AREAL GEOLOGY & STRUCTURAL INTERPRETATION

of

EL 17/65 TASMANIA

Prepared for

E.Z. INDUSTRIES

by

GEOPHOTO RESOURCES CONSULTANTS
BRISBANE, QUEENSLAND, AUSTRALIA.

APRIL, 1967.

001

173002

CONTENTS

INTRODUCTION

The area evaluated by Geophoto covers approximately 10,330 square miles in southeastern Tasmania. The area includes lease EL. 17/65 and a peripheral strip about 10,000 yards (5.682 miles) wide. See Plates 1 and 2 . The project area is bounded on the north by International Grid line 820,000 yards north, on the south by International Grid line 620,000 yards north, on the east by International Grid line 620,000 yards east, and on the west by International Grid line 460,000 yards east.

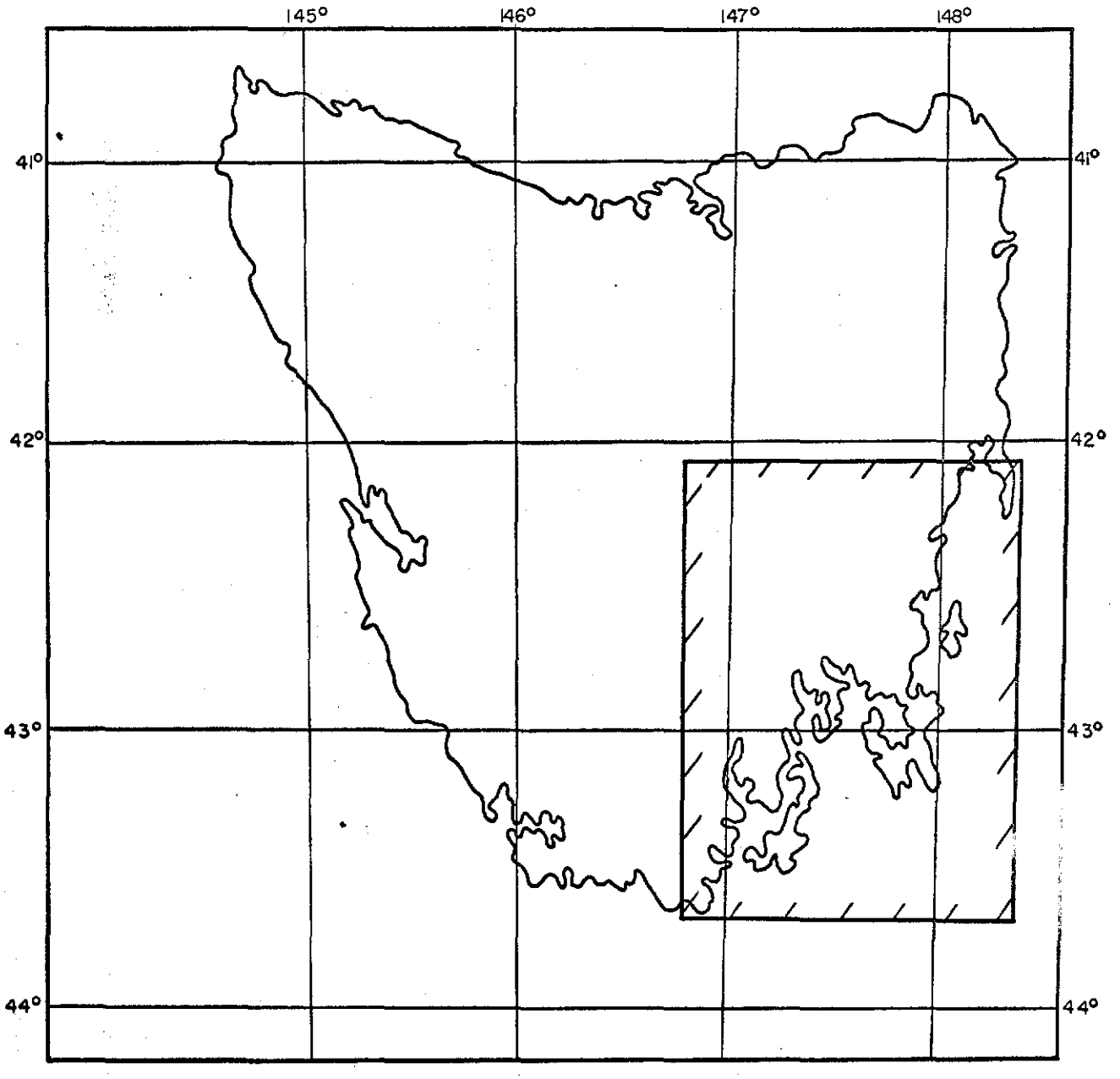
PURPOSE

The primary purpose of this evaluation was to provide a stratigraphic and structural interpretation of about 5,600 square miles of land area, through the stereoscopic examination of air photographs.

A geomorphic and geologic analysis of sub-sea land forms, interpreted from Admiralty charts and utilizing a seaward projection of surface structure was previously made for E.Z. Industries by Mr. L.J. Lucarelli. The combined photogeologic and sub-sea information was utilized to determine the tectonic framework of the region.

005

173006



REGIONAL LOCATION MAP

Scale 1" to 40 miles (approx.)

Project Area

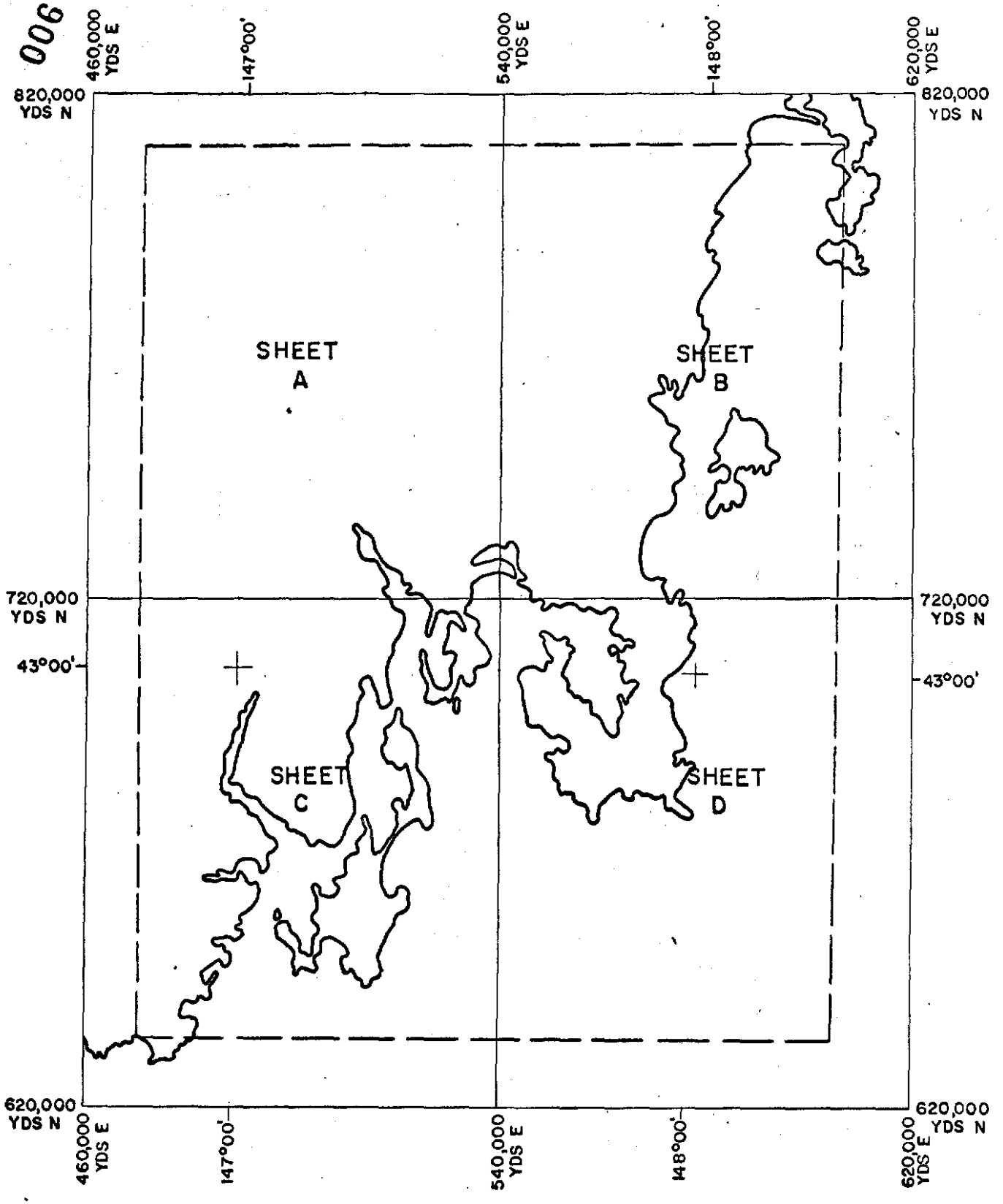
5 cm

Prepared By Geophoto Resources Consultants, Brisbane.

Plate 1

006

173007



INDEX TO PHOTOGEOLOGICAL MAP SHEETS

Lease area.

Scale: 1" to 15·78 miles

5 cm

Prepared By Geophoto Resources Consultants, Brisbane.

Plate 2

Upon completion of the photogeologic study Geophoto conducted a field examination. This field program was restricted to an evaluation of the structure in the Permian sedimentary sequence, due to the extremely complex structure and to the extensive areal distribution of the Jurassic dolerite intrusives over most of the land area. The field information is incorporated in the photogeologic maps accompanying this report, and a copy of the field notes is included as an appendix to the report.

PHOTOGRAPHY

The air photographs covering the project area were furnished by E.Z. Industries and were obtained from the Tasmanian Lands Department. Approximately 5% of the area is covered by 1:23,760 scale air photographs approximately 15% at a scale of 1:35,640 and the remaining 80% at a scale of 1:15,840.

