COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

RECORDS:

1965/98

NOTES ON THE GEOLOGY OF THE EDDYSTONE 1:250,000 SHEET AREA

by

R.G. Mollan, N.F. Exon, and V.R. Forbes*
(*Queensland Geological Survey)

NOTES ON THE GEOLOGY OF THE EDDYSTONE 1:250,000 SHEET AREA

by

R.G. Mollan, N.F. Exon, & V.R.Forbes*
(*Queensland Geological Survey).

RECORDS 1965/98.

CONTENTS

NOTES ON THE GEOLOGY OF THE EDDYSTONE 1:250,000 SHEET AREA

INTRODUCTION

The Eddystone* 1:250,000 Sheet area lies north-west of Roma and immediately east of Injune, in southern Queensland, between longitudes 147°E and 148°30'E and latitudes 25°S and 26°S. It is named after Mount Eddystone in the central north of the area. There are no towns within EDDYSTONE.

The area was mapped by a combined Bureau of Mineral Resources - Geological Survey of Queensland field party in 1964, as part of the Bowen Basin regional mapping programme. The geology was plotted on vertical air-photographs at 1:85,000 scale taken by Adastra Airways Pty. Ltd. in 1962. The information was then transferred to controlled photo scale compilation sheets drawn from originals compiled by the Division of National Mapping.

Several formed roads cross EDDYSTONE, connecting the towns of Injune, Mitchell and Augathella, respectively east, south and west of EDDYSTONE. Tracks and some formed roads serve the numerous homesteads in the area. The rugged sandstone country of the north, centre and south-west, and the basalt plateaux, which include Mount Hutton in the south-east, allow only a few roads. The sandy roads are usually passable whereas the black soil roads and many stream crossings are impassable after heavy rain.

Water for stock and domestic use is obtained from semipermanent waterholes in the Merivale, Maranoa and Warrego Rivers, Hutton Creek and their tributaries, and from dams and earth tanks. Much water, especially for stock use, is obtained from numerous subartesian and artesian bores.

The average annual rainfall is about 20 inches; and an average of 60% of this falls in the 5 months from November to March. Beef cattle raising is the dominant industry although a few sheep are run in the south. Summers are hot; the dry winters have mild sunny days and cold, often frosty, nights.

Vegetation:

The vegetation is closely related to the underlying rock type. Quartz-rich sandstone which predominates in the Lower Jurassic and Upper Jurassic-Cretaceous sediments, gives rise to two vegetational types. The better sandy soils support open eucalypt forest and poor grass; poorer sandy soils support thick pine forest or scrub consisting largely of wattle, lancewood and boodgeroo. The calcareous sediments of the Middle Jurassic Injune Creek Beds give good calcareous clayey soils and naturally support brigalow - belah - wilga - bottle tree - sandalwood scrub. Brigalow is more common on the heavy clay soils and belah, wilga and sandalwood on the slightly sandier soils. The large cleared areas are well grassed. Plateaux of basalt and gabbro are covered with open forests of ironbark, box, zamia, blackboy etc., and good grass, or with low scrub.

Footnote. Subsequent reference to 1:250,000 Sheet areas is signified by the use of capital letters, e.g. EDDYSTONE.

Nomenclature: Crook's (1960) classification of arenites is followed. "Arenite" is used as the generalised non-genetic term for sand-sized clastic material. The generally accepted arbitrary figure of 75% matrix is taken as the division between arenite and mudstone. Arenites (excluding those with abundant detrital carbonate) are subdivided into quartzose, sublabile, and labile arenite. The name assigned depends on the ratio of quartz to labiles in the rock-viz.

Quartzose arenite has $<$ 75% matrix and quartz forms $>$ 90% of the quartz + labile clasts.

Sub-Labile " " $<$ " " " " " 75-90% " "

Labile " " $<$ " " " " " $<$ 75% " "

Labile arenties are further subdivided on the basis of the ratio of feldspar to rock fragments plus other labiles, as follows -

Feldspathic arenite with $\frac{F}{R}$ ratio between ∞ and 3

Lithofeldspathic " " " " " 3 and 1

Feldspatholithic " " " " " 1 and $\frac{1}{3}$

Lithic " " " " " $\frac{1}{3}$ and 0

On the basis of sedimentary structures arenites are assigned to one of two groups - the "greywacke suite" and the "arkose-quartzose sandstone suite". Where such determination is possible the non-genetic term "arenite" is replaced by the genetic terms "greywacke" or "sandstone". The above subdivision and names applied to arenite are applied similarly to greywacke and sandstone.

