DEPARTMENT OF MINES
SOUTH AUSTRALIA

# REPORT ON THE WHEAL MOTLEY COPPER PROSPECT

M.C. 5748. Mannunda 1:63,360 Sheet

(A. Tiver)

by

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| 70-644 Fe | Wheal Motley Copper Prospect<br>M.C.5748 Mannunda 1:63,360 Sheet<br>Regional plan and mine sketch map. | 1" to 3/4 mile<br>and<br>1" to 400ft.approx. |

Rept.Bk.No.70/107
G.S.No.4495
D.M.771/70

20th July, 1970

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## ABSTRACT

The Wheal Motley copper mine is a small prospect unworked for many years, situated about 23-miles from Yunta or 150 miles northeast of Adelaide, South Australia. Copper so far revealed is of limited extent laterally and occurs as minor narrow veins and impregnations of malachite and azurite in interbedded quartzite and pebbly siltstone of the late Proterozoic Appila Tillite.

Copper carbonates may have formed from sparsely dispersed sulphides in the oxidised zone. Testing by trenching is warranted in the northern part of the prospect where the mineralisation could be more widespread than elsewhere.

## INTRODUCTION

This report records observations made on a visit of about three hours to the Wheal Motley copper prospect on June 23rd 1970. The visit follows a request for advice, received from the claim holder, Mr. A. Tiver of Spring Dam Station.

The only previous reference to the mine is a brief note by Mirams (1962) who recorded that the mine was worked in 1888-1890 when apparently all the oxidised material was removed.

Two samples submitted by Mr. Tiver to the Department in May 1970 (Samples A82/70, A83/70) returned assays of 1.0% and 8.3% Cu. No details of location were given. Analysis for gold returned results of less than 0.01 oz/ton.

## Location

Location of the mine and general geology of the neighbourhood are shown in the accompanying sketch plans. The area is about 23-miles south of Yunta which is on the Barrier Highway and Commonwealth Railways line to Broken Hill, and four miles south of Oak Park H.S. It is reached by unsealed, partly rough roads leading south from the Barrier Highway near Paratoo railway siding. Paratoo is about 173 road miles from Adelaide.

## General Geology

Rocks of the area are mainly of the Umberatana Group (glacial sequence)of the Proterozoic Adelaide System, and include coarse and fine-grained quartzite and sandstone, pebbly siltstone and quartzite (probably tillite) and siltstone. The rocks are folded with axial surfaces of folds trending in an east-northeasterly direction. About 1½-miles northwest of the Mine there is a zone of partially crushed older rocks of the Adelaide system, possibly Callanna Beds, which separate overturned sandstones of the Papuarta Tillite to the north from quartzite and tillite of the Appila Tillite to the south.

The Appila Tillite gives rise to rougher, more thickly wooded country of the mine area. South of Turner Dam and two miles southeast of the mine are greenish siltstones of the Wilyerpa Quartzite which is younger than the Appila Tillite.

Two miles northeast of the mine there are remnant patches of silcrete and ferricrete which are possibly indicative of a middle Tertiary phase of weathering.

## Description of Workings

No one was present at the mine at the time of the visit, but there seems to have been some recent prospecting activity. Hydrated copper carbonates malachite and azurite (azurite contains slightly more copper, and may alter to malachite according to Winchel, 1951) were noticed in quartzite and grey pebbly siltstone at points (2) to (5) shown on the sketch plan and in pits near (6). The area is steep and rocky.

The following are some observations made at the various points:

1) A trench about 15 feet long and 3 feet deep exposes quartzite and grey pebbly siltstone with strike of about 070 degrees. Further east the quartzite is pebbly and coarse-grained.
2) A small, shallow exposure of quartz and quartzite stained with copper carbonates.
3) What appears to be the main excavation, on a 15 to 25 degree hill slope an elongate pit, partially filled in, with associated minor pits. At the west end of this a quartzite bed about 30 inches thick is underlain

(probably overlain, in the stratigraphic sense) by gray pebbly siltstone; the contact strikes 070 degrees and dips 45 degrees northerly. The quartzite appears to be lenticular and carries malachite stains and quartz veins. The carbonates appear mainly in joints and cracks but are also present as small diffuse patches within the rock. Underlying the quartzite and seperating it from the siltstone is a two-inch ferruginous layer containing quartz and malachite. Within the siltstone are narrow, widely-spaced ferruginous and malachite-rich veins, sub-parallel to the quartzite or normal to it and dipping in the opposite direction; there are also sparsely scattered small malachite spots in the siltstone.

The same siltstone is host for irregular veins and impregnation of azurite and malachite in the main part of the pit which is about 40 feet long, and up to 18 feet wide and averaging five feet in depth. What appears to be the richest zone in this is about 50 inches wide and contains a total thickness of less than two inches of carbonate. Longitudinal (east-west) extent of this is uncertain.