The quality of the 1:35,640 scale air photographs is good and the best suited of the three scales for photogeologic mapping. The quality of the 1:15,840 scale air photographs is generally poor. These photographs are too dark in the large forested areas and have excessive tilt and distortion in areas of high relief.

008

MOSAIC CONSTRUCTION

Geophoto constructed uncontrolled airphoto mosaics at a scale of 1:100,000. As the 1:15,000 scale photographs had to be used to make the mosaics, considerable distortion, displacement and variation in scale occurs making it most difficult to minimize horizontal planimetric error.

BASE MAPS

The four planimetric base maps covering the project area were redrafted by Geophoto at a scale of 1:100,000. The planimetry shown on these base maps was selectively taken from bases provided by E.Z. Industries. Only the major drainages, roads and towns are shown due to the regional map scale. The Index to Photogeological Map Sheets (Plate 2) shows the relative map sheet divisions.

MAP COMPILATION

The geologic information obtained through stereoscopic examination was annotated directly on the contact prints and was then transferred to the 1:100,000 mosaics. The information was then adjusted and drafted to the previously

constructed planimetric base maps using the planimetry for horizontal control. Position accuracy is only as good as the accuracy of the original bases used as control. Further difficulty of position accuracy was encountered due to the poor quality of the air photographs.

TOPOGRAPHY AND ACCESSIBILITY

The topography within most of the project area is steep and densely forested. There are few roads in the area except for the five main highways radiating from Hobart. Within a short distance from these highways the area is mountainous and too heavily forested to be accessible to any but a well equipped field party. The field check of the area was of necessity confined to accessible Permian rock exposures, either on the shoreline or within walking distance of the main roads from Port Arthur on Tasman Peninsula to South Cape on the southern tip of Tasmania.

STRATIGRAPHY

INTRODUCTION

The rocks exposed within the project area are mainly Permian and Triassic sedimentary rocks and Jurassic dolerite intrusives. The respective

010

Permian and Triassic formations are not subdivided in this evaluation, due to the extremely complex structural geology of southeastern Tasmania and the very extensive intrusion of Jurassic dolerites into both the Permian and Triassic systems.

PRECAMBRIAN (PЄ)

Distribution

Precambrian rocks crop out at only one locality within the project area. This outcrop is located north of Lune River at the head of Southport Bay.

Air Photographic Characteristics

The Precambrian outcrop forms a well rounded, weathered, tree covered topographically high area.

ORDOVICIAN (Θ)

Ordovician rocks are indicated on the geologic map of Tasmania (1961), about 3 miles southwest of Southport Bay. These rocks could not be

delineated on the air photographs and are not mapped separately in this evaluation.

DEVONIAN GRANITE (Dg)

Distribution

Devonian granite is exposed on the eastern shore of Maria Island, on the peninsula, east of Oyster Bay and on Schouten Island.

Lithology

The Devonian granites are red, potassic granite. It has been suggested by Walker (1957) and Spry & Ford (1957) that these granites are metasomatized granodiorites.

Air Photographic Characteristics

The granite is medium to light toned and extremely fractured and jointed. The rocks weather into steep cliffs forming a very rugged topography.

012

PERMIAN (P)

Distribution

Permian rocks crop out throughout the project area but are most abundant in the southwest part of the area. Extensive Permian outcrops occur throughout Map Sheet C and in the southern parts of Map Sheets A and B.

Air Photographic Characteristics

The Permian rocks can in general be divided into two broad units according to their respective air photographic characteristics. Where exposed along the shoreline the Permian rocks form cliffs and are generally very light toned, thin bedded and gently-dipping. The Upper Permian sandstones and siltstones are in places difficult to distinguish on the air photographs from basal Triassic sandstones and conglomerates. The problem areas were resolved during the field check.

Inland in the forested and the cultivated areas the Permian rocks generally appear dark toned on the air photographs and weather into well rounded hills and broad valleys.

Lithology

The following summary of the major Permian formations is from the journal of the Geological Society of Australia, Vol. 9, Part 2, 1962. The Permian succession in Tasmania consists of in ascending order :

Wynyard Tillite

Quamby Group

Golden Valley Group

Mersey Group

Cascades Group

Malbina Siltstone and Sandstone

Ferntree Group

Cygnet Coal Measures

WYNYARD TILLITE

The Wynyard Tillite is not recognizable on the air photographs. A small outcrop of what is believed to be Wynyard Tillite was observed in the field about 10 yards from the beach at Cape Bruny (field station 77).

QUAMBY GROUP

The Quamby Group includes all the formations between the uppermost tillite or conglomerate of the Wynyard Tillite and the Darlington Limestone of the Golden Valley Group. The predominant rock type of the Group is a medium to dark grey mudstone which is carbonaceous in places. It contains pebbles and small cobbles, pyritic nodules, and erratics up to 4 feet in diameter. Calcareous concretions up to 12 feet long are also common.

On Woody Island and North Bruny Island, the Quamby Group consists of light colored, very fossiliferous, cross-bedded siltstone and sandstone. (Field Stations 24 and 25).

GOLDEN VALLEY GROUP

The Golden Valley Group includes all the formations between the top of the Quamby Group and the base of the Mersey Group. The predominant rock types of the Golden Valley Group are dark to medium grey, very fossiliferous limestone overlain by pebbly, slightly fossiliferous, light colored siltstones and mudstones.

MERSEY GROUP

The Mersey Group consists of a basal conglomerate and breccia, overlain by well-sorted, siliceous, micaceous or ripple marked sandstone and interbedded siltstone. Pebble bands, conglomerates, and bituminous coal appear locally.

CASCADES GROUP

The dominant rock types of the Cascades Group are interbedded fossiliferous, calcareous siltstone and impure silty, sandy limestone. Some fossiliferous sandstone and metabentonite also occur. The limestones are clastic and include lutite, arenite and rudite grades. Fragments of quartz, igneous and metamorphic rock are also present which occasionally reach small boulder size.

MALBINA SILTSTONE AND SANDSTONE

Five members comprise this formation in the Hobart area and in other areas of southeastern Tasmania. The basal member is an alternation of poorly-sorted, pebbly sandstone with carbonaceous siltstone. The second member

is predominately unfossiliferous siltstone with some poorly-sorted, fossiliferous, graded sandstone bands. The third member is a very pebbly sandstone. The fourth member consists of unfossiliferous siltstone. The top member is a very fossiliferous fine-grained sandstone and siltstone with lenses of dark grey, foetid limestone.

Is this generally true?

FERNTREE GROUP

The Ferntree Group consists of the Risdon Sandstone at the base overlain by the Ferntree Mudstone. The Risdon Sandstone is a thin, poorly-sorted, pebbly, feldspathic sandstone with rare marine fossils. The Ferntree Mudstone consists predominately of an alternation of fissile and non-fissile siltstone with thin beds of sandstone and conglomerate in many sections.

CYGNET COAL MEASURES

The predominant rock type of the Cygnet Coal Measures is a well sorted, siliceous, cross-bedded and ripple marked sandstone. The sandstones are pebbly in many places. Carbonaceous and siliceous siltstones and thin uneconomic coal seams are present in many places.

TRIASSIC (R)

Distribution

Triassic rocks occur throughout the project area, but are most abundant on Map Sheets A & B, the west-central part of Map Sheet C and on the western part of Tasman Peninsula, west of Port Arthur on Map Sheet D.

Lithology

The Triassic system is composed of lacustrine and fluviatile protoquartzites, lithic arenites, lutites, minor conglomerates and coal beds. The protoquartzites, or quartzose sandstones, are composed of well-sorted, medium-grained quartz, feldspar, with some muscovite, biotite and graphite.

The lithic arenites, called "Salt & Pepper" sandstone, are medium to coarse-grained, well-sorted, quartzose sandstone. They contain the same sedimentary structures as the protoquartzites and are characterized by their texture and distinctive blue or green discolouration which becomes buff on weathering. The "Salt & Pepper" sandstones contain up to 10% rock fragments including quartz, chert, quartzite, slate, granite and volcanic fragments.

018

Lutites occur throughout the Triassic section. The lutites are generally quartz-shales, although micaceous and chloritic mudstones also occur.

Sub-bituminous coal occurs throughout the lithic arenites of the Triassic system.

Air Photographic Characteristics

In general, throughout the project area the Triassic sediments are light toned, resistant ledge formers and are more resistant than the Permian sediments.

JURASSIC DOLERITES (Jd)

Distribution

Large scale intrusion of tholeiitic magma took place during the Middle Jurassic period. More than 2000 cubic miles of magma formed a nearly continuous body through the Permian and Triassic sediments over almost all of Tasmania. The dolerite occurs in a variety of forms, most prominant are the sheets or sills, but in some places steep-sided dykes are found.

Repeated intrusion is restricted to a very few dykes which cut the major bodies and all evidence points to a single short-lived major period of intrusion.

The dolerite mostly appears as interconnected sheets and sills which resist erosion and tend to dominate the landscape; dolerite caps most of the highest mountains and underlies the Great Central Plateau.

Lithology

The Jurassic dolerites belong to the tholeiitic quartz dolerite suite composed of dark basaltic rock with microphenocrysts of plagioclase feldspars embedded in a matrix of pyroxene.

Air Photographic Characteristics

Where the dolerite is intruded into the Triassic system it is often difficult to distinguish it on the air photographs from the resistant quartzose sandstone. Where it crops out at the surface the dolerite most often exhibits very rugged topography which is highly jointed and fractured; however, in many placed it is very extensively weathered and forms rounded hills which are covered with dense

020

vegetation.

