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FIRST SIX MONTHLY REPORT
ON
EXPLORATION LICENCE 6/79 (CATAMARAN)
TASMANIA
FOR PERIOD 16.5.80 TO 15.11.80
by
W.R. Barbour
November 1980

MICROFILMED

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2. Marathon Petroleum Australia, Ltd., Brisbane
3. Field Copy

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1.0 INTRODUCTION

Exploration Licence 6/79 (Catamaran) covers an area of 136 square kilometres in the vicinity of Recherche Bay, south-eastern Tasmania. It was granted to Marathon Petroleum Australia, Ltd. on 16th May, 1980 for a period of six months.

2.0 EXPLORATION

Work carried out during the six months included:

- a) an assessment of current literature
- b) photogeological study
- c) reconnaissance mapping

A copy of the consultants report is attached.

Following our assessment of the consultants report, a programme of geological mapping in conjunction with ground magnetic and gravity surveys is planned for late 1980. This will be followed in 1981 by drilling of related targets.

3.0 EXPENDITURE

Marathon Petroleum Australia, Ltd. have spent \$23,288.56 on exploration activities on this area during the first six month period. A detailed statement and Statutory Declaration are attached as Appendix I.

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APPENDIX I

Statement of Expenditure and Statutory
Declaration

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STATEMENT OF EXPENDITURE
EXPLORATION LICENCE 6/79 (CATAMARAN)
FOR PERIOD 16TH MAY, 1980 TO 15TH NOVEMBER, 1980

	\$
Salaries and Associated Costs	1 556.83
Business Expense	735.79
Motor Vehicle Rental	95.22
Commercial Transportation	983.40
Office Supplies	3.00
Communications Expense	44.80
Aircraft Hire	4 437.00
Miscellaneous	74.40
Technical Publications	76.00
Reproduction Expense	21.96
Camp Costs	87.05
Geological Services	13 055.97
	<u>\$23 288.56</u>

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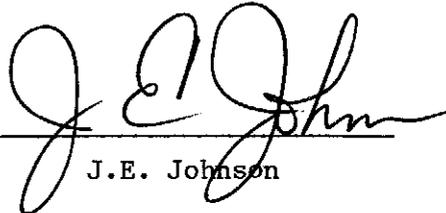
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STATUTORY DECLARATION

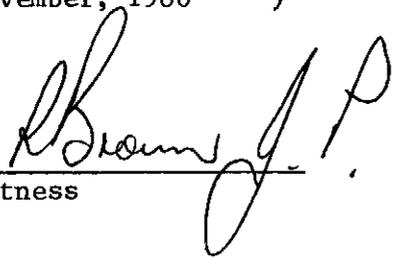
I, JAMES E. JOHNSON, FINANCIAL CONTROLLER OF MARATHON PETROLEUM AUSTRALIA, LTD. DO SOLEMNLY AND SINCERELY DECLARE THAT THE EXPENDITURE SHOWN BELOW (AND DETAILED ON THE ATTACHED STATEMENT) WAS EXPENDED ON EXPLORATION LICENCE 6/79 FOR THE PERIOD FROM 16TH MAY, 1980 TO 15TH NOVEMBER, 1980.

EXPENDITURE FOR PERIOD 16.5.80 TO 15.11.80 \$23,288.56.

Signed at Brisbane)
this 10th Day of)
November, 1980)



J.E. Johnson



Witness

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APPENDIX II

Photogeological Study of Catamaran
Project Area by Hunting Geology &
Geophysics (Australia), Pty. Ltd.

Hunting Geology and Geophysics (Australia) Pty. Limited

Postal Address: P.O. Box 365,
Fyshwick, A.C.T. 2609
Business Address: CentreCourt,
1 Pirie Street,
Fyshwick, A.C.T. 2609
Telephone (062) 80 4277
Telex 62677
Telegrams: Astereo Canberra

Our Ref. MMC/bg/391/80

Your Ref.

PROVISIONAL

24th June, 1980

Mr. J. Mclean-Hodgson
Marathon Petroleum Australia, Ltd.
G.P.O. Box 687
BRISBANE QLD 4001

Dear John,

LETTER REPORT : PHOTOGEOLOGICAL STUDY, CATAMARAN
PROJECT AREA, SOUTHERN TASMANIA (Our Job No. GA.8/80)

1. Introduction

A photogeological study of the Catamaran coal project-area in Southern Tasmania, using black and white panchromatic vertical aerial photographs at the approximate scale of 1:48 500, was carried out during the period April - June, 1980, by Hunting Geology and Geophysics (Australia) Pty. Limited on behalf of Marathon Petroleum Australia, Ltd. This letter report presents the findings of the photogeological interpretation and offers some recommendations for future coal exploration in this area.

The Catamaran project-area covers approximately 520km² of densely vegetated country (see Figure 1) which forms two distinct physiographic regions, as follows:

- The western half of the area is a deeply dissected and densely timbered region of rugged topography with mountain peaks and elevations frequently in excess of 1,000 metres. Alpine vegetation replaces gradually the wet sclerophyll forest above an approximate altitude of 800m.
- The eastern half of the area forms low-lying swampy plains which are vegetated mostly with cutting-grass and button-grass. Isolated hills are densely timbered and exploited for forestry products. Apart from a few roads in the eastern part which link the various timber exploitation fields and isolated settlements, access to the area is extremely restricted, and almost impossible in the central part of the area, even by means of helicopter.

.../...

APPLIED GEOLOGICAL SERVICES

Specialist interpretation of Imagery, Aerial Photography and Geophysical data
Integration of Geochemical data in Association with N. J. Marshall & Associates

