COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

RECORDS:

1965/231

HISTORY OF MANAGNESE DEVELOPMENT - GROOTE EYLANDT.

by

P.W.Crohn and P.R.Dunn

RECORDS 1965/231

HISTORY OF MANGANESE DEVELOPMENT - GROOTE EYLANDT

by

P.W. Crohn and P.R. Dunn

HISTORY OF MANGANESE DEVELOPMENT - GROOTE EYLANDT

by

P.W. Crohn and P.R. Dunn

RECORDS 1965/231

In November, 1960, P.R. Dunn, a geologist of the Bureau of Mineral Resources, noted manganese occurrences on Groote Eylandt in the course of a regional geological survey of the island. Dunn had observed ferruginous and manganiferous pisolitic material used as edging stone at the Groote Eylandt Mission and also near the mission airstrip (now Deposit F) and along the road to the old mission site on the Emerald River; he had also been shown samples of pyrolusite that the natives used as a black pigment. However it was the discovery of high-grade manganiferous material in outcrop about three-quarters of a mile south-west of the mission (Deposit A) which aroused his interest.

P.W. Crohn, Senior Resident Geologist seconded from the Bureau of Mineral Resources to the Northern Territory Administration, made a short visit to the island on the chartered aircraft which was to return with Dunn to Darwin. Crohn examined the deposit south-west of the mission and together with Dunn took several samples. Outcrops in this area were found to be sufficiently widespread and in part sufficiently high-grade to give promise of economically valuable deposits, at least for exploitation on a small scale by the Mission authorities, e.g. by shipping small parcels of hand-picked ore as back-loading on supply vessels calling at the island.

It was also apparent that the manganiferous material was not derived from the underlying rocks, and was not related to any structural or lithological features in them. Instead, the distribution and appearance of this material, which is markedly pisolitic, suggested that it was formed by direct precipitation of manganese and iron oxides, possibly under swamp conditions, on to a surface approximating very closely to the present one.

On returning to Darwin Crohn wrote a brief report on the deposits which he sent to the Chief Geologist and the Director of Mines. In the report he recommended that the mission do some pitting to indicate the thickness of the deposit and that as a follow up to this work, Mines Branch or the Bureau of Mineral Resources plan an exploration programme to test other occurrences on the island and to look for extensions or repetitions in soil-covered areas.

Four of the samples taken were later assayed and showed a manganese content between 50% and 55%. Despite these encouraging assays the Mission authorities took no further action, except to obtain the prospecting rights to the area, until P.W. Crohn again visited the island in December 1961. With the help of the Mission staff Crohn delimited five areas of manganese material (locations A, C, D, E and F) and carried out a limited programme of test-pitting at one of them (location A). (Crohn 1962).

At this location, scattered outcrops of fair to good quality manganese were noted over an area approximately 3,000 feet long and with an average width of about 200 feet. They lie on the flank of a low quartzite ridge, which limits their extent in one direction, but their full extent in all other directions is obscured by soil cover and the test pitting showed that they extend for at least some distance under this cover. Of five pits put down in this area, one failed to encounter ore of economic grade and two had to be stopped in medium grade material due to hard going, after penetrating into it for distances of about 15 inches each. However, the remaining two pits penetrated respectively 3 feet 9 inches of ore, averaging 45.4% Mn and 3 feet of ore averaging 46.8% Mn after crushing and screening out the minus 12-mesh fraction to eliminate earthy and clayey interstitial matter.

Although the investigation was too brief to permit the full evaluation of any of the deposits, it did confirm that at least some of them might be expected to be of economic importance, and suggested that the total tonnage of direct-shipping ore on the island might be considerably larger than had been originally envisaged. A report embodying the results to date and recommending a further and more extensive programme of surface mapping and test pitting was accordingly prepared by Crohn in February 1962 and was distributed to the Chief Geologist, the Director of Mines and the Mission Authorities. This report was subsequently incorporated in the B.M.R. Record Series as Record 1962/26.