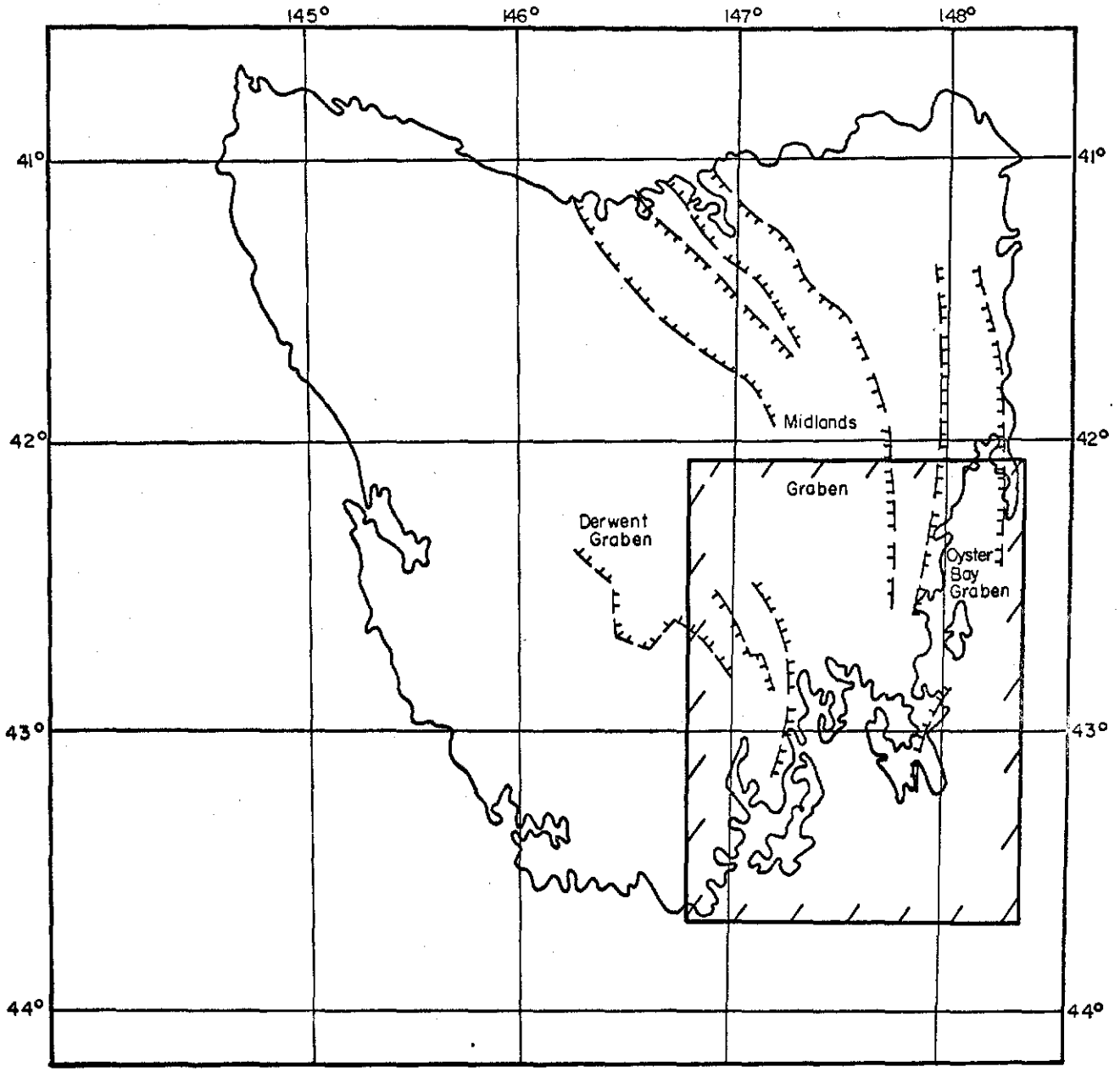
The dolerite cliffs are the dominant feature of the shorelines of southeastern Tasmania. The cliffs are dark reddish-brown to black, nearly vertical, and are very highly jointed and fractured. Columnar joining is also common.

STRUCTURE

The very prevalent faulting and jointing in the Jurassic dolerite are the most prominent structural features within the project area. This report is primarily concerned with the major features other than those present in the dolerites and with the structure of the Permian section in the southern-most part of the project area. (Map Sheet C and D).

PERMIAN STRUCTURE

Map Sheet C included with this report shows regional formlines based on photogeologic and field observed dips in Permian rocks of the southeast coastal area.



MAJOR TERTIARY STRUCTURES OF TASMANIA (Banks)

Project area

Scale 1" to 40miles (approx)

5 cm

Prepared By Geophoto Resources Consultants, Brisbane.

Plate 3

Banks (1962), states "A plot of all available dips on Permian rocks reveals that dips are certainly not uniform in direction even in small areas ---". The photogeologic and field observed dips of this evaluation reveal that a certain broad structural continuity does exist in the Permian between Tasman Peninsula and the mainland in the form of a broad asymmetrical syncline. The axis of this syncline extends from the mouth of Huon River through Great Taylor Bay and across Cape Bruny on South Bruny Island. The limbs of the syncline are gently dipping from the east coast of Tasman Peninsula across most of Bruny Island to the west coast of D'Entrecastreaux Channel, south of Huon River. A major anticline is situated between South Bruny Island and Southport. At South Cape the Permian is steeply dipping to the east.

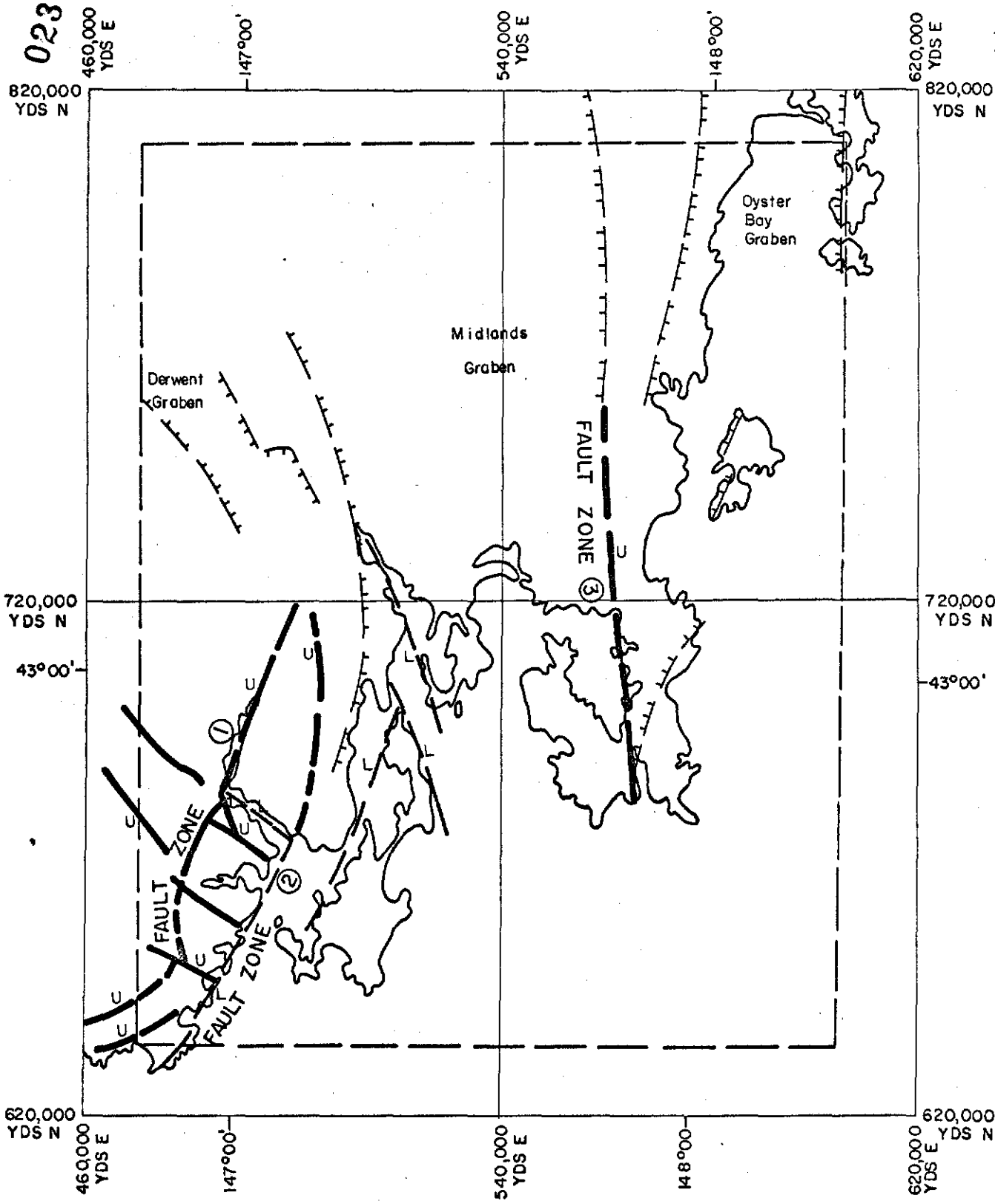
Further evidence is needed to determine whether this is a sedimentary basin or a structural feature related to Tertiary graben faulting. Banks (1962) seems to prefer a sedimentary origin.

TERTIARY FAULTING

Plate 3 is taken from Banks (1962) showing the three major Tertiary grabens that affect the project area.

023

173024



MAJOR FAULT ZONES AND GEOMORPHIC LINEAMENTS

Lease area.

Scale: 1" to 15·78 miles

5 cm

Prepared By Geophoto Resources Consultants, Brisbane.

Plate 4

024

Plate 4 shows the major faults and lineaments from the photogeologic interpretation superimposed on Banks' diagram.

The series of southwesterly trending faults labelled Fault Zone 1 form a relatively continuous fault zone extending from the Huon-Derwent drainage divide to South Cape. The Huon River is believed to parallel this zone southwesterly from Huonville to Cairns Bay where it makes a right angle turn to the southeast. Fault Zone 1 is offset in several places by large southeasterly trending faults. This zone may be the southern extension of the west side of the Derwent Graben, or it may be one of several steep faults on the west side of the Midlands Graben.

