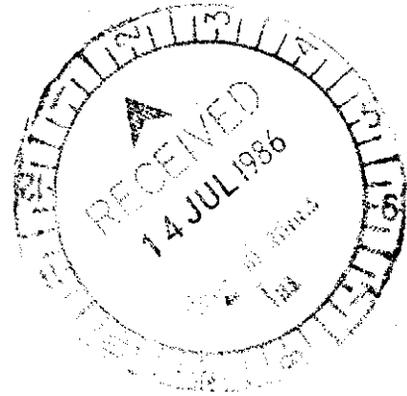


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BRUNY ISLAND OIL

E.L 29/84



A N N U A L

R E P O R T

June,
1986.

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				Records
G. DIR.	14 JUL 1986			E & IL
	DEPT. OF MINES			
REF. No.	6817 86			

BY: M.R. BENDALL

FOR: CONGA OIL PTY.LTD.

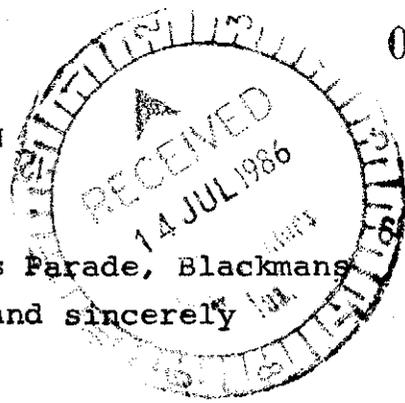
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STATUTORY DECLARATION



I, Malcolm Roy Bendall of 84 Wells Parade, Blackmans Bay, Tasmania, 7152, do solemnly and sincerely declare as follows:-

1. That the expenditure incurred by Conga Oil Pty. Ltd. for exploration of the Bruny Island Licence (E.L. 29/84) for the last quarter was as follows:-

2 Geologists Regional & local geology	\$2,700
Travelling Expenses	70
Equipment (Mapping equipment & Paper)	120
Insurance, Telephone, freight	140
Secretarial & Administrative costs (Typing reports, drafting maps, recovery of sample)	300
	\$3,330

2. That expenditure was incurred in collating regional geological reports and local geological reports and mapping and sampling.

And I make this solemn declaration by virtue of the statutory declarations act, 1959, and subject to the penalties provided by the act for the making of false statements in statutory declarations conscientiously believing the statements contained in this declaration to be true in every particular.

[Signature]
.....
Malcolm Roy Bendall

Dated at *HOBART* this *23*... day of *June*, 1986

[Signature]
.....
Justice of the Peace.

BRUNY ISLAND OIL

E.L. 29/84

C O N G A O I L P T Y L T D

INTRODUCTION:

The work programme this year has led to the application for an extra 350 skm of exploration licence in the south of the State. This years programme as specified in our letter of the 17th July, 1984, has been completed and surpassed. The second years exploration programme as specified in the above letter will be followed in conjunction with work programmes on the recently applied for exploration licences.

REGIONAL GEOLOGY:

In this report (Appendix 1) is a summary of the regional geology by Clive Burrett (Tas. University) which outlines the geological features of the ordovician related to possible petroleum reserves. Appendix 2 of this report summarizes the geological work completed on the local rocks within the Exploration Licence.

EXPLORATION LICENCE BRUNY ISLAND1. LEASE DATA

Licence No.	E.L. 29/84
Location	North Bruny Island
Granted	1985
Area	49 sq.Km.
Land Status	Private
Ownership	Conga Oil Pty Ltd.
Encumberances	Nil
Mineral	Oil and Petroleum

2. EXISTING INFRASTRUCTURE

a) Access:	Public road through lease Lease projects offshore
b) Electrical power:	Through lease
c) Water:	Intermittent streams

3. CURRENT ACTIVITY ON ADJACENT LEASES

Nil

4. SUMMARY OF SALIENT GEOLOGY

The area comprises the middle units of the Permian sequence in Tasmania (Ables Bay Formation, Risdon Sandstone, Minipoint Formation and Deep Point Formation), which have been intruded by sills of Jurassic dolerite. Underlying the Permian in the area, are older rocks including possibly Ordovician Limestones which from recent work are within the oil window in Southern Tasmania. Other petroleum sources within the Basal and lower permian (Lower Parmeener Group) exist, such as the 200 metre thick Woody Island siltstone which includes sequences of oil shales of algal origin. Structural comparisons to the N.W. Shelf have been made by Reeckmann and Mebberson 1984.

5. SUMMARY OF PREVIOUS MINING AND EXPLORATION

Gas and oil seeps have been reported at Bruny Island since 1915 with the most serious exploration being in 1929 when the then Director of Mines, McIntosh Reid, produced a report on them. A Hobart syndicate drilled the seep at that time but the rods snapped in the hole and the exploration was abandoned.

6. POTENTIAL TARGET

The target is a reservoir of natural gas and petroleum either structurally trapped above the dolerite intrusions or underneath them. Sealed faults may also provide potential targets.

7. WORK UNDERTAKEN BY MINSTOCK

The group has put together information which has only recently been discovered. This information has been gained by trips to the Adelaide Mines Department and from various private sources.

1. Oil and Gas are seeping to the surface witnessed by green staining on joint planes and strange undenudeable clays.
2. Oil shales occur in the Lower Permian sequences as well as in the basal Permian.
3. Older Ordovician limestones are within the oil window.
4. Structurally the field is similar to the North West Shelf Oil and Gas Field (the Canning Basin).

8. PROPOSED FUTURE EXPLORATION

Completion of seismic lines will require \$30,000 to determine the structure of the area and to ascertain the regional implications. At that stage, additional area may be acquired, if appropriate. The target which is defined by seismic results will then be the subject of a slim-line drill hole, 500m in depth. This would be undertaken at current costs.

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This appendix plus maps were delivered without letter as comment to Lease Enquiry Counter on the afternoon of Friday AUG 29.

APPENDIX 11.

Included in appendix 11 A is a map of the geology which includes a fault which runs from the seep at Johnstones Well to the area of Joint Plane Staining defined in appendix 11 B.

This information combined with appendix 1 figures 1 & 2 give an indication of a possible stratigraphy of the Bruny Island prospect and lead to the implication that the area south of Dover would possibly be an additionally prospective area. An area of 350 skm has therefore been applied for due to this initial work.

A sample of the seep was taken and given for assay to Amdel through Amoco Petroleum, the result of which is not yet available.

Appendix 1

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PETROLEUM PROSPECTIVITY OF CENTRAL SOUTHERN TASMANIA

- A PRELIMINARY REPORT

BY DR. CLIVE F. BURRETT

GEOLOGY DEPARTMENT, UNIVERSITY OF TASMANIA.

007

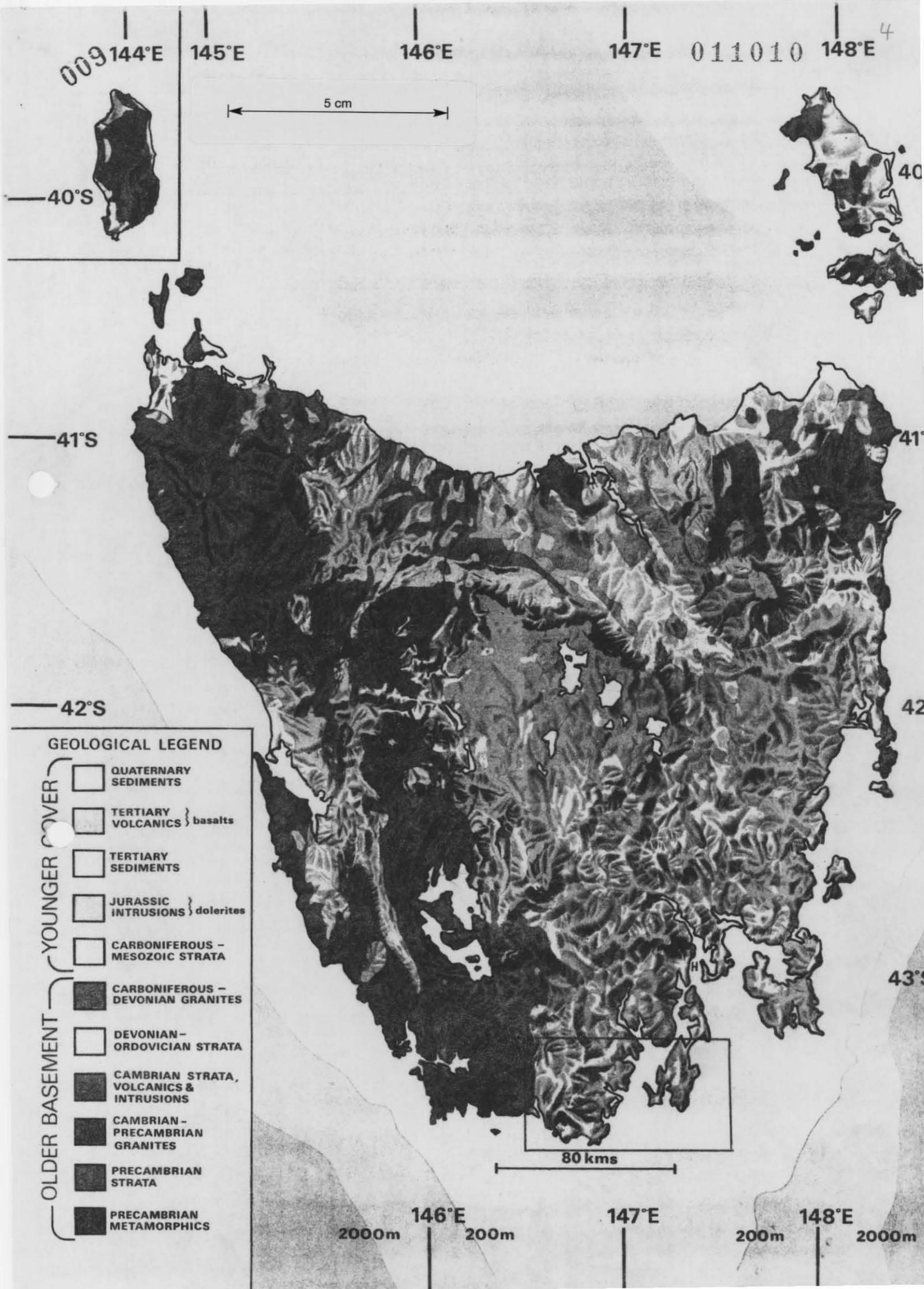
SUMMARY

Possible source rocks occur as organic rich shales and nodular carbonates beneath suitable reservoirs (platform margin buildups) in the Ordovician of Central South Tasmania. On the basis of the conodont Colour Alteration Index (CAI) much of the ordovician carbonate sequence is in the oil window (CAI of 1.5-2) and could, if intersected, beneath suitable seals (which exist in the Parmeener Supergroup) be prospective for hydrocarbons. The prospectivity of the area is degraded by the existence of extensive and often unpredictable diabase sills and associated dykes, by widespread (mainly) Tertiary faults and the unknown extent of post-Devonian-pre-permian erosion. A stratigraphic well sited northwest of Catamaran should intersect the potential ordovician reservoir rocks beneath a few hundred metres of Permo-Triassic and possibly Silvrian siliciclastics and will provide the information necessary to determine if further investigations are warranted.

