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Report on
RECONNAISSANCE SEARCH FOR PHOSPHATE
in
WESTERN TASMANIA

November, 1967.

CR. 581.

MICROFILMED



by
Maxwell R. Banks,
University of Tasmania.

Hobart,
Australia.

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(follows Page 6)

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INTRODUCTION

Early in July 1967, Mr. Warin, Chief Geologist, requested an extension of an earlier programme of surface sampling for phosphate of rocks of Permian and Lower Paleozoic age throughout Tasmania to include the Lyell Schists and other rocks of Lower Paleozoic age in West Tasmania. Mr. R. D. Beattie was available to commence this work almost immediately, and on confirmation of his appointment by Mr. Warin, I discussed the programme with him in some detail on Friday, July 14, and asked him to obtain some maps, some information from the Mines Department, and to check on registration etc. of the Land Rover forthwith, and these he did.

The programme decided on and followed fairly closely was as follows (see Fig. I for localities):

- July 17: Picked up Rover, drove to Wynyard; collected specimens of Tertiary sandy limestone at an near Fossil Bluff (13 collected; also one specimen of siltstone from Wynyard Tillite was collected).
- July 18: Completed collection at Fossil Bluff; drove along Waratah Highway to near Oonah; collected 23 specimens from the Quamby Mudstone and Wynyard Tillite along highway. Drove to Rosebery along Murchison Highway; collected specimens (5) of Cambrian black, pyritic shale from near Que River.
- July 19: Drove from Rosebery via Renison Bell to Zeehan; collected 42 specimens from Crimson Creek Formation between Rosebery and Renison Bell, 5 specimens from Upper Pre Cambrian near Renison Bell, and 5 from Cambrian rocks between Renison Bell and Zeehan.
- July 20-21: Made detailed stratigraphic collection (41 specimens) in Gordon Limestone at the Smelters Quarry, Zeehan, and immediately adjacent areas.
- July 22-23: Drove to Queenstown and made detailed stratigraphic collection (28 specimens) in Gordon Limestone at Smelters Quarry, Queenstown.
- July 24: Collected specimens (28) of Lyell Schist and associated rocks along Lyell Highway between Queenstown and the Gap at Gormanston (about 1-3/4 road miles of outcrop fresh enough for collection); collected specimens (3) of Gordon Limestone near Linda.

- July 25: Drove to Bubbs Hill and collected specimens (10) of Gordon Limestone.
- July 26: Drove along Crotty Road to Darwin and collected specimens (6) of Ordovician rocks; drove to King River Bridge and collected specimens (6) of Jukes Breccia.
- July 27: Collected specimens of Gordon Limestone (15) from Bubbs Hill.
- July 28: Drove to Hobart.
- August 1: Commenced analyses.
- August 5: Completed analyses.
- August 7: Land Rover returned to Winnaleah.

RESULTS

Pre Cambrian:

The Oonah Quartzite and Slate Formation (Blissett, 1962) was sampled in the immediate vicinity of the Renison Bell Treatment Plant. All specimens collected were black slates but none gave positive results. The location of the sampling sites is shown on Plate 2.

Cambrian:

Black, pyritic slates outcrop in cuttings along the Murchison Highway at and south of the Que River. Five specimens (one in duplicate) were collected from these slates at the Que River and at intervals for the next three miles to the south (Plate 3). These contain sponge spicules, inarticulate brachiopods, dendroids and agnostid trilobites and are younger Middle Cambrian. No phosphate was detected.

Between the Williamsford Turn-off, on the Murchison Highway near Rosebery, and Renison Bell Township, a thick succession of intricately folded slates with subordinate greywackes outcrops. These rocks are grouped as the Crimson Creek Formation and are thought to be Cambrian, probably Lower and early Middle Cambrian (Blissett, 1962, pp. 26-28). The lutites are red, purple or green as well as black and grey. Blissett estimated the thickness in this area

as 8,000 ft., but the structural complexity is such that this figure must be treated with reserve. No stratigraphic section can be provided.

Forty-two specimens were collected along this stretch of the Murchison Highway (see Plates 2 and 4). Two specimens showed traces (approx. 1% P_2O_5) of phosphate by the Shapiro method of rapid analysis. These were specimens of olive grey and biscuit-coloured, fine, even-grained siltstones from just east of the Ring River (B 77, 80) where they were associated with greywackes and a basic (?gabbroic) intrusion which yielded a fainter trace of phosphate (less than 1%)(B 79). Another specimen (B 53) of light and dark-grey siltstone from east of the Exe River yielded a very faint trace only. Four specimens of the Crimson Creek Formation on the Murchison Highway south of Renison Bell (Plate 2) did not yield phosphate.

The intensity of collecting along the Murchison Highway, the main access and main source of outcrop in the area was high (12-15 specimens per mile). Despite this intensity, assessment of the results is difficult because of ignorance of the detailed stratigraphy and structure locally and because of lack of comparative figures from other sections of the same age. Sampling along traverses (1) across the area west of the Serpentine Hill Ultrabasic Complex, (2) from Renison Bell to Commonwealth Hill, (3) along the railway line between Renison Bell and the Rosebery Golf Links and (4) along the Pieman River upstream from the Wilson River to the golf links and up the Huskisson River to the ultrabasic rocks, would be necessary to test the local potential and sampling in other areas; e. g. Mt. Cleveland, Gordon Road, would be necessary to assess the regional significance of any positive results. The sampling suggested in the Renison Bell-Rosebery area would be arduous and logistically difficult, and I do not consider that it is warranted at the present juncture because of better prospects elsewhere, the environment and palaeogeography of which are better understood, and because of activities of other companies already in this area.

The Lyell Schists, host rocks for the copper ore at Queenstown, represent sheared tuffs, lavas and sediments of the Mt. Read Volcanics (Solomon and Elms, 1965) thought to be Cambrian. At several places the orebodies are in or close to bodies of chert; e. g. Comstock and North Lyell, and it is perhaps significant that Wade and Solomon (1958, p. 413) reported aluminium phosphate from one of these chert bodies at Comstock. The schists are cut by veins, some of which reputedly contain phosphate, and by ?Devonian lamprophyric dykes (Wade and Solomon, 1958). Twenty-seven specimens were collected along the Lyell Highway over a distance of about 1-3/4 miles to the west of the Gap near Gormanston (Plate 5). Only one of these specimens (B 190) gave a positive test (estimated P_2O_5 approx. 2-3%) and this came from a

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narrow, weathered dyke, probably lamprophyric (Solomon and Elms, 1965, p. 464).

Of the Cambrian rocks sampled, only the Crimson Creek formation between the Ring River and Colebrook Hill and a gabbro intrusive into these gave positive tests. Cherts of potential interest in the Queenstown area are probably transgressive or pile-like bodies and not sedimentary, although Solomon and Elms (1965, p. 483) refer to them as "apparently a product or associate of Cambrian vulcanism". No further exploration of the Cambrian rocks is recommended at this stage.

Ordovician:

Ordovician fanglomerate containing chert fragments was tested at one place, and Ordovician limestones tested in six areas between Zeehan, Darwin and Bubbs Hill.

The fanglomerate, part of the Jukes Breccia, was tested in road cuttings immediately adjacent to the bridge on the Lyell Highway over the King River (Plate 5). None of the six specimens tested showed detectable phosphate.

The Gordon Limestone was sampled in the Smelters Quarry, Zeehan (Plate 7), in the Smelters Quarry, Queenstown (Plate 5), at Linda (Plate 5), near Darwin (Plate 6) and at Bubbs Hill (Plate 8). The sampling at Zeehan, Queenstown and Bubbs Hill was stratigraphically controlled. Forty-five specimens from a thickness of slightly more than 480 ft. at the Smelters Quarry, Zeehan, failed to yield a positive test (Phosphate Log 1). None of the 28 specimens collected in the 330 ft. of the Gordon Limestone at the Smelters Quarry, Queenstown, yielded phosphate (Phosphate Log 2). No phosphate was detected in any of the 25 specimens collected from about 560 ft. of Gordon Limestone at Bubbs Hill (Phosphate Log 3). Three specimens from the base of the limestone at Linda and six from localities close to the Darwin Road (Plate 9) were also negative.

Considering the sampling done in Gordon Limestone at Flowery Gully, Mole Creek, Railton, Eugenana and Gunns Plains (see previous report, May 3, 1967) with the results from Zeehan, Queenstown and Bubbs Hill obtained during this survey, it is reasonable to infer that there are more phosphatic horizons in the Gordon Limestone the further north-east the limestone is sampled; i. e. the further away from the inferred shoreline the sampling is done, or perhaps more accurately, the closer to the outer edge of the continental shelf during the Ordovician the samples are collected. On this basis, further sampling of the Ordovician system in Western Tasmania is not recommended, as the chance

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of finding littoral lagoonal deposits of phosphate is remote. Close stratigraphic sampling of the limestone in the Florentine Valley and at Ida Bay may eventually be worthwhile. Specimens from both areas were tested without positive result earlier in the year, and both areas are probably too far from the outer edge of the continental shelf to be of immediate interest. The facies change from limestone to deeper water lutite which is thought to mark the outer edge of the continental shelf, occurs near Beaconsfield and Flowery Gully, but cannot be projected south with confidence. It lies west of Maria Island but east of Maydena, probably east of Hobart if projection of trends from Beaconsfield and Deloraine means anything. Cover of Permian and later rocks prevents establishment of this edge without drilling.

These results and inferences focus closer attention on the lutite association of the Mathinna Beds in the Den Range area and north-west of the Den Range through Lisle and beyond, and support the need to attempt to determine the stratigraphic position of the phosphate source-rock at the Den Range and to trace this along the strike of the Ordovician continental slope through successive anticlinal structures in the Mathinna Beds north-west or north-north-west, and south-east or south-south-east of the Den Range.

Permian:

Pebbly mudstone of the Upper Carboniferous and Lower Permian Wynyard Tillite was sampled along the Waratah Highway south of Oonah (10 specimens), and a siltstone of this formation collected at Fossil Bluff, Wynyard (one specimen but did not yield phosphate. This is not surprising and the sampling was partly done through difficulty in being sure of the tillitic nature of the associated beds.

The Quamby Mudstone which overlies the Wynyard Tillite was sampled along the Waratah Highway north and south of Oonah. Of the fourteen specimens collected, two (B 19 and B 26) gave distinct phosphate indications (approx. 2-3%), and another (B 24) gave a very faint positive reaction. Specimen B 19 lies about 275 ft. topographically (and about the same height stratigraphically) above the Bakes Oil Shale Member of the Quamby Mudstone. The oil shale lies approximately 50 ft. above the top of the Wynyard Tillite in a cutting on a Forestry Road known as the Shale Mine Road (see Plate 9). The stratigraphic position of specimens B 24 and B 26 could not be determined during the brief follow-up reconnaissance made by the author because of uncertainty about precise dips and the presence of faulting. It is likely from the reconnaissance made that the thickness of the Quamby Mudstone near Oonah is greater than that (210 ft.) quoted by McNeil (1961, p. 53) for the stratigraphically equivalent Takone Mudstone further west, and closer to that (300 ft.) quoted by Loftus Hills (1913) for this unit at Preolenna. The thickness appears to decrease to the south-west.