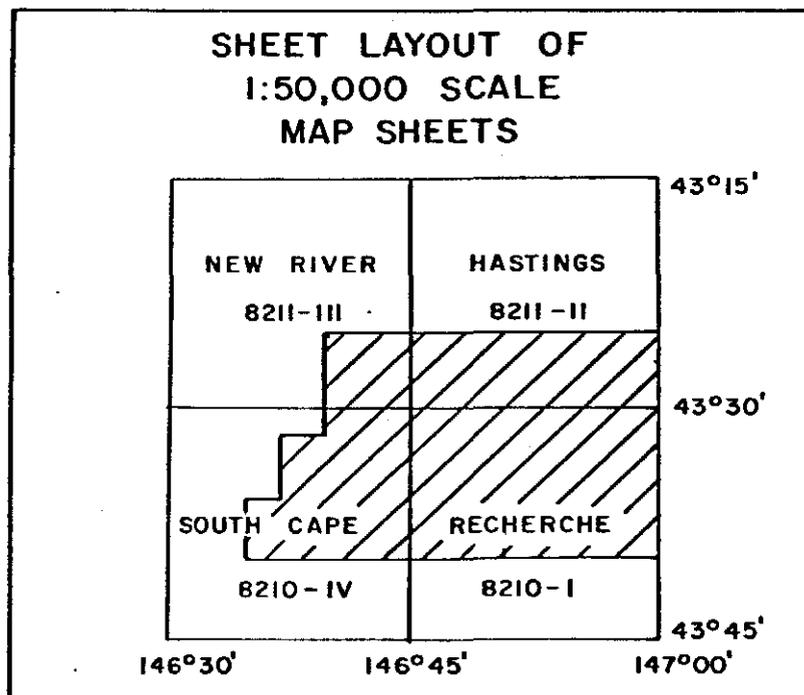
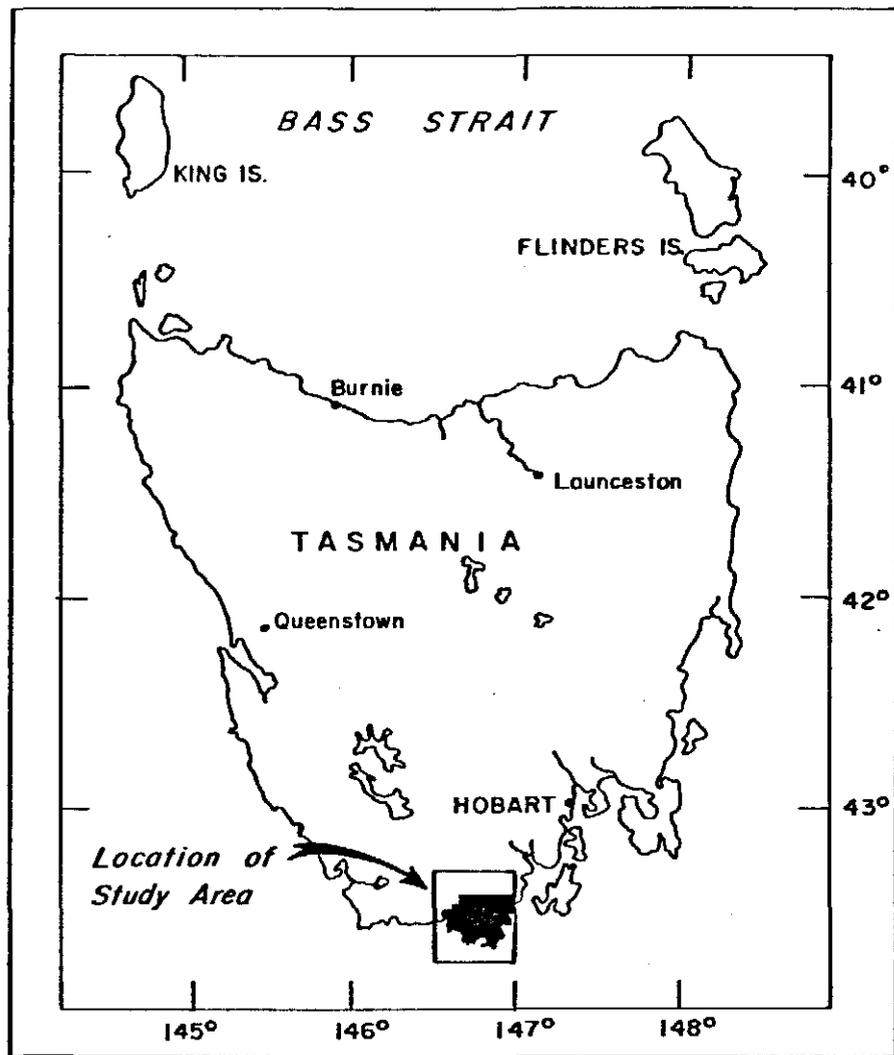
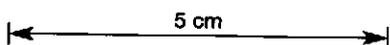


Figure 1. LOCATION DIAGRAM



The area has been previously mapped by geologists of the Geological Survey of Tasmania, at a scale of 1:250 000 (Hobart sheet SK-55/8). Geological reconnaissance and numerous investigations of the coal outcrops have been carried out since their discovery in 1824, and are reported in detail by Twelvetrees (1915a and b).

Comprehensive reconnaissance studies of the geology and the stratigraphy of the area are found in Farmer (1979), Banks (1962a, b and c), Hale (1962), Spry (1962) and Twelvetrees (1915a and b). Reports on coal occurrences and preliminary assessment have been made by Twelvetrees (1915a) and Rasmus (1975).

2. Aims of the Study

The aims of the photogeological mapping were twofold:

- To provide a detailed account of the stratigraphy and structure of the area to assist coal exploration;
- To formulate recommendations and guidelines for the next stage of coal exploration.

3. Procedure

The photogeological mapping involved a total of 22 aerial photographs (three runs) at the approximate scale of 1:48 500. Annotation of photogeological detail was done under a Zeiss N2 mirror stereoscope fitted with a 6x magnification binocular, onto two acetate drainage bases obtained from the photographic enlargements of 1:50 000 scale provisional toposheets (New River, Hastings, South Cape and Recherche).

Field checking of the photogeological mapping took two days at the end of the annotation phase, using a helicopter. Seventeen (17) localities were inspected in detail and are indicated on the photogeological map.

Extensive re-annotation, literature compilation and construction of geological cross-sections took place after the field checking phase; further re-annotation was done during the final stages of the integrated interpretation of the area. The results of the mapping are presented as a single photogeological map-sheet at the approximate scale of 1:48 500, a coloured version of which accompanies this report. A stratigraphic column and four (4) geological cross-sections are also presented to supplement the map-sheet.

4. Results

The regional geology consists of a thick (3,100 metres +) gently dipping sedimentary pile, ranging from Cambrian to Triassic in age, which has been intruded by Jurassic dolerite. A summary of the local strati-

graphy compiled from the literature, the field checking and observations made during the photogeological mapping is outlined in Figure 2.

The photogeological mapping has resulted in the empirical differentiation of 12 discrete units, however it has been severely hampered by the thick vegetal cover and the abundance of glacial deposits. The degree of reliability of the interpretation is considered to be good in the highest parts of the area and along the coast, where vegetation is least developed. Elsewhere it is considered to be fair, but cannot obviously be subdivided to the extent shown in Figure 2.

Significant stratigraphic features noted during the photogeological mapping are as follows:

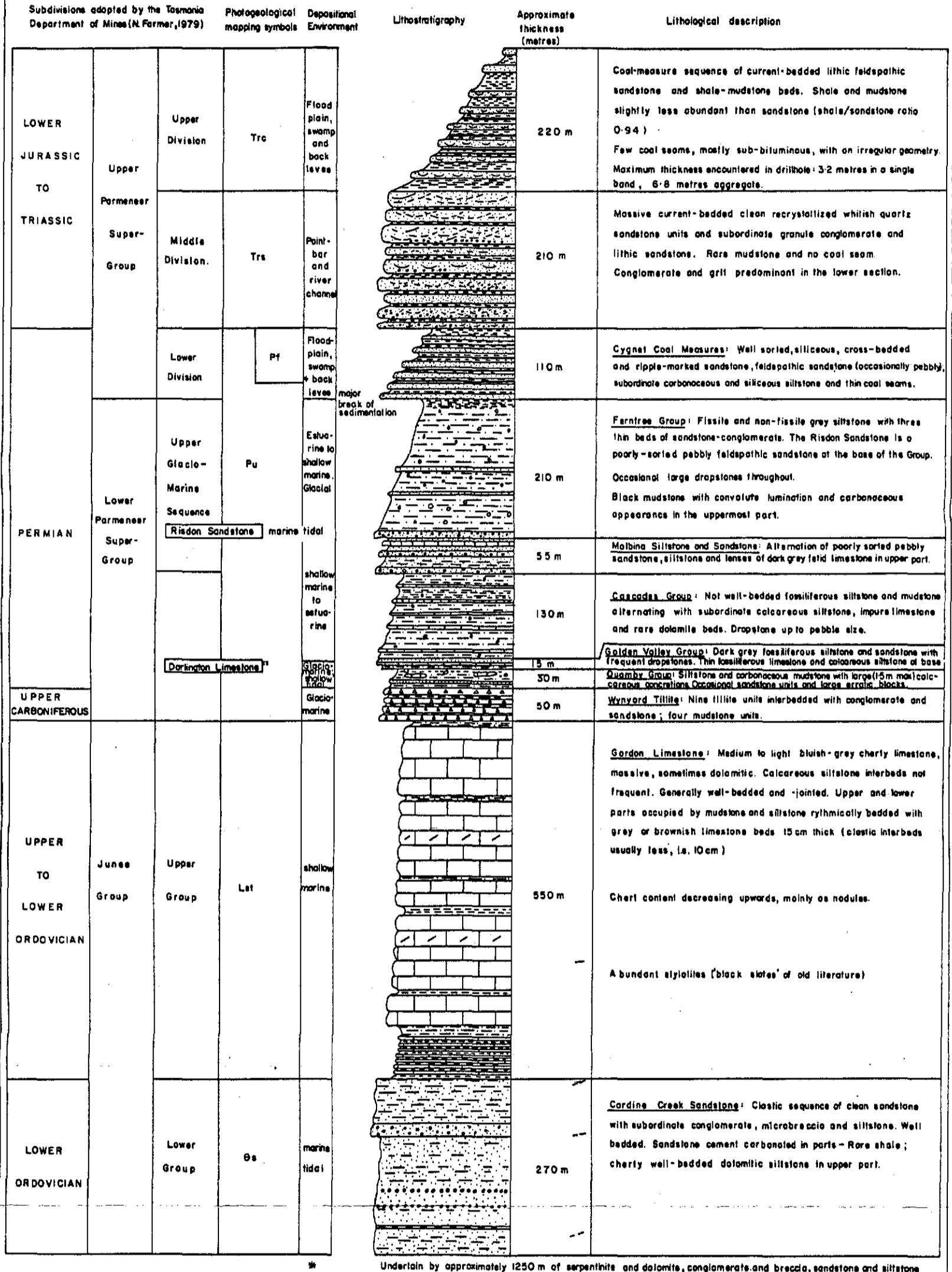
- The Gordon Limestone (Lst) is difficult to recognise, because it does not readily form sinkholes, a corollary to its cherty nature. A similar vegetation cover to the other units is associated with the limestone, except near the top of the Lune Sugarloaf hill.
- The lowermost Triassic sandstone unit (Trs) is whitish on the air photographs and has been used as a "marker" horizon.
- The uppermost Triassic coal-measures sequence (Trc) forms extremely poor outcrops, owing to its lithological nature and is often found in low-lying swampy plains occupied by cutting-grass.
- The Jurassic dolerite produces rounded or conical hills which are (or have been, following the intensive present timber exploitation in the eastern parts of the area) densely forested at moderate altitudes. Higher-up, the dolerite is usually well-exposed and column-jointed; the presence of lichens or tea-trees associated with the dolerite imparts a characteristic mottling on the air photographs. The density of linear features is often a reliable indicator of the presence of dolerite, even in areas of poor outcrops.

The dominant structural features noted during the photogeological mapping are illustrated by the geological cross-sections (see plate 2) and are briefly as follows:

- The dominant feature in the area is the arcuate Lune River Fault, broadly oriented N-S and with an E block-down movement. Various interpretations as to its type can be envisaged, however for reasons of brevity, suffice it to say that it is a scissor-fault with a throw increasing northwards; a horsetail nature of the fault near the south coast suggests it terminates there or indicates the hinge zone.
- On a regional basis, the Lune River Fault appears to be the physical continuity of a large (50km+) N-S lineament, whose trace dictates the course of the Mountain River (west of Hobart), Huon River and Wobbly Creek. A hot spring north of

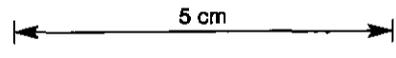
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Summary of the stratigraphy in the Catarmaran - Mount La Perouse Area, Figure 2.
Southern Tasmania.



Underlain by approximately 1250 m of serpentinite and dolomite, conglomerate and breccia, sandstone and siltstone. Siltstone sometimes dominant in some intervals.

* Definitions within this group follow the nomenclature proposed by Pettijohn, Potter and Siever (1972)



- | | | | | | |
|--|-----------|--|--------------------------|--|---------------------|
| | MUDSTONE | | COARSE-GRAINED SANDSTONE | | LIMESTONE |
| | COAL | | CONGLOMERATE | | DOLOMITIC LIMESTONE |
| | SILTSTONE | | TILLITE | | CURRENT-BEDDING |
| | SANDSTONE | | DROPSTONE (erratics) | | |

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the Lune River appears to be conveniently located at the intersection of this lineament and a NW-trending fracture.

Other predominant fracture directions are E-W and NW-SE.

The Jurassic dolerite has extensively intruded the sedimentary sequence, far more in fact than shown on the 1:250 000 scale Hobart Geological Sheet. Two dolerite sheets are indicated by the geological cross-sections (plate 2), and this indication agrees well with the geophysical conclusions of Leaman and Naqvi (1967) in the Cygnet District and Leaman (1972) in the Hobart area.

The geometry of the dolerite is often flat-lying sheet- or trough-like, although considerable distortions, including bulging and/or coalescing of sheets, can suddenly be produced (see plate 2, east of Lune Sugarloaf). Figure 3 illustrates some of the forms of a dolerite body.

5. Conclusions and Recommendations

The following conclusions and recommendations for coal exploration in the Catamaran project-area are discussed in point form below:

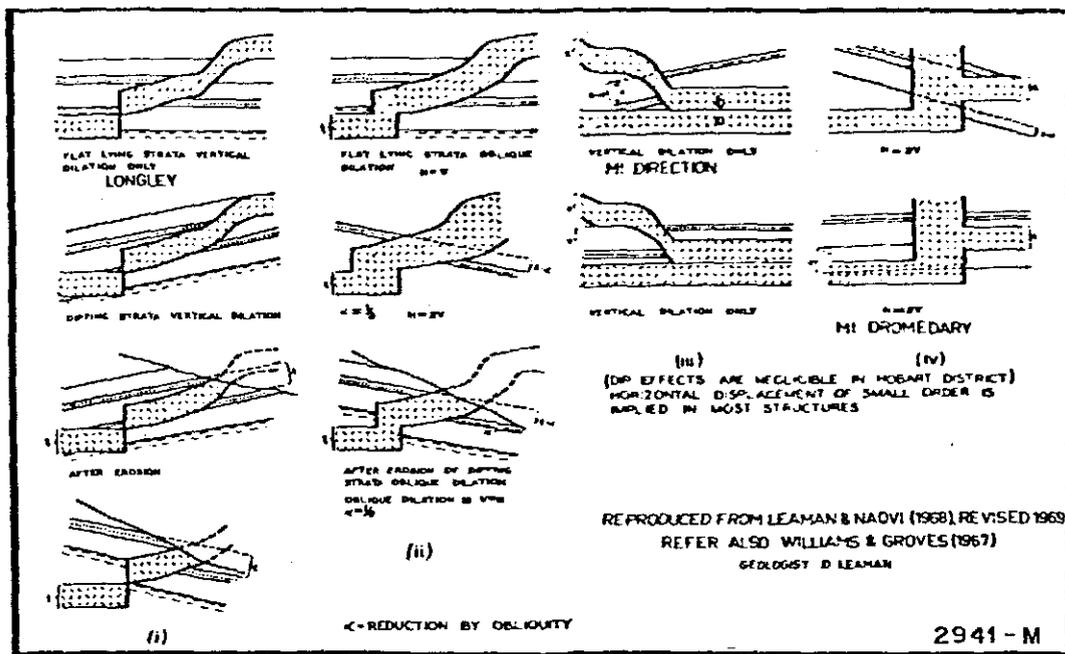
- (i) The most important conclusion of the photogeological mapping is the discovery of a sandstone unit (Trs) south of the Catamaran River. This implies that the thin coal seams outcropping in the cliffs of South Cape Bay are probably part of the Permian Cygnet Coal Measures and not Triassic. The poor quality of coal reported by Twelvetrees (1915 b, p.6), the thinness of individual bands and the ratio coal:band (which was estimated to be in the order of 1:15 during the field checking) all appear to agree with a Permian age, traditionally considered to yield only inferior coal.

Further work along the South Cape Bay could define more precisely the quality and thickness of the coal, but should not be regarded as a high priority target.

- (ii) The second major conclusion concerns the area west of the Lune River Fault. No Triassic coal-measures sequence (Trc) can outcrop in this area, because the lowermost Triassic sandstone (Trs) unit forms the highest topographic areas, at or above 1,000 metres altitude, namely the Moonlight Ridge and Mount La Perouse.

The area located west of the Lune River Fault which coincidentally is one of almost impossible access, does not therefore warrant further coal exploration.

- (iii) The photogeological evidence indicates that from the initial 520km² of prospective country, a narrow "corridor" of sedimentary rocks (Trc), approximately 14km by 2.5km, constitutes the actual prospective target-area east of the Lune River Fault. Access problems are not quite as acute as



Reproduced from Gravity Survey of the
Hobart District
(Geol. Surv. Bull. 52, page 13)

Figure 3. FORM OF DILATION ASSOCIATED
WITH DOLERITE BODIES

5 cm

further west, however could still severely hamper exploration efforts. Detailed field checking of this "corridor" should be done to improve the photogeological mapping, especially west of Leprena, where coal outcrops have been reported in the literature. Three sub-areas should be considered in order decreasing priority:

- A small basin-like structure 4 x 3km, is located between the Catamaran and D'Entrecasteaux Rivers and contains the best Triassic coal intersections made to date with a maximum aggregate thickness of 6.8 metres. The nature of the basin, whether sedimentary or tectonic, is still a matter of speculation, owing to the paucity of observed dips or sedimentary features.

This area has so far been well prospected with shallow diggings and scout drillholes in the immediate vicinity of known coal outcrops, yet away from the coal outcrops, no prospecting activity has taken place to test the down-dip continuity and/or improvement or deterioration of the seams.

Further work in this sub-area is therefore warranted, and could include some geological field mapping with particular emphasis towards sedimentary structures for basin analysis. The field mapping should be assisted by shallow auger holes in areas of thicker overburden. Drillholes away from the coal outcrops should be located upon the results of the field mapping integrated with the photogeology and the previous drilling results. Other methods such as ground magnetics and particularly gravity could be readily incorporated with the field mapping stage and aid in delineating the subsurface extent of dolerite above and below the coal measures. Depending on the results of these ground geophysical surveys, aeromagnetic surveying may be employed to aid in outlining subsurface dolerite, particularly in areas of poor outcrop.

- The area located south of Ida Bay has also some coal potential and has been partly tested with two drillhole profiles. The results of this drilling are however unknown to the writer. Further untested coal potential could still exist south of the above drillhole profiles.

Yours sincerely,

M.M. Coupard

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TWELVETREES, W.H., 1915b Reconnaissance of country between Recherche
Bay and New River, Southern Tasmania.
geol. Surv. Tasm., Bull. 24.

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LIST OF FIGURES AND PLATES

Figure 1: Location map.

Figure 2: Summary of the stratigraphy.

Figure 3: Form of dilation associated with dolerite bodies.

Plate 1: Photogeological worksheet.

Plate 2: Geological cross-sections (four).

Plate 3: Individual photoscale field checking overlays. X 9

NB, TRANSPARENCIES OF PLATES 1 & 2
FILED IN VERTIPLAN AT 801493

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CATAMARAN AREA - LIST OF AERIAL PHOTOGRAPHS

Scale of Photography: Approximately 1:48 500

Camera: 152.95mm

Source: Department of Lands, Tasmania

Type: Black and white contact prints, 24x24cm format, double weight glossy finish.

Forward Overlap: 60%

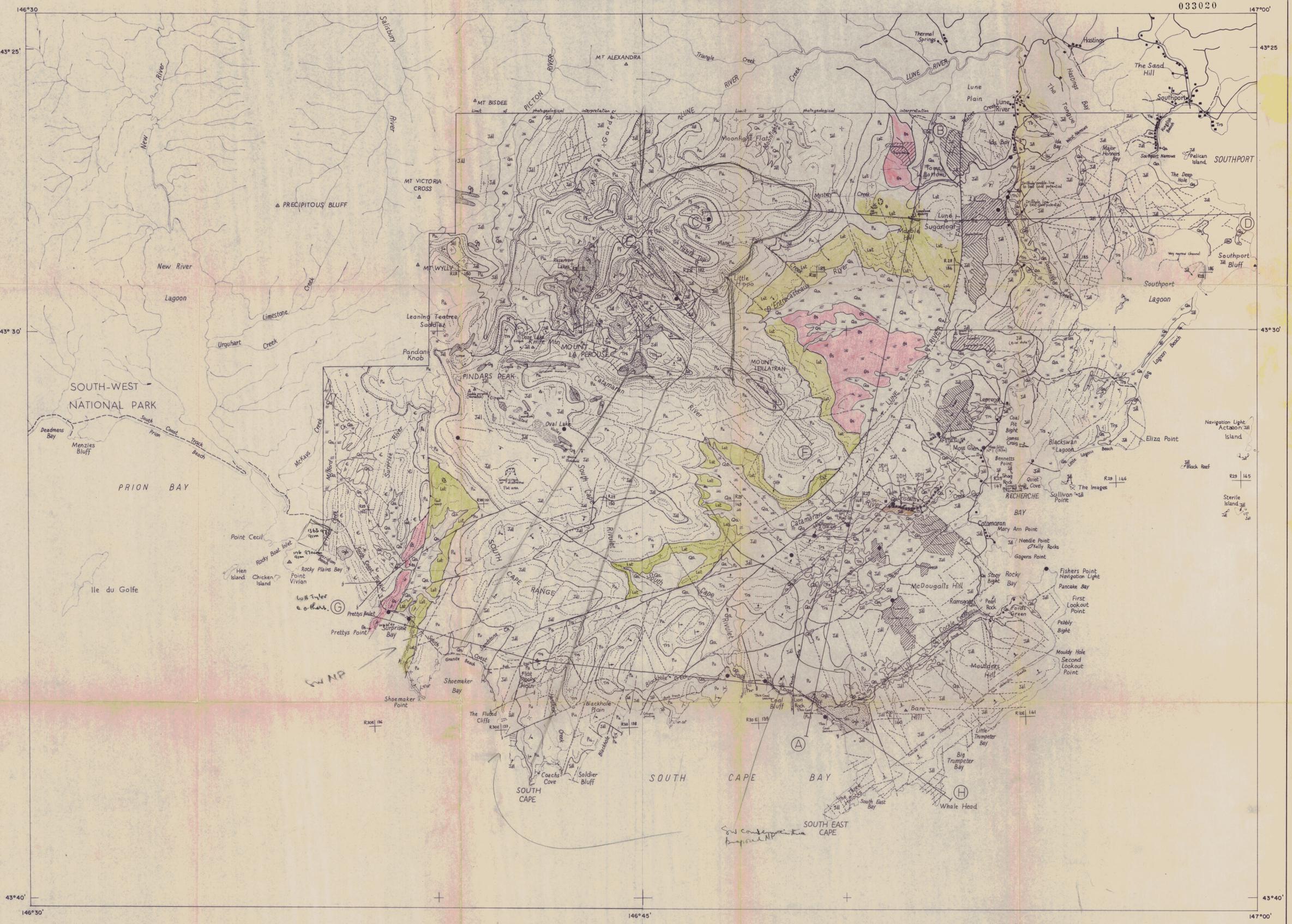
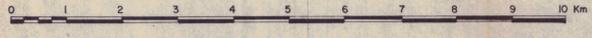
Side Overlap: 25%