008

INTRODUCTION

Oil exploration was initiated in this area (Fig.1) in 1909 when the government geologist (W.H. Twelvetrees) was commissioned to investigate oil seeps and shows along the South Coast. Very little work was done in the area until B.H.P. Company geologists compiled a map of the area based on rapid helicopter reconnaissance. Intensive geological work was initiated by the writer and colleagues in the late 1970's who concentrated mainly on the Ordovician Limestone sequence (Burrett et al 1981, 82, 84). Unpublished theses dealing with the area and surrounding regions include Davidson (1969), Correy (1983) and Sharples (1979). Bruny Island has been studied by Rigg (1970), Clark (1972) and Farmer (1985).



GEOLOGICAL LEGEND

- YOUNGER COVER
 - QUATERNARY SEDIMENTS
 - TERTIARY VOLCANICS } basalts
 - TERTIARY SEDIMENTS
 - JURASSIC INTRUSIONS } dolerites
 - CARBONIFEROUS - MESOZOIC STRATA
- OLDER BASEMENT
 - CARBONIFEROUS - DEVONIAN GRANITES
 - DEVONIAN - ORDOVICIAN STRATA
 - CAMBRIAN STRATA, VOLCANICS & INTRUSIONS
 - CAMBRIAN - PRECAMBRIAN GRANITES
 - PRECAMBRIAN STRATA
 - PRECAMBRIAN METAMORPHICS

GEOLOGICAL CONSTRUCTION OF TASMANIA

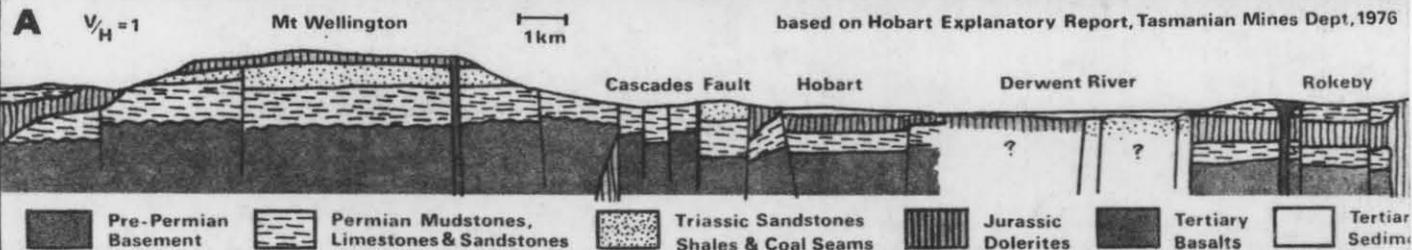
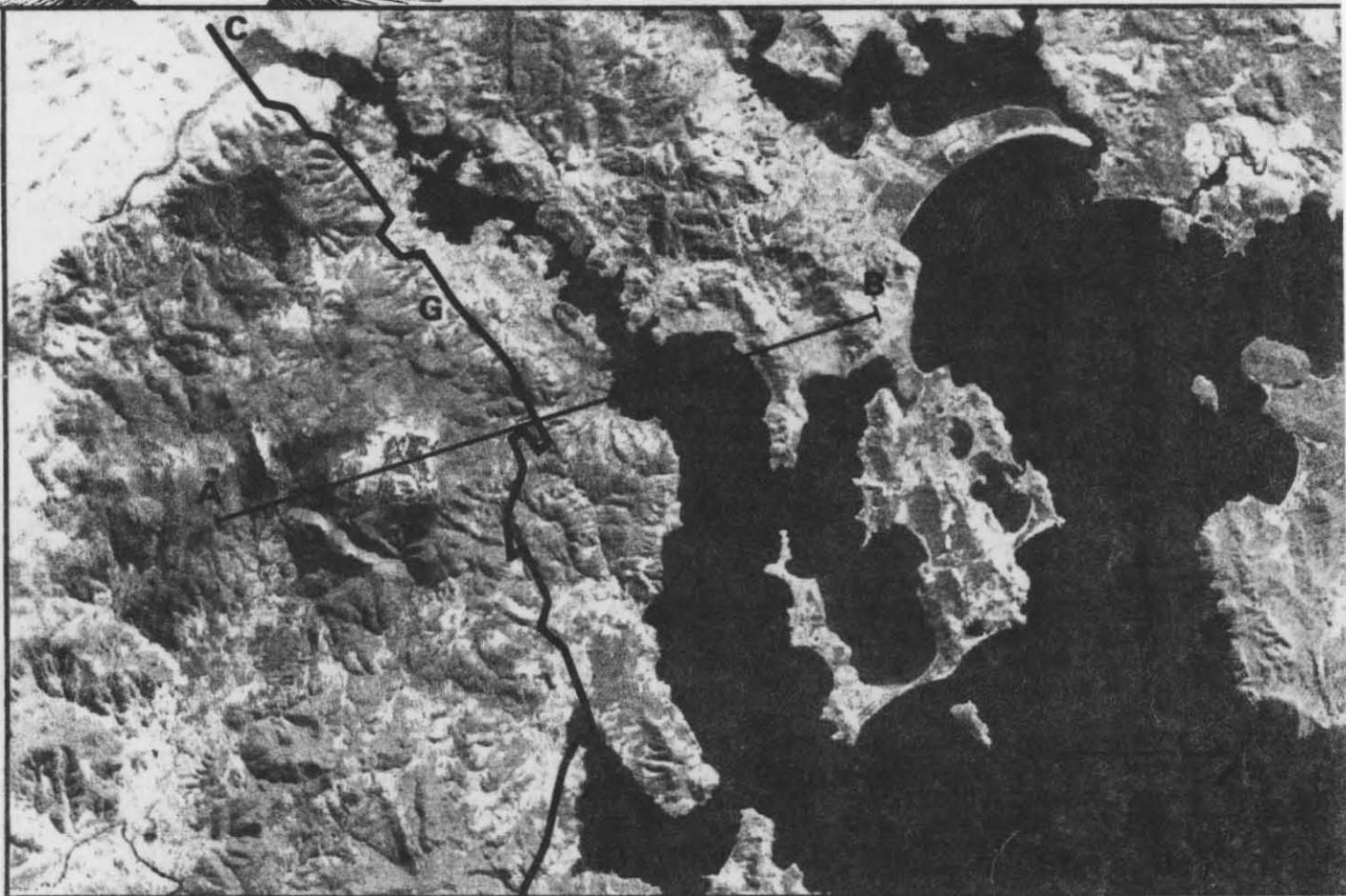
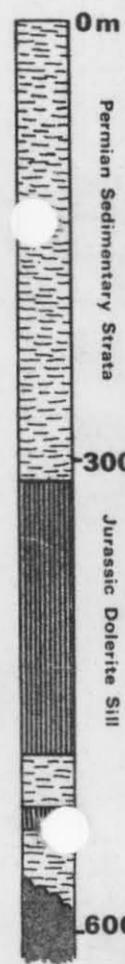
An Illustrated Summary in Colour

by Lin Sutherland and Sally Robinson
The Australian Museum, Sydney

Prepared in conjunction with Australian Natural History
Special issue on Tasmania, March-April 1980



GLENORCHY DRILL HOLE

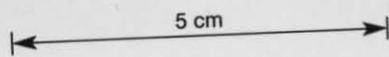


Landscape and geological features of the Hobart area. The satellite image (false colour composite) clearly shows the resistant dolerite plateau capping Mt Wellington (snow covered) and the drowned valley and coast lines which were formed by a rise in sea-level to its present position about 6,000 years ago after the

last glaciation. The positions of the geological section (A-B) through Mt Wellington and the Derwent Estuary, the Glenorchy drill hole (G) which reached the underlying basement rocks and the line of the Cascades-North West Bay Fault System (C) which uplifted the Mt Wellington side are shown on the image.



Block stream of dolerite fragments, Mt Wellington. Photo: J.L. Davies



Contents Include:

- Geological Landscape Map
- Sections through the Island
- Metallic Mineral Areas
- Fossil Fuel Sites
- Structures of the Island, Bass Strait
- Underlying Crust & Mantle

FIG. 1. GENERALIZED GEOLOGY OF TASMANIA.

AREA CONSIDERED IS INDICATED BY RECTANGLE.

012

RECOMMENDATIONS

The extent of the dolerite on Bruny Island (Clark 1972) makes selection of a drilling site on that Island difficult. The problems of predicting basement in this area also make Bruny Island unattractive. Potentially, more productive areas occur on the mainland where suitable sections of Parmeener Supergroups probably overlie potential reservoirs and sources in the Eldon and Gordon Groups. A site located on a track at grid ref. DM 889781 and outside of the National Parks boundary is indicated on Fig. 5. and in appendix 1 (1:100 000 Map S.E. Cape). These sites would be expected to pass through a few hundred metres of Triassic Sandstone, about 600m. of Permian siliciclastics, about 50m of Eldon Sandstones and then about 600m of Ordovician carbonate thereby intersecting all likely reservoirs.