However, in May 1962, before any further work could be carried out, Crohn was approached by Mr. W.C. Smith, a geologist of the Broken Hill Pty Co. Ltd. stationed in Darwin, who claimed to have noticed some of the Groote Eylandt manganese samples in the office of the Darwin Uranium Group and expressed an interest in the occurrences. With the full concurrence of the Director of Mines, Mr. Smith was therefore given a brief outline of the known features of the occurrences, as a result of which the Company approached the Director of Mines shortly afterwards, asking for an opportunity for Mr. Smith to inspect the area personally. A visit to the island was accordingly arranged for Mr. Smith and Mr. P.G. Dunn of the Resident Geological Section in May 1962. This was followed by further negotiations between the Company, the Northern Territory

Administration and the Church Missionary Society, resulting in an agreement which authorised the Company to carry out exploration on the island for a limited period, and to apply for leases if the results of their investigations appeared to warrant it.

Actual exploration by the Company commenced in September 1962, and about 40 pits were dug in the remainder of that year. In 1963, the company established a substantial base camp for its prospecting operations and continued exploration by means of test pits, wagon drilling and some costeaning, as well as carrying out preliminary metallurgical tests and surveys for a port site. (Smith et al, in press).

The decision to proceed with mining of the deposits was taken early in 1964, and in August of that year an open cut was being opened up for production on Deposit D, using a 7/8 cubic yard shovel and a crusher with a rated capacity of 60 tons per hour. After screening to reject the minus ½-inch fraction, this resulted in a product assaying 46 to 48% Mn and comprising about 60% by weight of the mined material.

At that time, known reserves of hard, high-grade material were estimated by the Company to be sufficient to yield some 2¼ million tons of direct shipping ore, which would supply the Company's requirements for about 25 years at the present rate of consumption. The bulk of this material is contained in Deposit D South, with minor tonnages in Deposits A, F and D West, developed in each case in the originally noted locations with the same letter. The tonnages of low-grade and loose pisolitic material which would require beneficiation and/or sintering before shipment have not been computed, but are substantially larger than this.

Further prospecting is being undertaken by the Company, concurrently with the beginning of mining operations and the construction of a township, loading jetty and auxiliary facilities, and there is no doubt that this will result in an increase in the reserves of both direct shipping and low-grade ore, but it is of interest that no deposits of economic value have so far been found on the mainland of Arnhem Land or in fact anywhere outside the area of about six by twelve miles, centred on Groote Eylandt Mission.