"Siltstone" is used as a grainsize term ($\frac{1}{16}$mm to $\frac{1}{256}$mm). The term "mudstone" is used as a general term for non-fissile sediments of the lutite class, and "shale" is defined as a fissile mudstone. "Claystone" is used for sediment consisting dominanatly of clay minerals.

Palaeontology: Dickins' macrofaunal divisions of the Permian of the Bowen Basin referred to in this text are defined in Dickins, Malone & Jensen (1964). Reference is also made to Evans' palynological zones of the Permian (Evans, 1964).

PREVIOUS INVESTIGATIONS

(a) Geological.

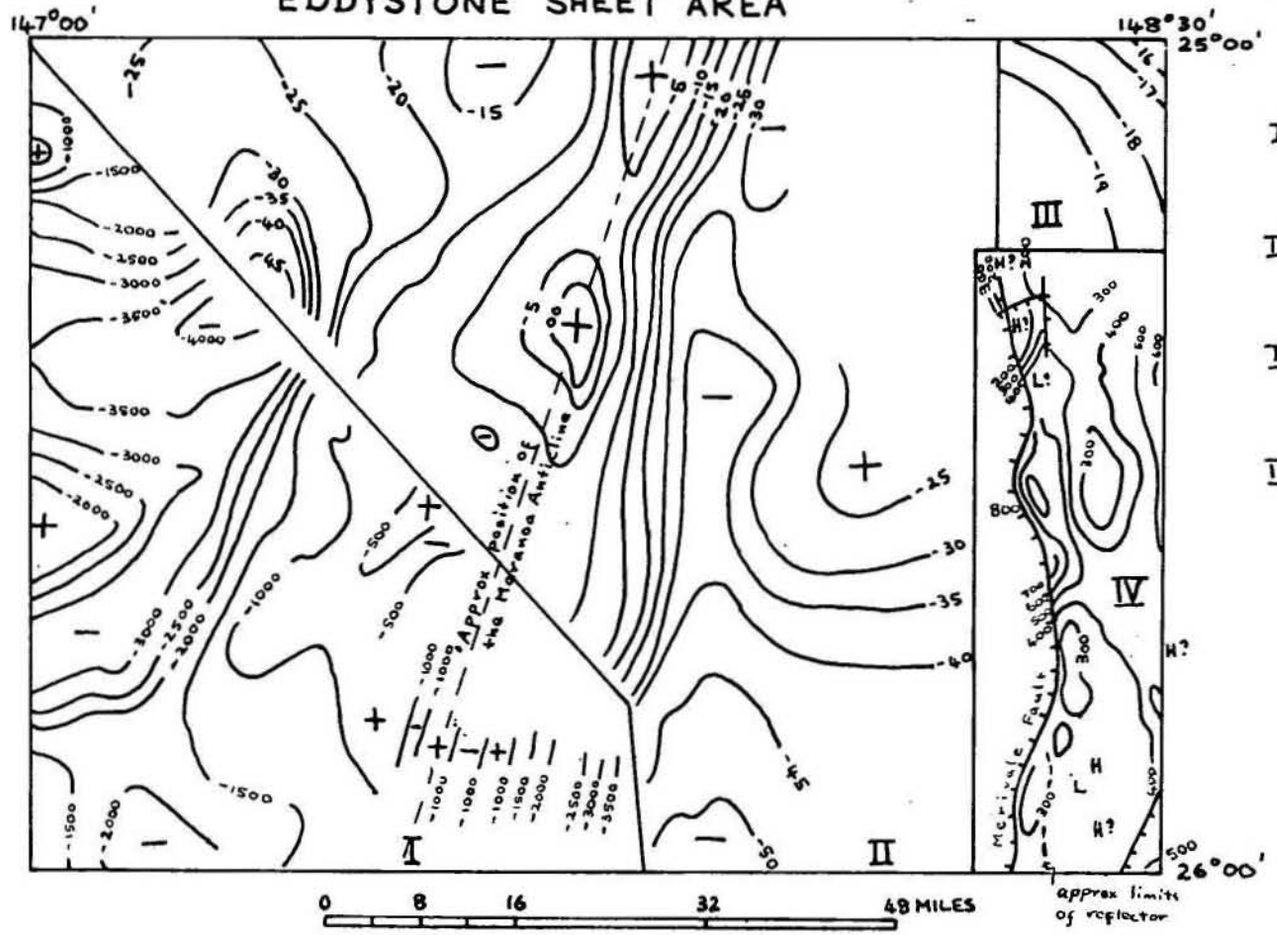
Probably the first geologist to visit EDDYSTONE was R.L. Jack while he was investigating the possibility of obtaining underground water at the time of the great 1885 drought. His report on artesian water in the western interior of Queensland was published in Jack (1895a). L.C. Ball visited the area and reported on a mound spring at Crystalbrook (Ball, 1918).