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A Precambrian quartzite-dolomite sequence is overlain by a Cambrian submarine fan complex with minor carbonates. These are overlain by an Upper Cambrian - Lower Ordovician siliciclastic sand sequence and then by shales and shaley nodular carbonates of Lower Middle Ordovician age (Karmberg Limestone correlate). These in turn are conformably overlain by oncolitic algal carbonates (Cashions Creek Limestone correlate). These are overlain by about 130m of massive carbonates and 230m of micrites and shales of Upper Ordovician age (Fig.3). These are overlain by a few tens of metres of siliciclastics of the Upper Ordovician - Silurian Eldon Group. Folding along N - S trending axes occurred during the Early Devonian with some minor overthrusting towards the east.

The base of the Parmeener Supergroup is usually a fillite of variable thickness that rests with marked landscape unconformity on the Lower Palaeozoic strata. This basal Upper Carboniferous tillite is overlain by a sequence of glacio-marine shales and sandstones of Permian age (Figs. 2 & 8). These are succeeded by an Upper Permian coal-bearing sequence (the Cygnet Coal Measures) and are in turn overlain by the dominantly fluviatile sandstones and shales of the Triassic Upper Parmeener Supergroup.

Extensive and often transgressive (Davidson 1969) sills of dolerite (diabase) intruded during the Jurassic (Fig.4) mainly into the Parmeener Supergroup. The unpredictable nature of the dolerite makes drilling hazardous as dolerite sills or dykes may be intersected unexpectedly at depth. Dolerite sills now forms most of the high ground in the area. Metamorphism is localised in the vicinity of the sills, though where there is a combination of sill and dyke (for instance along the New River) contact metamorphism may be more extensive. This has led to high conodont colour alteration index values (5)

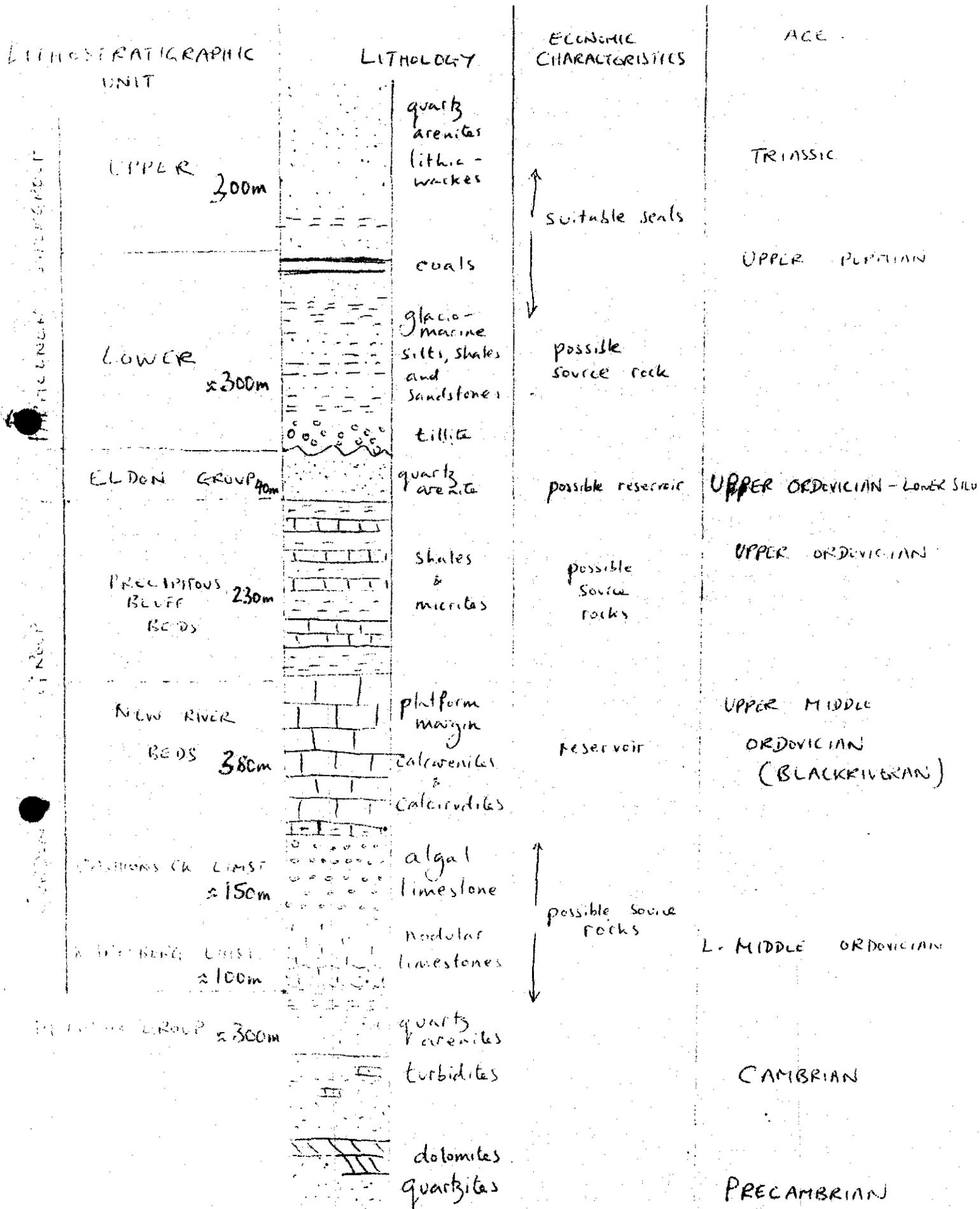
at Precipitous^S Bluff and at Mt. Bobs.^E

The area was extensively faulted during the Tertiary and possibly in the Jurassic.

FIG. 2. GENERALIZED STRATIGRAPHIC COLUMN FOR SOUTH CENTRAL TASMANIA.

FIG. 2

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FIG. 3. STRATIGRAPHIC COLUMN OF GORDON GROUP CARBONATES AT PRECIPITOUS BLUFF.

5 cm

Clive Burrett, John Laurie and Bryan Stait

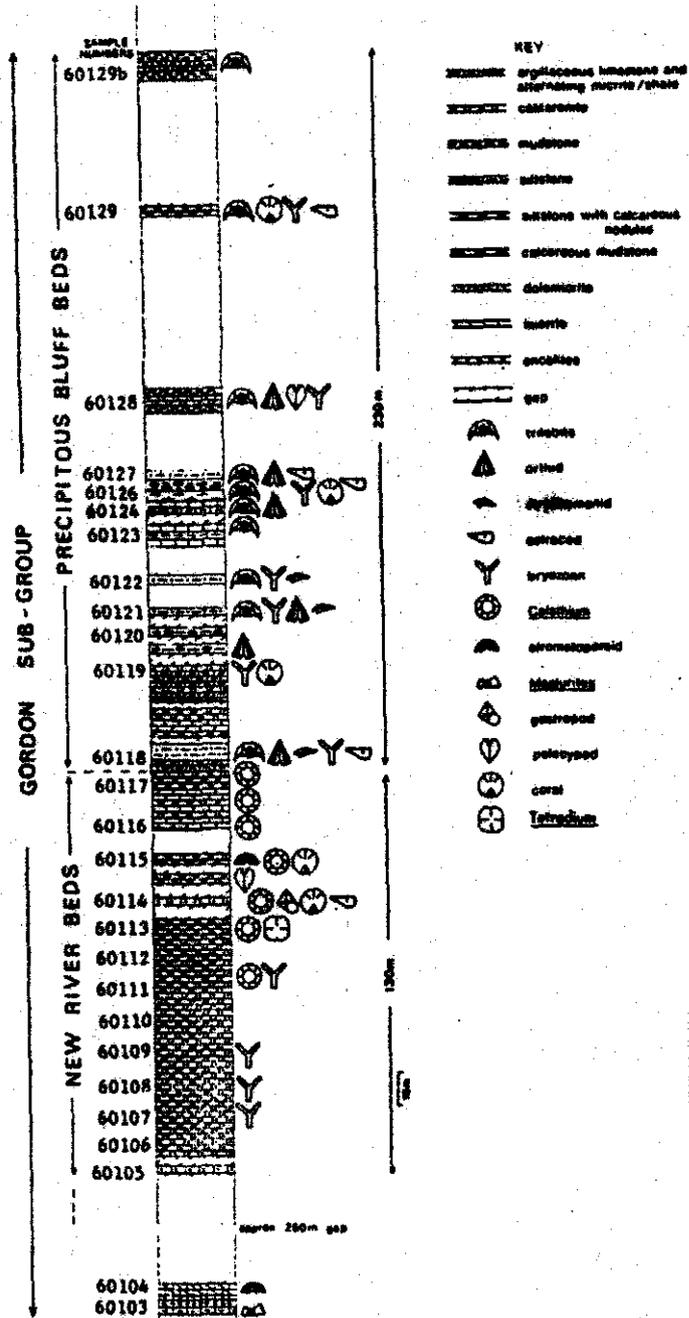
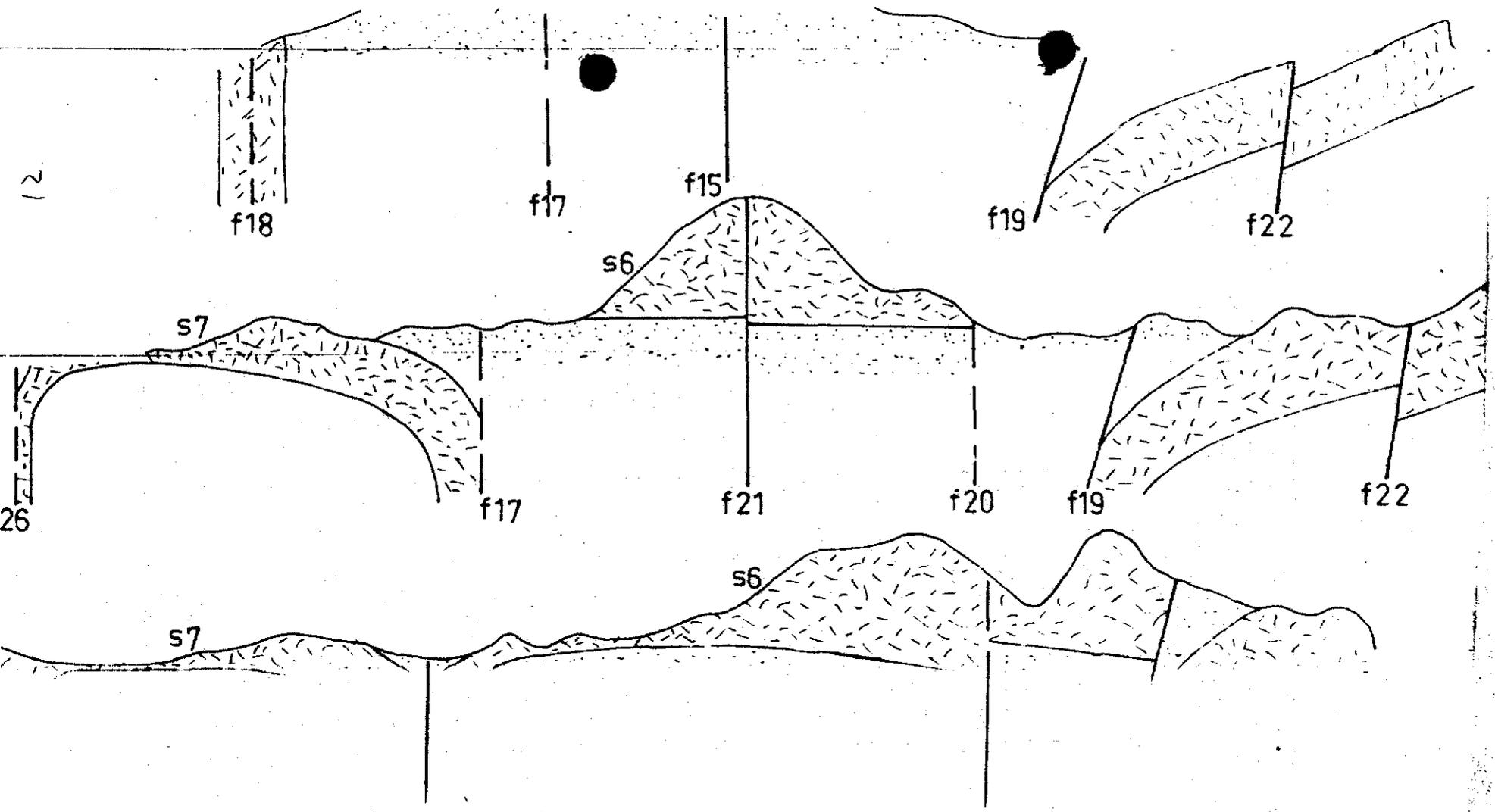