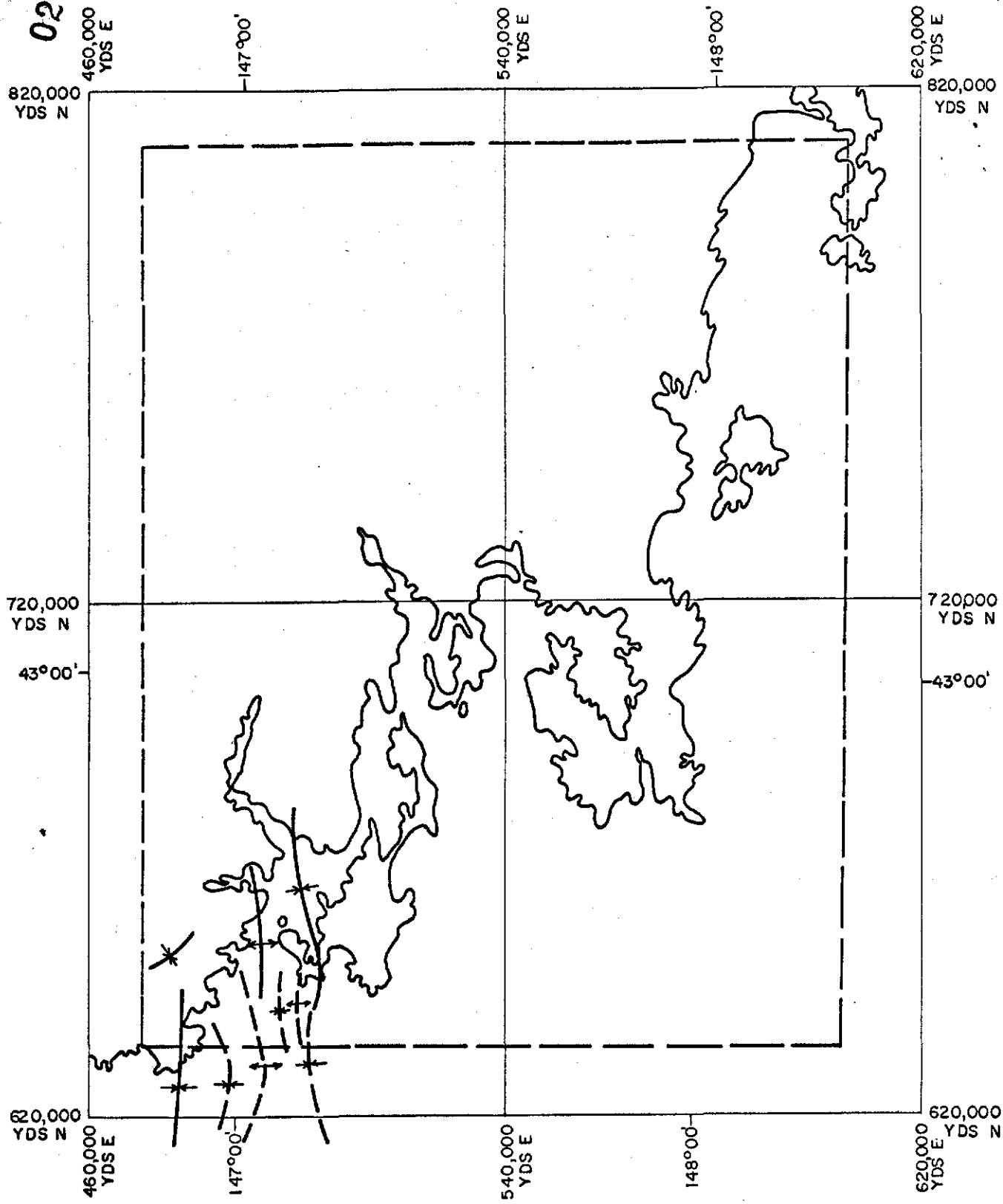
The western fault of the Midlands Graben is coincident with several photogeologic faults of fault zone 2 trending southward to Randalls Bay. The relatively straight coastline from the mouth of Huon River to Whales Head, may reflect a further southward extension of fault zone 2.

A second alternative for the Midlands Graben would be southeasterly through the relatively straight Derwent Channel across Ralph's Bay to South Arm; then offset to the southwest and continuing southeasterly along the straight east coast of North Bruny Island.

Fault zone 3 is a series of faults, stream alignments and straight

025

173026



PERMIAN STRUCTURAL AXES AND INFERRED AXES DRAWN ON SUBMARINE TOPOGRAPHY

Permian Axes

Inferred Submarine Axes

Scale: 1" to 15·78 miles

5 cm

Prepared By Geophoto Resources Consultants, Brisbane.

Plate #

shorelines trending north-south from Prosser Bay through Port Arthur on Tasman Peninsula. This zone coincides perfectly with a southern extension of the east side of the Midlands Graben. Additional support to the hypothesis that Zone 3 is a southern extenson of the Midlands Graben, is given by the fact that west of this line on Tasman Peninsula only Triassic sediments are exposed whereas east of the line both Triassic and Permian crop out.

BATHYMETRIC DATA

Contour lines were drawn on bathymetric soundings of the floor of Tasman Sea south of South Bruny Island and South Cape of the mainland, and structural axes were then inferred through the high and low areas. These inferred axes are shown in Plate 5 (dashed lines) along with the Permian structural axes (solid lines). Close agreement exists between the syncline south of Cape Bruny and the submarine low, and between the anticline between South Bruny Island and the mainland and the submarine high.

CONCLUSIONS

The existence of a broad low within the Permian sedimentary sequence between Tasman Peninsula and South Cape of southeastern Tasmania is supported by both photogeological and field observed evidence. Regional dip of Permian strata is generally westerly from Tasman Peninsula to the southwest tip of South Bruny Island, and easterly from there to South Cape. The axis of the basin appears to extend from Randalls Bay at the mouth of Huon River to Cape Bruny on South Bruny Island. A small anticline lies on the west flank of the basin between South Bruny Island and the mainland.

Several major fault zones and geomorphic lineaments suggest that this apparent synclinal structure is a southern extension of the Midlands Graben or the Midlands-Derwent Graben of Banks (1962).

The probability of commercial quantities of petroleum existing in southeastern Tasmania is debatable due to the extensive intrusion of the dolerites. However, a reconnaissance marine seismic survey should be conducted to determine the seaward extension of the Permian Basin. Specifically, such a survey should be designed to answer the following :

028

1. The southern extent of the Permian Basin south of South Bruny Island.

2. The subsea magnitude and possible structural closure of the anticline in D'Entrecastreaux Channel.

3. The presence, or absence of major faulting in D'Entrecastreaux Channel, in Derwent Channel and Storm Bay, and south of Tasman Peninsula.

4. The thickness of the sedimentary sequence in D'Entrecastreaux Channel, Storm Bay and Tasman Sea.

5. The presence, or absence, or dolerite intrusives within the Permian in the offshore part of the permit.

Respectfully submitted
GEOPHOTO RESOURCES CONSULTANTS

Robert H. Barton
MANAGER.

Bennett F. Brock
Senior Geologist.

APPENDIX I

RESULTS OF

FIELD TRIP INVESTIGATION

030

173031

A generalized photogeologic map of southeastern Tasmania was compiled by Geophoto by means of stereoscopic examination of aerial photographs. This map covered all of Tasmania east of International Grid line 460,000 yards and south of International Grid line 820,000 yards.

One of the features revealed by this investigation was what appeared to be a major structurally low area in the Permian sediments, between the mainland and South Bruny Island. This low area or basin (?) was evident from formlines drawn on the photogeologic dips and some published dips. Its axis appeared to extend from Port Cygnet near the mouth of the Huon River, south-southeasterly across D'Entrecastreaux Channel, through Great Taylor Bay, thence passing just east of Cape Bruny and south into Tasman Sea. North of Port Cygnet it becomes lost in the faulted Permian and dolerite intrusive area of the mainland.

A field trip was arranged to verify the photo interpretation and to locate its position more precisely. Four weeks were allotted for the field check with the following objectives in mind :

1. Locate as precisely as possible the position of the basin axis and width.
2. Measure and describe a complete Permian section if possible.
3. Determine the extent of intrusion of Jurassic dolerite into Permian and older rocks.

Arriving in Hobart, Tasmania, on 6 February, 1967, I found myself in the midst of the recent "bush fires" that swept southern Tasmania the next day. At least three days were lost due directly and indirectly to the fires. Many more hours were lost trying to locate outcrop in the burned out brush and rubble. I have seen by car, private air plane and boat the entire coast of southeastern Tasmania from Tasman Peninsula to South Cape, and it is my estimate that of all the forest and farmland visible within a few miles of shore between the north end of Forester Peninsual to Recherche Bay, at least 70-80% has been burned. In most of the area that had not been burned, especially in the uninhabited areas south of Recherche Bay, the forest, brush and deadfall is so dense that it was impossible to walk more than a few tens of yards inland without more men, equipment and time.

It was decided, therefore to confine the present investigation to the outcrop accessible at shoreline or in road-cuts. The following coastline was reached by car : From Pirates Bay on Tasman Peninsula around South Arm to Hobart; down the Channell Highway to Gordon, north to Huonville and south to Southport; all of North and most of South Bruny Island. Four days on the boat "Just David" were sufficient to cover the coast from Southport to South Cape, also the southern tip of South Bruny Island. The areas north to Cape Bernier and most of Tasman Peninsula were observed from private aeroplane. This aerial reconnaissance was valuable in pinpointing sedimentary outcrop areas, and in

discovering which could or could not be reached by car thus saving several days in fruitless search on the ground.

Objective number one was accomplished with little difficulty. Regional dip of Permian strata is generally westerly from Tasman Peninsula along the south east coast all the way to Randalls Bay at the mouth of Huon River. Dip is westerly on North Bruny and South Bruny Island east of Great Taylor Bay. At Randalls Bay and Port Cygnet the dip swings from southwesterly to southeasterly and continues southeasterly down the west side of D'Entrecastreaux Channel to Dover. At Southport dip is again westerly as it is also in Recherche Bay. Permian rocks are not visible at the surface again until around the southern tip of Tasmania to South Cape Bay. Here the dip is again southeasterly.