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Further work near Preolenna, West Takone, and around Oonah would be necessary to establish the extent, grade and stratigraphic position of the phosphatic beds. The possibility that cold currents deflected northwards and westwards by the "East Coast Peninsula" late in Quamby time welled up into shallowing water along the Cradle Mountain high area and especially into long narrow inlets, perhaps fjords, as the Wynyard-Oonah area seems to have been, was mooted in my first report (January 1964, pp. 23-24). This possibility is strengthened by the results obtained in this reconnaissance traverse and more extensive and precise traverses are warranted to test the possibility further. The area of interest is held by Pickands Mather. Should it subsequently become available it could be delimited by grid lines 918N, 938N, 345E, 375E. Much of this area lies within the Burnie Quadrangle recently mapped by the Department of Mines. Detailed planning of further testing depends on the availability of the results of this mapping from the Department. With a detailed map available the target areas and sections could be selected efficiently within a few hours and sampling and analysis would need to occupy two men only a week to a fortnight.

Tertiary:

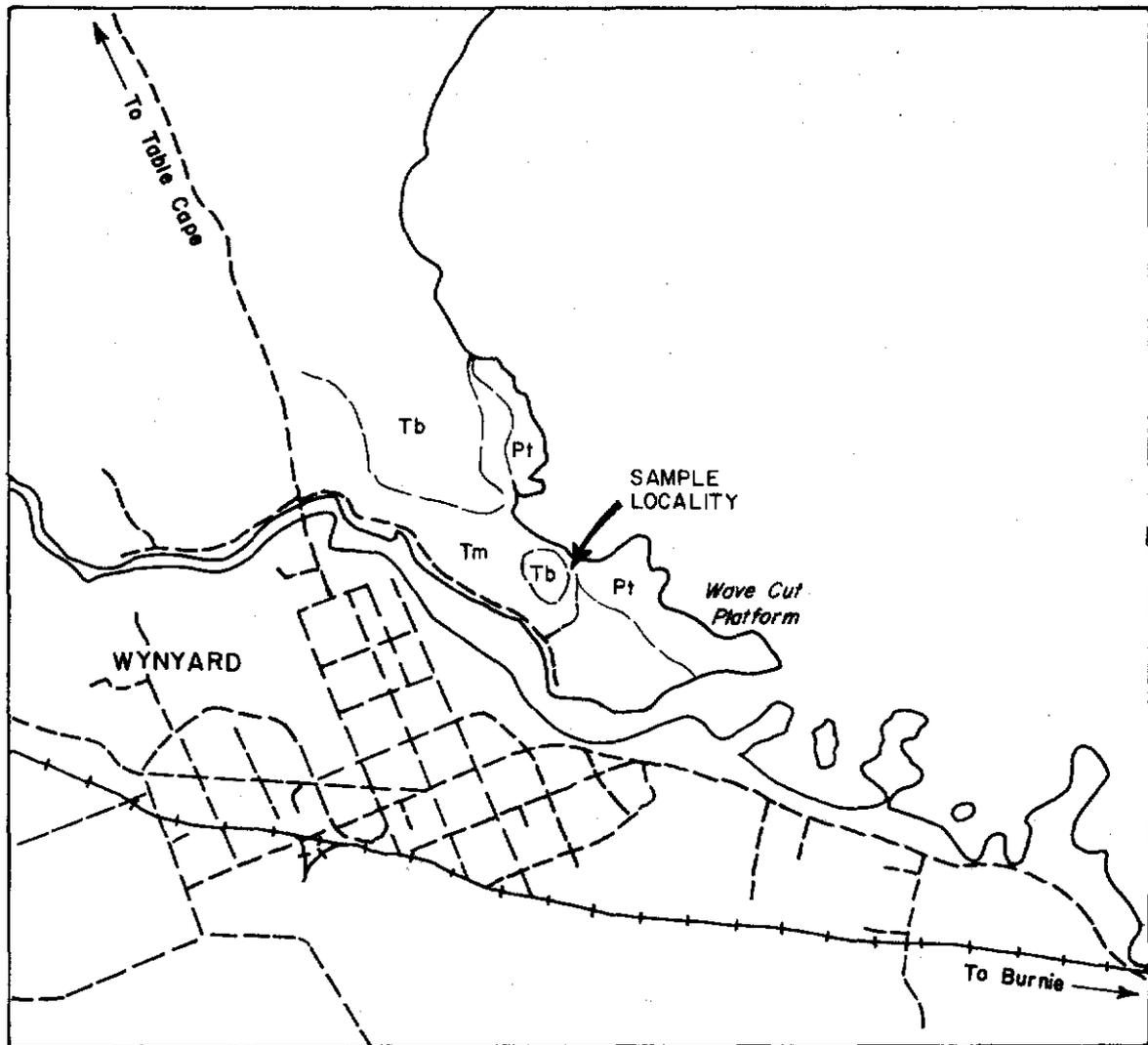
Thirteen specimens of sandstone, calcareous sandstone and glauconitic sandstone from the Tertiary section at Fossil Bluff, Wynyard (Fig. I) produced no positive results.

SUMMARY AND RECOMMENDATIONS

During the last twelve months approximately 850 specimens from Tasmania have been tested for phosphate. The Lower Cambrian Crimson Creek Formation between Renison Bell and Rosebery yielded some phosphatic rocks. Ordovician limestones at Mole Creek and Flowery Gully are phosphatic, and lutites (probably Ordovician) at the Den Range contain phosphatic veins. A weathered (?) lamprophyric dyke at Queenstown gave a positive test, and the Quamby Mudstone at Oonah contains detectable phosphate on at least one horizon.

Further testing of the Crimson Creek Formation is difficult, and without a lot of regional information not very significant, and for these reasons not recommended immediately. The small size and scarcity of lamprophyric dykes rule these out as economic sources of phosphate. Negative tests on the Lyell Schists, the pipe-like nature of the chert masses associated with the copper ore bodies at Comstock and Mt. Lyell and the tenancy of these fields rule out the Lyell Schists and associated rocks as potentially interesting.

The possibility of richer phosphate rocks in the Quamby Mudstone in the Oonah area is a real one. Properly designed traverses along roads, Forestry tracks and creeks and the accompanying analyses would occupy two men less than a



TERTIARY

Tm Table Cape Group
Tb Basalt

PERMIAN

Pt Tillite

LOCALITY MAP
FOSSIL BLUFF

Scale 1 : 31,680
(2 inches = 1 mile)

5 cm

Figure I
Report No. CR 581
M.R. Banks
University of Tasmania
March, 1968

fortnight, provided a suitable geological map can be obtained from the Department of Mines. Such a programme would be worthwhile, but is prejudiced at the moment by the fact that the area is within a lease held by Pickands Mather.

The best prospect is, however, that in the Mathinna Beds in north-eastern Tasmania where phosphate minerals occur in veins at the Den Range and at Turquoise Bluff. A detailed survey to establish the structure of the Den Range and to allow choice of drilling sites most likely to reveal the stratigraphic position of the phosphate-source beds is necessary, followed by search for surface outcrops of the phosphatic bed by examination of anticlinal structures along and close to the structural trend of the Den Range structure or the strike of the continental slope during the deposition of the Mathinna Beds. This part of the work would be assisted by access to the completed or nearly completed geological map of the Beaconsfield quadrangle being produced by the Department of Mines. The area of immediate interest lies between 475E and 510E and 910N to 950N, with particular attention being warranted in the area between 480E and 510E and 920N to 950N (see Plate 1) east of the Tamar River.

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BLISSETT, A. H. , 1962: Explanatory Report. One-mile Geological Map Series - Zeehan. Dep. Min. Tasm.

HILLS, C. L. , 1913: Preolenna Coal Field and the Geology of the Wynyard District. Bull. geol. Surv. Tasm. , 13.

McNEIL, R. D. , 1961: Geological Reconnaissance of the Arthur River Area. Tech. Rep. Dep. Min. Tasm. , 5, pp. 44-60.

SOLOMON, M. , and ELMS, R. G. , 1965: Copper Ore Deposits of Mt. Lyell. Geol. of Aust. Ore Deposits 2nd Edit. , 8th Comm. Min. Metall. Congr. , Vol. 1, pp. 478-484.

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PHOSPHATE LOG

Quadrangle No. ZEEHAN

Section of GORDON LIMESTONE Group, formation etc.
Smelters Quarry (see field note book)

Sheet No. 1

Section begins at E. N; elevation m. (ft.); traverse proceeds in direction T

with elevation / depression

Beds dip 4.1° at units 1-6
0.1° at units 7-12

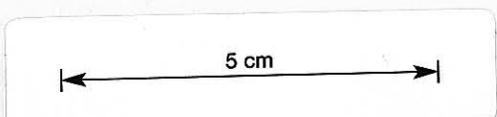
Scale of compilation 4.8 m. / cm. 405t-1?

OBSERVER R. D. BEATTIE

DATE 20/21. 7. 67

Unit Number	Thickness (m.) Min. Mod. Max.	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.) C. B.	Stamps	Concretions	Algae &	Main Fossil	GPS.	Specimen Number	Name	Notes
9																	between units 12 & 13 large thickness, poorly exposed limestone with some chip samples (see field Note Book)
8																	
7																	
6																	
5	12.6								0.2 to 1				trilobites, brachiopods at top		B 118 7-16m B 117 0-7m	hst	variably dolomitic
4	11.7	5 ⁺	4						21						B 115	Lst.	massive, dolomitic
	10.5												trilobites, brachiopods		B 113, 4	Lst	apparently little dolom.
	9.5	4 to 5 ⁺	2						?						B 112	dolom. hst.	basal 0.3-0.6 m very pure, lt grey hst
3	8.5	5 ⁺	4										gastropod		B 110 B 109	Lst	massive, dolomitic in parts
	7.10														B 108 B 107	hst.	some lenses of dolomite near base and at top
2	6.15								?				see field note book		B 106 B 105 B 104 B 103 B 102 B 101	sheared and unshered hst.	convenient unit for a weathered poorly exposed section
1	5.2								?						B 100	Lst.	sheared
	4.4								>0.5				worm casts		B 98, 9	Lst	weathered
	3.1								?						B 97	Lst	unweathered
	2.5								0.1 to 1.3						B 96	dolomitic Lst.	weathered
	1.5								1.5						B 95	Lst	bands of dolom and recryst calcite

Log 1 (1)
Report No. CR 581
M.R. Banks
University of Tasmania
March, 1968



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PHOSPHATE LOG

Quadrangle No. ZEEHAN

Section of GORDON LIMESTONE Group, formation etc.
base of small quarry just east of Smelters Quarry

Sheet No. 2

Section begins at E. N; elevation m. (ft.); traverse proceeds in direction 41° T

with elevation 15° / depression

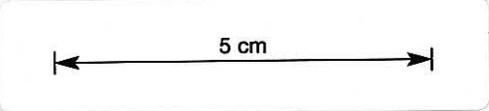
Beds dip 41° T at 75°

Scale of compilation 40 ft / 1" = 4800 m. / cm.

OBSERVER R. D. BEATTIE

DATE 21. 7. 67

Unit Number	Thickness (m.)	φ Min.	φ Mod.	φ Max.	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.) C. B.	Stamps	Concretions	Algae %	Main Fossil	GPS.	Specimen Number	Name	Notes	
9																					
8																					
7																					
6																					
5																					
4																					
3																					
2	18.25											0.25						not obs	B131	Lst	dolomitic hard occasionally present
	17.8											?						not obs	B130	Lst	beds broken up (probably soil slip)
1	16.15											0.01						not obs	B128,9	Lst	
	15.7											?						not obs	B127	Lst	beds broken up
	14.21																	not obs	B125,6	Lst	
	14																		B124	deeply weathered zone	
00	13.4											0.2						brachs triles	B123	Lst	weathered non-dolomitic



PHOSPHATE LOG 2

Quadrangle No. LYELL A

Section of GORDON LIMESTONE Group, formation etc.
north side of west end of Smelters Quarry, Q'ROWN

Sheet No. 1

Section begins at (see Field Note-book); elevation m. (ft.); traverse proceeds in direction.....°T

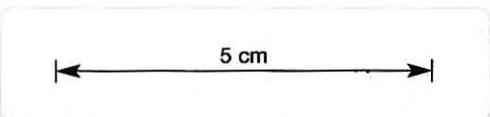
with elevation.....°/depression.....°.