FIG.3.- Stratigraphic column of the Gordon Subgroup at Precipitous Bluff. The thickness of the stratigraphic gap (if any) between samples 60106 and 60105 is not known but could be as much as 250 m. Sample 60114 is dolointrasparite from an outcrop of vertically dipping carbonate. Sample 60115 is from the entrance (lower southern side) of Damper Cave. Sample numbers are catalogue numbers of the University of Tasmania, Geology Department rock collection.



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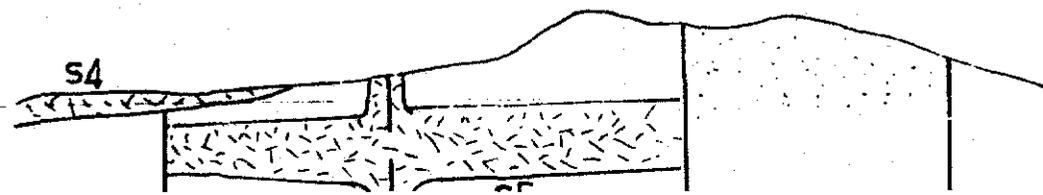
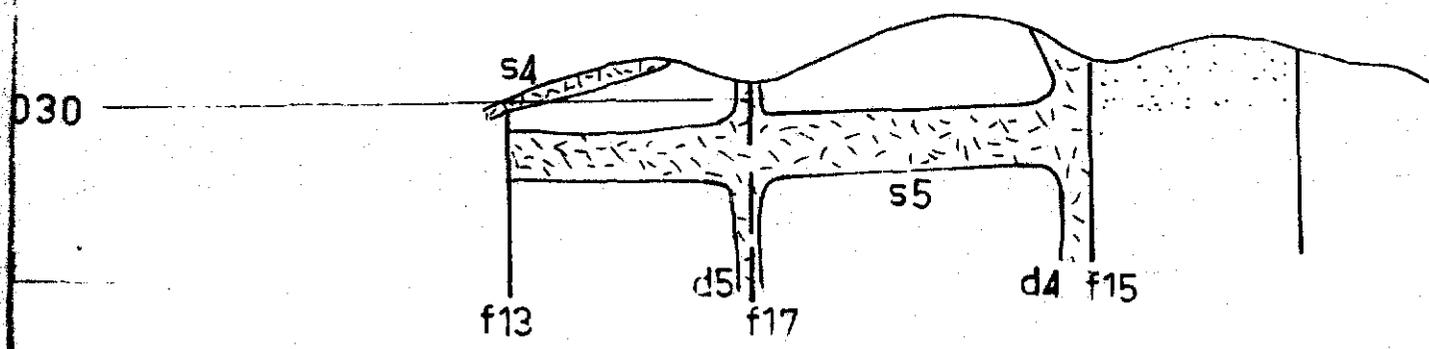
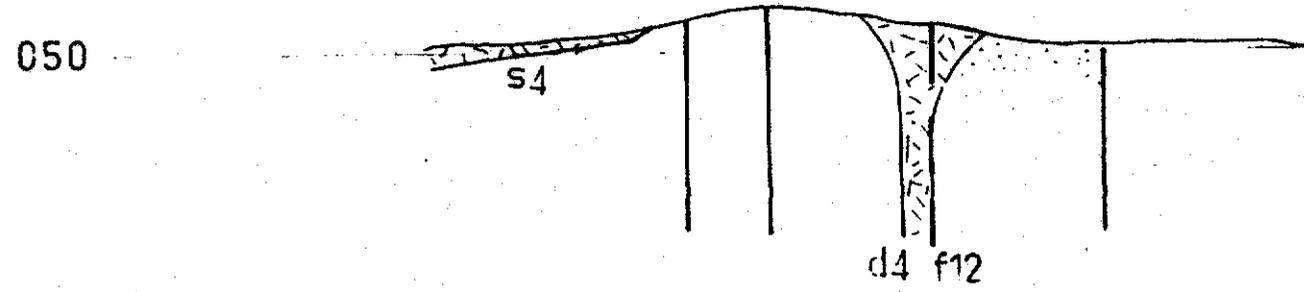
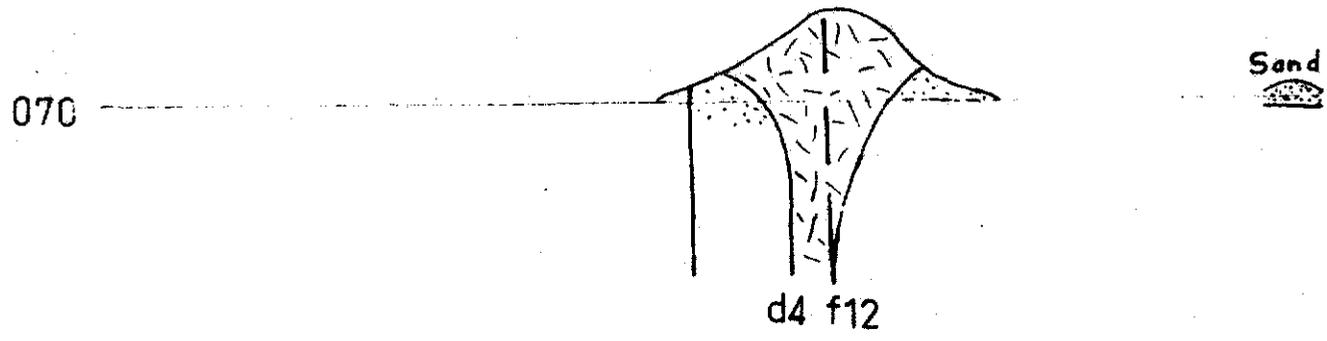
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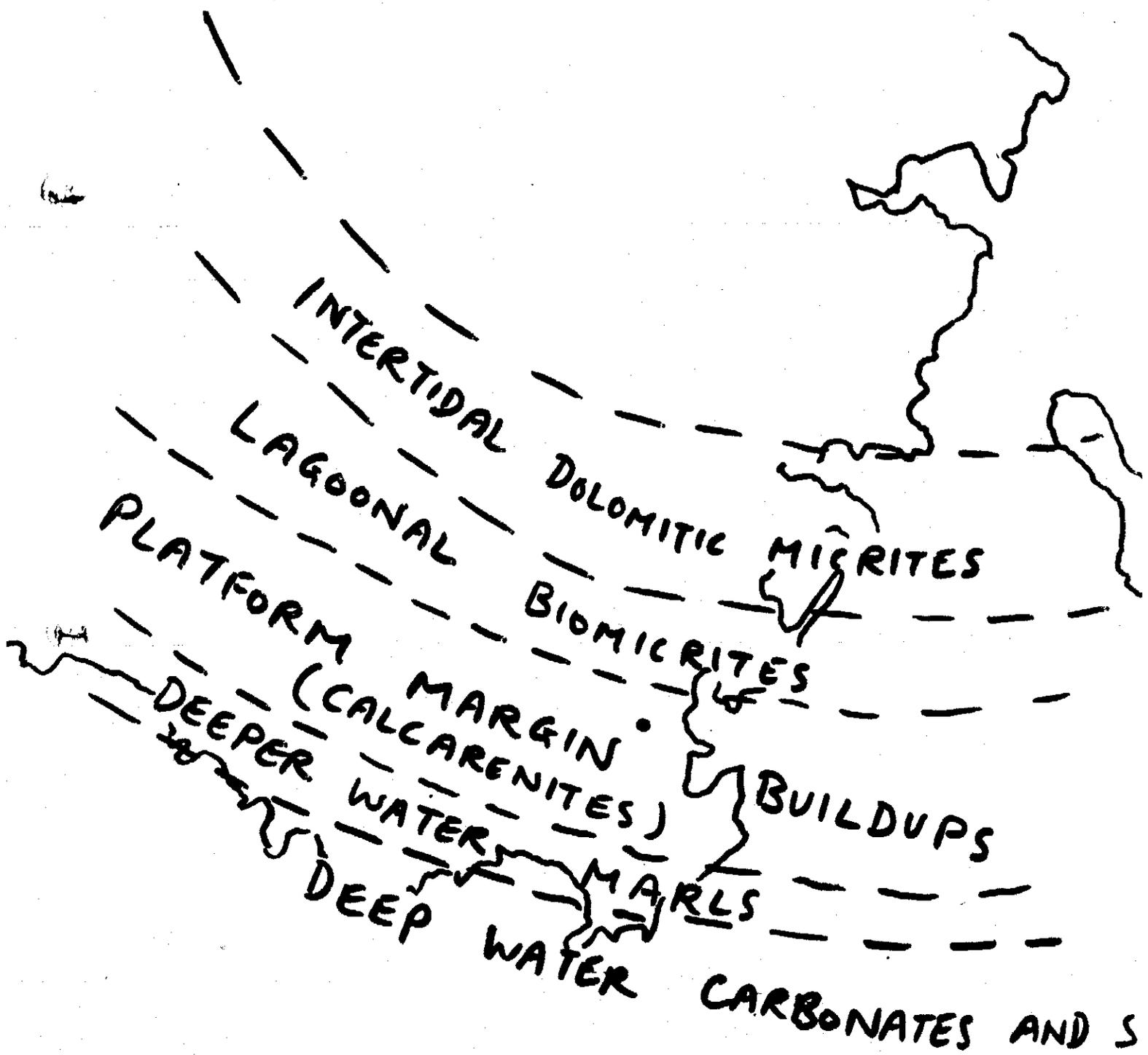
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FIG. 4. EXTENT AND FORM OF DOLERITE (DIABASE) INTRUSIONS ON
BRUNY ISLAND (FROM CLARK 1972).