The first regional geological report on the district was that by H.I. Jensen (1921a, 1926a) describing the geology of the area between Roma, Springsure,

FIG. 1

BOUGUER GRAVITY AND REFLECTION SEISMIC CONTOURS

EDDYSTONE SHEET AREA



REFERENCE

I. Blackall-Augathella Gravity Survey for Amoseas by Petty Geophysical Engineering Co, 1964
Contour interval shown 500 milligals.

II. Chesterton Gravity Survey A.T.P. 81P for Alliance Oil Development by United Geophysical, 1964
Contour interval shown 500 milligals.

III Regional Gravity Survey from map in B.M.R. record 1961/150, based on gravity survey by Minad Rep. Q/56P/64
Contour interval shown 1000 milligals.

IV Reflection Seismograph Survey Report of Merivale Area (A.T.P. 55/56P) for Mines Administration Pty. Ltd. by Austral Geoprospectors Pty. Ltd., 1962. Map on contours at top of Permian. Contour interval shown .100 sec.

Bureau of Mineral Resources, Geology and Geophysics, June 1965 To accompany Record No. 1965/98

G55/A7/5

Tambo and Taroom. His sketch map shows Permo-Carboniferous (Middle and Upper Bowen), Triassic (Bundamba), Jurassic (Walloon), Lower and Upper Cretaceous, and basaltic formations outcropping on EDDYSTONE. He mentioned serpentine and asbestos occurring at Eddystone Vale and suggested the presence of a ridge of metamorphic rocks striking north-south under the Mesozoic rocks of this area. He also recognized the Serocold Anticline.

J.H. Reid (1930) mapped the Serocold Anticline in detail and subdivided the Permian rocks into formations. A.K. Denmead examined and reported on an oil shale occurrence in this area (Denmead, 1943). Geological surveys of the eastern edge of the area by Oil Search Limited from 1933-1939 resulted in a summary report by Reeves (1947) covering the Jurassic and Permian sequences.

Regional work by F.W. Whitehouse on the Great Artesian Basin resulted in a number of general reports and maps (Whitehouse 1941, 1952, 1954).

No other regional geological work had been done in the area until the present survey commenced in 1964.

(b) Geophysical

Extensive geophysical surveys have been carried out on EDDYSTONE by private companies (generally subsidised by the Commonwealth Government) and by the Bureau of Mineral Resources. The areas covered by significant gravity and seismic surveys are shown in Fig. 1 and the operators listed. This figure shows in particular, the position of the subsurface Merivale Fault, and basement trends which parallel the fold axes in the centre and west of EDDYSTONE. The gravity high on the Maranoa Anticline corresponding to the basement outcrop west of Darkwater Homestead is very prominent.

Magnetic surveys cover the whole area, the south western segment being done by Magellan Petroleum Corporation (1959) and the remainder by the Bureau of Mineral Resources (1964).

(c) Drilling for oil and gas

Fourteen wells have been drilled in the search for petroleum on EDDYSTONE. Their positions are shown on Enclosure 1 and a general summary of each is given in Table 2. Most of the wells are subsidized, and completion reports of these are available at the Bureau of Mineral Resources and the Geological Survey of Queensland.