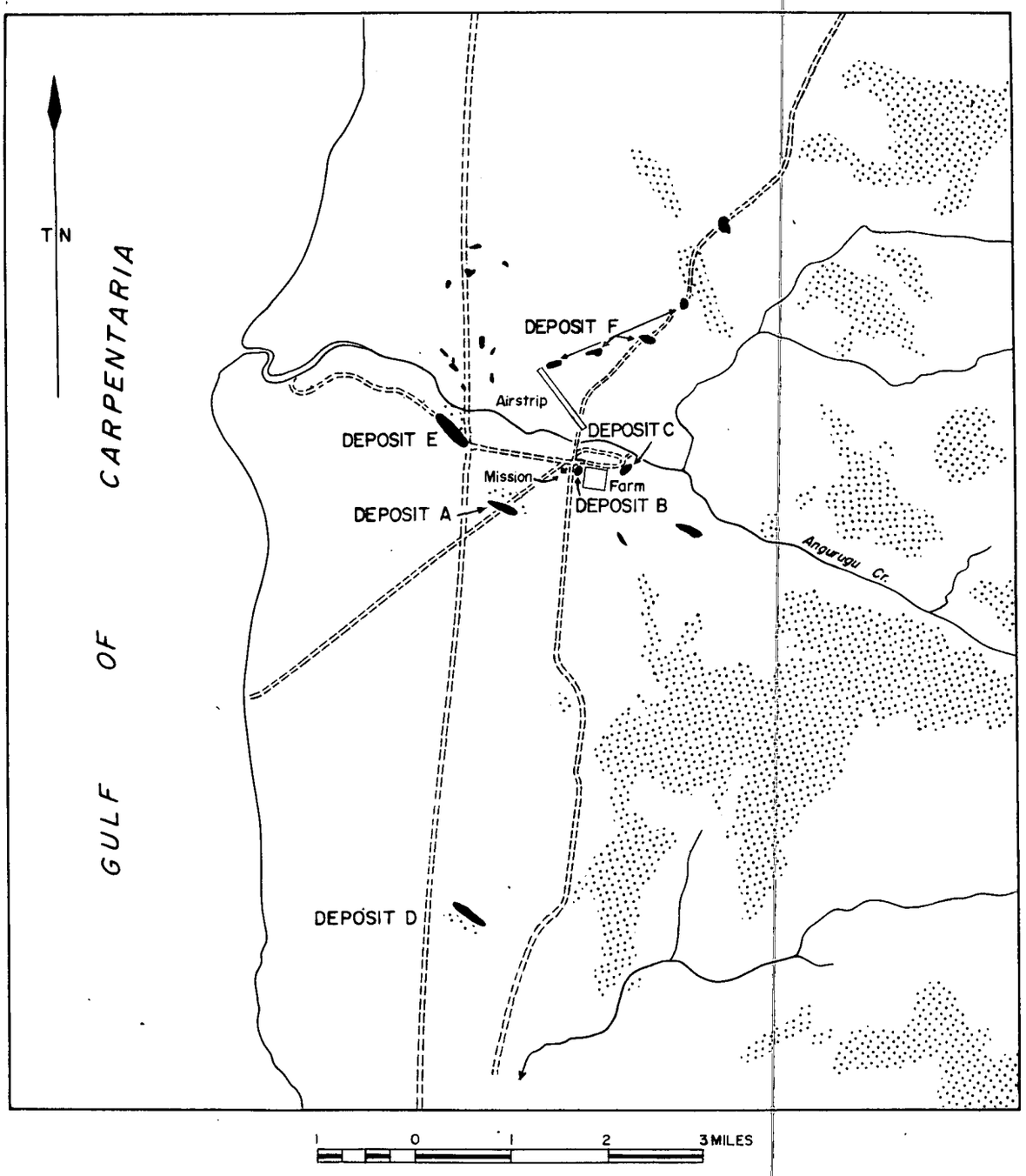
REFERENCES

CROHN, P.W., 1962 - Preliminary report on manganese deposits, Groote Eylandt, Northern Territory. Bur.Min.Resour.Aust.Rec. 1962/26 (unpub.).

SMITH, W.C., CROHN, P.W. and O'BRIEN, R.T., - The manganese deposits of Groote Eylandt, Northern Territory. Proc. Aust. Inst. Min. Metall. (in press).

MANGANESE DEPOSITS

GROOTE EYLANDT



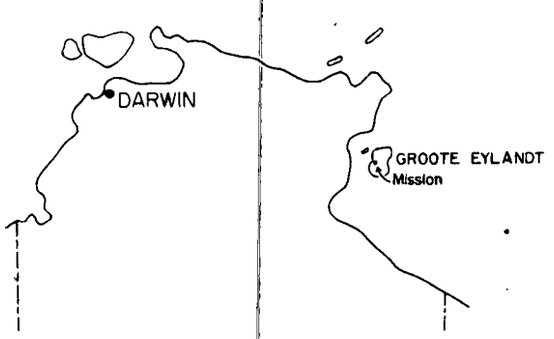
Reference

Known manganese deposits

Main areas of quartzite outcrops mainly from air photos

Main tracks

Locality Map



To accompany record 1965/231

D53/A7/3

GE