Beds dip 298 °T at 78 °.

Scale of compilation 20ft = 1"
2.4 m. / cm.

OBSERVER R.D. BEATTIE DATE 22/24.7.67

Unit Number	Thickness (m.)	Min.	Mod.	Max.	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.)	C. B.	Stamps	Concretions	Algae %	Main Fossil	GPS.	Specimen Number	Name	Notes	
16	6											0.2 0.6 0.3								B151	calci-lutite	dolomitic; rare shaly partings; light & dark bands present
15	10											21								B150	dolomitic calci-lutite	dolomite max % - 60 av. % - 40-50
14	12											0.5								B148	calci-lutite	thinly banded
13	10											0.5								B147	dolom. c.-l.	
12	23											0.5								B146	dolom. c.-l.	
11	20											0.2								B145	dolom. c.-l. to c.-l.	top 0.6m. non. dolom. gas in centre basal 0.75m. dolom.
10	7.5											0.5								B144	dolom. c.-l.	est. 20-30% dolom.
9	12											0.15								B143	c.-l.	non. dolom. shaly bands
8	1.8											0.3								B142	dolom. c.-l.	5% dolom.; 3x2" "shaly" bands
7	1											0.15								B141	c.-l.	"shaly" bands
6	4											?								B140	dolom. calci-lutite	
5	6											0.2								B139	dolom. calci-lutite	dolom. 0-20% stylolitic.
4	3.5											0.3								B138	dolom. c.-l.	
3	4											0.1								B137	calci-lutite	parts of basal 1.5m. dolomitic
2	1.4																					no exposure
1	2.6																			B136	calci-lutite	
1	5.5											21								B135	dolom. calci-lutite	



PHOSPHATE LOG

Quadrangle No. LYELL A

Section of GORDON LIMESTONE Group, formation etc.
Smelters Quarry, Q. TOWN

Sheet No. 2

Section begins at E. N; elevation m. (..... ft.); traverse proceeds in direction T
with elevation / depression

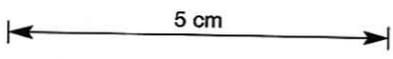
Beds dip 198 ° T at 88 °

Scale of compilation 20 ft = 1"
2.4 m. / cm.

OBSERVER R. D. BEATTIE

DATE 24.7.67

Unit Number	Thickness (m.)	φ Min.	φ Mod.	φ Max.	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.)	C. B.	Stamps	Concretions	Algae %	Main Fossil	GPS.	Specimen Number	Name	Notes
9	22.12				-											5-10	gast. Girvaella		B159	dolom. c.l.	dolomitic "beds"
6	21.55				-												+?		B158	dolom. c.l.	
5	20.55				-												algae? corals?	+?	B157	dolom. c.l.	5-20% dolom.
4	19.35				-												-?		B156	dolom. non-dolom. c.l.	basal 1.5m with beds av. 0.2m; non dolomitic
3	18.75				-												Fossils through-out trilos, gastros, etc		B155	dolom. c.l.	dolom. av 20-40% but reaches 50-60% bedding not clear
2					-														B154		foetid in parts
1	17.7				-												+ throughout gastros		B153		
0					-														B152	dolom. c.l.	dolom. av. 20-40% max. 50% foetid



PHOSPHATE LOG 3

Quadrangle No. LYELL B

ion of GORDON LIMESTONE Group, formation etc.
see field note book

Sheet No. 1

ion begins at E. N; elevation m. (ft.); traverse proceeds in direction.....°T

with elevation°/depression.....°

40 St - 1"

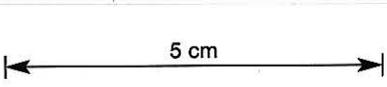
ds dip 23 ° T at 6 °

Scale of compilation 4:8 m. / cm.

OBSERVER R. D. BEATTIE

DATE 25/27.7.67

Unit Number	Thickness (m.)	Min. ϕ	Mod. ϕ	Max. ϕ	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.)	C. B.	Stumps	Concretions	Algae %	Main Fossil	Specimen Number	Name	Notes
12	7	4.5	3	-	-	-	-	-	-	-	-	0.3	-	-	-	-	+ ?	B218	hst.	non-dolom.
9	11	8	5	3	-	-	-	-	-	-	-	0.5	-	-	-	-	+ ?	B217	v. fine calc-arenite	mostly non-dolom
10	10		4 or 5	-	-	-	-	-	-	-	-	0.5	-	-	-	-	rare or absent	B216	hst.	dolom. av. 5%
9	9.5				-	-	-	-	-	-	-	0.1 to 0.3	-	-	-	-	12.5 cm. Fossil bed at 4.5 m.	B202	hst.	
8	11				-	-	-	-	-	-	-	-	-	-	-	-	+ ?	B201	hst.	dolom. to 5%
7	12				-	-	-	-	-	-	-	0.5	-	-	-	-	present in top metre	B200	hst.	< 2-3% dolom.
6	16				-	-	-	-	-	-	-	0.2 to 0.3	-	-	-	-	rare but present near top gastros	B199	hst.	halfway up unit 2.2 to 2.4 m. dolom. top 4.5 m. non-dolom.
5	8	5.6	5.6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	B198	Lst.	relatively pure
4	11		4 or 5		-	-	-	-	-	-	-	-	-	-	-	-	-	B197	Lst.	both dolom. and non-dolom.
3	12				-	-	-	-	-	-	-	0.5	-	-	-	-	+ ?	B196	fine-grained calcaren. or coarse calcilut.	2-12 m. 0-50% dolom 0-2 m. non-dolom
2	7				-	-	-	-	-	-	-	0.5	-	-	-	-	+	B195	Lst.	dolom. av. 10-20%
1	10			3	-	-	-	-	-	-	-	0.5	-	-	-	-	-	B194	Lst.	both dolom. and non-dolom.



Log 3 (1)
Report No. CR581
M.R. Banks
University of Tasmania
March, 1968

158017

PHOSPHATE LOG

Quadrangle No. LYELL B

Section of GORDON LIMESTONE Group, formation etc.

Sheet No. 2

Section begins at E. N; elevation m. (ft.); traverse proceeds in direction °T
with elevation °/depression

Beds dip 23 °T at 6 °.

Scale of compilation 4.8 m. / cm. 40' = 1"

OBSERVER R. D. BEATTIE

DATE 27.7.67

Unit Number	Thickness (m.) φ Min. φ Mod. φ Max.	Chert	Clastics %	Phosphate %	Pyrite	Carb. Matter	Oolites	Glauconite	Bed Thickness (m.) C. B	Stumps	Conc.	Al.	Main 'S.	Specimen Number	Name	Notes
18	5.9	-	-	-	-	-	-	-	-	-	-	-	-	B225 B224	Lst.	non-dolom. dolom.
17	7	-	-	-	-	-	-	-	-	-	-	-	-	B223	Lst.	exposure limited
16	14	-	-	-	-	-	-	-	-	-	-	-	+ in top 2.5-3m. incl. silicified corals	B222	Lst.	
15	7	-	-	-	-	-	-	-	-	-	-	-	-	B221	Fine-grd calcarenite	dolom. and non-dolom.
14	7.5	-	-	-	-	-	-	-	-	-	-	-	present but rare	B220	Lst.	dolomitic esp. top 3m. where 5-10% present
13	4	-	-	-	-	-	-	-	-	-	-	-	+ esp. top 7.5cm	B219	v. fine calcarenite	dolom. and non-dolom. beds

5 cm

Lower Ordovician sandstone occur near the Dolcoath Granite at Round Mountain.

Granitic rocks at Renison Bell, Mt Bischoff and Dolcoath have tin deposits close to them and zinc-lead deposits at Zeehan and Dundas, Magnet and Round Mountain as more distant holes.

Deposits not related to Granite: Gold, zinc, lead and copper occur in several rocks. Faulted Lower Ordovician Mathinna Beds trending 80° in a northerly direction, and quartz veins also trending north.

Sulphides occur at Chester, Mt Chester, pyrite, Galena and sphalerite trending from a belt of Cambrian Steep easterly cleavage and chalcopyrite in grey shale under Williamsford a cleavage. At occur disseminated volcanic rocks glomerate. The folding and west Fault Zone and Zone. The scale minor scale.

Ice flowing State during past time. This ice with a high are position of the present near W

Early in the of ice on high Mountain and dotted with islands between the high bonaceous pyrite horizon of algal ularly polyzoa dropped erratics and richly fossiliferous near the shore very fossiliferous flourished during fossiliferous numbers of fossils and deltas advanced land. Deposit carbonaceous the coastal plain *teris, Gangamopteris*, *Gangamopteris* ished. The sea a narrow north and the same type plain as on the over the coastal fossiliferous. These rocks were ance of polyzoa teropods and

killed a little later as sand-laden currents from shallow water close to the rejuvenated highlands to the northwest and northeast spread sand and pebbles over the sea floor. The sands were overlain by unfossiliferous siltstone containing a few erratics, and then by siltstone containing an abundance of brachiopods, pelecypods and polyzoa, the result of recolonization of the areas previously swamped by sand and pebbles. Further sand-laden currents deposited more sand and

67-481

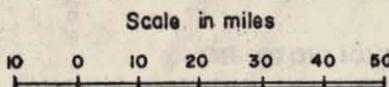
UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