Topo sheets: (1:100 000) South Cape 8210 and Huon 8211.
(Provisional 1:50 000) New River 8211-III;
Hastings 8211-II; South Cape 8210-IV; Recherche 8210-I.

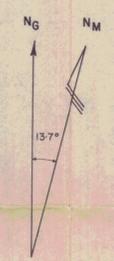
Job Name	Job No.	Date	Run No.	Print No.	No. of Photos	Quality
South West	F.617	12.12.79	28	180-187	8	Good
South West	F.617	12.12.79	29	145-152	8	Good
South West	F.617	12.12.79	30	136-141	6	Good
Total					22	

PHOTOGEOLOGICAL WORKSHEET MAP OF THE CATAMARAN PROJECT AREA, TASMANIA

Scale approximately 1:48 500



This map was produced from 22 black and white aerial photographs 21 days were spent on annotation, reannotation and compilation phases. The base maps were compiled from photographic enlargements of New River, Hastings, South Cape and Recherche 1:50 000 scale topographic maps. (Enlarged to photoscale 1:48 500) 2 days field verification using a helicopter.



SUMMARY OF GOVERNMENT DRILLHOLES, DESCRIBED BY TWELVETREES, (1915, Geol. Surv. Bull. 20)

MOSS GLEN N6.1

0 - 75m	Feldspathic sandstone with occasional coal markings and shale
75 - 83m	Shale with thin coal bands (15cm)
83 - 99.7m	Sandstone with coal markings
99.7 - 124m	Shale with thin coal bands (20cm max.)
124 - 138.5m	Alternance of sandstone and shale (approx. equal amount)
138.5 - 157m (EOH)	Dolerite

MOSS GLEN N6.2

0 - 17.2m	Clay and shale
17.2 - 19.8m	Alternance of coal and claystone; ratio approx 0.9-max. thickness coal band 25cm
19.8 - 31.8m	Shale with subordinate coal (10cm max.)
31.8 - 46.3m (EOH)	Shale and sandstone (Sometimes conglomeratic or with coal markings) alternating

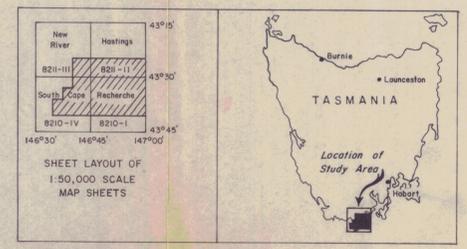
CATAMARAN N6.1

0 - 16.3m	Shale
16.3 - 43.3m	Sandstone
43.3 - 65.5m	Shale
65.5 - 70m (EOH)	Dolerite

CATAMARAN N6.2

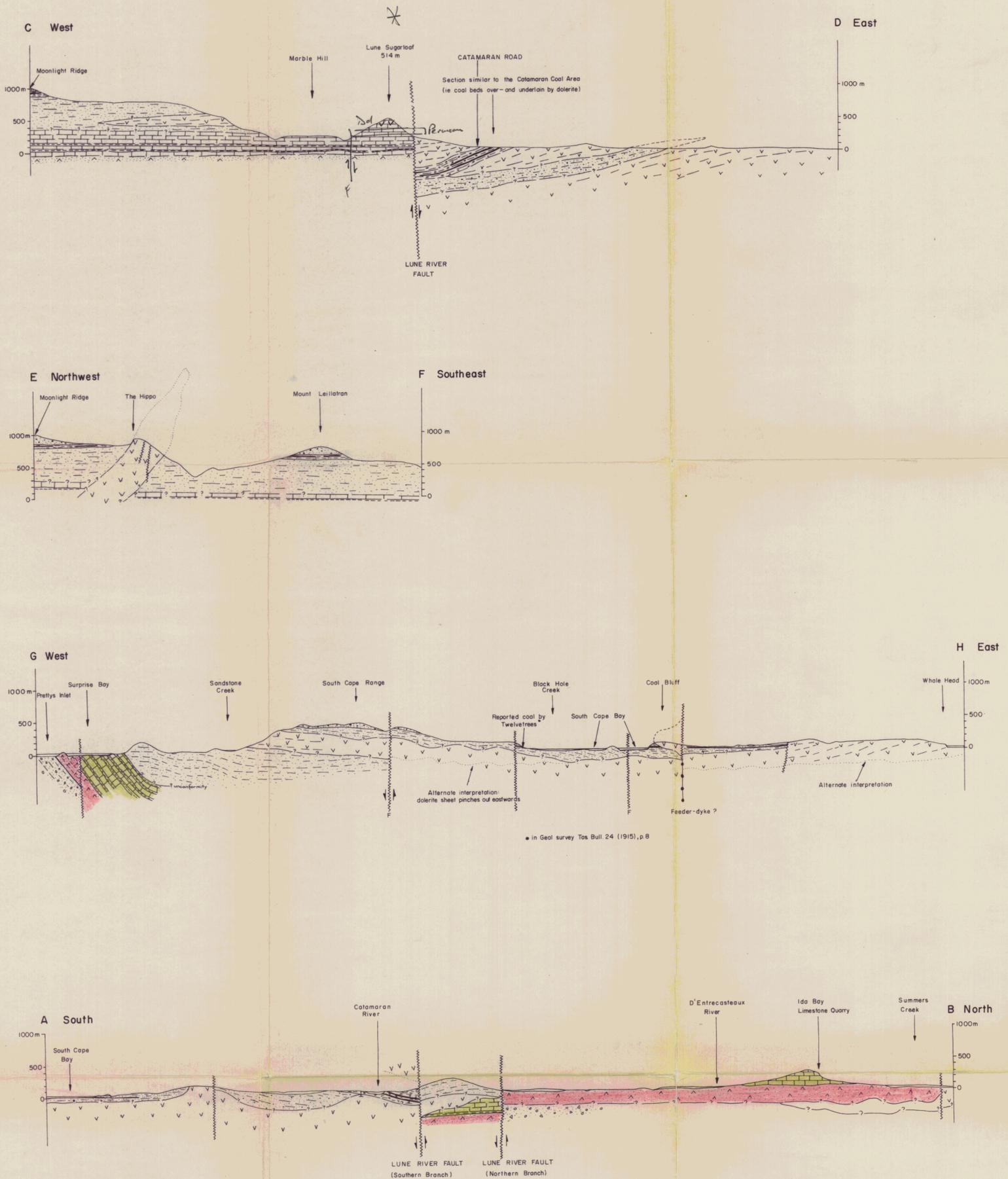
0 - 14m	Shale and clay
14 - 97.5m	Sandstone, conglomeratic in the upper part, with rare shale bands
97.5 - 119.8m	Grey shale, carbonaceous in upper section
119.8 - 209.9m	Sandstone with subordinate shale
209.9 - 221.4m (EOH)	Dolerite