I was unable to prove conclusively the presence of Permian rocks at Cape Bruny on South Bruny Island. No Permian crops out at shoreline, on the south shore of Great Taylor Bay or at shoreline on Cape Bruny.

In a wave cut cliff on the beach just east of Cape Bruny a poorly consolidated conglomeratic rock crops out which could be the Wynyard Tillite.

On top of Cape Bruny in three road-cuts along the road north to Tunawanna is a very weathered rock resembling sandstone and siltstone. Positive identification could not be made due to extreme weathering, nor could definite bedding be distinguished. However, it appears to be dipping east. These rocks could be the Wynyard Tillite overlain by Quamby sandstone at the bottom of the Permian section. Dolerite does not appear to intrude the Permian here.

Objective number 2 was impossible to complete. Nowhere did I find a complete Permian section, and to compile a complete section from the numerous faulted, intruded and widely separated outcrops would have required much more time than was allotted.

The accompanying list is a description of the rock and other field observations at each field station visited. The station numbers correspond to circled numbers on the map.

As for Objective three I can say that with the exception of the possible basal Permian outcrops on Bruny Island Jurassic dolerites are intruded throughout the Permian sequence at almost every locality visited. No sedimentary rocks older than Permian were observed in the field.

SUMMARY AND RECOMMENDATIONS

Briefly the results of the field trip are summarised as follows :

1. The major syncline, or basin, between the mainland and South Bruny Island was verified by field observation. The west dipping strata between Dover and Recherche Bay suggest two possible shapes of the basin :

   a. It is long and narrow, being defined laterally by South Bruny Island on the east and the major anticline at the west side of D'Entrecastreaux Channel near Dover on the west :

   b. The major anticline described in (a) above may, on the other hand, reflect a structural high on the west limb of a very broad synclinal basin whose western limb extends beyond the western project boundary.

2. Permian outcrops in southeastern Tasmania are widely scattered with only small portions of the system exposed in any one locality. This fact in addition to the very dense forest and brush cover and the recent fires in southeastern Tasmania did not permit a complete and detailed field study of the Permian system in the time allotted to

this program.

3. Jurassic dolerite is intruded into almost every part of the Permian observed in the field.

The probability of commercial quantities of petroleum existing in southeastern Tasmania is debatable due to the extensive intrusion of the dolerites. However, a reconnaissance marine seismic survey could be justified. The survey would be for the purpose of determining :

1. The southern extent of the basin, south of South Bruny Island.

2. The thickness of the sedimentary sequence in D'Entrecastreaux Channel and Tasman Sea.

3. The presence, or absence of dolerite intrusives below the Permian.

4. The subsea magnitude and possibility of structural closure on the large anticline along the west side of D'Entrecastreaux Channel.

036

173037

EXPLANATION OF FIELD STATIONS

Station	Rock Description and Remarks	Strike	Dip
	Map Sheet A. East from Hobart to South Arm.		
1.	Permian. Ls. buff-Itgry, shly, slty	Published dips	OK
2.	" " "	"	
3.	Jurassic dolerite in quarry No Permian visible		
	Map Sheet C.		
4.	Permian siltstone-mudstone, buff-yellow, VERY FINE-GRAINED	Published dip	OK
5.	Same as above	N25E	6W
6.	"	N45E	4W
	South from Hobart on Channel Hwy.		
7.	Same as 4	N10W	15W
8.	" Published dip OK	N25W	8W
9.	Permian Sandstone - siltstone- mudstone yellow to buff, very fine grained, calcareous	N10E	6W
10.	No outcrop visible. Burned area.		
11.	P? Sandstone, white, fine-grained Possible Risdon Sandstone or basal Triassic	N80E	13SE
12.	P. Limestone breccia, brown to gray, very shaly, very fossiliferous, with modules of dark, crystaline igneous rock Possible Darlington limestone	N25W	6W
13.	P. siltstone-mudstone, yellow, calcareous	N10W	9E
14.	P. same as above fires still burning	N30E	15SE
15.	No outcrop fires and rubble cover outcrop		
16.	Same as above		
17.	P. same as 13	N15W	11W
18.	Dip component observed on Arch Island from shore. Probably Jd	-	12SW

Station	Rock Description and Remarks	Strike	Dip
19	P, Limestone-mudstone, very light gray, very silty	N80W	85W
20	P. same as above	N70E	75S
	North Bruny Island		
21	P. OK . Sighted from ferry So. shore Barnes Bay	Comp.	5W
	" North shore " "	N10W	6W
22	P. OK sight from ferry	Approx N	10W
23	P. No Jd. visible	" NNE	10W
24	P.Mudstone, light brown, calcareous Light colored, coarsely, crystaline, igneous rock, possible syenite; also dark fine crystaline, igneous, poss. Jd? observed on Kelly's Point, North Bruny Is.	N10E	6W
25.	P. same as 24	N20E	7W
26.	P. "	N10E	7W
27.	No outcrop visible, burned area		
28.	P. Limestone-mudstone, gray to light brown	N20E	17W
29.	P. same as above. Exposed at base of cliffs Could not find abandoned oil well.	N10W	14W
	Southeast from Huonville on Channel Hwy.		
30.	P. Mudstone, light brown, hard, silty	N40E	14NW
31.	Intricately intercalated Jd and P		
32.	P.mudstone. Js not visible.	N30W	4N
33.	Unknown rocks. Probably Permian mudstone extremely intruded and metamorphosed by Jd.		
34.	P.Limestone-mudstone	N40W	*SW
35.	Jd along cliffs No P. visible on shoreline		
36.	Same as above		
37.	P. Limestone, Light gray, very hard, silty	N70E	16NW
37a.	P. Same as above	N30W	16SW
38.	Intricate and complex intercalated Jd. Tr and P. first 10 miles from Hobart to Huonville. Mostly P.		

Station	Rock Description and Remarks	Strike	Dip
	South from Huonville to Dover		
39	P Limestone, gray, shaly	N35W	6NE
40	Jd		
41	Jd in quarry top of hill. Photo dip no good		
42	P Ls, dark gray, shaly, dense. Small outcrop, bedding not apparent.		
43	P Ls, dark gray, shaly, thin-bedded	N35W	18SW
44	P Ls, gray to brown, thin-bedded, hard. Copper show (Azurite ?) on cliff. 2 miles by road south from Surges Bay.	N60W	7SW
45	P Limestone and mudstone all along shore to 46	N65W	8SW
45a	P. same as above sighted at distance		
46	Jd		
47	P same as 44	N80W	8SW
48	Jd.		
49	P limestone, light gray, at water line. Sandstone white to buff, massive above. Possible Triassic or top of Permian (Risdon SS)	N70E	8SE
50	Same as 49	N40W	10NE
51	R. Sandstone, gray, very fine-grained, thin-bedded, calcareous. May be Risdon SS		
52 & 53	P Sand limestone to limy sandstone, white to light gray, very fine grained.	N55E	2 SE
54	Jd		
55	P Mudstone, white to buff; much dark colored, porous, scree. Looks like volcanic. May be weathered Jd. No visible bedding		
56	P limestone, gray	Comp	3W
57	P limestone, buff to light brown, thin-bedded	N15W	8W
58	Channel Hwy. south of Kettering P. Limestone, gray, thin-bedded.	N10E	15W
	South Bruny Island		
59	No outcrop visible. Weathered surface at side of road looks like siltstone or mudstone. Definitely not Jd. Smooth topographic slope may be bedding.	Comp	15E
60	Jd on both sides of Cloudy Bay Inlet. Brush and forest-covered upper slopes may be Permian.		

Station	Rock Description and Remarks	Strike	Dip
61	P. Limestone, dk gray	N20W	9W
61a	P Limestone, published dip OK		
	Abroad "Just David" South down D'Entrecastreaux Channel from Hobart.		
62	North Bruny Is. Sight from boat. P. West dip.		
63	South tip peninsula near Gordon. Sight from boat P. west dip.	Comp	14 W
64	P Sandstone, fine grained, calcareous, brecciated, intruded by Jd, metamorphosed	N10E	3W
	Great Taylor Bay		
65	Jd. at shoreline. No permian visible		
66	Jd. along shore. Weathered surface on road cut 100 yards from shore same as station 59. Fires still burning cannot travel inland.		
	67 - 76 Dover to South Cape		
67	P. Limestone, dark gray	N30W	6W
68	P. same as 67	Comp.	8W
68a	NW trending fault. East of fault sandstone buff to gray, coarse-grained, limy, very hard, overlying Limestone, buff to white. Probably Triassic protoquartzite over Permian. Jdx south shore of bay	S10W	8W
69	Southport Lagoon. No Permian visible Triassic Sandstone, coarse-grained, white, cross bedded, true bedding indefinite - dip approximate, Jd all north shore. R all south and west shores and several small islands	N	13W
70	P-R ? Sandstone-conglomerate, gray, alternately fine to coarse grained matrix, mostly very weathered, fresh sample very hard, pebbles and cobbles of quartzite, mudstone, basalt and pyrite with seams of coal and carbonaceous matter, May be gradational Permo-Triassic protoquartzite or lithic arenites. Similar rock is described in both upper Permian and Lower Triassic.	N10E	12W

