

TR7-10-16  
**Section 1.—Economic and General Geology**  
**RESULTS OF DRILLING IN THE RAZOR-**  
**BACK—GRAND PRIZE AREA, DUNDAS**

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#### INTRODUCTION

The area between the Razorback and Grand Prize mines in the Dundas mineral field can be considered as a potential zone for the occurrence of sulphide mineralization with tin. At the Razorback Mine, where operations commenced in 1909, tin is intimately associated with pyrrhotite and other sulphides along a persistent fault zone between serpentine and Cambrian slate, conglomerate and greywacke. At the Grand Prize mine, tin occurs with sulphides in a fault zone in Cambrian sediments.

A geophysical investigation of the area was undertaken by the Bureau of Mineral Resources, Geology and Geophysics between January and April, 1960 at the request of the Director of Mines. The result of this survey and recommendations for further exploration are embodied in a comprehensive report by Langron and Horvath (1962). A drilling programme to explore the anomalies indicated by the geophysical survey was commenced by the Department of Mines in March, 1961.

#### GENERAL GEOLOGY

The area has been mapped in detail by Blissett and Gulline (1961). The country rocks consist of slate, greywacke and conglomerate of the Dundas Group. These sediments are intruded by a thick sill of pyroxenite, now almost completely serpentinized, of probable Upper Cambrian age.

The rocks were strongly folded during the Tabberabberan Orogeny along axes which trend NW-SE, and the Razorback-Grand Prize area forms portion of the complex eastern limb of the Zeehan Syncline. Faulting with a predominant NNW trend served to localize the mineralization. Later faulting with E-W and SW-NE trends offset the mineralized zones. Rock exposures are rare and most of the area is covered with dense vegetation.

#### RESULTS OF GEOPHYSICAL SURVEY

Electromagnetic (Turam), self potential and magnetic methods were used in the search for sulphide bodies near the Grand Prize mine and along the eastern flank of Razorback Hill for a distance of about one mile and a half. Various persistent linear anomalies were detected, mainly by Turam and magnetic methods. Some of these are interpreted as due to the presence of sulphide bodies; others to the irregular concentration of magnetite in the serpentine. The distribution of these anomalies is shown on Figure 2.

In the vicinity of the Razorback Mine, distinct indications were obtained with all methods in the region of the main open cut. Elsewhere on the Razorback grid the Turam indications are weaker with the exception of the northern section where they are of good quality and originate from a conductor at fair depth. In general the magnetic results are inconclusive over sulphides and the most intense magnetic "highs" are due to concentrations of magnetite in the serpentine.