LOCATION DIAGRAM



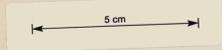
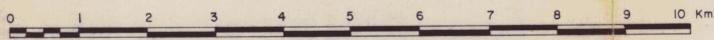
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GEOLOGICAL CROSS-SECTION OF THE CATAMARAN AREA, TASMANIA

Scale Horizontal 1:48,500
(as per photogeological map - sheet)



REFERENCE

QUATERNARY		Superficial deposits (alluvium; raised beach deposits; glacial deposits).
MIDDLE JURASSIC		Dolerite; layering tentatively estimated.
LOWER JURASSIC TO TRIASSIC		Coal-measure sequence of sandstone with subordinate shale-mudstone and potentially economic coal seams (black thin lines).
PERMIAN TO UPPER CARBONIFEROUS		Massive whitish recrystallised quartz sandstone units; subordinate conglomerate. No coal seam.
CYGNET COAL MEASURES		Coal-measure sequence of feldspathic sandstone with subordinate carbonaceous siltstone and mudstone, and thin coal seams.
		Undifferentiated glacio-marine sequences (two sequences consisting predominantly of tillite, pebbly mudstone, sandstone, siltstone, shale and subordinate limestone) overlain by a coal-measure sequence (Cygnet Coal Measures).
ORDOVICIAN		Massive bluish-grey limestone, rhythmically interbedded limestone and siltstone in the lower part.
		Sandstone and subordinate conglomerate; cherty and calcareous/dolomitic siltstone in the upper part.
CAMBRIAN		Serpentinite and dolomite-conglomerate and -breccia with subordinate dolomitic sandstone, siltstone and chert
		Fault with relative movement
		Trace of bedding

LEGEND TO ACCOMPANY PLATE 1 OF THE CATAMARAN PROJECT AREA, TASMANIA

REFERENCE

QUATERNARY	HOLOCENE	{	{	{	Qa	River alluvium, swamp and mudflat deposits.
	HOLOCENE TO PLEISTOCENE				Qgb	Raised beach deposits.
	PLEISTOCENE				Qg	Glacial (moraines) and fluvioglacial deposits.
TERTIARY	MIOCENE TO OLIGOCENE ?	{	{	{	Tb	Basalt flow, subordinate tuff and agglomerate.
JURASSIC	MIDDLE JURASSIC	{	{	{	Jdl	Dark grey/green fine- to medium-grained dolerite.
JURASSIC TO TRIASSIC	LOWER JURASSIC TO TRIASSIC	{	{	{	Trc	Coal-measure sequence of shale and current-bedded lithic and feldspathic sandstone with subordinate beds of mudstone and potentially economic coal seams; coal outcrops indicated by asterisks.
				{	Trs	Massive current-bedded, clear recrystallised whitish quartz sandstone units with subordinate granule conglomerate and lithic sandstone; rare mudstone; no coal seam.
PERMIAN TO CARBONIFEROUS	PERMIAN TO UPPER CARBONIFEROUS	{	{	{	Pf	Coal-measure sequence of massive feldspathic, sometimes pebbly, sandstone with subordinate beds of mudstone and siltstone, often carbonaceous, and thin coal seams.
				{	Pu	Undifferentiated glacio-marine sequences (two sequences comprising of tillite, pebbly mudstone and siltstone, sandstone and subordinate limestone and calcareous beds) overlain by a coal-measure sequence (Pf).
ORDOVICIAN	UPPER TO LOWER ORDOVICIAN	{	{	{	Lst	Light bluish-grey limestone; massive in the upper part; rhythmically interbedded limestone and calcareous siltstone in decimetric beds in the lower; ...
	LOWER ORDOVICIAN	{	{	{	Gs	Well-bedded sandstone and subordinate conglomerate; cherty calcareous/dolomitic siltstone in the upper part.
CAMBRIAN		{	{	{	E	Grey, green and red dolomite serpentinite conglomerate and breccia with subordinate dolomitic sandstone and siltstone and chert beds; several intercalations of ultrabasic and basic volcanic rock.