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FIG. 5. LITHOFACIES MAP OF THE MIDDLE MIDDLE ORDOVICIAN (BLACKRIVERAN) BASED ON INFORMATION FROM ALL OUTCROPS. A POSSIBLE DRILLING SITE IS INDICATED.



BLACKRIVERAN (M. ORD.) FACIES BELTS

021

ORDOVICIAN PALAEOGEOGRAPHY

Due to the discovery of low Conodont Colour Alteration Index (CAI) values in much of the Gordon Group Limestone, the Ordovician rocks of this area are of interest from a hydrocarbon point of view.

During the Ordovician, the sea gradually transgressed from the east and south over the gradually eroding Precambrian-Cambrian rocks of the Tyennan Block of Western Tasmania. The resultant Tyennan Island or archipelago was, by the Middle Ordovician (Blackriveran) surrounded by broad tidal flats now represented by algal-laminated dolomitic micrites such as those at Ida Bay, (Burrett et al 1984). From information at localities at Mt. Bobs, Judds Cavern, Picton River, Precipitous Bluff, Pt. Cecil, Surprise Bay and Ida Bay, the broad pattern of lithofacies can be mapped (Fig.5). The extension of these M. Ordovician lithofacies to Bruny Island is not known. Deeper water (650m) lay to the south and the platform was rimmed by coralline platform margin buildups (Fig. 6A). During the Upper Middle Ordovician ("Trentonian") the angle of depositional slope changed and a rimmed platform (Fig.6B) was transformed into a ramp with a consequent inland (northward) migration of the fringing coralline buildups. In the Upper Ordovician and Lower Silurian well sorted quartz arenites were deposited due to a rise in ^{seawater} some lands to the west (Correy 1983).

022

FIG. 6 A & 6 B.

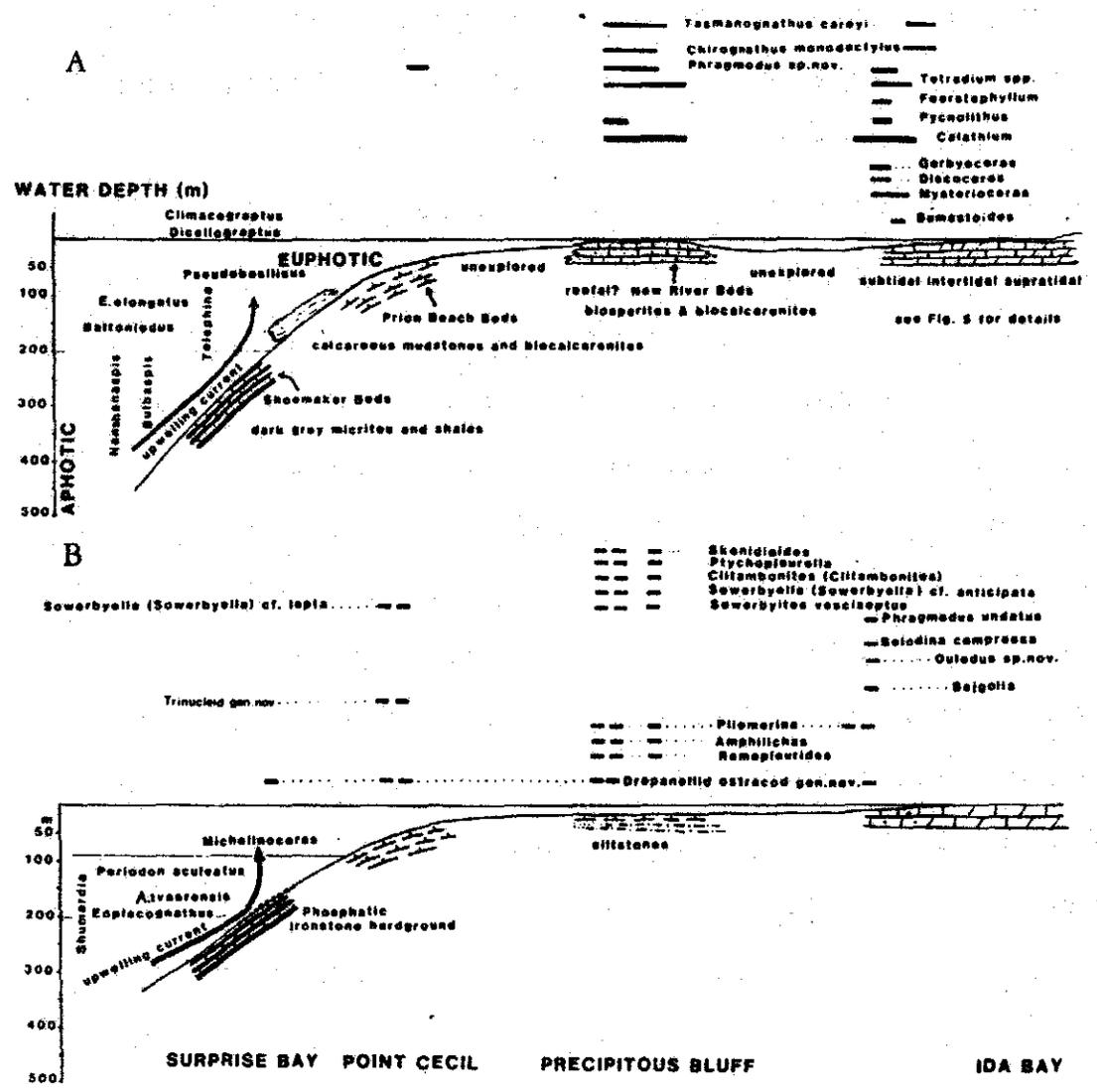


Fig. 6. Generalised environmental model showing transect from Ida Bay to Surprise Bay. Present distance is 25 km. A: Diagrammatic reconstruction for Blackriveran, B: reconstruction for Rocklandian/Kirkfieldian time.

FIG. 7. PALAEOGEOGRAPHIC MAP FOR PART OF THE
LOWER PERMIAN. FROM CLARKE (IN PRESS).

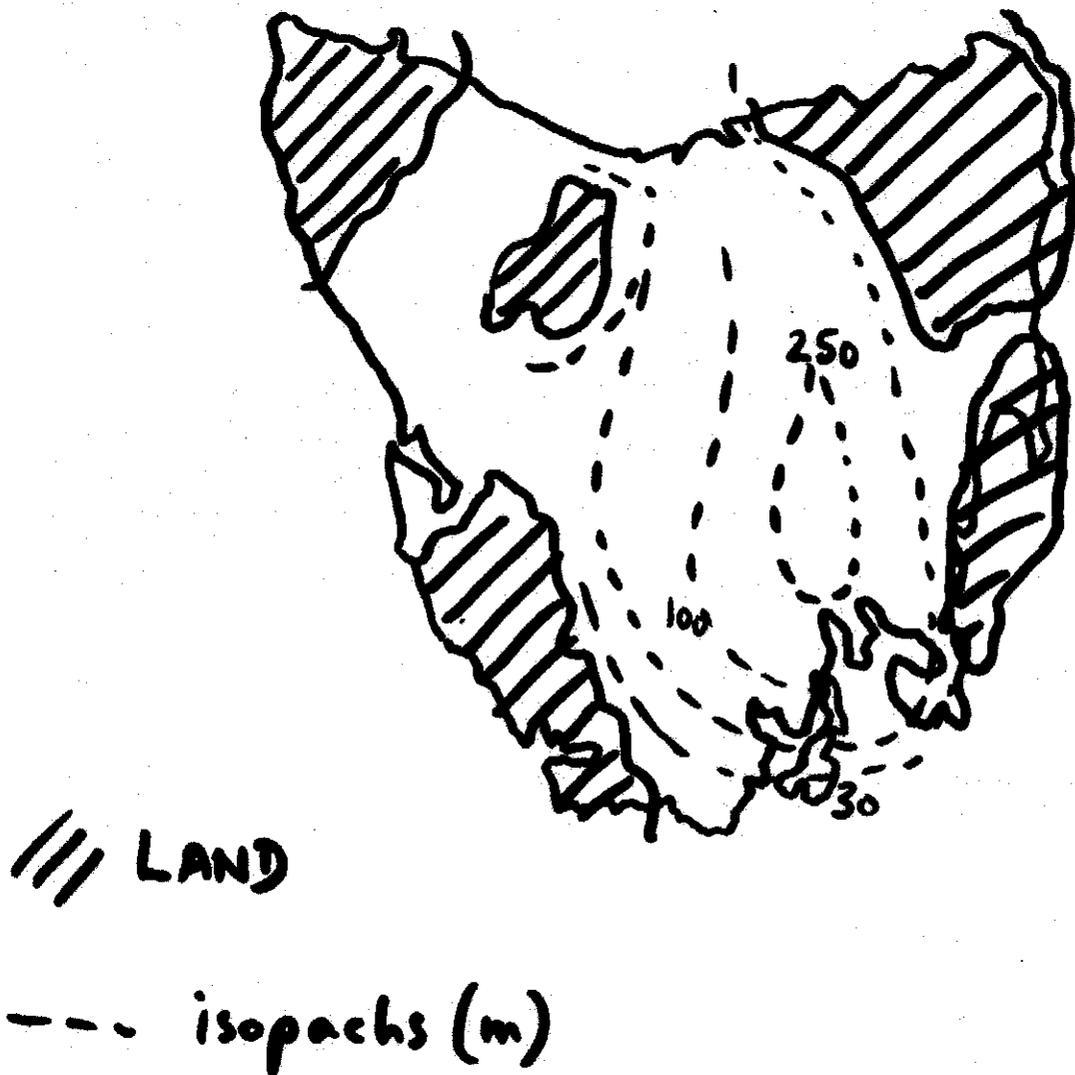


FIG. 8. STRATIGRAPHIC COLUMNS FOR THE LOWER PARMEENER SUPERGROUP. (UPPER CARBONIFEROUS - PERMIAN) SOUTH CENTRAL TASMANIA. FROM CORREY (1983).