GEOLOGICAL MAP

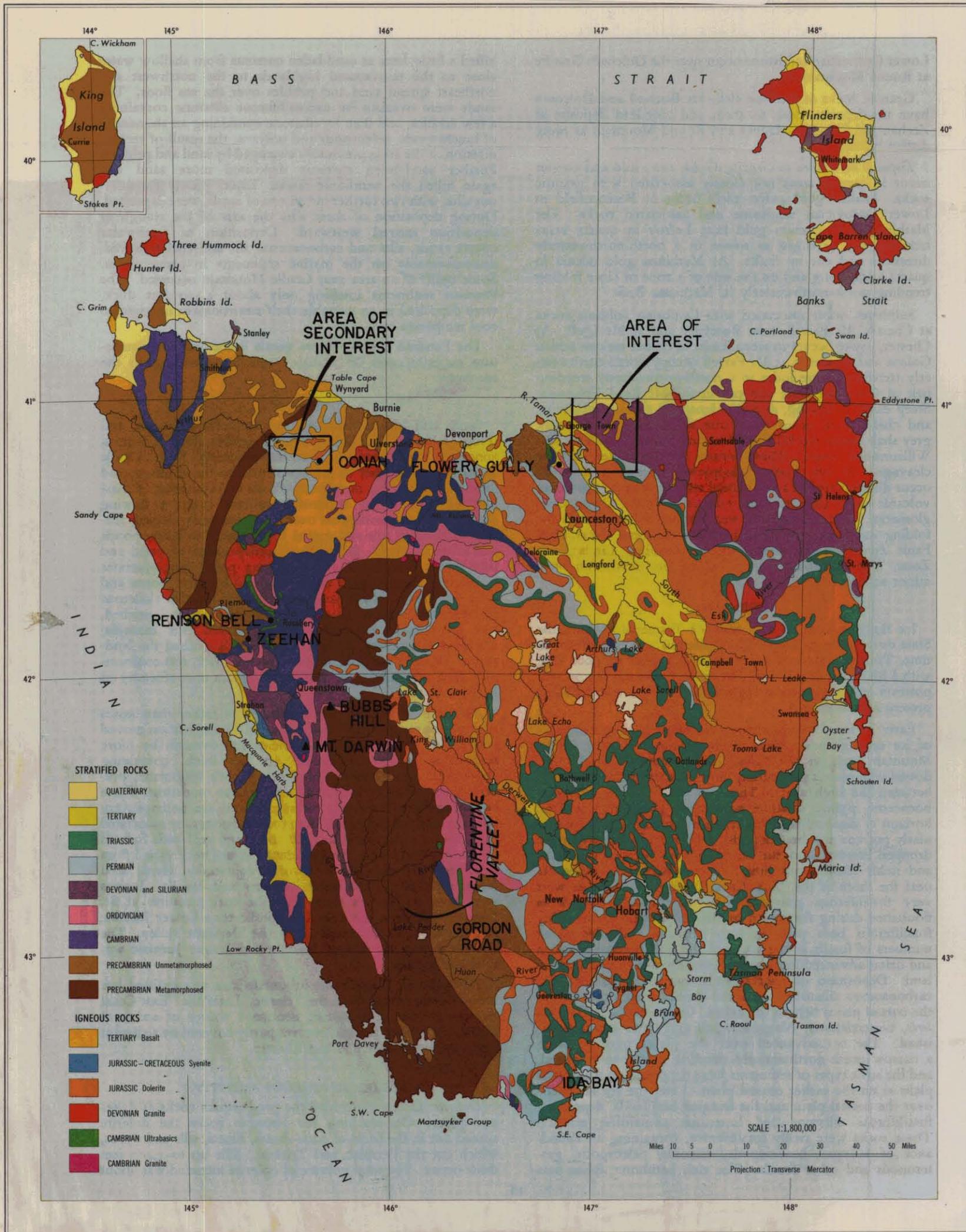
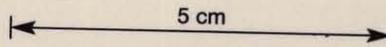
TASMANIA

SHOWING LOCALITIES MENTIONED AND AREAS OF INTEREST

Plate I



Report No. CR 581
M.R. Banks
University of Tasmania
March, 1968.



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UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

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TOPOGRAPHIC MAP

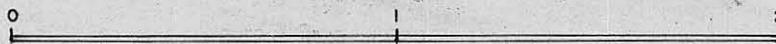
ZEEHAN

SHOWING
SAMPLING SITES

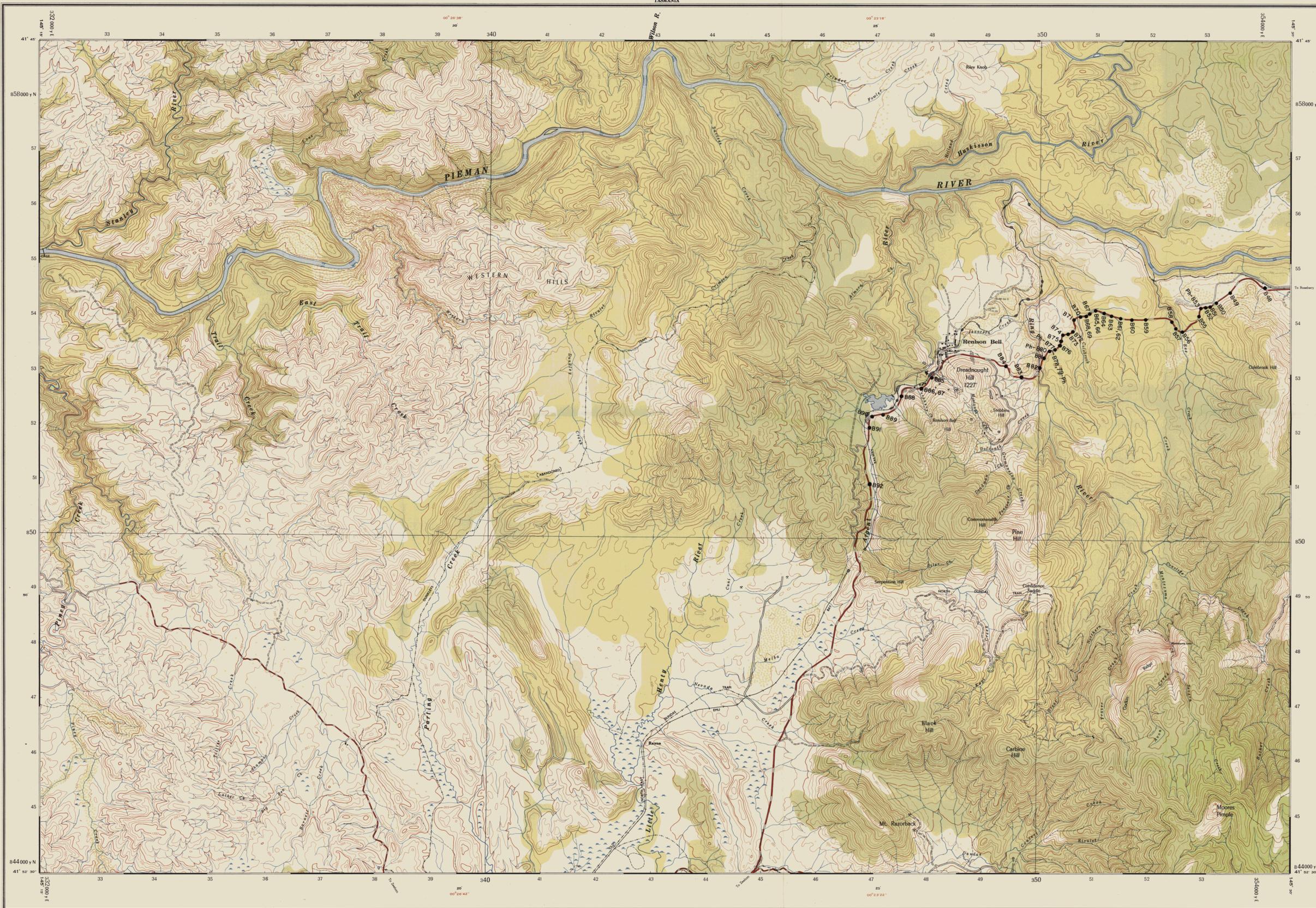
Plate 2

Plate

Scale in miles



Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968



TOPOGRAPHICAL SERIES
1st EDITION
Reference: T40 50B 1
Issued by authority of the Hon. D. A. Cashion
Minister for Lands and Works.

PRODUCTION: In compliance with National Mapping Standards by the MAPPING BRANCH, Lands and Surveys Department Hobart 1962
DETAIL: Aerial Photography 1955
NOMENCLATURE: Approved by the Nomenclature Board of Tasmania.
PROJECTION: Transverse Mercator.
LEVEL DATUM: Mean Sea Level of Hobart.
CONTROL: 2nd and 3rd order Triangulation based on Lochmaben Astronomical Station, Lat. 41° 38' 23.38" S, Long. 147° 17' 49.725" E.
GRID CONVERGENCE: Based on Long. 146° 00'. To obtain true bearing use correction as shown in brown in margin of map.
Origin of co-ordinates: is 400,000 yards West and 1,800,000 yards South of the True Origin of Zone 7.

- Roads**
- 1st Class Sealed
 - 2nd Class Metal or Gravel
 - 3rd Class
 - 4th Class Unmetalled
 - Vehicle Track
 - Foot or Pack Track
 - Gate, Cattle-grid Bridge
- Railways**
- Douglas Line
 - Single Line
 - Light Railway or Tram
 - Embankment Cutting
- Trig. Stations**
- 2nd Order
 - 3rd Order
 - 4th Order
 - Astronomical Station
 - State Permanent Mark
- Buildings and Structures**
- Major building
 - Minor building
 - Post Office
 - School
 - Church
 - Hospital
 - Garage
 - Hotel
 - Mine
 - Factory or Mill
 - Dismantled
 - Windmill
 - Lighthouse
 - Cemetery
 - Wireless Mast

- Electric Transmission Line**
- Telephone Line**
- Stone Fence or Wall**
- Quarry**
- Gravel Pit**
- Cave**
- Wreck**
- Sand**
- Mud**
- Waterhole**
- Water Tower**
- Falls**
- Rapids**
- Swamp or Marsh**
- Subject to inundation**
- Contours**
- Depression**
- Form Lines**
- Timber and/or Scrub**
- Dense Coverage
 - Medium
 - Light
- Moorlands and/or Button Grass**
- Pine Plantation**
- Orchard**
- The representation of a road or track on this map is no evidence of the existence of a right-of-way.

INDEX TO ADJOINING SHEETS

PIEMAN RIVER	CORINNA	MACKINTOSH
	A B	MURCHISON
	C D	
	STRAHAN	LYELL

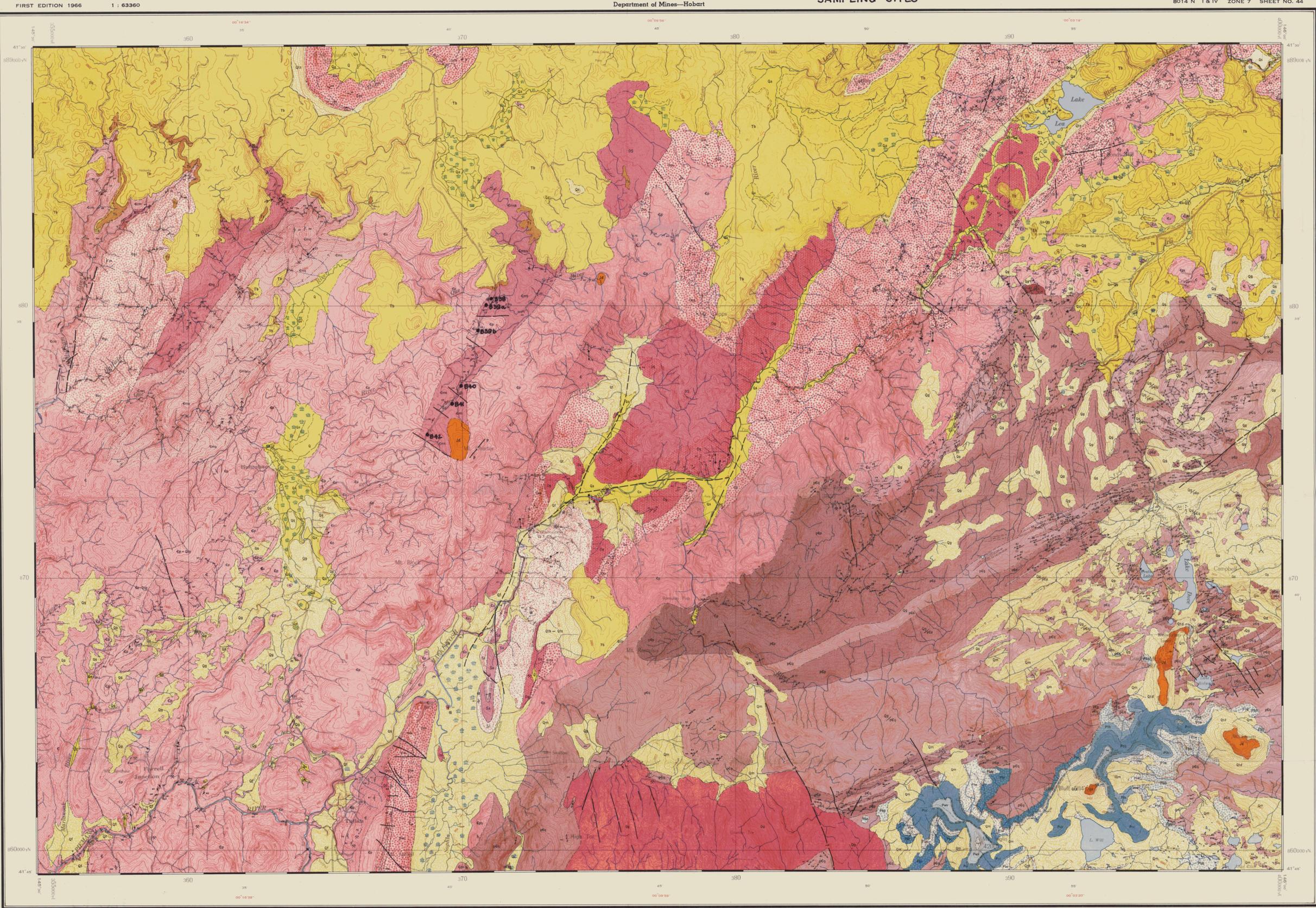
Magnetic Variation from True North for the centre of this sheet is approximately 11°53'E.