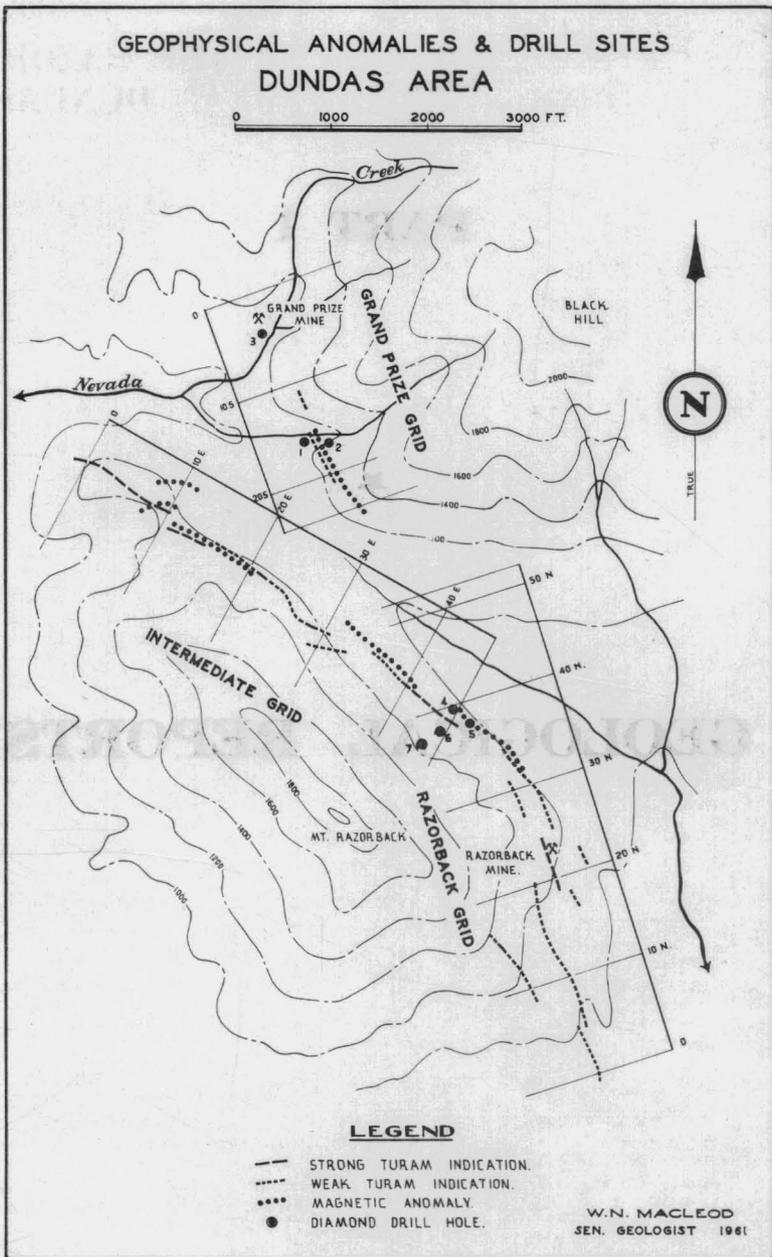
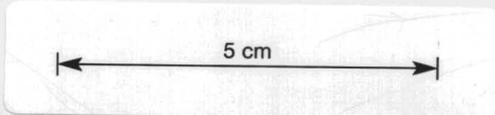


FIGURE 2.