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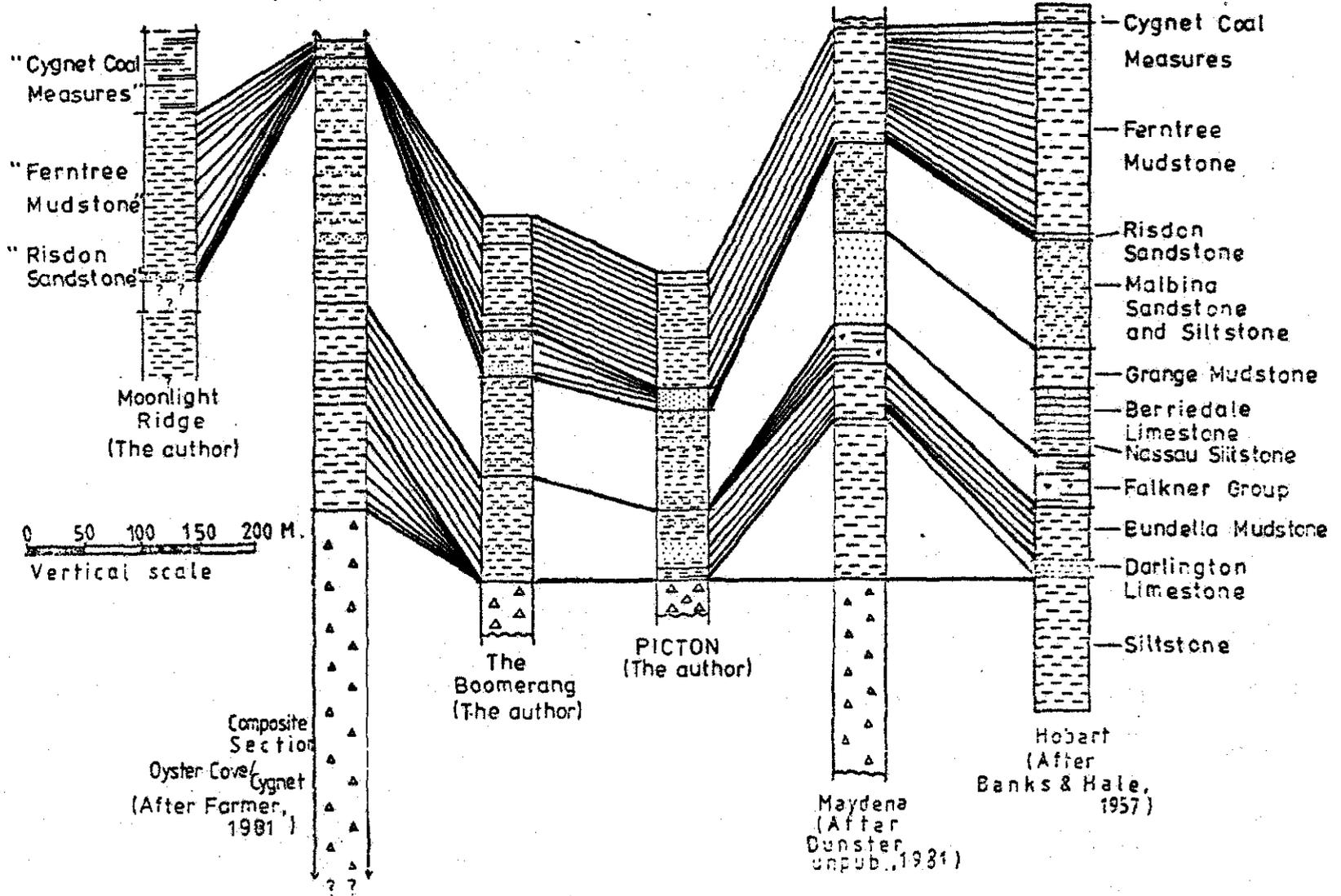


Figure 3.12
Correlation diagram of six lithostratigraphic columns through the lower part of the Parmeener Super-Group in south-east Tasmania

420

PERMIAN PALAEOGEOGRAPHY

The area was near to the western depositional margin of the Tasman Basin during the Permian (Fig.7). As a result many of the units recognised in the basin depocentre (north of Hobart) are either thinner or absent in this area (Clarke in press). Little work has been done on the Permian of the area, what little is known is summarised in Fig. 8. The lower part of the sequence (the Woody Island Formation) is a suitable source rock but is unlikely to have been buried sufficiently to be (or have been) generating hydrocarbon unless there is (or was) an (unexpectedly) steep geothermal gradient in the area.

026

SOURCE ROCKS

Suitable source rocks are present in the Karmbe Limestone (and underlying shales if present) in the Precipitous Bluff Beds, in the unnamed Mid-Ordovician lagoonal carbonates of the Vanishing Falls area and in the shales and siltstones of the Lower Parmeener Supergroup. No bio-geochemical work has been carried out on any of these sediments.

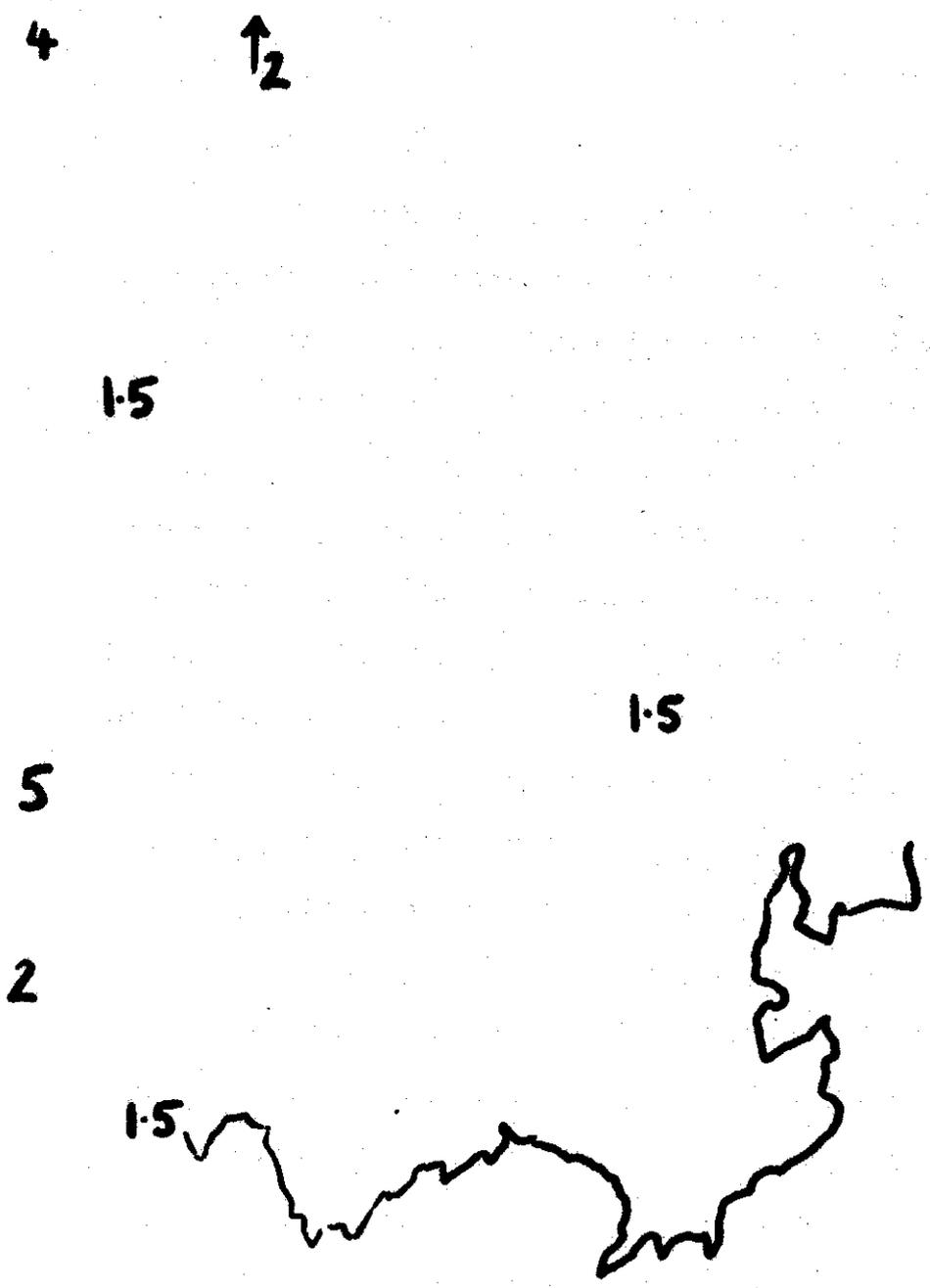
ORGANIC MATURATION

The possible Ordovician source rocks are, within much of the area, within the oil window on the basis of the Conodont Colour Alteration Index (CAI) (Fig.9-10).