OIL DRILLING ON EDDYSTONE

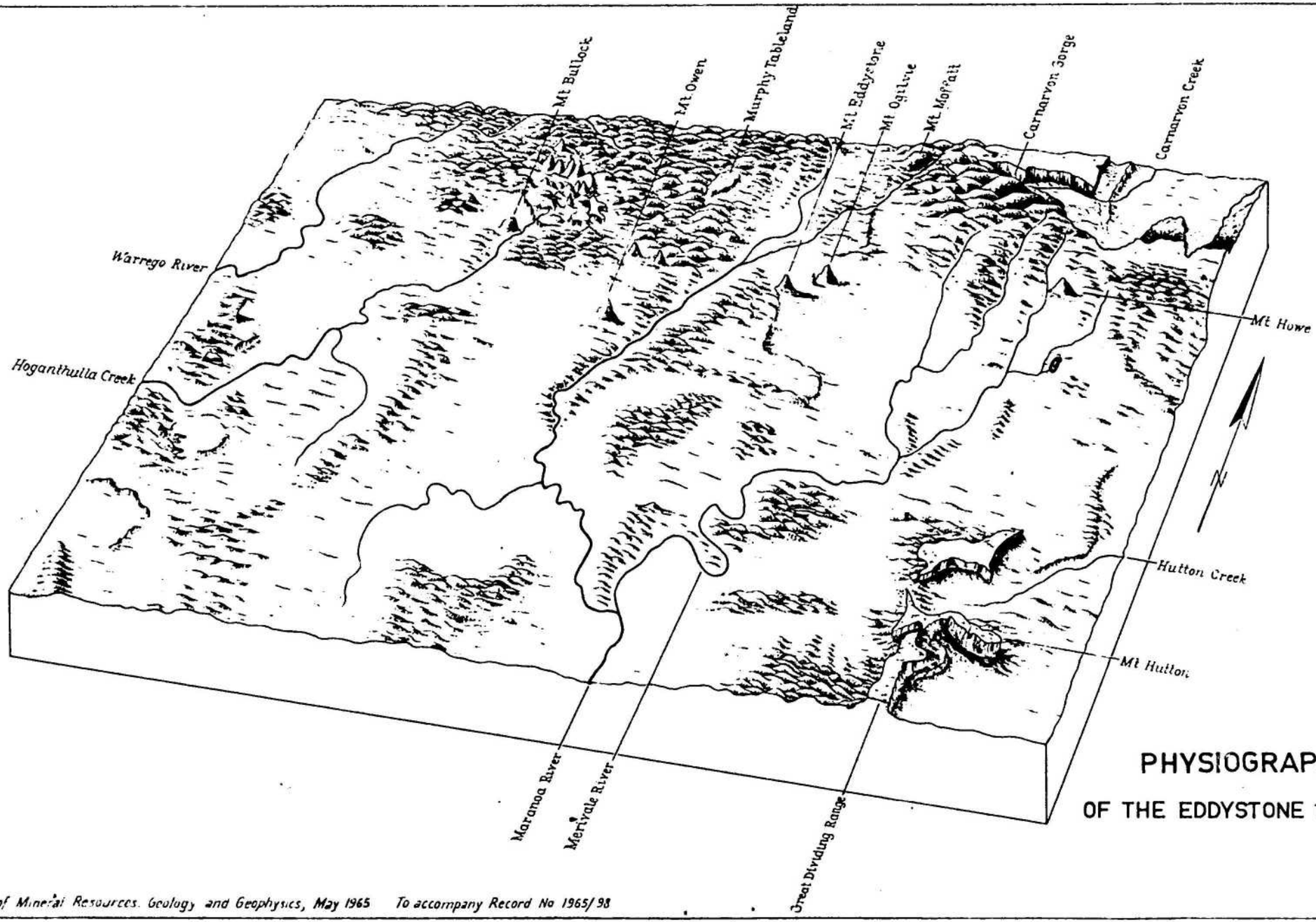
TABLE 2.