040

Station	Rock Description and Remarks	Strike	Dip
71	Sandstone same as 70. Jd intruded into SS.	N15W	9W
72	Jd. along shore. Coal mine reported by locals. Could not find. Loose white Sandstone on surface		
73	Jd along shore. Loose white SS and quartz pebbles		
73a	Jd. along coast to Three Hillock Point.		
74	TR sight from boat	N25E	12E
75	Permian Limestone, light to dark gray, very hard, thick bedded. Small anticline and syncline, regional east P. Ls continues eastward at water line for approx half mile. TR SS above limestone same as, Station 70. Jd. dike and thin sills intruded into sandstone	Comp	3E
76	Interbedded light-colored Sandstone and dark shale. May be Permian. Light colored bed at water line probably Permian-Triassic same as Station 75 Sighted from Boat. Sea getting very rough, storm warning. Must leave South Cape.		
	South Bruny from "Just David"		
77	P. Tillite ? outcrop 10 yards from beach.		
78	One mile on road from lighthouse. P. same as Station 59 Apparent bedding	Comp.	N40E 4
	Map Sheet A		
	Tasman Highway east from Hobart		
79	½ mile east on Mt. Rumney Road Permian limestone and mudstone above mud-stone - siltstone below. Malimba over cascades ?	N40E	5W
80	Permian siltstone and mudstone, white to buff	N30W	5W
81	Permian same as 80	N25W	6W
	Map Sheet B		
82	Observed from plane. Lower TR or upper Permain Sandstone, white, medium bedded, cross-bedded Regional dip to the west. Two small folds.	Comp.	W

Station	Rock Description and Remarks	Strike	Dip
83	Same as 82. No folds	Comp.	W
84	Map Sheet D. same as 82	Comp.	W
	Map Sheet A		
85	Permian mudstone, white, hard; cliff former	N30W	3W
86	Angular unconformity. Sandstone, buff, yellow, white, fine grained, cross-bedded. Same lithology above and below. Probably Triassic-Permian contact.	N70W	18W
87	Permian mudstone, white, hard	N5W	17W
	Map Sheet B		
	Arthur Highway		
88	Permian mudstone, white, hard	N70W	3E
89	Same as 88	N55W	9E
90	Permian mudstone and shale, light brown	N20W	31E
	Map Sheet D		
91	Cliffs north Pirates Bay P. Limestone, gray, shaly, very fossiliferous	N15E	3W
92	Cliffs south end Pirates Bay Permian Limestone, gray, sandy, with dark green nodules (serpentine?) up to 3 x 5 inches. Permian limestone breccia, and limy conglomerate below.	Horizontal	
93	R or Top of Permian. Sandstone-siltstone, yellow, thin-bedded	N45W	21W

RECONNAISSANCE PHOTOGEOLOGIC INTERPRETATION MAP OF E.L. 17/65 TASMANIA

PREPARED BY GEOPHOTO RESOURCES CONSULTANTS, BRISBANE

FOR

THE ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

SCALE 1:100,000

1 1/2 0 1 2 3 4 5 MILES

March, 1967.

5 cm

LEGEND

SEDIMENTARY ROCKS

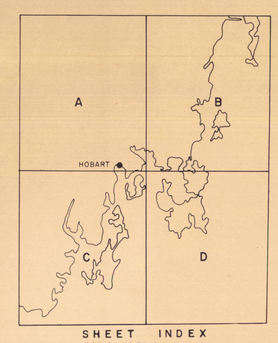
QUATERNARY TERTIARY	Qal	Alluvium.
	Q	Quaternary undivided.
	QT	Quaternary - Tertiary undivided.
TRIASSIC	TR	Triassic undivided.
PERMIAN	P	Permian undivided.
ORDOVICIAN	O	Ordovician undivided.

IGNEOUS ROCKS

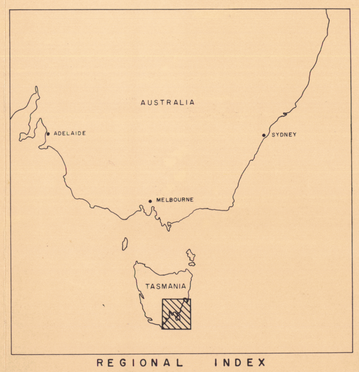
TERTIARY	Tb	Basalt.
JURASSIC	Jd	Dolerite.
	Js	Syenite.
DEVONIAN	Dg	Granite.
PRECAMBRIAN	PC	

GEOLOGIC SYMBOLS.

- Bedding appears horizontal on photographs.
- Dip group 1, less than 3°.
- Dip group 2, 3° to 10°.
- Dip group 3, 10° to 25°.
- Dip group 4, 25° to 45°.
- Dip group 5, 45° to nearly vertical.
- Bedding appears vertical on photographs.
- Overturned bedding.
- General dip of beds having subordinate folds.
- Dip and strike. Amount of dip cannot be determined on photographs.
- Dip component.
- Field observed dip or component with field station number.
- Field observed dip from published map.
- G — Geomorphic dip.(Possible dip slope.)
- S — Strike line. Direction of dip cannot be determined on photographs.
- Fault, normal or reverse. Fault, position indefinite. Fault, inferred. — Dashed where indefinite, dotted where concealed, questioned where inferred.
- Distinctive lineation.
- Dyke intruded along fault plane.
- Dyke or sill.
- Fracture or joint.
- Anticline. Arrow denotes plunge, diamond denotes apex; dashed where indefinite, questioned where inferred.
- Syncline. Arrow denotes plunge, —|— denotes high point, dashed where indefinite, questioned where inferred.
- Axis of anticline appears to coincide with fault trace.
- Axis of syncline appears to coincide with fault trace.
- Contact, dashed where indefinite, questioned where inferred.
- K — Key bed.
- SB — Stratigraphic break.
- TB — Tonal break.
- x — Outcrop area.
- x Jd — Outcrop identified.
- x ? — Possible outcrop area.
- x Jd ? — Outcrop identity uncertain.
- Identifies isolated or faulted segment with labelled area.



SHEET INDEX
SCALE : 15·78 Miles to 1 inch.



REGIONAL INDEX
SCALE : 200 Miles to 1 inch.

SHEET A

820 540

NO STEREOSCOPIC COVERAGE

820

720 540

720 029

SWANSEA
PT. BAGOT
OYSTER BAY
MACQUARIE RIVER
TOOMS LAKE
LITTLE SWANPORT
SWANPORT RIVER
LITTLE
TASMAN HIGHWAY
SCHOUTEN ISLAND
CAPE SONNERAT
TRIABUNNA
BLACK POINT
ORFORD
PROSSER BAY
PROSSER RIVER
MARIA ISLAND
CAPE BERNIER
CAPE PERON
FORCETT
COPPING
BLACKMAN BAY

RECONNAISSANCE PHOTOGEOLOGIC INTERPRETATION MAP OF E.L. 17/65 TASMANIA

PREPARED BY GEOPHOTO RESOURCES CONSULTANTS, BRISBANE.

5 cm

FOR

THE ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

SCALE 1 : 100,000

1 1/2 0 1 2 3 4 5 MILES

March, 1967.

LEGEND

SEDIMENTARY ROCKS

QUATERNARY TERTIARY	Qal	Alluvium.
	Q	Quaternary undivided.
	QT	Quaternary - Tertiary undivided.
TRIASSIC	R	Triassic undivided.
PERMIAN	P	Permian undivided.
ORDOVICIAN	O	Ordovician undivided.

IGNEOUS ROCKS

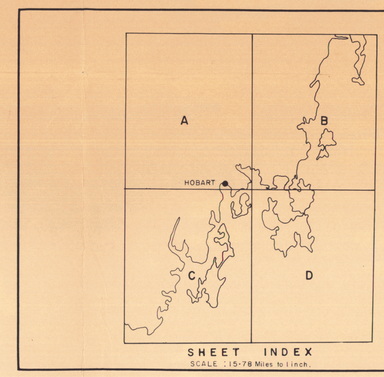
TERTIARY	Tb	Basalt.
JURASSIC	Jd	Dolerite.
	Js	Syenite.
DEVONIAN	Dg	Granite.
PRECAMBRIAN	PC	

GEOLOGIC SYMBOLS.

- Bedding appears horizontal on photographs.
- Dip group 1, less than 3°.
- Dip group 2, 3° to 10°.
- Dip group 3, 10° to 25°.
- Dip group 4, 25° to 45°.
- Dip group 5, 45° to nearly vertical.
- Bedding appears vertical on photographs.
- Overturned bedding.
- General dip of beds having subordinate folds.
- Dip and strike. Amount of dip cannot be determined on photographs.
- Dip component.
- Field observed dip or component with field station number.
- Field observed dip from published map.
- G — Geomorphic dip. (Possible dip slope.)
- Strike line. Direction of dip cannot be determined on photographs.
- Fault, normal or reverse.
- Fault, position indefinite.
- Fault, inferred.

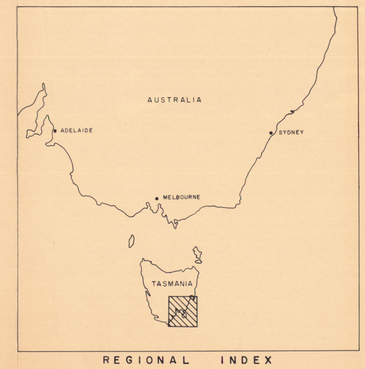
(Dashed where indefinite, dotted where concealed, questioned where inferred.)

- Distinctive lineation.
- Dyke intruded along fault plane.
- Dyke or sill.
- Fracture or joint.
- Anticline. Arrow denotes plunge, diamond denotes apex; dashed where indefinite, questioned where inferred.
- Syncline. Arrow denotes plunge, ⊣⊢ denotes high point, dashed where indefinite, questioned where inferred.
- Axis of anticline appears to coincide with fault trace.
- Axis of syncline appears to coincide with fault trace.
- Contact, dashed where indefinite, questioned where inferred.
- K — Key bed.
- SB — Stratigraphic break.
- TB — Tonal break.
- x — Outcrop area.
- xJd — Outcrop identified.
- x? — Possible outcrop area.
- xJd ? — Outcrop identity uncertain.
- Identifies isolated or faulted segment with labelled area.



SHEET INDEX

SCALE : 15·78 Miles to 1 inch.



REGIONAL INDEX

SCALE : 200 Miles to 1 inch.

SHEET B

RECONNAISSANCE PHOTOGEOLOGIC INTERPRETATION MAP OF E.L. 17/65 TASMANIA

PREPARED BY GEOPHOTO RESOURCES CONSULTANTS, BRISBANE.