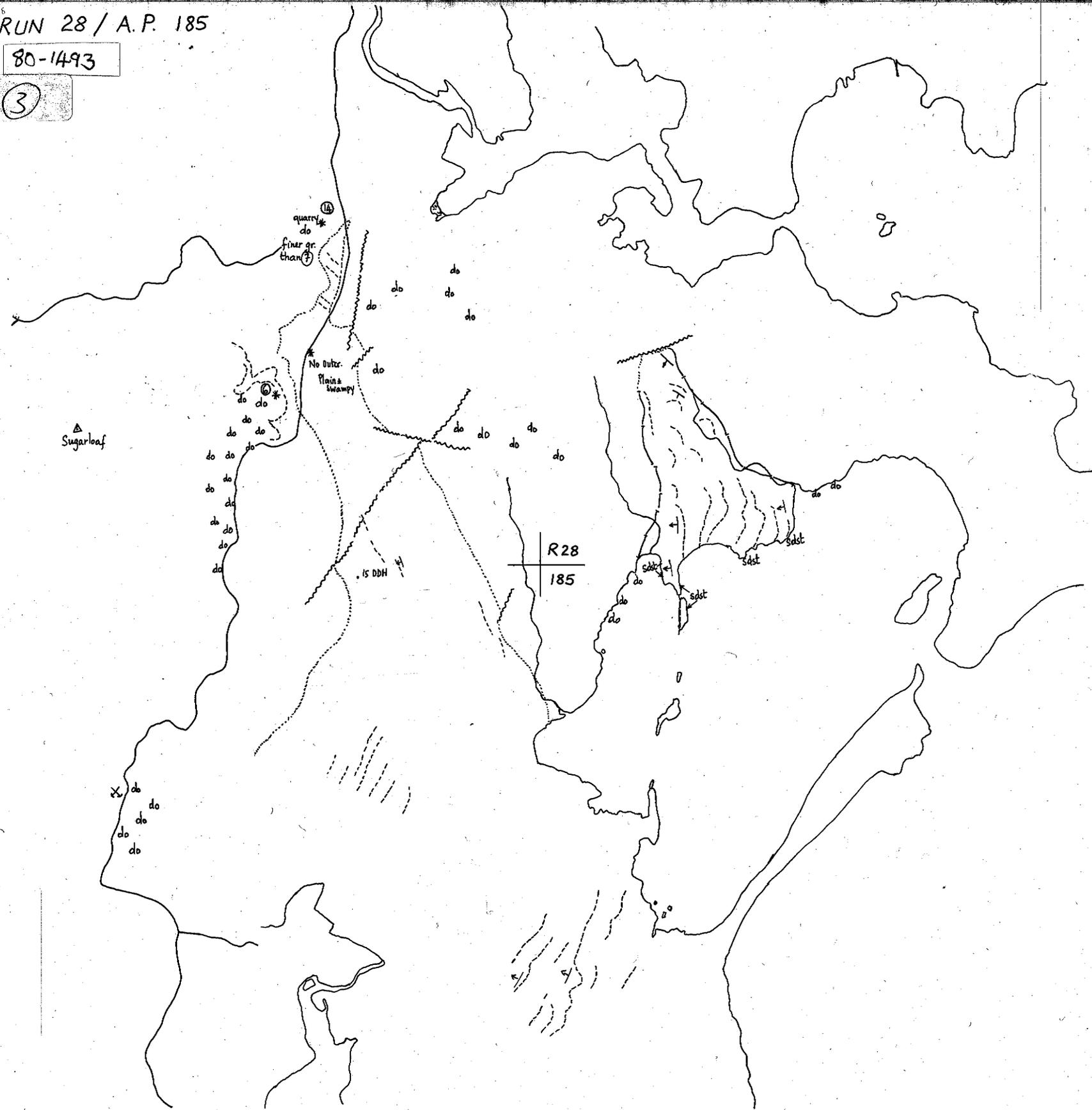
SYMBOLS

 Boundary of superficial deposits (Qa, Qg)  Trace of bedding or foliation  Geological boundary, position approximate  Geological boundary, position inferred  Unconformity  Horizontal  < 5°  5° - 15°  15° - 30°  30° - 45°  > 45°  Strike and dip of bedding observed during field checking  Jointing pattern  Fault showing relative movement (tick on downthrown side)  Approximate or inferred fault	 River, creek; waterfall  Lake, tarn  Swampy ground; swamp  Road, track; buildings  Prominent hill; peak  Boundary of forestry exploitation (a.- in progress; b.- recently abandoned)  Shaft (approximate location)  Quarry  Excavation; cliff or depression  Sinkhole  Aerial photograph centre, showing run and photo number  Field check locality (helicopter landing)  Costean; drillhole; government bore
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RUN 28 / A.P. 185