Name of well	Year drilled	Subsidized	Total depth (feet)	Hydrocarbon shows	Status
A.R.O. No. 9 (Gunnewin)	1928–30	No	2104	gas reported from 1140, 1485, 1590, 1682, 1772 (all non-petroliferous); doubtful very small oil shows from 950 to bottom	abandoned
S.Q.D. No. 1 (Morella)	1950–51	No	4634	Trace of oil and gas at about 3000'	abandoned
A.A.O. Glentulloch No. 1	1961	Yes	4083	Many shows of dry gas; open hole drill stem test gave 7,500,000 cfd	abandoned
A.A.O. Westgrove No. 1	1962	Yes	6442	nothing significant	abandoned
A.A.O. Westgrove No. 2	1962	Yes	5550	gas shows; open flow potential mainly dry gas 4,750,000 cfd	capped, potential gas well
A.A.O. Westgrove No. 3	1962–63	Yes	12,663	gas shows; 541,000 cfd dry gas 2748–2802; 852,000 cfd dry gas 2855–2911; 293,000 cfd dry gas 12,303–12,360	capped, potential gas well
A.A.O. Westgrove No. 4	1963	No	3017	nothing significant	abandoned
A.F.O. Bandanna No. 1	1963	Yes	4041	several minor gas shows	abandoned
A.A.O. Killoran No. 1	1962	Yes	2350	nothing significant	abandoned
A.A.O. Kildare No. 1	1963	Yes	5724	nothing significant	abandoned
A.A.O. Kildare No. 2	1963	Yes	5677	nothing significant	abandoned
Planet Tooloombilla No. 1	1964	Yes	1750	none	abandoned
Planet Crystalbrook No. 1	1964	Yes	2061	none	abandoned
Planet Warrong No. 1	1964	Yes	3579	none	abandoned

A.R.O. : Australian Roma Oilfields Ltd.; S.Q.D. : Shell (Queensland) Development Pty. Ltd.

A.A.O. : Associated Australian Oilfields N.L.; Planet : Planet Oil Co. N.L.

FIGURE 2



PHYSIOGRAPHIC SKETCH

OF THE EDDYSTONE 1:250,000 SHEET AREA

Bureau of Mineral Resources, Geology and Geophysics, May 1965 To accompany Record No 1965/98

G55/A7-4

PHYSIOGRAPHY

EDDYSTONE is drained by four river systems. The Great Dividing Range in the eastern quarter separates the Warrego and the Merivale-Maranoa River systems, which drain westwards into the Murray-Darling drainage system, from the Comet and Dawson River systems which drain eastwards into the Fitzroy River.

Several streams show structural control and tend to follow anticlinal axes, notably the Maranoa River which follows the Maranoa Anticline in the north and centre of the Sheet, but many streams do not.

The topography and altitude are quite variable and depend largely on rock type. The Tertiary basalts form high-level plateaux (about 3000 feet*) in the Mount Hutton and Carnarvon Creek areas. Basalt plugs form isolated peaks in the north and centre. The essentially arenitic sequence from the Clematis Sandstone to the Boxvale Sandstone forms a rough, dissected plateau area lying between 1800 and 2500 feet in general in the north and centre of EDDYSTONE . The Permian and Triassic units in the extreme north-east form a regionally lower area, with maximum relief of 1500 feet. The generally soft sequence from the Hutton Sandstone to the base of the Blythesdale Formation in the west, south and central east forms a low area (1500 to 1800 feet) consisting of undulating country with some strike ridges. The Blythesdale Formation in the south-west, capped in places by Tertiary sediments, forms another plateau area. The small area of outcrop of the soft Roma Formation, in the extreme south-west, is characterised by rolling country of low relief and low elevation.