CAI's of 1.5-2 are present in carbonates for the Picton River, Vanishing Falls, Surprise Bay and Ida Bay. There is a probability that potential source rocks are (or were) in the oil window beneath Parmeener Supergroup rocks. It is unlikely that potential source rocks within the Parmeener are at a sufficient depth to have generated hydrocarbons, though in areas of high geothermal gradient - for instance near Hastings, near the Cretaceous syenite at Cygnet or adjacent to the pervasively ^{dyke} dolerite, local heating may have produced oil and gas. Such local heating may well be the source of the gas reported by Mr. Bendall on North Bruny Island. Mr. Steve Forsyth (in Farmer 1986) reports that the palynomorphs for the Parmeener Supergroup of the Cygnet area are carbonised. This is probably due to heating associated with the Cretaceous ^K alkaline intrusions. Chitinozoa ^u from the Ordovician of the Salisbury River are reddish-brown in colour which indicates an 'Oil window' maturation index and agrees with the CAI values of the conodonts.

027

FIG. 9. CHART SHOWING ORGANIC MATURATION INDICES
INCLUDING THE CONODONT COLOUR ALTERATION
INDEX (CAI).



CONODONT COLOUR ALTERATION INDEX

ORDOVICIAN CARBONATE OCCURRENCES. HIGH

VALUES IN THE WEST ARE DUE TO PROXIMITY TO

A DOLERITE REEDED DYKE. BURRETT (UNPUBLISHED).

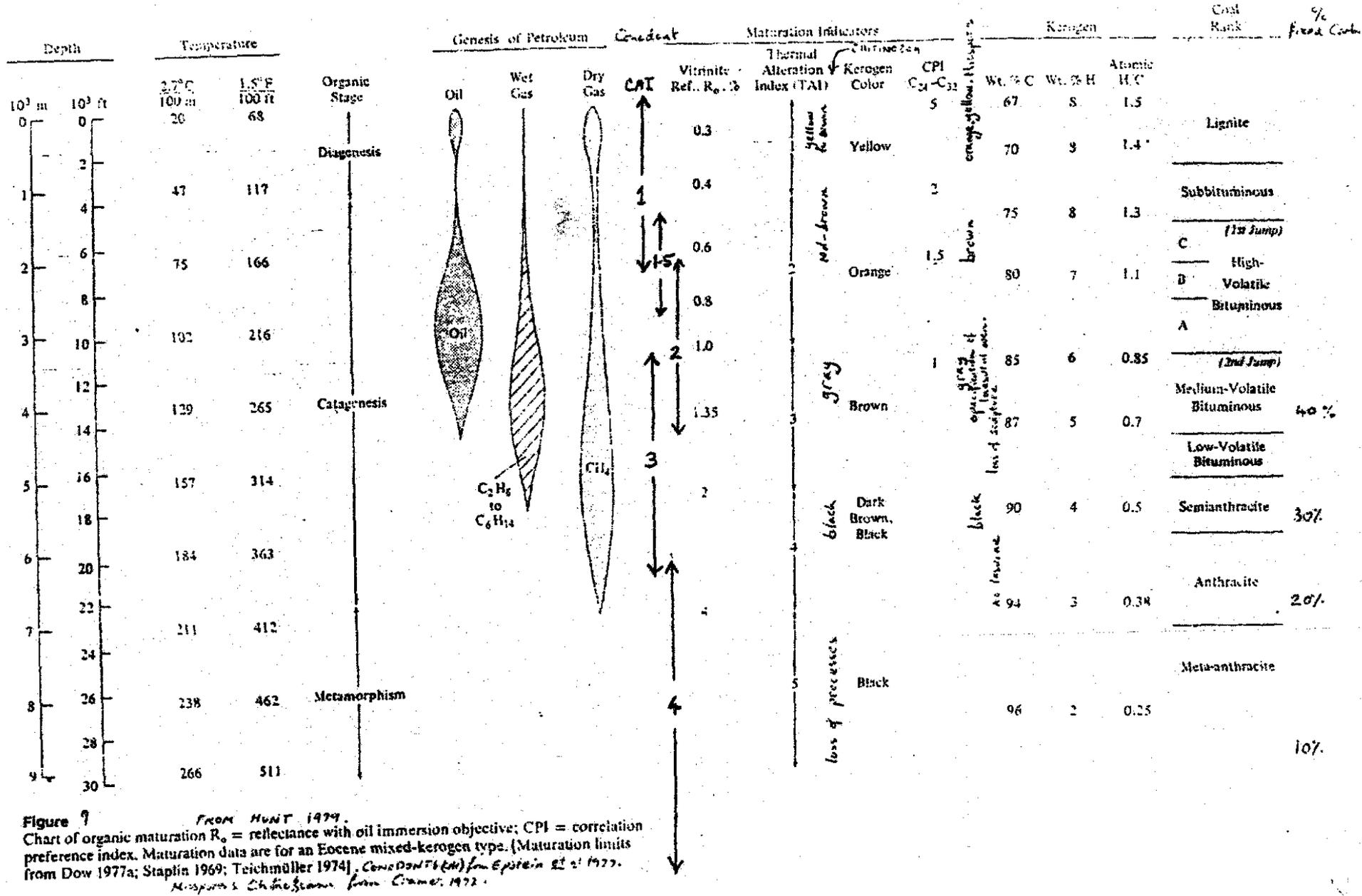


Figure 9 FROM HUNT 1979. Chart of organic maturation R_0 = reflectance with oil immersion objective; CPI = correlation preference index. Maturation data are for an Eocene mixed-kerogen type. (Maturation limits from Dow 1977a; Staplin 1969; Teichmüller 1974). Conodont CAI from Epstein et al. 1977. C_2H_6 & C_6H_{14} from Crane, 1972.

028

r2 RESERVOIRS

Potential reservoirs with relatively high porosity (15%) and adequate permeability may exist in the Eldon Groups (Silurian) siliciclastics overlying the limestone sequence in the calcareous upper parts of the Ordovician limestones and in some of the sands of the Parmeener Supergroup. The excellent reservoir characteristics of coeval and similar Permian glaciomarine and glaciofluvial siliciclastics in the Eromanga Basin of Australia and in Southern Oman are now well known. However, few porosity / permeability measurements have been carried out on any of these rocks and the potential reservoir characteristics of these units is based on thin-section estimates only. Direct measurements on core samples are clearly needed.

030

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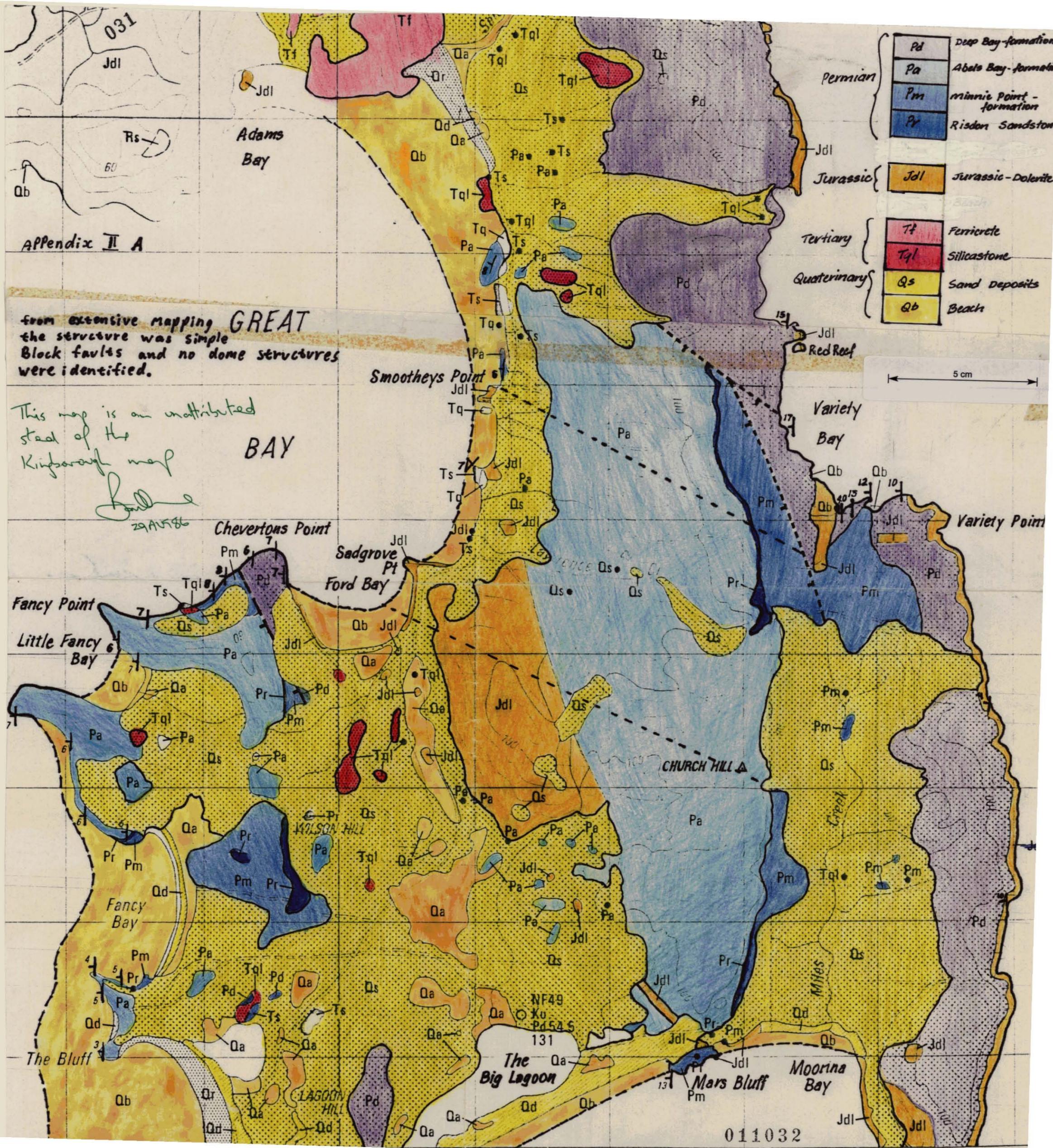
Appendix II A

from extensive mapping GREAT the structure was simple Block faults and no dome structures were identified.

