GEOPHYSICAL SURVEY

PENGUIN BEACH EL 15/65 SHEFFIELD

TASMANIA

W. V. HEWITT

MELBOURNE JUNE, 1968.

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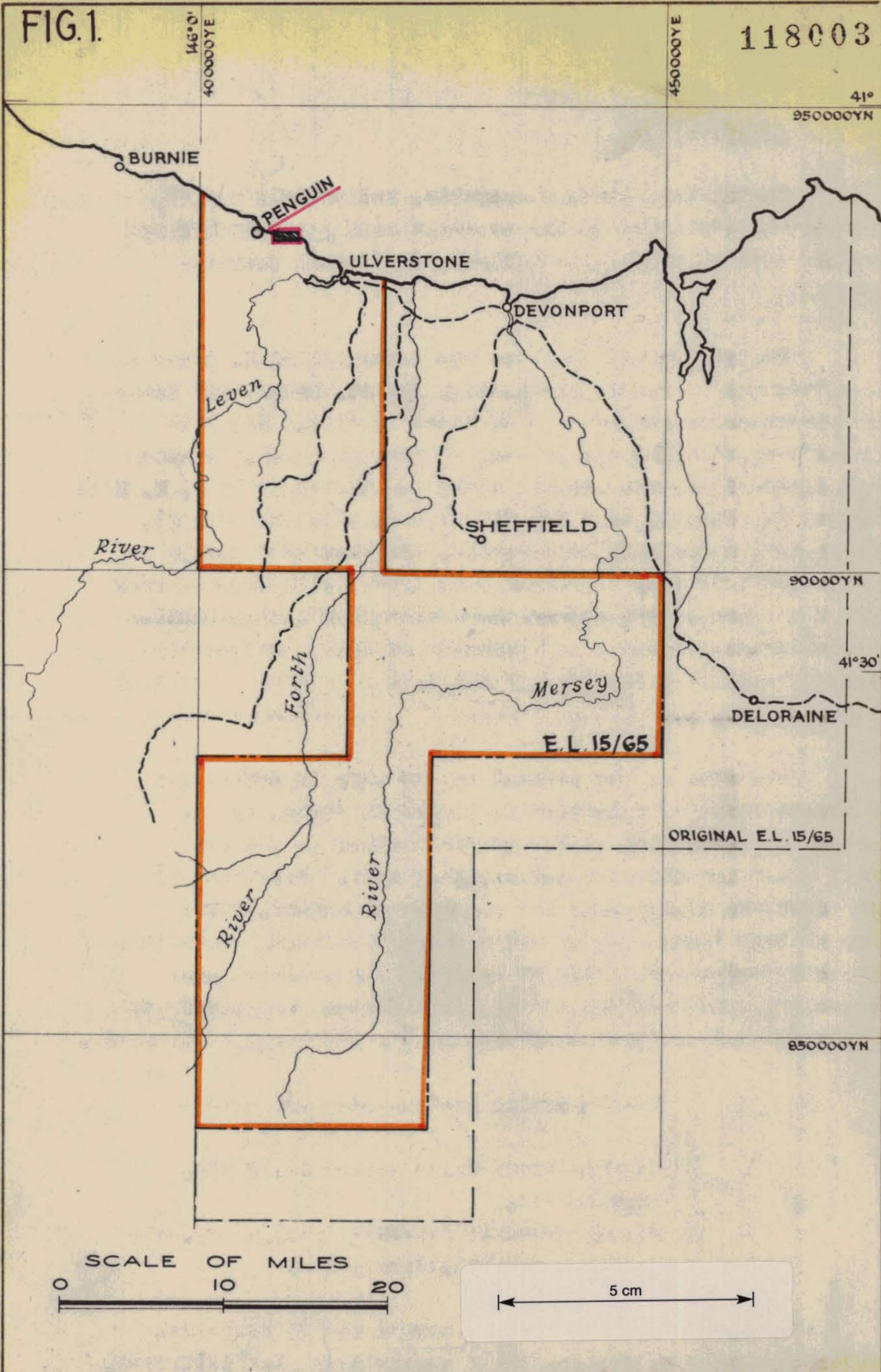