ANNUAL CHANGE ABOUT 6"E.



SCALE 40 CHAINS TO 1 INCH
CONTOUR INTERVAL 50 FEET
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- REFERENCE**
- Quaternary**
 - Qa Alluvium and swamp deposits
 - Qt River terrace sediments
 - Qtb Talus deposits of basalt (Qtb), dolerite (Qtd), sandstone (Qts), porphyry (Qtp)
 - Qm Moraine
 - Qg Silvioglacial deposits
 - Qg includes periglacial deposits
 - Tertiary**
 - Tb Siliceous conglomerate, grt, occasional fossiliferous sandstone and clay
 - Td Unconformity
 - Permian**
 - Pf Sandstone and shale (= Ferntree Group)
 - Pm Mt. Inglis Sandstone
 - Pw Waterfall Valley Siltstone
 - Ps Benson Peak Sandstone
 - Pc Cradle Cirque Siltstone
 - Ph Lake Holmes Coal Measures
 - Pp Lake Will Pebbly Siltstone
 - Pb Barn Bluff Conglomerate
 - Pd Bluff River Pebbly Siltstone
 - Silurian**
 - Sa Unconformity
 - Ss Siltstone (? = Austral Creek Siltstone)
 - Sq Quartzite (= Keel Quartzite)
 - Sr Fossiliferous shale (= Amber Slate)
 - Sz Quartzite (= Crotty Quartzite)
 - Ordovician**
 - Or Gordon Limestone
 - Oo Correlate of Owen Conglomerate; sequences of predominantly quartz sandstone (Oos) or siliceous conglomerate (Ooc) indicated
 - Oc Conglomerate, including pebbles of Cambrian porphyries
 - Cambrian**
 - Os Undifferentiated Ordovician - Silurian siltstone and sandstone
 - Um Unconformity
 - Em Mudstone and slate with sandstone (s)
 - Emc Mudstone, quartzite and greywacke sequence with conglomerate (c) horizons and thicker mudstone (m) layers indicated
 - Ch Greywacke and mudstone sequence of the Hatfield River
 - Gc Greywacke conglomerate - sandstone and mudstone sequence
 - Lm Limestone conglomerate
 - Ms Mudstone and greywacke sequence of the Coldstream River with bedded limestone localities indicated (l)
 - Cu Undifferentiated igneous and sedimentary rocks
 - Precambrian**
 - U Unconformity
 - Sh Shales, siliceous sandstone - siltstone
 - Qz Quartzite and platy quartzite with subordinate pelitic layers
 - Ps Pelitic sequence of phyllite and micaceous schist with subordinate quartzite
 - Igneous Rocks**
 - Tb TERTIARY Basalt
 - Jd JURASSIC Dolerite
 - Dg DEVONIAN Granite
 - Ep CAMBRIAN Predominantly quartz and quartz felspar porphyries. Occasionally with flow banding (Epf); sedimentary inclusions (Eps); porphyry inclusions (Epi)

- Geological boundary — observed
 - Geological boundary — position approximate
 - Geological boundary — inferred
 - Geological boundary — inferred and concealed
 - Geological boundary — surface interpretation
 - Airphoto linear
 - Strike and dip of beds — right way up, overturned
 - Vertical and horizontal bedding
 - Strike and dip of beds — facing unknown
 - Strike and dip of bedding in igneous rocks: vertical banding
 - Dip slope
 - Lineation
 - Strike and dip of dyke
 - Minor fold: direction and plunge (note kink bands omitted)
 - Fault: exposed (downthrown side indicated)
 - Fault — position approximate (downthrown side indicated)
 - Fault — position inferred (downthrown side indicated) and concealed
 - Shatter zone
 - Strike and dip of cleavage: vertical cleavage
 - Strike and dip of joint: vertical joint
 - Landlip
 - Macrofossil locality
 - Plant fossil locality
 - Mine or prospect
 - Minor mineralisation (p-pyrite; g-galena; h-hematite)
- Schistose structures in Lower Palaeozoic rocks of N.E. quadrant
- Strike and dip of earlier, and probably earlier schistosity and cleavage; vertical schistosity and cleavage
 - Strike and dip of later, and probably later schistosity and cleavage; vertical schistosity and cleavage
- Structures in Precambrian rocks:
- S₁ Strike and dip of platy parting, possibly bedding, in quartzitic layers and lithological banding in pelitic rocks; vertical S₁
 - S₂ Strike and dip of strain slip cleavage in quartzitic layers and transposition surface in pelitic rocks believed equivalent; vertical S₂
 - S₃ Strike and dip of closely spaced planes in quartzitic layers and schistosity in pelitic rocks believed possible equivalents; vertical S₃
 - Strike and dip of undifferentiated surfaces; vertical surfaces
 - L₁ Direction and plunge of early lineation in quartzitic layers, and intersection of S₁, S₂ in pelitic rocks associated with mineral orientation
 - L₂ Direction and plunge of intersection S₂ and S₃
 - L₃ Direction and plunge of strong quartz mineral line in quartzitic rocks; Creulation lineation on S₃ in pelitic rocks with axial plane dip indicated where known
 - L₄ Creulation lineation on S₃ in pelitic rocks with axial plane dip indicated where known
 - Direction and plunge of undifferentiated lineations
 - Direction and plunge of earliest minor folds associated with L₁
 - Direction and plunge of later minor folds associated with an omitted creulation
 - Direction and plunge of later minor folds associated with L₁
 - Direction and plunge of latest minor folds associated with L₁

CONTROL: 2nd and 3rd Order Triangulation based on Lochmaber Astronomical Station Lat. 41° 28' 23.88" S Long. 142° 17' 18.72" E.

DETAIL: Aerial Photography 1956

PROJECTION: Transverse Mercator

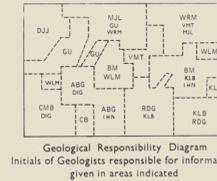
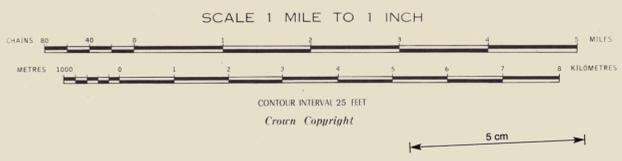
LEVEL DATUM: Mean Sea Level Hobart

NORMALEPHE: Approved by the Nomenclature Board of Tasmania

GRID CONVENTIONS: Based on Longitude 146° 00' E. To obtain True Bearing see correction as shown in margins of map.

INDEX TO ADJOINING SHEETS

MAGNET	ST. VALENTINES	SHEFFIELD
CORINNA	MACKINTOSH	MIDDLESEX
ZEBHAN	MURCHISON	DUCANE



Geology by C. M. Barton B.Sc., Ph.D., F.G.S., K. L. Burns B.Sc., Ph.D., F. D. Caw B.Sc. (Hons), D. I. Groves B.Sc. (Hons), A. B. Gulliver B.Sc., D. I. Jennings B.Sc. (Hons), M. I. Loomom B.Sc., A.M.Aus., I.M.M., B. Marshall B.Sc., Ph.D., A.R.C.S., F.G.S., W. L. Mathews B.Sc., W. R. Moore B.A., M.Sc., H. Nagvi B.Sc. (Hons), V. M. Tweedie B.Sc., G. Urquhart M.Sc. with acknowledgments to C. Brooks B.Sc. (Hons) (University of Tasmania) and Rio Tinto Australian Exploration Pty. Ltd.

Base map adapted from 40 chain to 1 inch sheets produced by the Lands and Surveys Department, Hobart.

Geological Map production by the Drawing Office, Department of Mines, Hobart.

E. Williams, B.Sc., Ph.D., F.G.S., Senior Geologist in charge of Regional Mapping

I. B. Jennings, B.Sc. (Hons), Chief Geologist

Compiled under the direction of J. G. Symons, B.E., Director of Mines.

Issued under the authority of the Honourable Dr. E. Reece, Minister for Mines.