4) In the southwest wall of a shaft of undetermined depth a quartzite bed, similar to the one at the west end of excavation (3), dips steeply in a northerly direction and is underlain on its southern side by an approximately four inch layer of copper carbonate underlain by pebbly siltstone. The quartzite is cut by narrow, sub-horizontal quartz veins which appear to extend northward from the carbonate zone.

5) A further pit and inclined shaft about 30 feet east of (4) exposes what appears to be the same quartzite bed containing malachite and reddish veins, possibly impure cuprite (copper oxide: tentative identification by A.N. Blissett). East of this a quartz vein outcrops at intervals but does not contain copper minerals where exposed.

6) Several pits about 20 to 40 feet south of a prominent quartzite bed contain mainly pebbly siltstone, but also some quartzite, sparsely impregnated with malachite. The pits are contained in an area approximately 120 by 30 feet.

7) A shaft in pebbly siltstone.

8) Closely-jointed grey quartzite with quartz veins up to four inches wide. One wide vein contains a ferruginous core, possibly resulting from alteration of pyrite. Attitude of joints:

| strike 030 degrees | dip 40 degrees SE |
|---|---|
| 165 | 85 W |
| 180 | 65 E |
| 015 | 90 |

## CONCLUSIONS

The Wheal Watley deposit appears to have resulted from migration of copper bearing solutions through rocks in the oxidised zone. Concentration of copper seems to be related to cracks and joints in the rocks and the permeability of the rocks. There may originally have been a weak dispersion of sulphides such as pyrite and chalcopyrite introduced in places with quartz veins, the copper in these sulphides later becoming redissolved under oxidizing conditions.

Surface exposures suggest that copper at localities (2) to (5) is of limited lateral extent. Even if the deposit as seen at the surface extends to depth it would not be economically workable. The occurrence at locality (6) is of greater interest because of its greater lateral extent and the possibility that it may extend further. To test this area more extensive trenching and

sampling would be required.

As the enclosing country rocks contain no carbonate minerals, ore produced would be amenable to standard leaching methods.

All ore exposures should be channel sampled to determine grade so that cost estimates of treatment can be made.

The viability of the deposit is dependent on grades disclosed and estimated treatment costs.

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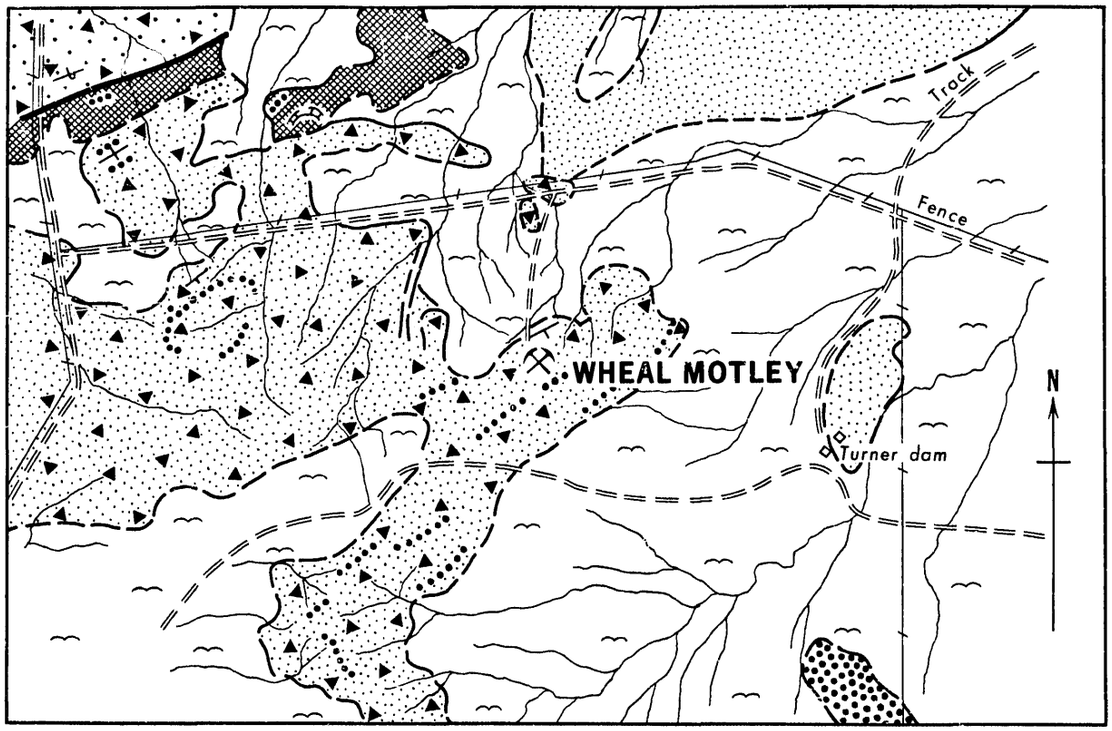
20th July, 1970
BCF:PHM