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Centre	THE BROKEN HILL PROPRIETARY CO. LTD. E.L. 15 65 SHEFFIELD - TASMANIA	Project No. TSh 12
Date	LOCALITY MAP GEOPHYSICAL SURVEY - PENGUIN AREA	Drawing No. A4-1065

1. INTRODUCTION

During May, 1968, a magnetic, radiometric and EM survey was conducted on the wave-cut rock platform exposed at low tide at Penguin in EL15/65, Sheffield, Tasmania (Fig 1).

The geology of the area was described by K. Burns in the "Geological Survey Explanatory Report, Devonport" issued by the Tasmanian Department of Mines in 1964. Fig 7 to Burns' report shows the geology of Penguin Beach. Gossans and mineralised veins, mapped along two traverses by K. M. Hall during the survey, were superimposed on this map (Fig 2). Known as the Beecraft Megabreccia, the rock is a jumble of large slabs of many different rock types, with gossans over the whole area. The silver, lead and other mineralisation is mainly concentrated in hornstone striking north-north-east through Penguin Mine and outcropping again at Watcombe Prospect (Fig 3).

The aims of the present survey were to detect any concentrations of sulphides in the beach rocks, and to define any extension of the mineralisation to the south west under the alluvium and basaltic soil. Execution of the aims was hindered by the presence of houses, roads and railway lines, and by natural and artificial conductors which interfered with the EM method. The procedure was essentially to test the effect of the known mineralisation and then to look for similar effects in the areas of interest.

The following instruments were used:-

Askania Werke magnetometer No.582374,
ABEM EM Gun,
PUG-1E Portable Universal Monitor No.1020
with a scintillation probe.

The party consisted of W. Hewitt and P. Hillsdon, geophysicists; B. Reilly, field supervisor; J. Williamson, surveyor; and W. Cherrie technical assistant.

2. OPERATIONS

(a) Magnetics

A grid was set up with the origin near the old Penguin Mine (Fig 2). To detect any localised magnetic bodies, and to test the effect of gossans and veins, the grid over the mine was closely spaced, with stations every 25 feet along traverses 50 feet apart. Stations on extended traverses and on traverses south of the road were generally at 50 feet spacing, to give the structural picture.

Readings were reduced to a common base, converted to gammas, and plotted in profile along each traverse.

(b) Radiometric

Readings were taken with the scintillation probe on the ground at each station. Between stations, the instrument was left switched on to provide audible warning of high count rates. Anomalous readings were traced between traverses.

The average background count was 300 counts per minute over the whole area. Readings from 600 to 900 were expressed as 2 times background and those from 900 - 1200 as 3 times background. Only readings twice background or more were plotted.

(c) EM

No definite reading on the EM Gun can be obtained above a conductor that is much wider than the EM staff separation, which is a maximum of 300 feet. The sea water at Penguin Beach was just such a large conductor and the method failed. Staff separation of 100 feet and 300 feet and frequencies of 440 cps and 1760 cps were tried over many different sections of the beach, without success. One traverse was tried south of the road again without success, owing to the proximity of power lines, underground PMG cables, fences and water pipes.

3. RESULTS

The magnetic profiles are shown on Fig 2. Several anomalies continue over several hundred feet, all striking roughly north-north-east. None of these are caused by the gossans and veins mapped by K. Hall.

All but two can be explained by the rock types as mapped by Burns. The anomalies follow bands of rock having high susceptibilities, for example the band of spilite tuff at 250'W. Another example of geology explaining the anomalies is the erratic variation over the diorite boulders at 600'E on the 200'N traverse. These anomalies disappear on traverses where there is a few feet of sand or soil over the rock, confirming a shallow source.