Published 1965

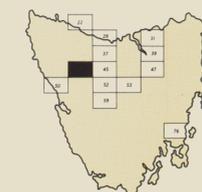


PLATE 3
020

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

67-481

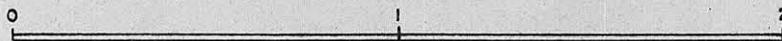
TOPOGRAPHIC MAP

ROSEBERY

**SHOWING
SAMPLING SITES**

Plate 4

Scale in miles



Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968

1:31680

MAP SHEET MURCHISON

A	B
51	
C	D

158024

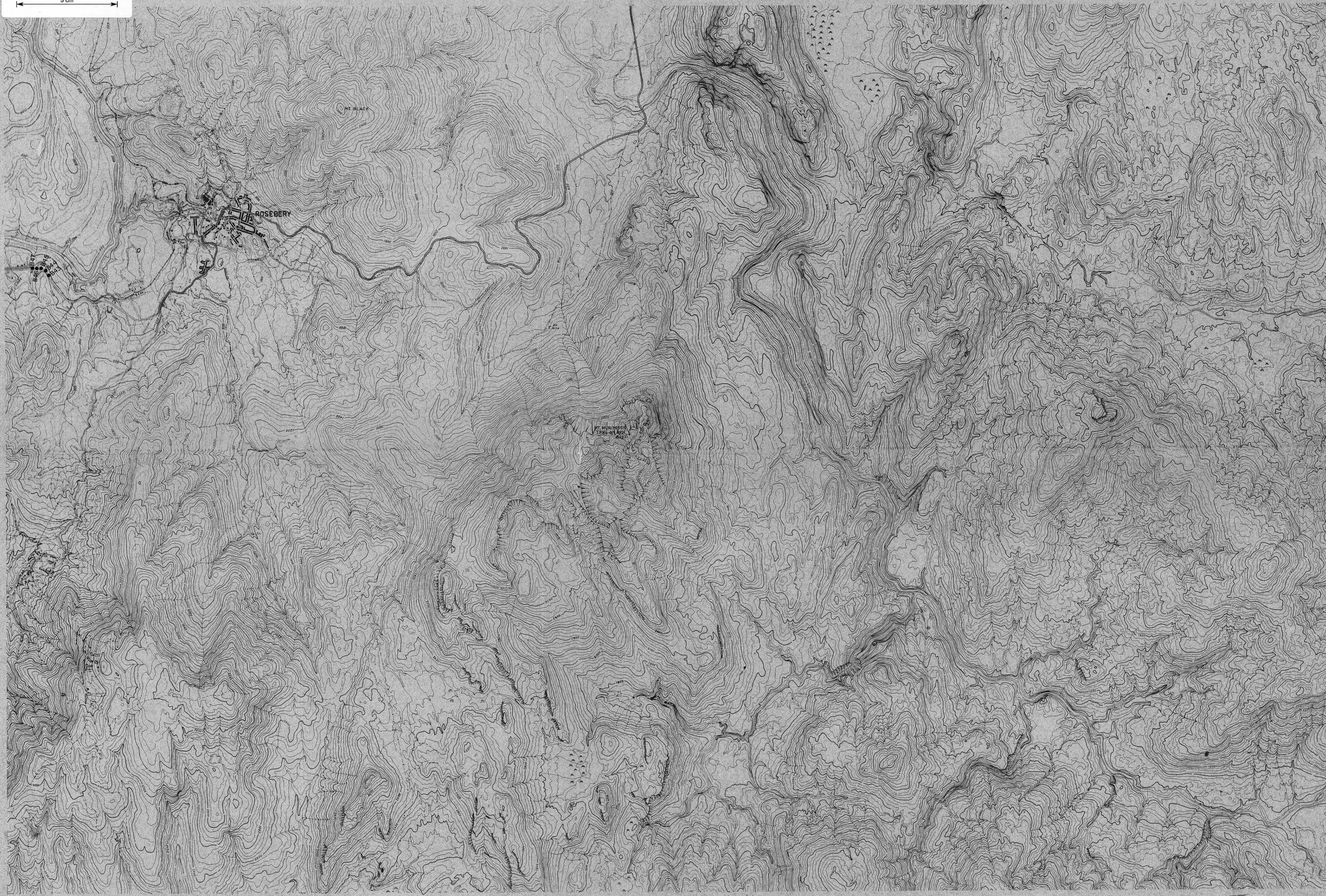
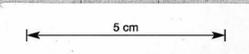


PLATE 4
021

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158025

67-481

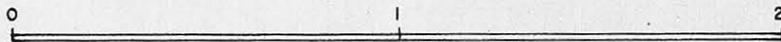
TOPOGRAPHIC MAP

QUEENSTOWN

SHOWING
SAMPLING SITES

Plate 5

Scale in miles



Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968

1:31680

5 cm

MAP SHEET : LYELL

A	B
C	D

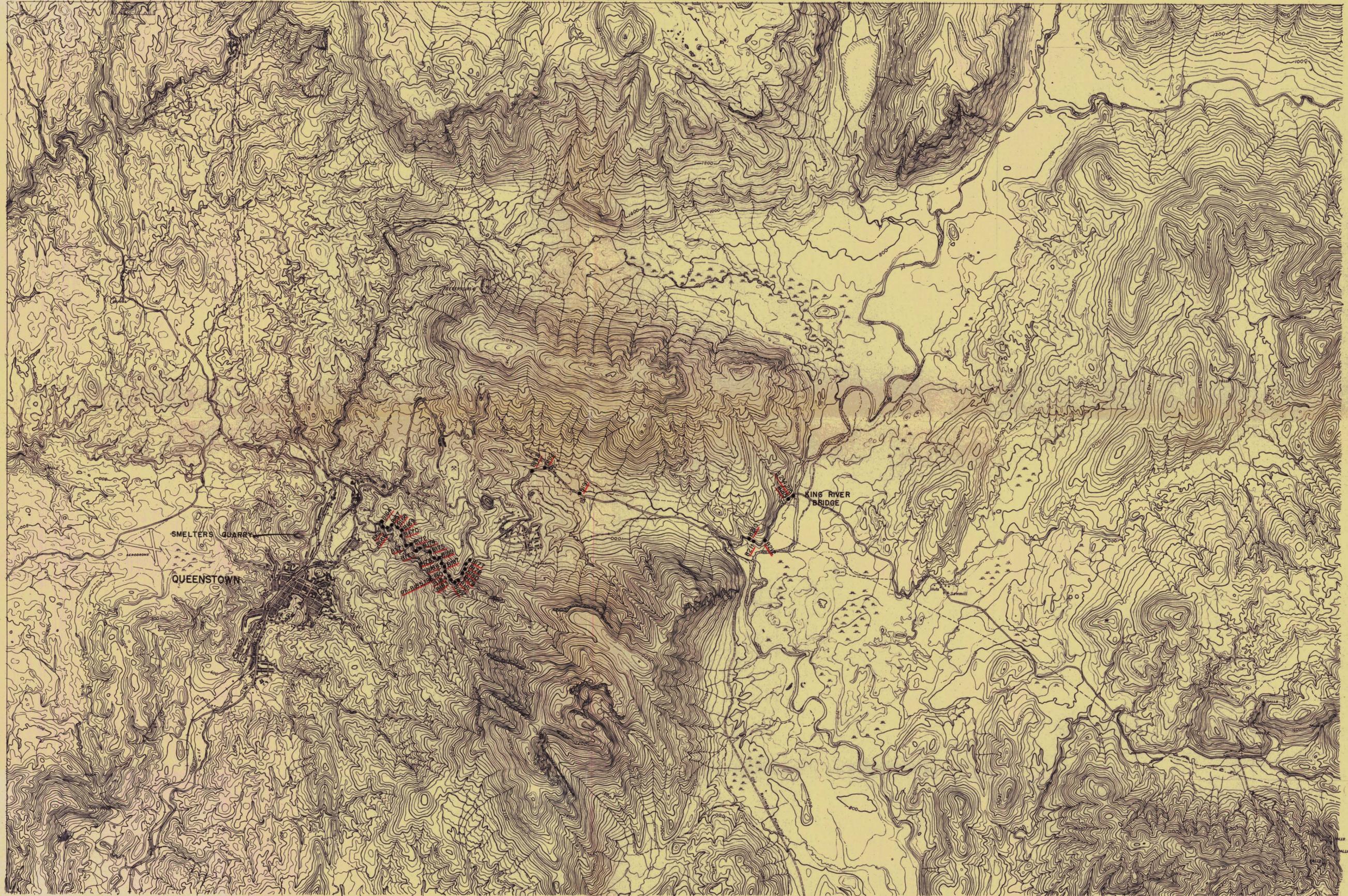


PLATE 5 4660

158026

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158027

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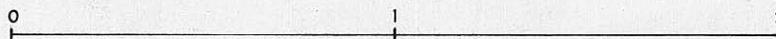
TOPOGRAPHIC MAP

KING RIVER

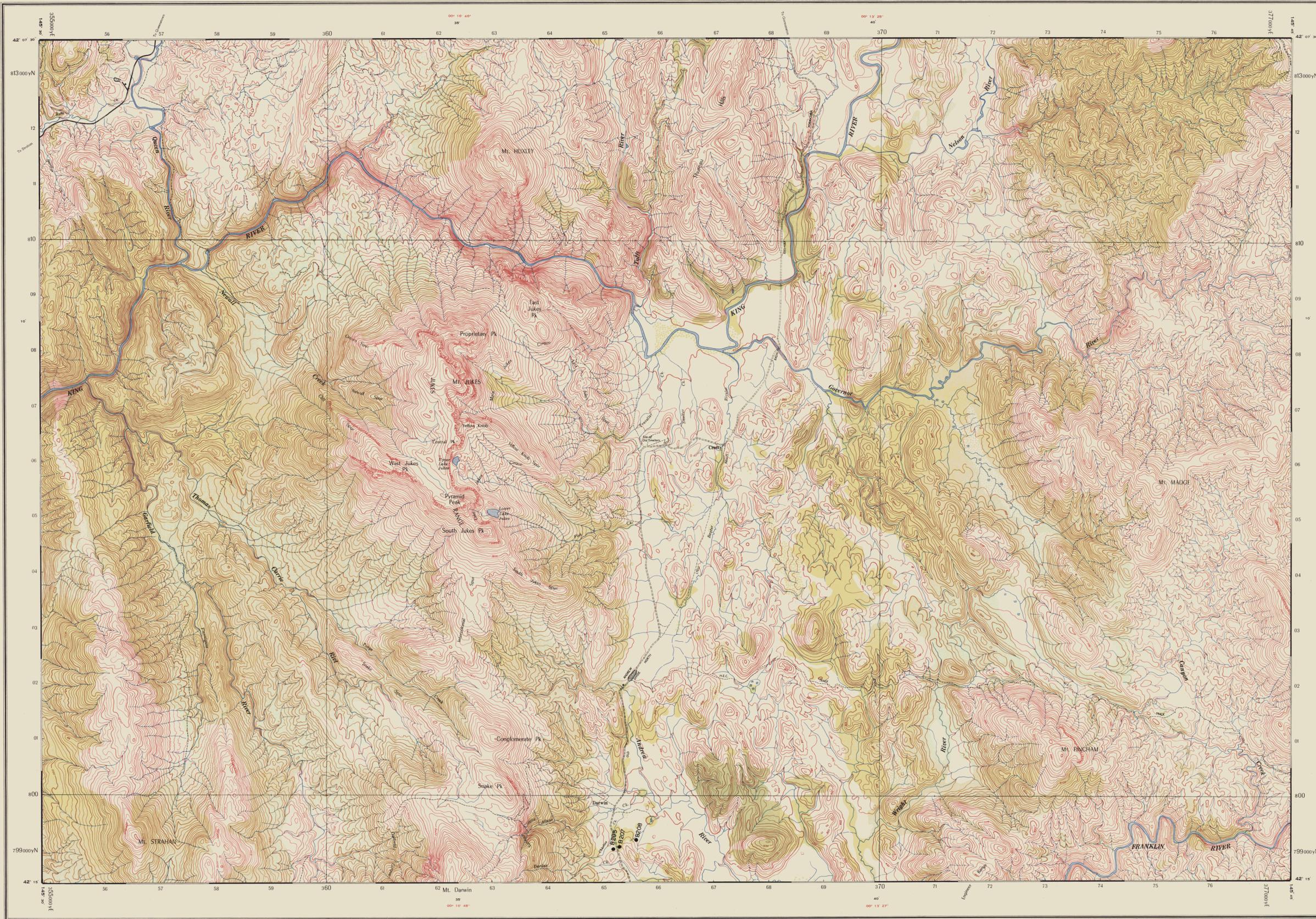
SHOWING
SAMPLING SITES

Plate 6

Scale in miles



Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968



TOPOGRAPHICAL SERIES
1st Edition
Reference: T4058C/1

Issued by authority of the Hon. Eric Reece,
Minister for Lands and Works.

PRODUCTION: In compliance with National Mapping
Standards by the **MAPPING BRANCH**
Lands and Survey Department Hobart 1958

DETAIL: Aerial Photography 1953.

NOMENCLATURE: Approved by the Nomenclature
Board of Tasmania.

PROJECTION: Transverse Mercator.

LEVEL DATUM: Mean Sea Level at Hobart.

CONTROL: 2nd and 3rd order Triangulation based on
Lochmaben Astronomical Station.
Lat. 41° 38' 23.389" S.
Long. 147° 17' 49.725" E.