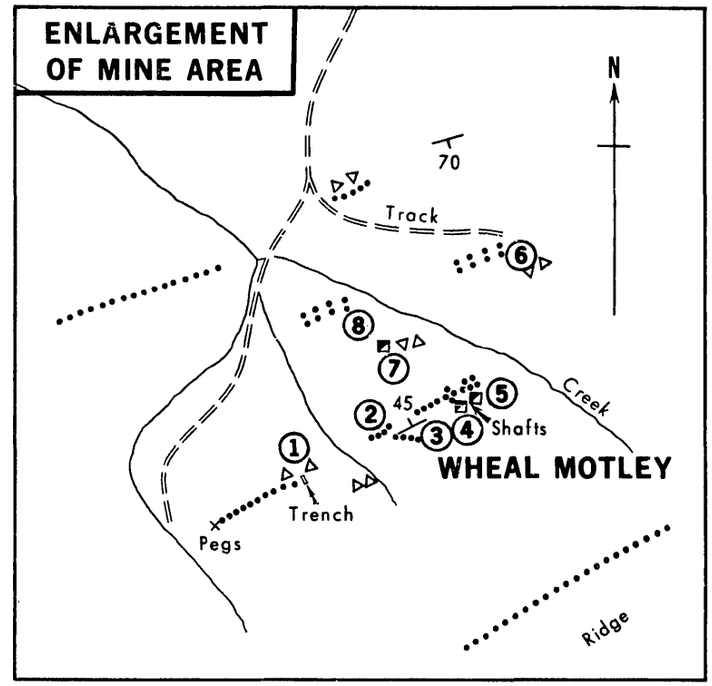
## REFERENCES

MIRAMS, R.C. 1962. The Geology of the Mumunda Military Sheet. Geol. Surv. S. Aust. Rept. Invest.19

WINCHEL, A.N. and WINCHEL, H. 1951. Elements of optical mineralogy. Fourth Edition Part II. Descriptions of Minerals. Wiley, New York.




## ENLARGEMENT OF MINE AREA




## SCALE

KILOMETRES 0 1 2 3 4 KILOMETRES

MILES 0 1 2 MILES

## SCALE

METRES 0 100 200 300 400

FEET 0 500 1000 FEET

## L E G E N D

Soil, alluvium

**Pleistocene**
Gravels, partly covering Tertiary silcrete, ferricrete

**Marinoan**
PEPUARTA TILLITE: Fine sandstones, siltstones

**Sturtian**
WILYERPA QUARTZITE: Greenish siltstone

APPILA TILLITE: Quartzite pebbly siltstone

**Callanna Beds**
Dolomite, siltstone, quartzite, crush breccias

Quartzite, sandstone

Pebbly siltstone

Fault

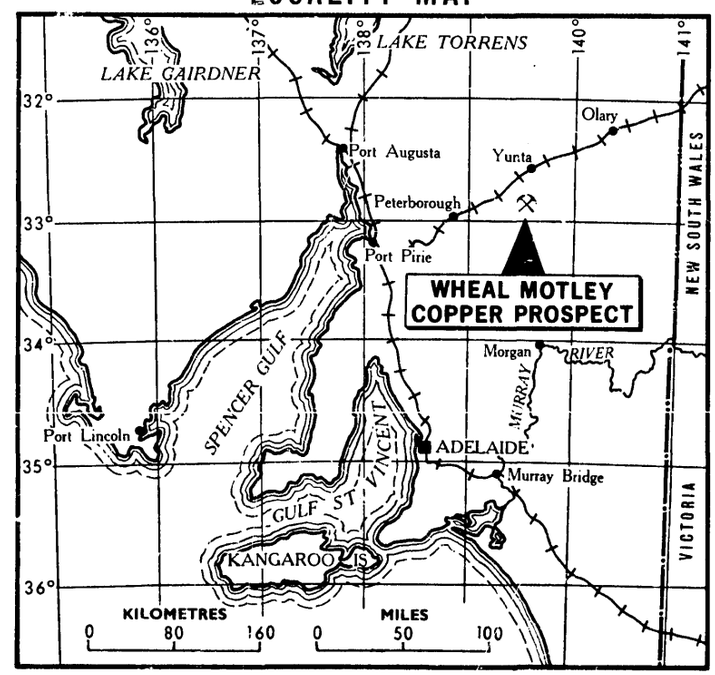
Copper exposures ③

Strike and dip of bedding 45

Verticcl bedding

Overturned bedding

## LOCALITY MAP

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