5 cm

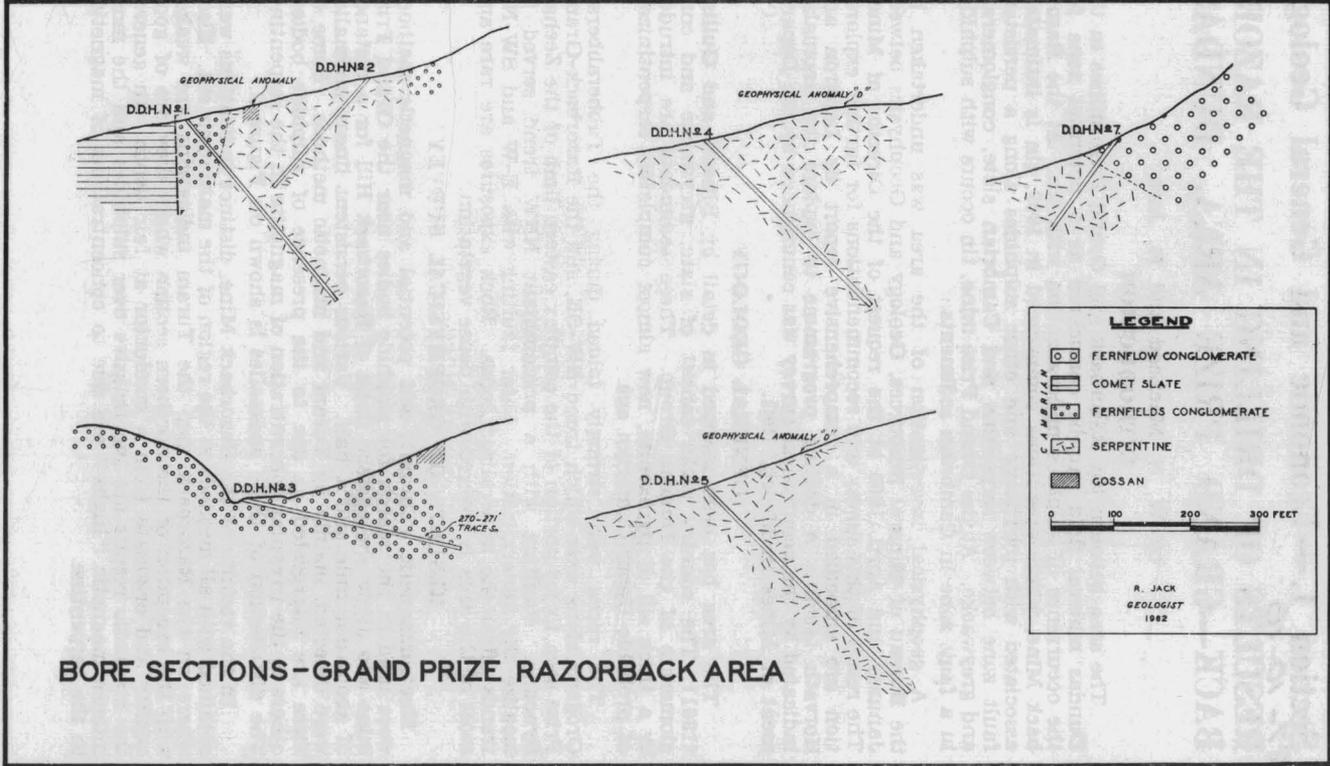


FIGURE 3.

**BORE SECTIONS - GRAND PRIZE RAZORBACK AREA**

**LEGEND**

○ ○	FERNFLOW CONGLOMERATE
▬ ▬ ▬	COMET SLATE
■ ■ ■	FERNFIELDS CONGLOMERATE
~ ~ ~	SERPENTINE
▨ ▨ ▨	GOSSAN

0    100    200    300 FEET

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In the Grand Prize grid a strong magnetic anomaly was found near the serpentine-slate contact, associated with superficial gossan. This anomaly is associated in part with a distinct Turam indication.

On the Intermediate grid, the strong Turam indication located in the northern part of the Razorback grid was followed almost continuously with fluctuations and offsets for over 4,000 feet. Most of the magnetic indications on this grid are not related to the Turam anomalies and are probably due to concentrations of magnetite. The serpentine boundary is clearly defined by steep magnetic gradients.

Drilling at four sites was recommended to test the anomalies. On the Intermediate grid three sites were selected at Coordinates 44E/850S, 28E/750S and 14E/540S. In addition two costeans were recommended to test the shallow strong magnetic anomalies at 8E/270-330S and 10E/425-550S. On the Grand Prize grid it was recommended that a hole be drilled to test the Turam and magnetic anomalies between 16S/500E and 18S/500E.

### DRILLING RESULTS

(see Figure 3)

#### Grand Prize Grid.

Two diamond drill holes were bored to test the anomaly between 16S/500E and 18S/500E. D.D.H. No. 1 was sited at 1576S/475E on a bearing of 80° magnetic and inclined at an angle of 50°. The core log is summarized as follows:—

From	Depth To	Rock Type
0	71'	Conglomerate, greywacke and grey-brown siltstone. No sign of sulphide mineralization.
71'	87'	Decomposed gossanous serpentine. Poor core recovery. No evidence of sulphides.
87'	330' 6"	Serpentine with colour variation from dark green to pale yellow-green and creamy white. Magnetite is commonly associated with slip-fibre chrysotile and picrolite which in places amounts to about 5% of the volume. Stichtite occasionally noted. No sulphides recorded.