GRID CONVERSION: CE based on Long. 146° 00'.
To obtain true bearing use correction as shown
in boxes in margin of map.

Origin of coordinates is 400,000 yards West and
1,800,000 yards South of the True Origin of Zone 7.

- Roads**
- 1st Class Sealed
 - 2nd Class Metal or Gravel
 - 3rd Class
 - 4th Class Unmetalled
 - Vegetable Track
 - Foot or Pack Track
 - Gate
 - Cattle-grid
 - Bridge
 - Railway Double Line
 - Railway Single Line
 - Light Railway or Tram
 - Embankment
 - Cutting
- Trip Stations**
- 2nd Order
 - 3rd Order
 - 4th Order
 - Astronomical Station
 - State Permanent Mark
- Major building** **Minor building**
- Post Office
 - School
 - Church
 - Hospital
 - Garage
 - Hotel
 - Mill
 - Dismal
 - Mine
 - Factory
 - Lighthouse
 - Wayside
 - Cemetery
 - Wireless Mast

- Electric Transmission Line
 - Telephone Line
 - Stone Fence or Wall
 - Quarry
 - Gravel Pit
 - Cave Wreck
 - Sand Mud
 - Waterhole
 - Water Tower
 - Falls
 - Rapids
 - Swamp or Marsh
 - Subject to inundation
 - Cuttings
 - Depression
 - Fern Lines
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 - Light
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- The representation of a road or track on this map is
no evidence of the existence of a right-of-way.

INDEX TO ADJOINING SHEETS

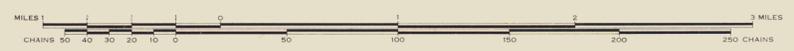
ZEHAN	MURCHISON	DU CANE
STRAHAN	A B	ST. CLAIR
	C D	
MACQUARIE HARBOUR	PILLINGER	KING WILLIAM

Magnetic Variation from True North for the centre
of this sheet is approximately 11° 45' E.

ANNUAL CHANGE ABOUT 0.7' E.



67E
PLATE 6
4661



SCALE 40 CHAINS TO 1 INCH
CONTOUR INTERVAL 50 FEET
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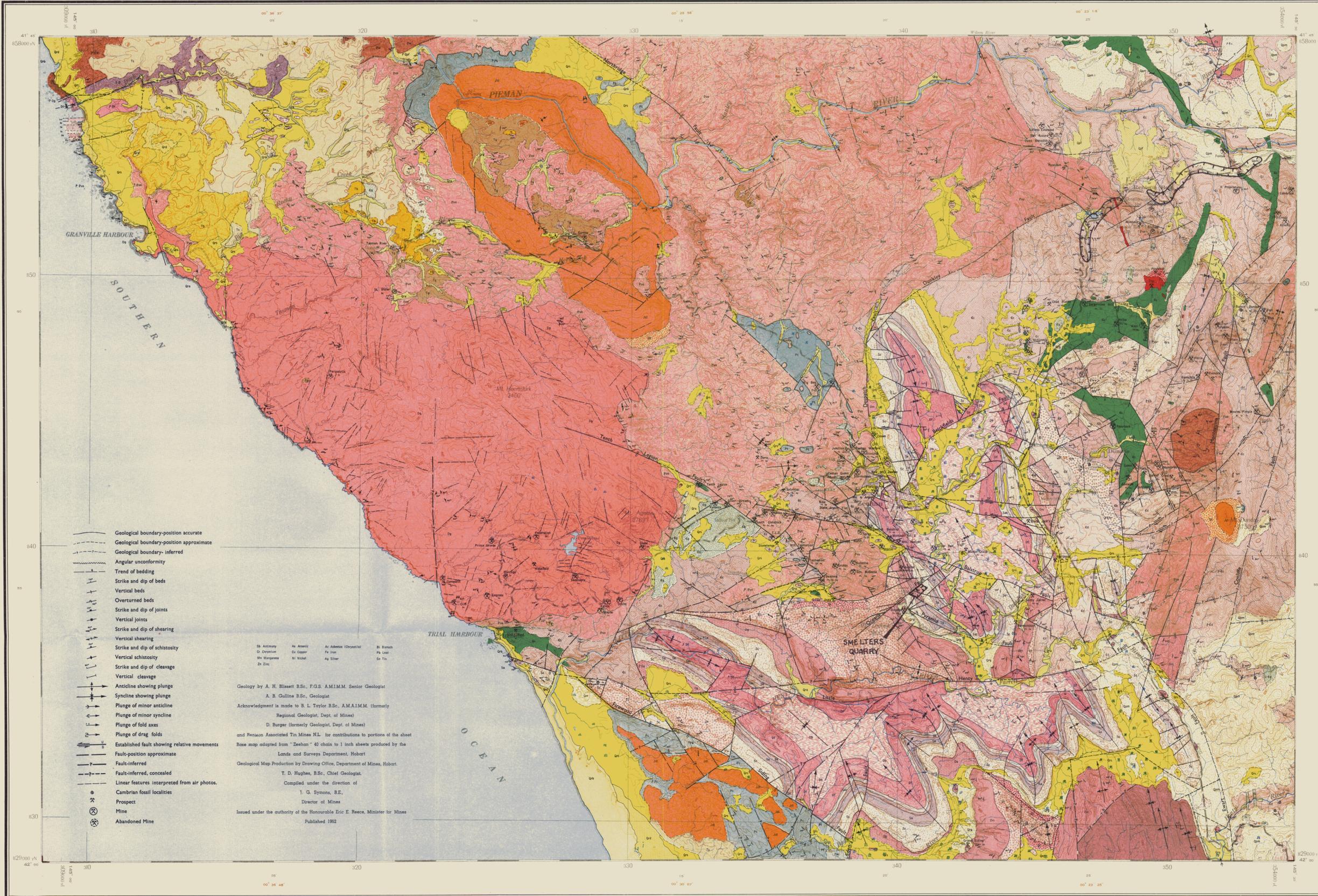
ZEEHAN
GEOLOGICAL SURVEY OF TASMANIA.
DEPARTMENT OF MINES—HOBART.

Plate 7
SHOWING
SAMPLING SITES

GEOLOGICAL ATLAS 1 MILE SERIES
ZONE 7 SHEET NO. 50



FIRST EDITION 1962 1: 63360



REFERENCE

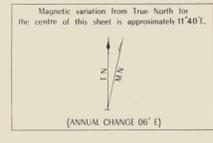
- | | | | |
|-------------------------|--------------------------|----------------------------|--|
| Cenozoic | QUATERNARY | Qa | Alluvium |
| | | Qb | Beach deposits |
| | | Qc | Sand dunes and blown sand |
| | | Qd | Gravels |
| | | Qe | Conglomerate talus |
| | | Qf | Dolerite talus |
| | | Qg | Quartz porphyry talus |
| | | Qh | Raised beaches |
| | | Qi | Older alluvium marsh deposits, downwash etc. |
| | | Qj | Fluvioglacial and lacustrine deposits |
| | | Qm | Moraine |
| | | } PLEISTOCENE | |
| TERTIARY | Ta | Conglomerate and grit | |
| | Tb | Gravels | |
| | Tc | Limestone | |
| | | Td | Sand, silt and clay |
| PERMIAN | P1 | Cygnets Coal Measures | |
| | P2 | Fernreef Group | |
| | P3 | "Woodbridge" Group | |
| | P4 | Zeehan Glacial Formation | |
| DEVONIAN | D1 | Bell Shale | |
| | D2 | Florence Quartzite | |
| SILURIAN - ELDON GROUP | S1 | Austral Creek Siltstone | |
| | S2 | Keel Quartzite | |
| | S3 | Amber Slate | |
| | S4 | Crotty Quartzite | |
| | S5 | Unassigned | |
| Palaeozoic | ORDOVICIAN - JUNEA GROUP | O1 | Gordon Limestone |
| | | O2 | Moira Sandstone |
| | | O3 | Mt. Zeehan Conglomerate |
| CAMBRIAN - DUNDAS GROUP | C1 | Misery Conglomerate | |
| | C2 | Climie Formation | |
| | C3 | Fernflow Formation | |
| | C4 | Comet Formation | |
| | C5 | Fernfields Formation | |
| | C6 | Brewery Junction Formation | |
| | C7 | Razorback Conglomerate | |
| | C8 | Hodge Slate | |
| | C9 | Red Lead Conglomerate | |
| | C10 | Dundas Group Unassigned | |
| Precambrian | PROTEROZOIC | P1 | Oonah Quartzite and Slate |
| | | P2 | Concord Schist |
| | | P3 | Whyte Schist |
| CAMBRIAN DEVONIAN | J1 | TERTIARY Basalt | |
| | J2 | JURASSIC Dolerite | |
| | J3 | Granite | |
| | J4 | Quartz porphyry | |
| | | J5 | Gabbro, norite and dolerite |
| | | J6 | Serpentinite and pyroxenite |

- Geological boundary—position accurate
- Geological boundary—position approximate
- Geological boundary—position inferred
- Angular unconformity
- Trend of bedding
- Strike and dip of beds
- Vertical beds
- Overturned beds
- Strike and dip of joints
- Vertical joints
- Strike and dip of shearing
- Vertical shearing
- Strike and dip of schistosity
- Vertical schistosity
- Strike and dip of cleavage
- Vertical cleavage
- Anticline showing plunge
- Syncline showing plunge
- Plunge of minor anticline
- Plunge of minor syncline
- Plunge of fold axes
- Plunge of drag folds
- Established fault showing relative movements
- Fault—position approximate
- Fault—inferred
- Fault—inferred, concealed
- Linear features interpreted from air photos.
- Cambrian fossil localities
- Prospect
- Mine
- Abandoned Mine

Geology by A. H. Elisett B.Sc., F.G.S. A.M.I.M.M. Senior Geologist
A. B. Gallina B.Sc. Geologist
Acknowledgment is made to B. L. Taylor B.Sc., A.M.A.I.M.M. (formerly Regional Geologist, Dept. of Mines) and Renison Associated Tin Mines N.L. for contributions to portions of the sheet
Base map adapted from "Zeehan" 40 chain to 1 inch sheets produced by the Lands and Surveys Department, Hobart
Geological Map Production by Drawing Office, Department of Mines, Hobart
T. D. Hughes, B.Sc. Chief Geologist
Compiled under the direction of
I. G. Symons, B.E., Director of Mines
Issued under the authority of the Honourable Eric E. Reece, Minister for Mines
Published 1962

INDEX TO ADJOINING SHEETS

PIEMAN RIVER	CORINNA	MACKINTOSH
	ZEEHAN	MURCHISON
	STRAHAN	LYELL



- Swamp or Marsh
Quarry
Gravel Pit
Cliff
Area Sampled
- 1st Class Road
2nd Class Road or Gravel
3rd Class Road
4th Class Road
Vehicular Track
Foot or Park Track
Gate
Collapsible Bridge
Railway