Two anomalies over greywacke, at 500'E and 1000'E, have a magnitude of 1500 gammas and persist under a greater cover of soil than the other anomalies. They cover only part of the greywacke beds and greywacke normally has low susceptibility. This indicates that these two anomalies are caused by rocks of medium susceptibility within the greywacke. Burns admits that the boundaries of the greywacke are difficult to define and some sections are rich in fragments of volcanic rock (which has high susceptibility). An exploration for the anomalies, then, is that these sections of the greywacke are imbedded with volcanics.

Alternatively, greywacke provides a satisfactory environment for secondary mineralisation which may include magnetite or pyrrhotite. The anomalies could therefore indicate mineralization within the greywacke. This needs geochemical checking.

The radiometric results show two bands of radioactive rocks, the first lying between the two beds of greywacke previously mentioned, the other on the base line at 100'N in a slab of microsyenite. The maximum size of these anomalies is 1100 counts per minute, or nearly four times background. This is not unusually high, but since uranium and its early decay products are easily leached away at the surface leaving later insoluble members of its decay series, this count could indicate good deposits at depth. The anomalies could also be caused by thorium.

The radioactive rocks to the east were traced south until a few feet of sand absorbed the radiation.

4. CONCLUSIONS AND RECOMMENDATIONS

The magnetic anomalies over the greywacke and the radiometric anomalies require investigation. Geophysical methods were severely handicapped by the physical and cultural features of the area, and the results south of the road were rather negative.

Nevertheless, the area remains of definite interest. The most outstanding feature is Burns' statement that the Watcombe Prospect was found by tracing the ore-bearing Lornstone from the Penguin Mine. This line includes Hardy's Lode (Fig 3). Further work is required along the line to determine whether the lode is continuous.

IP would be hindered in the area by power lines and houses but short spreads may be possible in places. However, it is suggested that the line from Penguin Mine through Watcombe Prospect be drilled at intervals down to bedrock to provide samples for chemical analysis. Depth to bedrock is not known but it is assumed that it outcrops at Watcombe Prospect. Therefore it may be possible to use a hand auger.

It is also suggested that geochemical samples be taken along the highway cutting about one mile to the south west aroun the place where the extension of the line crosses it. This suggested geochemical programme has been discussed with Dr. Bumstead who agreed with it in principle.

Further geophysical work is not recommended at this stage. IP may be required later should the geochemical sampling indicate that the ore bearing rock extends as far south as the road.