D.D.H. No. 2 was sited at 17S/700E on a magnetic bearing of 251° and inclined at an angle of 50°. This hole was entirely in serpentine for its total length of 201 feet. The serpentine is yellow-brown and decomposed for the first 57 feet, but thereafter shows the same characteristic colour variation from dark to pale green as in D.D.H. No. 1. The proportion of asbestos and associated magnetite is rather higher in the core from this hole. Strong segregations of finely crystalline granular magnetite occur along the slip planes in the serpentine. There is no evidence of sulphide mineralization.

Assay of the core from two holes yielded the following results:—

D.D.H. No. 1.	Sn %	Ni %
71' — 87'	Nil	0.40
148' 6" — 152' 8"	"	0.24
255' — 257' 2"	"	0.30
297' 10" — 301'	"	0.39
D.D.H. No. 2.	Sn %	Ni %
74' — 76'	Nil	0.30
100' — 111'	"	0.28
116' — 120'	"	0.24

In view of the absence of any encouraging sign of sulphide mineralization in 530 feet of core it was not considered worthwhile to explore this anomaly further. The drilling indicated an extension of the serpentine further to the east than as shown on the geological map. The magnetic anomaly can be presumed due to the presence of abundant magnetite in the serpentine. All asbestos in the core is of the slip-fibre variety with a high proportion of the splintery variety, picrolite, intergrown with the chrysotile.

The Grand Prize mine was not included in the geophysical survey, but, while the drill was in the area, it was decided to test for a possible southern extension of the Grand Prize Lode. South of the workings, on the ridges south of Nevada Creek, a gossan outcrop can be followed intermittently for a distance of about 700 feet. Craze's Adit, which is situated on the access road to the mine, was designed to explore the southerly extension of the ore body but was abandoned before the mineralized zone was reached. D.D.H. No. 3 was sited on the access road at 4S/450E between the adit and the mine on a bearing of 81° magnetic and depressed at an angle of 20°.

The core log of D.D.H. No. 3 is summarized as follows:—

From	Depth	To	Rock Type
0	—	118'	Yellow-brown siltstone and greywacke conglomerate.
111'	—	213'	Brown decomposed conglomerate, practically no core recovery.
213'	—	270'	Grey slate and siltstone.
270'	—	271'	Reddish brown gossanous ironstone.
271'	—	273' 6"	Greywacke conglomerate with abundant pyrite. Pyrite partly oxidized.
273' 6"	—	278'	Greywacke conglomerate with pyrite.
278'	—	329' 6"	Greywacke conglomerate with no pyrite. Conglomerate is fresh and unaltered.

It would appear that the borehole intersected a wide fault or shatter zone prior to reaching the mineralized zone on the footwall. Core recovery from the 6 feet wide sulphide zone was poor and the assay values disappointing as shown below.

Depth	Material	Sn (%)
270' — 271'	Ironstone gossan	Less than 0.05
271' — 273' 6"	Sulphides	Nil
273' 6" — 277'	Sulphides	Nil
270' — 275'	Sludge	Less than 0.05

Despite the low assay results the drill hole, nevertheless, confirmed the southerly extension of the Grand Prize mineralized zone.

#### *Intermediate and Razorback Grids*

Two holes were drilled to test the strong Turam indication at the northern end of the Razorback grid between 36N/950W and 41N/1350W.

D.D.H. No. 4 was cited at 46E/850S (on the intermediate Grid) on an azimuth of 265° magnetic and inclined at an angle of 45°. Excellent core recovery was achieved in this hole which was entirely in serpentine for its full length of 338 feet. No indication of any sulphide mineralization was detected. The only unusual features were the appearance of abundant calcite in open fractures in the serpentine in the upper weathered section and the strong blue-green

tints in the slip fibre picrolite and talc. The colour suggests the presence of the chromiferous mica, fuchsite.