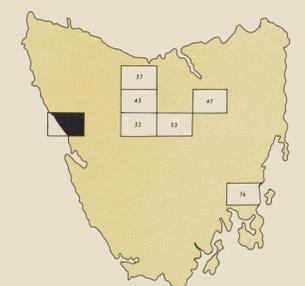


PLATE 7
4662

158029

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

158030

67-481

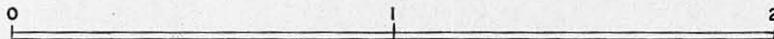
TOPOGRAPHIC MAP

BUBBS HILL

SHOWING
SAMPLING SITES

Plate 8

Scale in miles



Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968

1:31680

MAP SHEET: LYELL

A	B
C	D

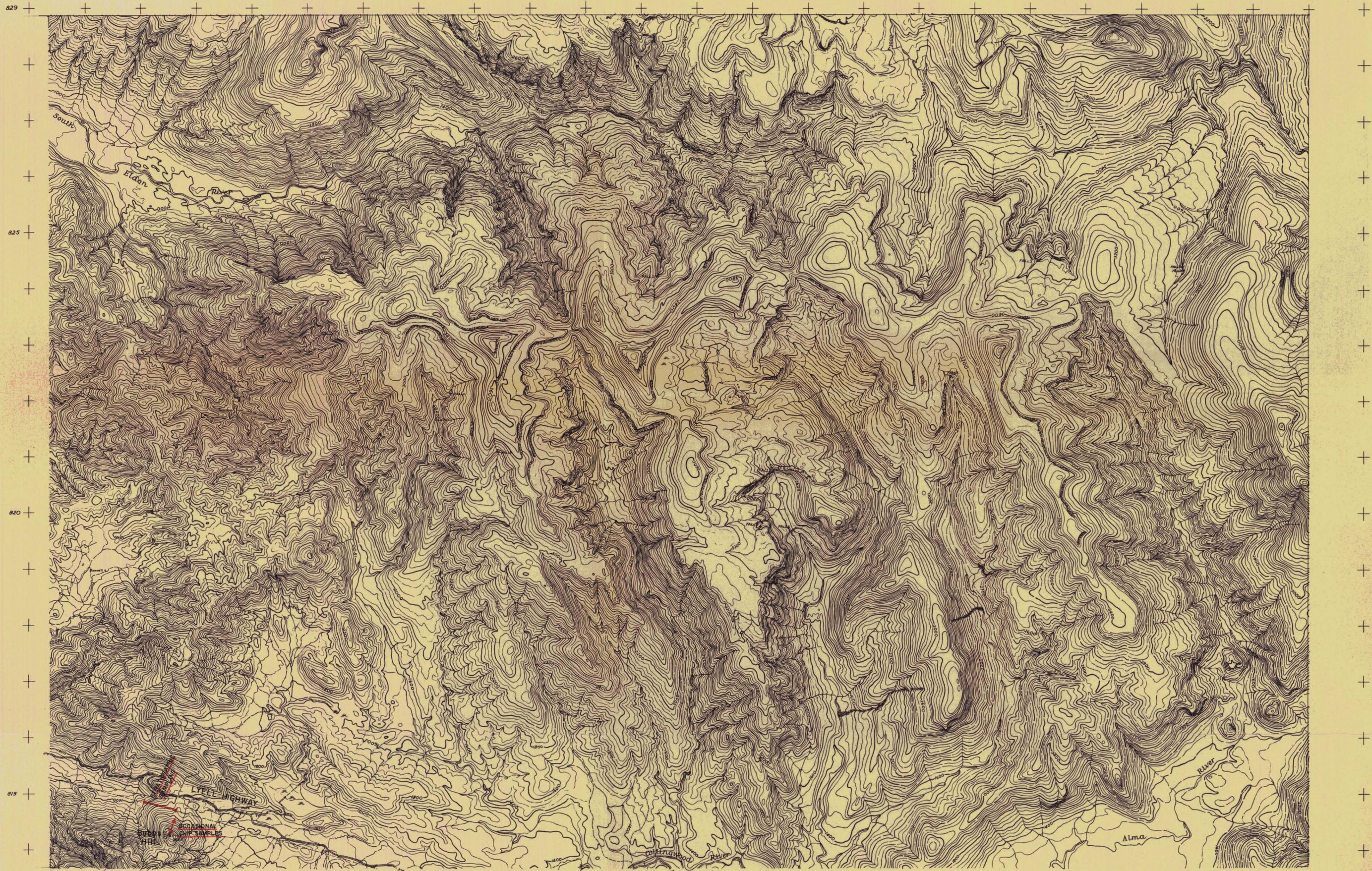


PLATE 9 4663

158021

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

158032

67-481

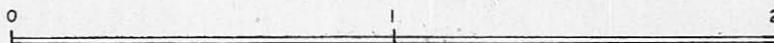
TOPOGRAPHIC MAP

HENRIETTA

SHOWING
SAMPLING SITES

Plate 9

Scale in miles



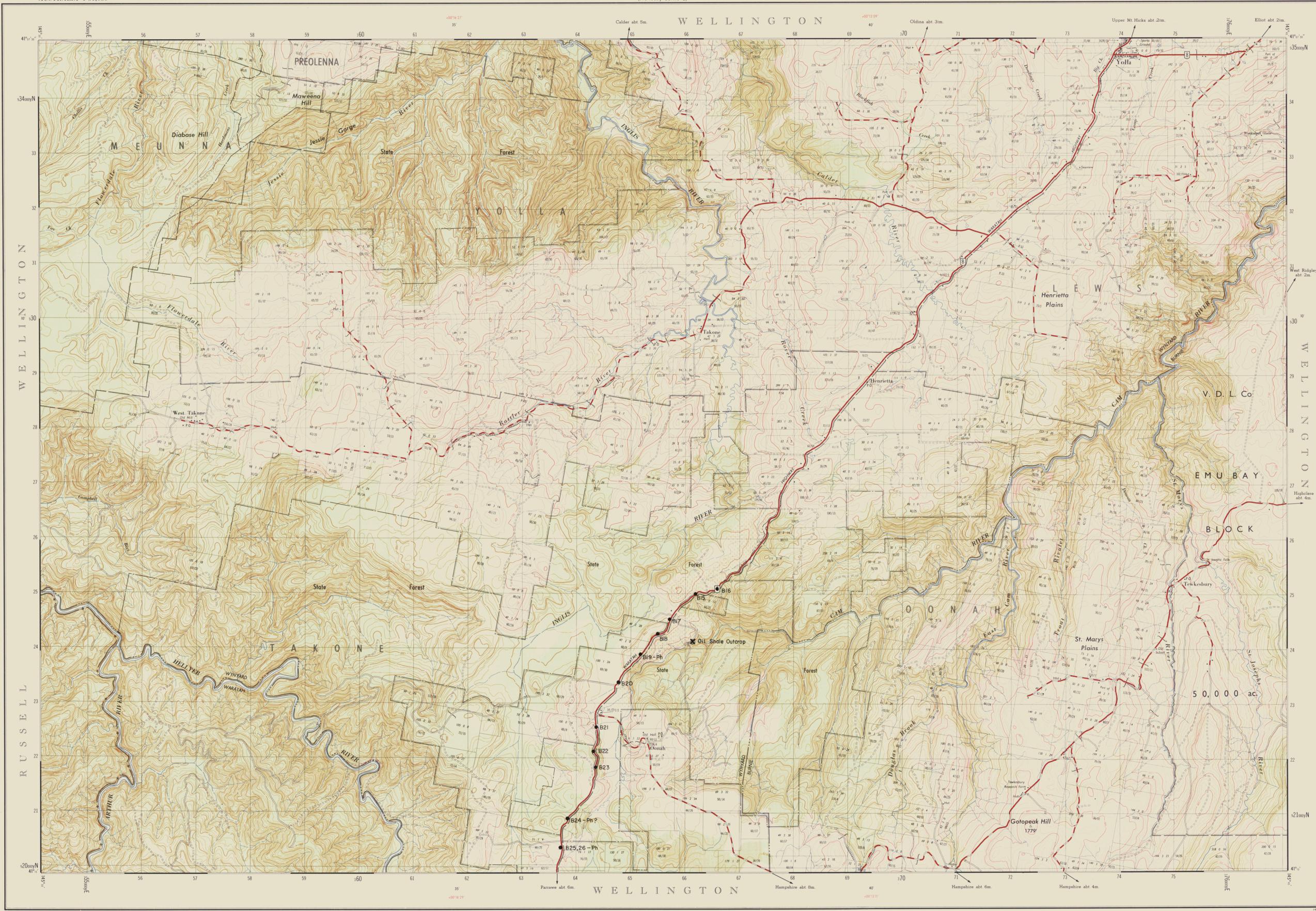
Report No. CR 581
M. R. Banks
University of Tasmania
March, 1968

HENRIETTA

(Previously Burnie C)

AUSTRALIA 1:31,680

Sheet No. 8015-IV-S



TASMANIA TOPOGRAPHICAL

Second Series 1st Edition

Produced by Authority of the Hon. D. A. Cashion, Minister for Lands and Works, Tasmania.

PRODUCTION - In compliance with National Mapping Standards by the Lands and Survey Department, Hobart, 1967.
 DETAIL - Aerial Photography, 1956.
 NOMENCLATURE - Approved by the Nomenclature Board of Tasmania.
 PROJECTION - Transverse Mercator.
 LEVEL DATUM - Mean Sea Level at Hobart.
 CONTROL - 2nd and 3rd order Triangulation based on Lochmaben Astronomical Station.
 GRID CONVERGENCE - Lat. 41° 38' 23.98" S, Long. 147° 17' 49.75" E.
 CO-ORDINATES - Based on Long. 146° 00' E. Origin is 400,000 yards West and 1,800,000 yards South of the True Origin of Zone 7.

- Road Sealed All weather 1st. Class All weather 2nd. Class Loose surface, dry weather
- Vehicular Track Foot or Pack Track
- Railway, Multiple Track Single Track
- Light Railway or Tram
- Gate, Cattle-grid, Bridge
- Embankment, Cutting
- Power Transmission Line
- Telephone Line
- Trigonometric Station
- Building
- Landmark
- Post Office
- Police Station
- School
- Hospital
- Church
- Fathom Lines
- Contours, approximate
- Depression
- Sand
- Swamp or Marsh
- Land Inundated
- Waterfall, Rapid
- Waterhole
- Timber, Dense
- Medium
- Scattered
- Pine Plantation
- Orchard

BOUNDARIES - Land District

Parish

Municipal

Reserve

Survey Line

Survey Areas, Acres, Rods, Perches

Survey Diagram Reference

Land District

Parish

Municipality

DORSET

SHERBORNE

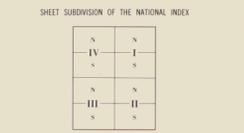
BURNIE

The representation of a boundary or other cadastral information on this map does not constitute evidence of its existence or location.

The representation of a road or track on this map is no evidence of the existence of a right of way.

INDEX TO ADJOINING SHEETS

MEUNNA	PREOLENNA	BURNIE
8015-IV-S	8015-IV-S	8015-IV-S
BLEE PEAK	HENRIETTA	NATONE
8015-IV-S	8015-IV-S	8015-IV-S
MT. HERBIA	PARRHANE	LOVETIA
8015-IV-S	8015-IV-S	8015-IV-S



Magnetic Variation from True North for the centre of this sheet approximately 11° 55' E, 1965.

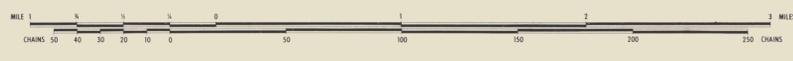
T.N. G.N. M.N.

Annual Change about 0.5" E.

To obtain true bearing use correction as shown in brown in margin of map.



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SCALE 40 CHAINS TO 1 INCH
 CONTOUR INTERVAL 25 FEET



TASMANIA TOPOGRAPHIC SERIES
 HENRIETTA
 8015-IV-S
 ZONE 7

PLATE 9
 4664
 158033