvetrees 1919 ..	34.36	15.33	8.20	..	6.67	..	..	..	..	..	2.00	..	..
Twelvetrees 1919 ..	16.23	40.74	4.00	0.082	..	..	1.17	..	..	..	0.80	..	..
Blake 1940 E1 ..	17.16	29.70	8.08	0.12	9.32	0.37	0.31	0.06	0.11	0.38	2.74	11.54	10' horizontal channel Trench No. 2
Blake 1940 E2 ..	19.70	26.84	10.48	0.12	6.45	0.24	0.44	0.08	0.02	0.97	2.48	10.70	10' horizontal channel Trench No. 2
Blake 1940 E3 ..	14.06	32.36	10.40	0.10	9.06	0.29	0.20	Trace	0.10	1.26	2.88	10.32	10' horizontal channel Trench No. 2
Blake 1940 E4 ..	25.88	26.80	8.68	0.08	9.06	0.24	0.15	Trace	0.05	2.09	2.14	12.86	8' horizontal channel Trench No. 2
Blake 1940 E5 ..	19.82	26.80	9.08	0.10	8.55	0.23	0.27	Nil	0.13	1.26	2.24	11.22	5' vertical channel Trench No. 2
Blake 1940 E6 ..	20.00	17.66	17.12	0.05	12.21	0.42	0.34	0.10	0.07	0.46	3.10	12.64	2 1/2' vertical channel Trench No. 3
Average (Blake) ..	19.44	26.70	10.64	0.10	9.11	0.30	0.29	0.04	0.08	1.07	2.60	11.55	..
Blake 1940 E7 ..	43.80	10.04	2.80	0.05	6.64	0.10	0.10	0.08	0.04	0.21	1.26	12.94	Picked Sample Trench No. 2
Hughes 1953 ..	28.4	..	..	..	..	..	..	..	..	..	..	..	Channel over several feet
Rowe 1962 ..	1.37	..	..	..	..	..	..	..	..	..	..	..	Over 3" Adit No. 1

GRADE AND RESERVES OF ORE

The results of analyses made on this deposit are shown in Table I. Five channel samples from Trench No. 2 and one from Trench No. 3 taken by Blake averaged per cent 19.4 Mn, 26.7 Fe, 10.6 SiO₂, 9.1 Al₂O₃, 2.60 moisture and 11.6 ignition loss with small quantities of barium, titanium, calcium and magnesium oxides, phosphoric acid and sulphur. A picked sample contained per cent 43.8 Mn, 10 Fe, 2.8 SiO₂ and 6.6 Al₂O₃ indicating that beneficiation could produce a marketable product. It is difficult to estimate reserves accurately due to unknown factors. An orebody 450 feet long by 200 feet wide with an average thickness of 10 feet and a wastage factor of two-thirds gives possible reserves of approximately 30,000 tons of manganese ore. Such reserves are too low to justify the setting up of a plant to beneficiate the ore.

CONCLUSION

The ore bearing solutions appear to have moved along fault fissures preferentially replacing a certain breccia bed. Later the manganese ore was superficially enriched by ground water. The available evidence indicates that the exposed deposit does not continue with depth and that replacement along faults will be small so that drilling of the prospect is unjustified.

APPENDIX

A further visit was made on 4th September in company with Mr. S. Olsen of Temco and Mr. L. G. Singleton of Ulverstone, holder of Special Prospector's Licence 386, covering this area.

Since I last visited the prospect, Mr. Singleton has repaired the Dial Road which is now trafficable to 4-wheel drive vehicles in dry weather. He has also cleared an area approximately 300 feet by 200 feet exposing the manganese deposit.

Mr. Olsen took three samples and the results are as follows:—

1. Surface samples from the cleared area—43.7% Mn, 9.41% Fe.
2. From the sides of the worked trench—5.32% Mn.
3. From material next to the ore area—0.66% Mn.

The material was very soft and apparently unsuitable as raw material for FeMn production.

REFERENCES

- ANN. REP. DIR. MIN. TAS. FOR 1941, p. 29.
- BLAKE, F., 1940.—Report on Manganese Deposit, Dial Range. *Rep. Geol. Surv. Tas.* (Unpublished).
- FLEISCHER, M. AND RICHMOND, W. E., 1943.—The manganese oxide minerals, a preliminary report. *Econ. Geol.*, 38, 269-286.
- HUGHES, T. D., 1953.—The Dial Range Mineral Field. *Rep. Geol. Surv. Tas.* (Unpublished).
- KNIGHT, C. L. AND LUDBROOK, N. H., 1947.—Manganese. *Summ. Rep. Bur. Miner. Resour. Aust.*, 7.
- THOMAS, D. E. AND HENDERSON, Q. J., 1943.—Manganese deposits in the vicinity of the Dial Range. *Rep. Geol. Surv. Tas.* (Unpublished).
- TWELVETREES, W. H., 1919.—The iron ore deposits of Tasmania. *Miner. Resour. Geol. Surv. Tas.*, 6, p. 46.