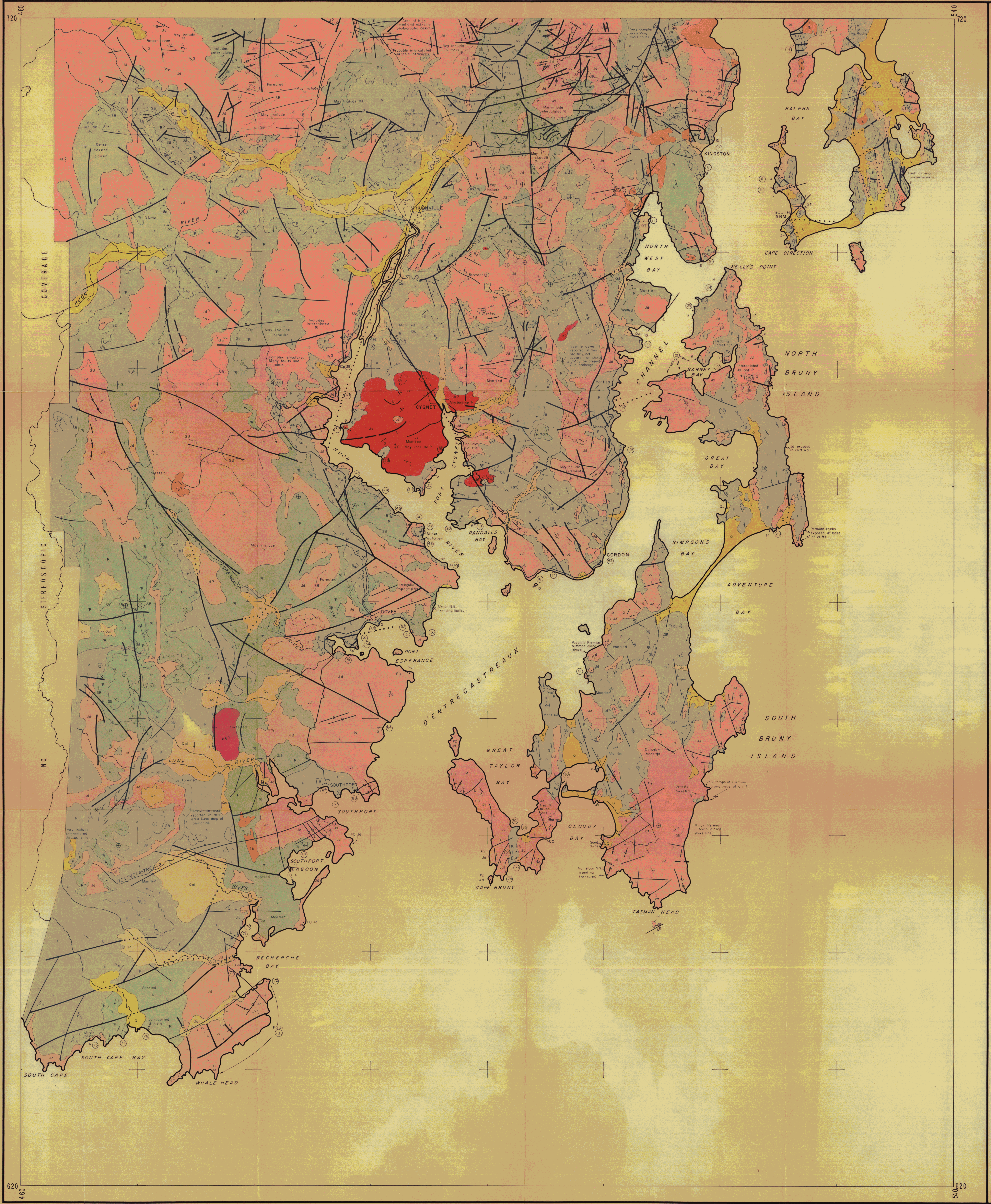
FOR

THE ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

SCALE 1/100,000

1 1/2 0 1 2 3 4 5 MILES

March 1967



LEGEND

SEDIMENTARY ROCKS

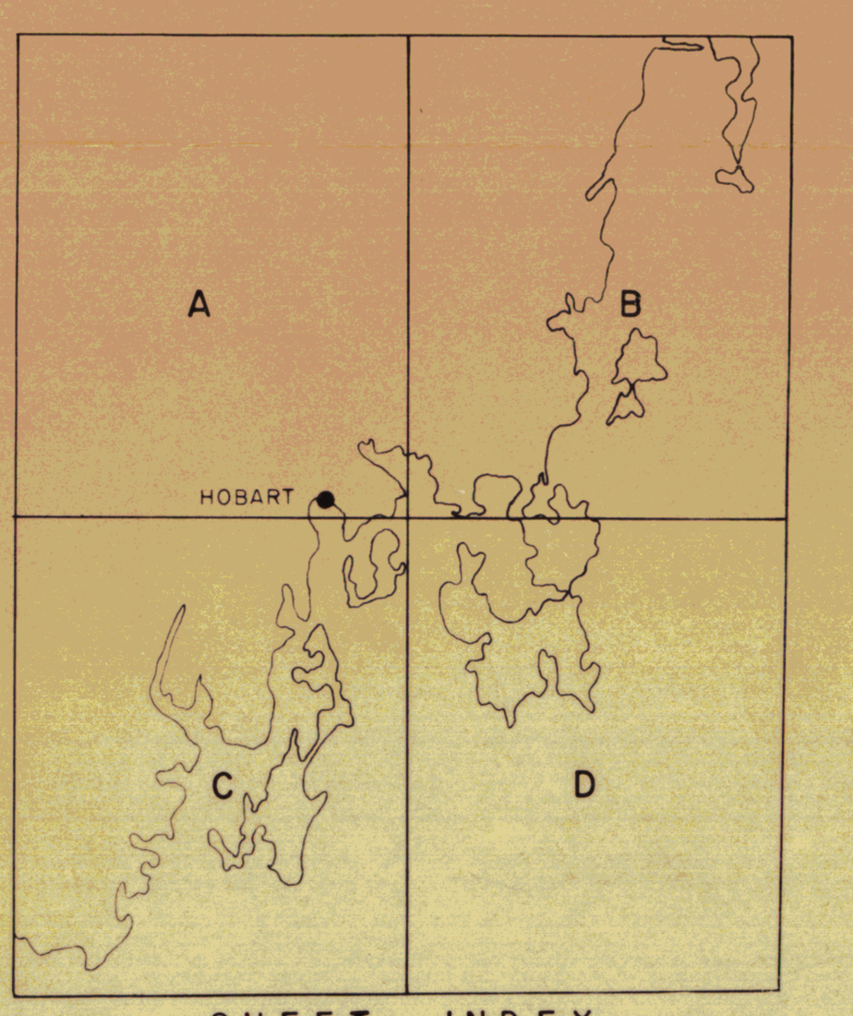
Age	Symbol	Description
QUATERNARY TERTIARY	Qal	Alluvium
	Q	Quaternary undivided
	QT	Quaternary - Tertiary undivided
TRIASSIC	R	Triassic undivided
PERMIAN	P	Permian undivided
ORDOVICIAN	O	Ordovician undivided

IGNEOUS ROCKS

Age	Symbol	Description
TERTIARY	Tb	Basalt
JURASSIC	Jd	Dolerite
	Js	Syenite
DEVONIAN	Dg	Granite
PRECAMBRIAN	P€	

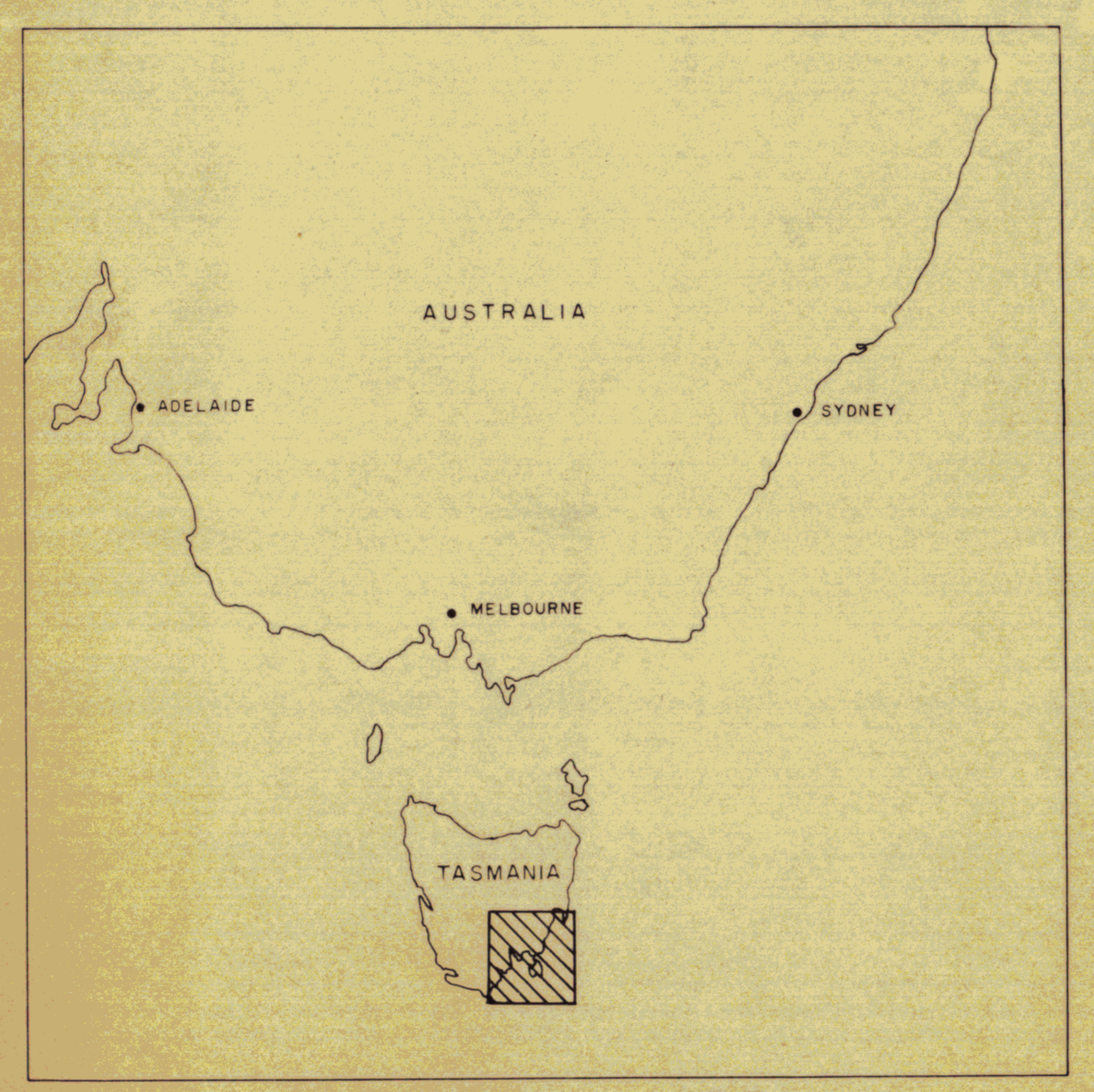
GEOLOGIC SYMBOLS.