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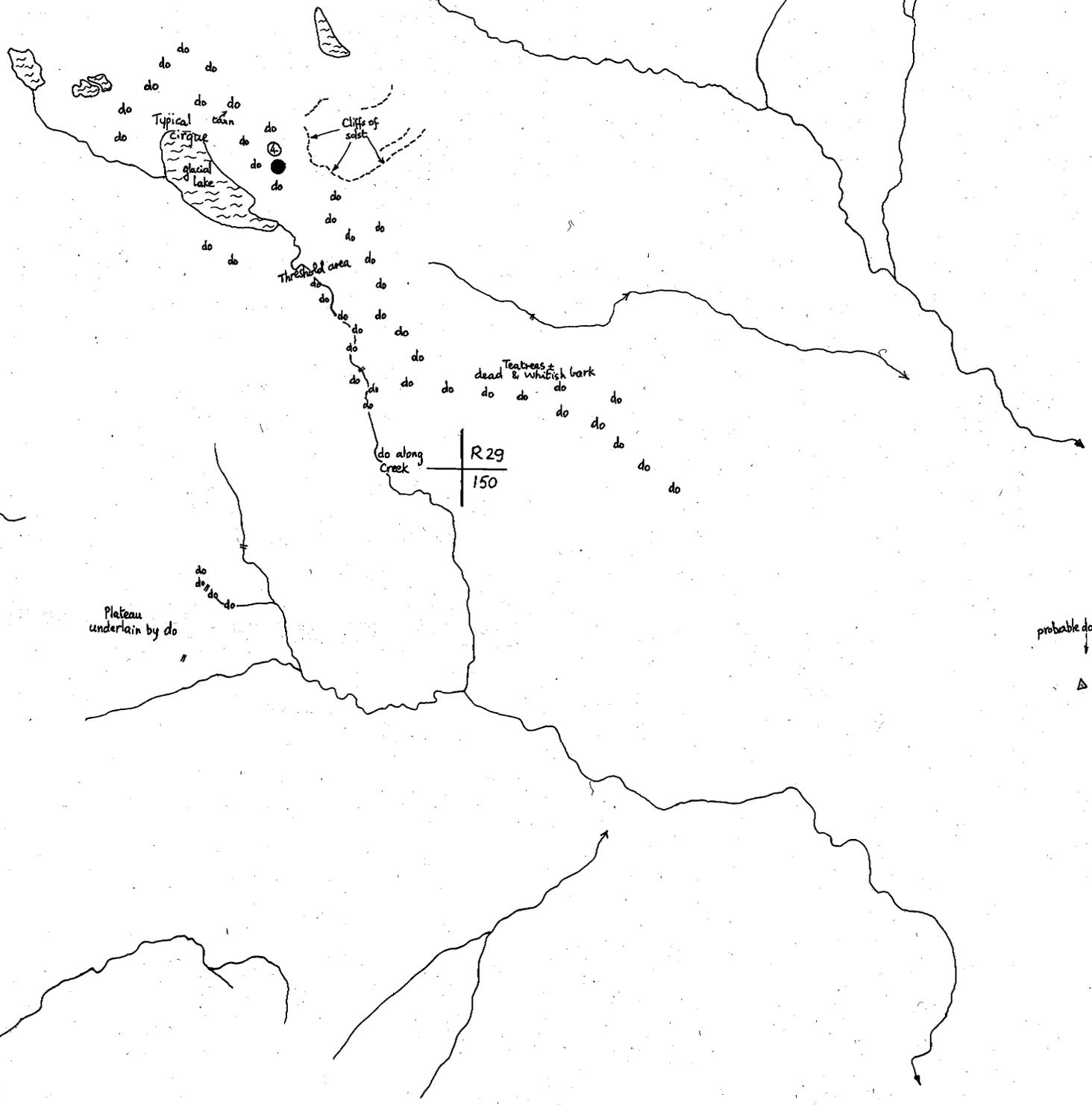
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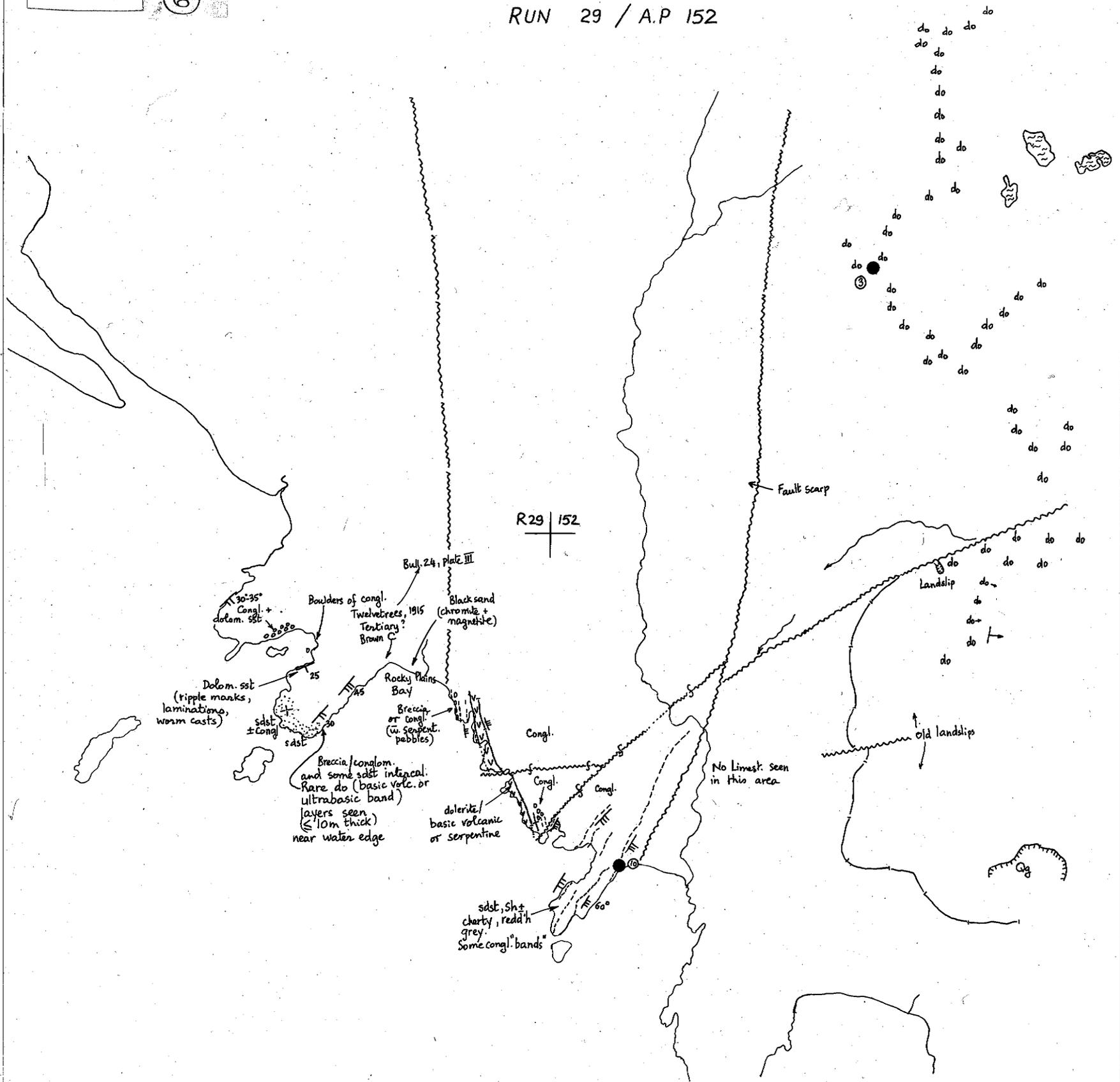
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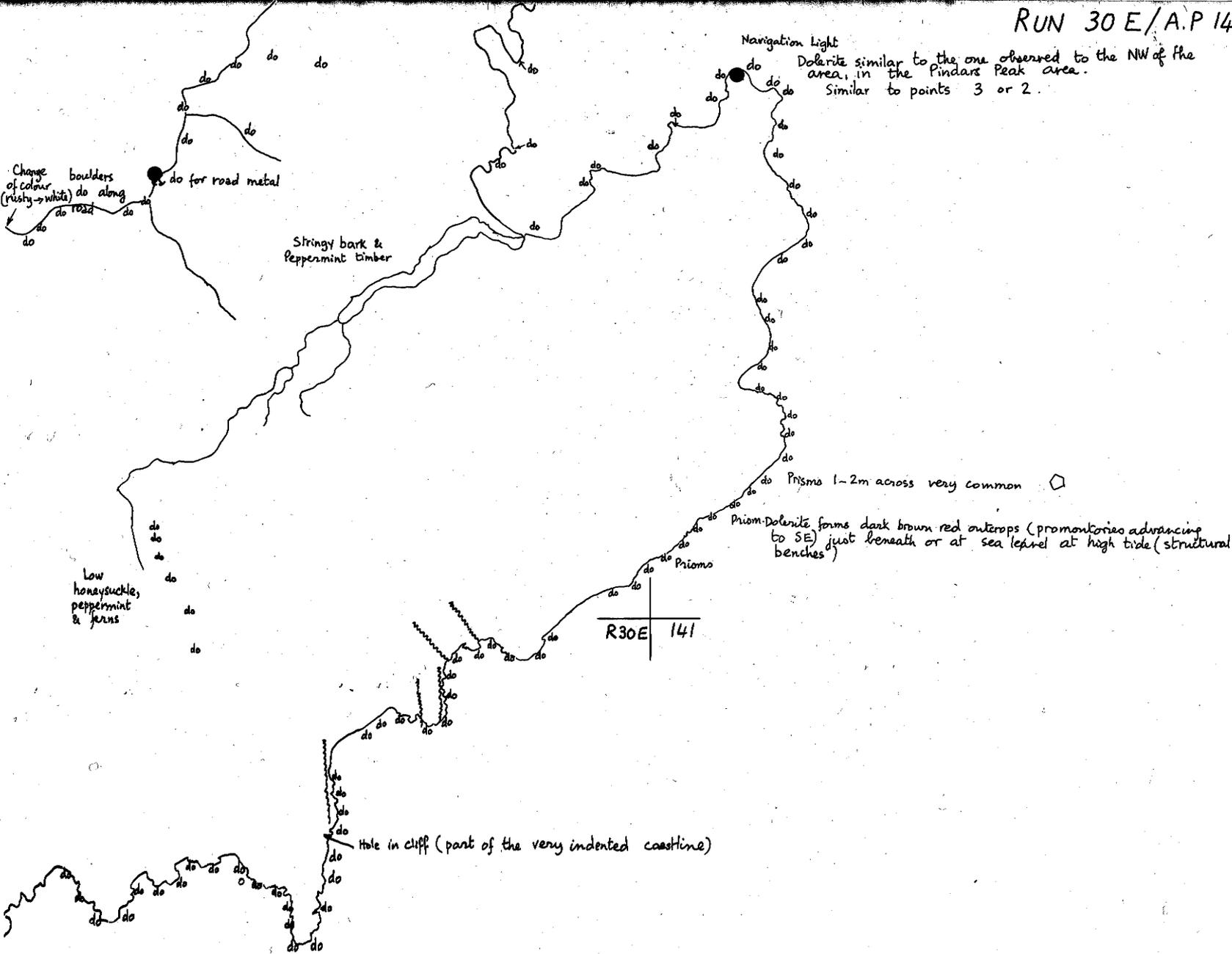
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