118009 FIG. 2

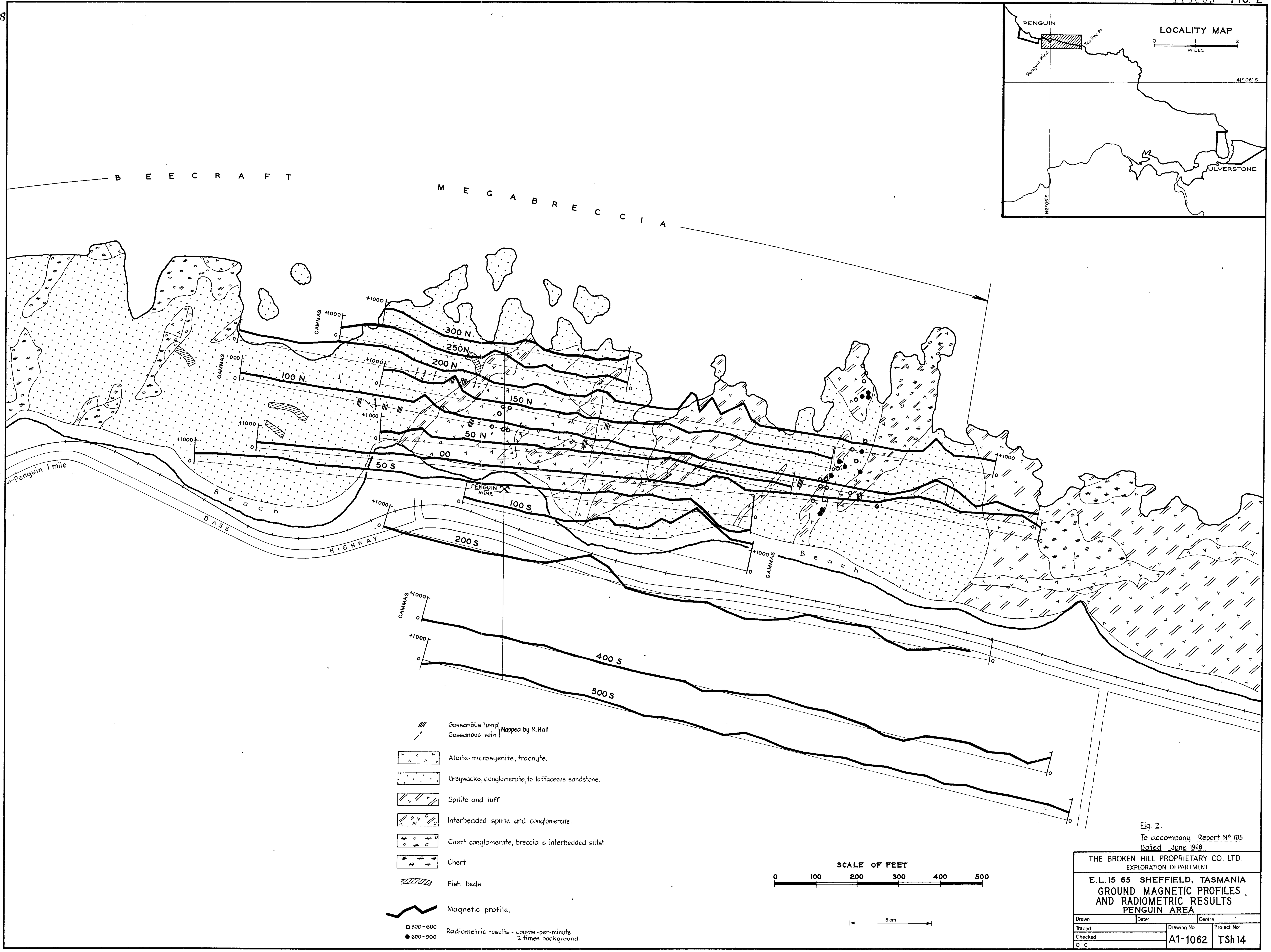
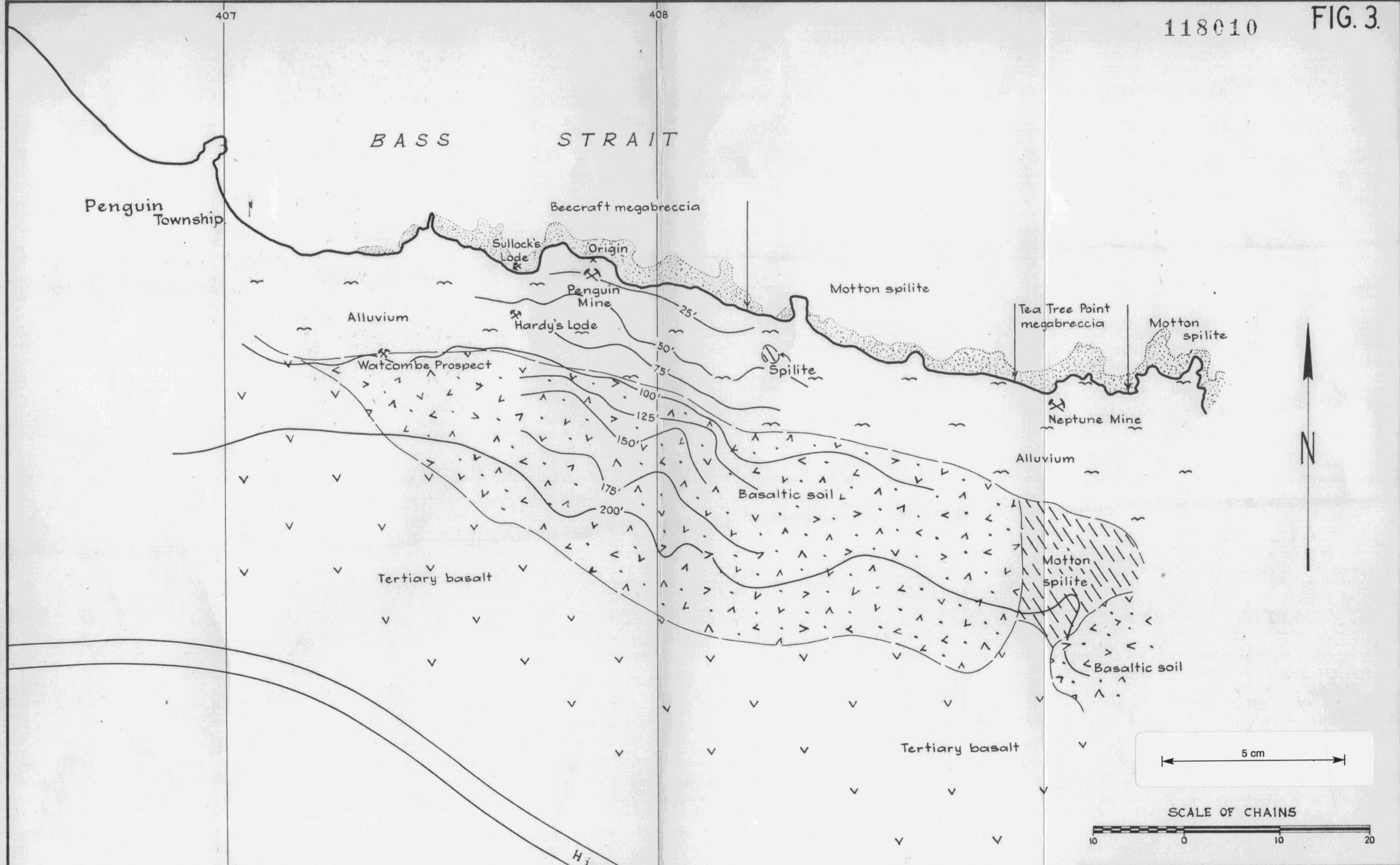