This map is an unattributed steal of the Kingborough map

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29/11/86

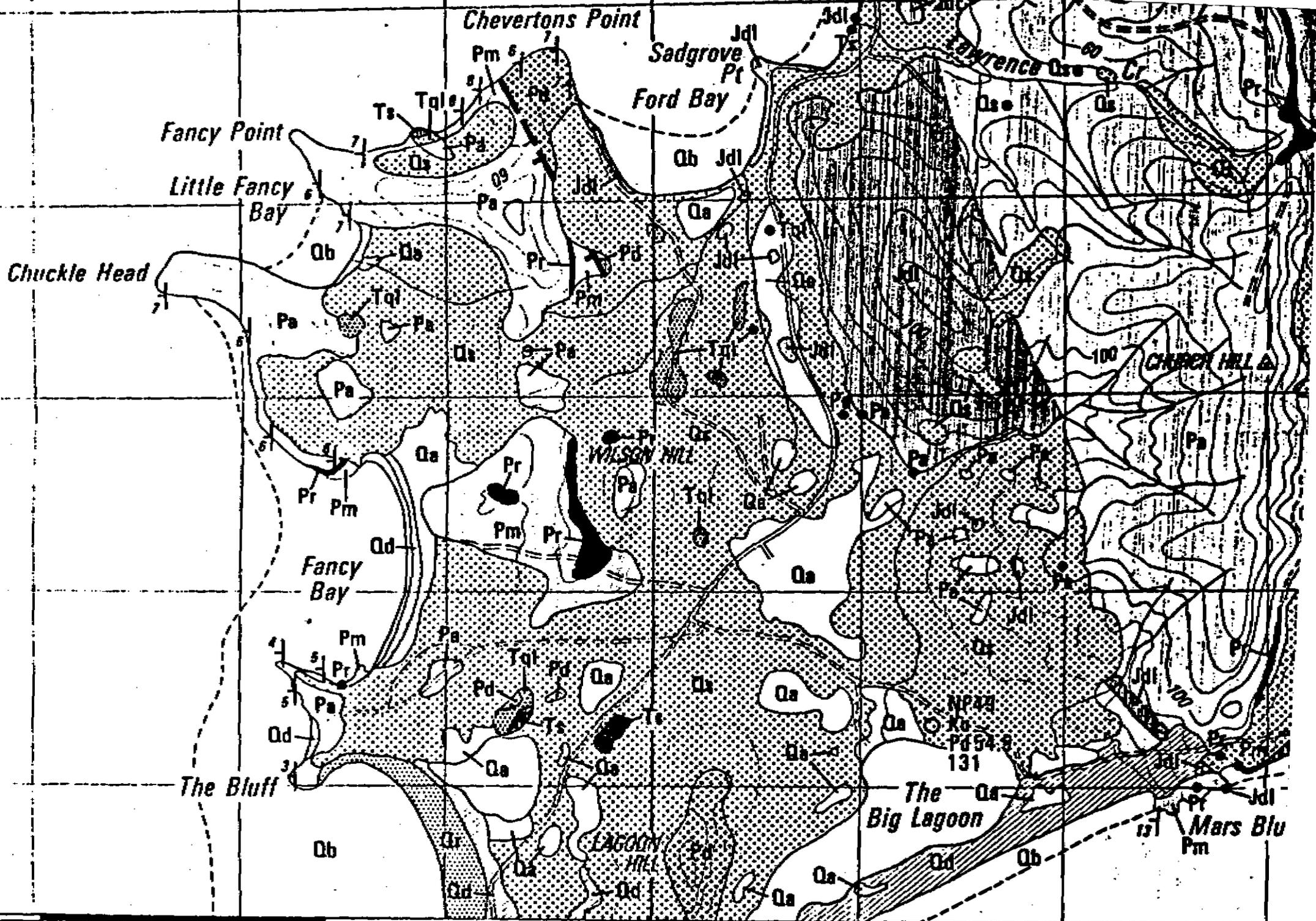
BAY



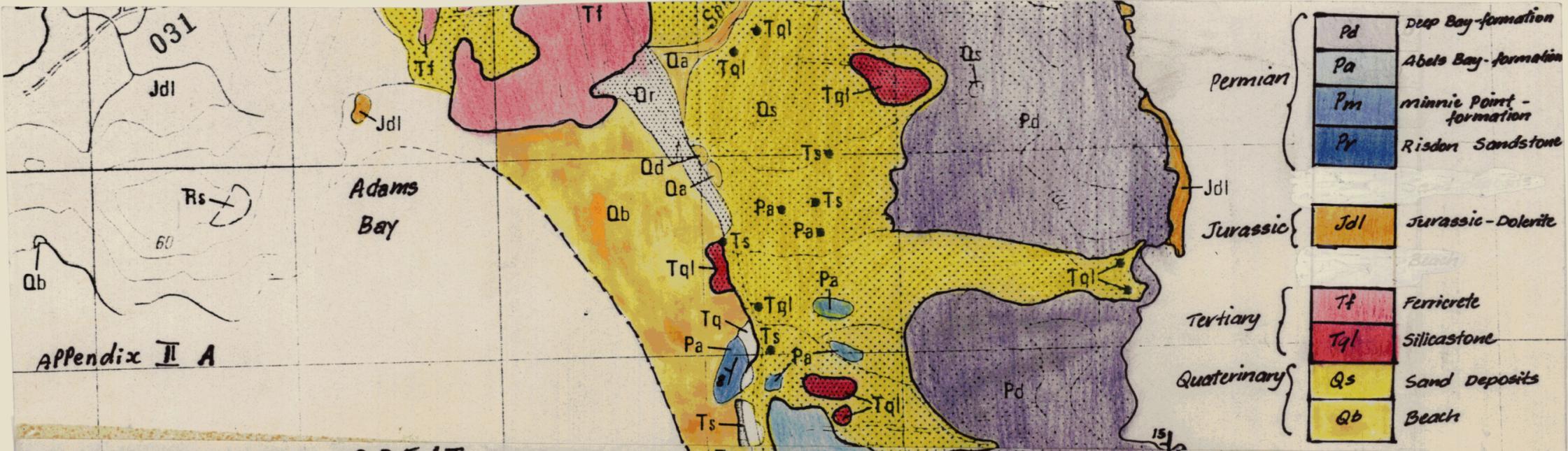
Permian	Pd	Deep Bay-formation
	Pa	Abels Bay-formation
	Pm	Minnie Point-formation
	Pr	Risdon Sandstone
Jurassic	Jdl	Jurassic-Dolerite
Tertiary	Tf	Ferricrete
	Tql	Silicestone
	Qs	Sand Deposits
	Qb	Beach

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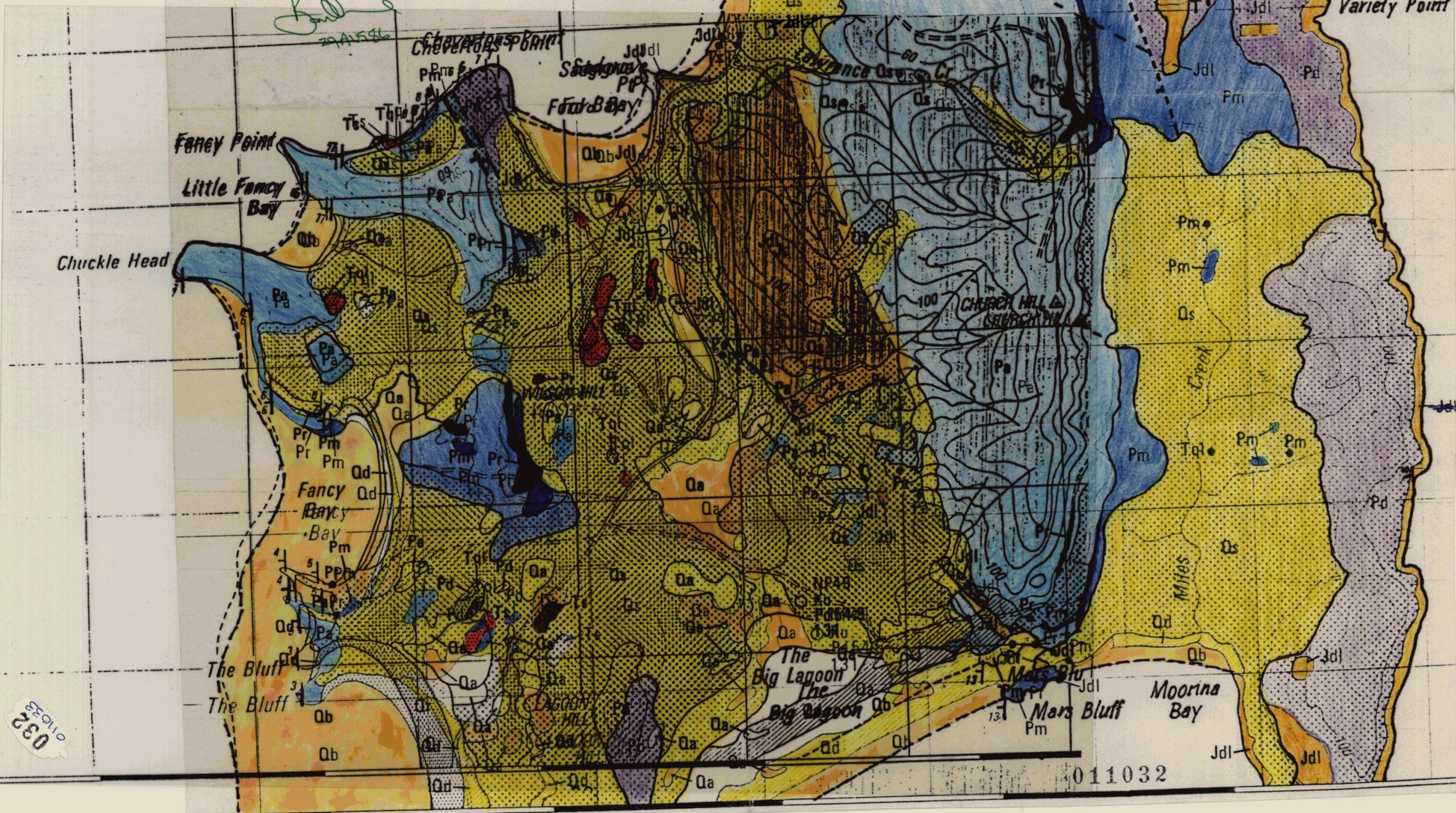


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from extensive mapping GREAT the structure was simple Block faults and no dome structures were identified.

This map is an unattributed stad of the Kiborough map BAY



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