Assay of the core for nickel and chromium gave the following results:—

Depth		Ni %	Cr %
From	To		
0'	18'	0.25	0.05
18'	31' 5"	0.25	0.05
31' 5"	45'	0.22	0.05
260'	275'	0.24	0.08
275'	290'	0.29	0.04
290'	300'	0.24	0.06

D.D.H. No. 5 was sited at 38N/950W (Razorback Grid) on an azimuth of 215° magnetic and inclined at an angle of 45°.

The hole was completed to a depth of 415 feet in serpentine without any sulphide mineralization. The serpentine varies from green to yellowish green and contains some slip fibre asbestos and a few small local concentrations of magnetite. The magnetite present in the serpentine probably accounts for the magnetic anomaly in the vicinity of the drill hole, but there was nothing unusual encountered in the drill hole to explain the Turam anomaly which was the drilling target.

It was expected that this drill hole would pass through the serpentine-conglomerate contact to the west. As this was not reached, it was decided to drill holes further to the west to find this contact which is the favourable location for ore deposition at the Razorback Mine. A vertical hole D.D.H. No. 6 was drilled at 38N/1250W to find the contact which was thought to dip at a moderately steep angle to the west. After passing through 16 feet of conglomerate and serpentine rubble the hole encountered serpentine and the drilling was stopped at 17 feet 6 inches. It was now obvious that the serpentine-conglomerate contact was much further west than shown by Blissett and Gulline (1961), and as no outcrop could be seen on the densely vegetated and scree covered slope the drill was shifted as far west as practicable on the steeply rising hillside.

D.D.H. No. 7 was drilled from 445E/1300S on a magnetic bearing of 40° and inclined at an angle of 55°. This hole was collared in conglomerate and passed through the conglomerate-serpentine contact at 50 feet. The hole was continued to 170 feet but apart from some brown iron stained serpentine from 50-66 feet no sign of sulphide mineralization was found. Assays of the iron stained serpentine showed no trace of any tin present and it is thought that iron staining is due to weathering of the serpentine and not from any pyrite mineralization.

The strong magnetic anomalies at 10E/425-550S and 8E/270-330S on the Intermediate Grid coincide with a large kernel of dark green pyroxenite which has resisted the almost ubiquitous serpentinization of the original intrusive. At 10E/500S there is a bold outcrop of pyroxenite which is intensely fractured and closely net-veined by magnetite. Hand specimens of the rock are sufficiently rich in magnetite to be picked up by a strong hand magnet. As the anomaly is almost certainly due to the high magnetite content, and the pyroxenite is well-exposed over nearly an acre, costeaning is not considered necessary.

The anomaly at 8E/300S coincides with a gossanous capping which has apparently developed above a zone of magnetite in the pyroxenite. Fragments of the gossan are ferromagnetic and it is considered that the limonite has been produced by the oxidization of magnetite. Costeaining is not regarded as necessary.

Geological examination along the line of Turam Indication "J" between 6E/500S and 0E/500S failed to disclose any unusual features. The rocks exposed are siltstone and greywacke conglomerate with no signs of sulphide mineralization.

The only sulphide mineralization found in the drilling programme was in D.D.H. No. 3 which was drilled to test for a possible extension of the Grand Prize orebody in an area not covered by the geophysical survey. Low grade nickel and chromium mineralization is found throughout the serpentine and locally small veins and crystals of magnetite were found in the serpentine. It is probable that the magnetite anomalies can be used to some extent in mapping the boundaries of the serpentine where it is concealed by scree and soil. No conclusive result can be drawn from the Turam anomalies investigated.

#### REFERENCES

- BLISSETT, A. H. AND GULLINE, A. B., 1961.—Tin Mineralization near Mt. Razorback, Dundas. *Tech. Rep. Tas. Dep. Min.*, 5, 136-161.
- LANGRON, W. J. AND HORVATH, J.—Dundas metalliferous geophysical surveys, Tasmania, 1960. *Rec. Bur. Miner. Resour. Aust.*, 1962/45. (*Unpublished*).