LOCALITY MAP
PENGUIN
Tea Tree Pt
Penguin Mine
MILES
41° 08' S
146° 05' E
ULVERSTONE
B E E C R A F T
M E G A B R E C C I A
GAMMAS
+1000
300 N
250 N
200 N
150 N
100 N
50 N
00
50 S
100 S
200 S
400 S
500 S
PENGUIN MINE
Penguin 1 mile
Beach
BASS HIGHWAY
Gossanous lump
Gossanous vein
Mapped by K. Hall
Albite-microsyenite, trachyte.
Greywacke, conglomerate, to taffaceous sandstone.
Spilite and tuff
Interbedded spilite and conglomerate.
Chert conglomerate, breccia & interbedded siltst.
Chert
Fish beds.
Magnetic profile.
300 - 600
600 - 900
Radiometric results - counts-per-minute
2 times background.
SCALE OF FEET
0 100 200 300 400 500
5 cm
Fig. 2.
To accompany Report Nº 705
Dated June 1968
THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT
E.L. 15 65 SHEFFIELD, TASMANIA
GROUND MAGNETIC PROFILES
AND RADIOMETRIC RESULTS
PENGUIN AREA
Drawn
Date
Centre
Traced
Checked
O.I.C.
Drawing No
A1-1062
Project No
TSh 14

FIG. 3.



THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E. L. 15/65 SHEFFIELD, TASMANIA
GEOLOGICAL MAP - PENGUIN MINE AREA
after Tas. Mines Dept. 1963

Prepared by: K. H. H.	Centre: Melbourne	
Date: 3·6·68	Drawing No: A3-1049	Project No: TSh 13
Drawn:		

Fig. 3
To accompany. Report N° 705
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