- Bedding appears horizontal on photographs.
- Dip group 1, less than 3°.
- Dip group 2, 3° to 10°.
- Dip group 3, 10° to 25°.
- Dip group 4, 25° to 45°.
- Dip group 5, 45° to nearly vertical.
- Bedding appears vertical on photographs.
- Overturned bedding.
- General dip of beds having subordinate folds.
- Dip and strike. Amount of dip cannot be determined on photographs.
- Dip component.
- (23) 5 — Field observed dip or component with field station number.
- 5p — Field observed dip from published map.
- G — Geomorphic dip. (Possible dip slope.)
- S — Strike line. Direction of dip cannot be determined on photographs.
- Fault, normal or reverse. } Dashed where indefinite, dotted where concealed, questioned where inferred.
- Fault, position indefinite.
- Fault, inferred.
- L — Distinctive lineation.
- U — Dyke intruded along fault plane.
- Dyke or sill.
- Fracture or joint.
- Anticline. Arrow denotes plunge, diamond denotes apex; dashed where indefinite, questioned where inferred.
- Syncline. Arrow denotes plunge, ⊣ ⊢ denotes high point, dashed where indefinite, questioned where inferred.
- Axis of anticline appears to coincide with fault trace.
- Axis of syncline appears to coincide with fault trace.
- Contact, dashed where indefinite, questioned where inferred.
- K — Key bed.
- SB — Stratigraphic break.
- TB — Tonal break.
- x — Outcrop area.
- x Jd — Outcrop identified.
- x ? — Possible outcrop area.
- x Jd ? — Outcrop identity uncertain.
- Identifies isolated or faulted segment with labelled area.



SHEET INDEX

SCALE : 15·78 Miles to 1 inch.



REGIONAL INDEX

SCALE : 200 Miles to 1 inch.

SHEET C

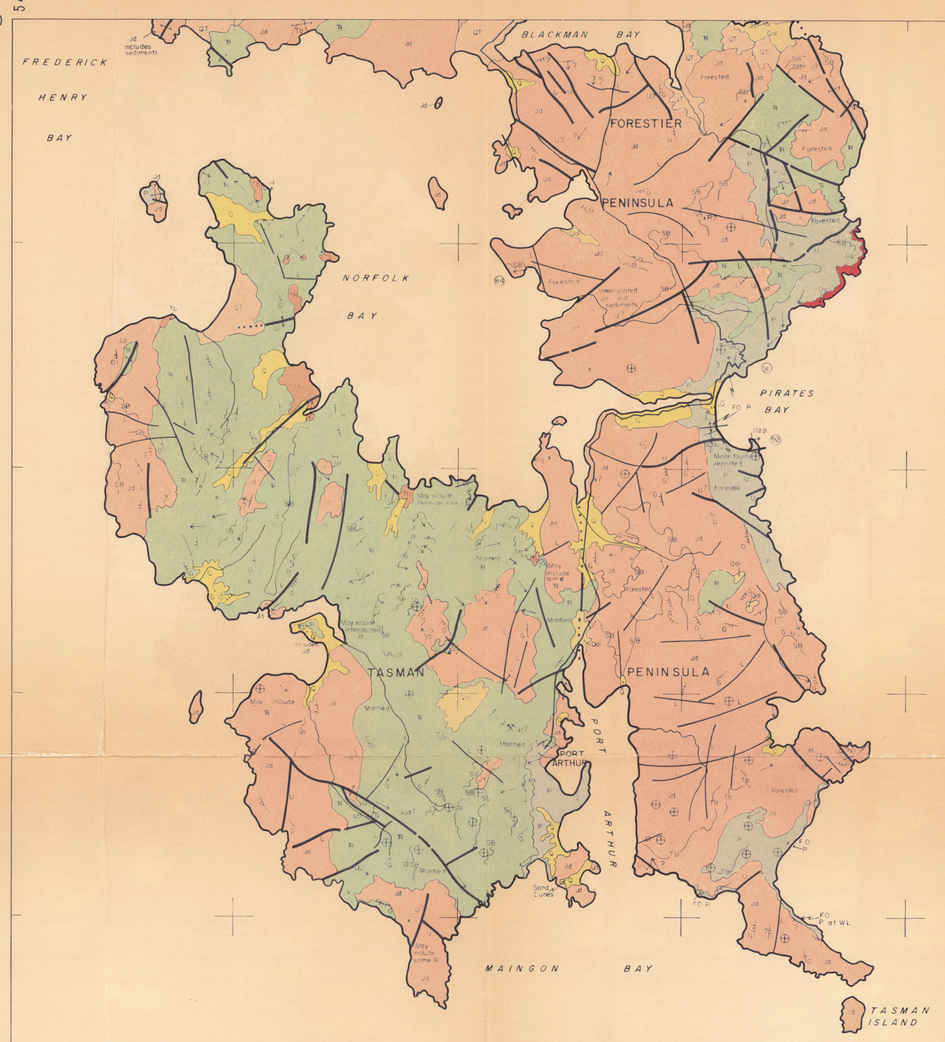
67-466

REGIONAL 32 67-2466

720 540

620

720



620

540

RECONNAISSANCE PHOTOGEOLOGIC INTERPRETATION MAP

OF

E.L. 17/65 TASMANIA

PREPARED BY GEOPHOTO RESOURCES CONSULTANTS, BRISBANE.

FOR

THE ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

SCALE 1 : 100,000

1 1/2 0 1 2 3 4 5 MILES

March, 1967.

5 cm

173046

LEGEND

SEDIMENTARY ROCKS

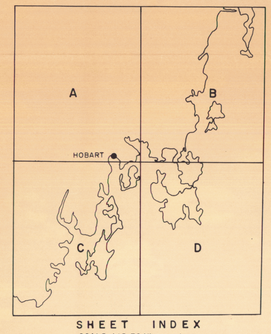
QUATERNARY TERTIARY	Qal	Alluvium.
	Q	Quaternary undivided.
	QT	Quaternary - Tertiary undivided.
TRIASSIC	TR	Triassic undivided.
PERMIAN	P	Permian undivided.
ORDOVICIAN	O	Ordovician undivided.

IGNEOUS ROCKS

TERTIARY	Tb	Basalt.
JURASSIC	Jd	Dolerite.
	Js	Syenite.
DEVONIAN	Dg	Granite.
PRECAMBRIAN	PC	

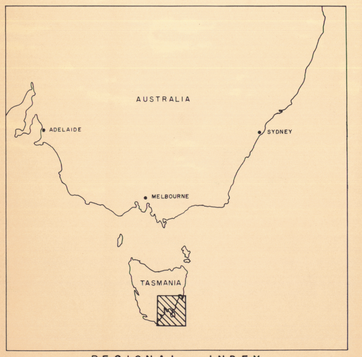
GEOLOGIC SYMBOLS.

- Bedding appears horizontal on photographs.
- Dip group 1, less than 3°.
- Dip group 2, 3° to 10°.
- Dip group 3, 10° to 25°.
- Dip group 4, 25° to 45°.
- Dip group 5, 45° to nearly vertical.
- Bedding appears vertical on photographs.
- Overturned bedding.
- General dip of beds having subordinate folds.
- Dip and strike. Amount of dip cannot be determined on photographs.
- Dip component.
- Field observed dip or component with field station number.
- Field observed dip from published map.
- G — Geomorphic dip.(Possible dip slope.)
- Strike line. Direction of dip cannot be determined on photographs.
- Fault, normal or reverse. (Dashed where indefinite, dotted where concealed, questioned where inferred.)
- Fault, position indefinite.
- Fault, inferred.
- L — Distinctive lineation.
- U — Dyke intruded along fault plane.
- Dyke or sill.
- Fracture or joint.
- Anticline. Arrow denotes plunge, diamond denotes apex; dashed where indefinite, questioned where inferred.
- Syncline. Arrow denotes plunge, ⊣ ⊢ denotes high point, dashed where indefinite, questioned where inferred.
- Axis of anticline appears to coincide with fault trace.
- Axis of syncline appears to coincide with fault trace.
- Contact, dashed where indefinite, questioned where inferred.
- K — Key bed.
- SB — Stratigraphic break.
- TB — Tonal break.
- x — Outcrop area.
- xJd — Outcrop identified.
- x? — Possible outcrop area.
- xJd ? — Outcrop identity uncertain.
- Identifies isolated or faulted segment with labelled area.



SHEET INDEX

SCALE : 15·78 Miles to 1 inch.



REGIONAL INDEX

SCALE : 200 Miles to 1 inch.

SHEET D

4212