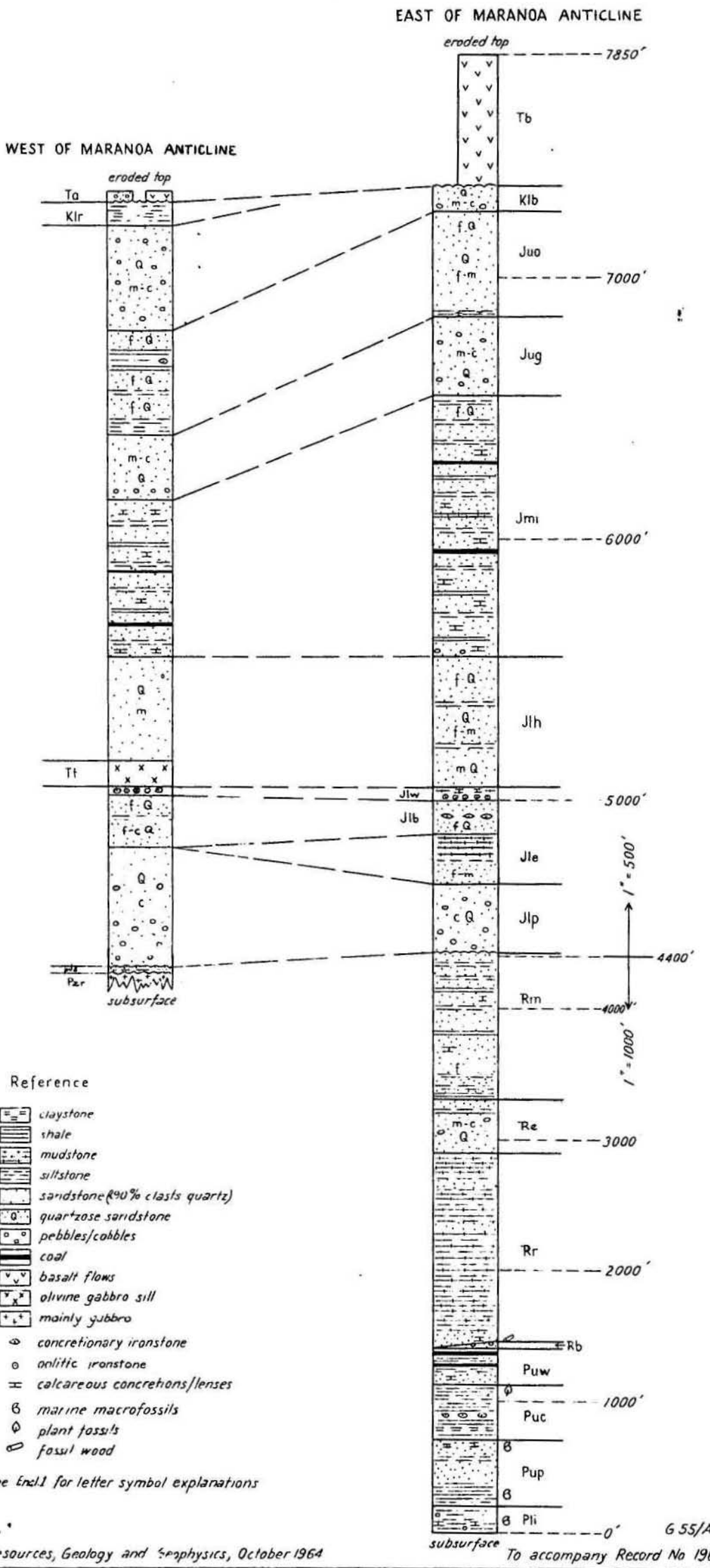
STRATIGRAPHY

The units occurring on EDDYSTONE are summarized in Table 1. New unit names have been introduced in accordance with the Australian Code of Stratigraphic Nomenclature. Rocks of Permian to Tertiary age, and gabbroic Lower Palaeozoic basement rocks, crop out. The Aldebaran Sandstone and the Cattle Creek Formation are found only in the subsurface on EDDYSTONE although they crop out on the adjacent SPRINGSURE area (Mollan, Exon & Kirkegaard, 1964). The Reid's Dome Beds, the andesite at the base of SQD No. 1 (Morella), the Carboniferous rocks at the base of Planet Warrong No. 1., andthe Timbury Hills Formation are known only in the sub-surface on EDDYSTONE.

*Footnote: Heights quoted throughout this record are above sea level.

FIG. 3

GENERALISED COLUMNAR SECTIONS OF OUTCROP EDDYSTONE 1:250,000 SHEET AREA



G 55/A7/2

Bureau of Mineral Resources, Geology and Geophysics, October 1964

To accompany Record No 1965/98

STRATIGRAPHY OF THE EDDYSTONE SHEET AREA — TABLE 1

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS (feet)	PALAEONTOLOGY	RELATIONSHIPS	ENVIRONMENT OF DEPOSITION	SYNONYMOUS NAMES
CAINOZOIC	UNDIFFERENTIATED	Cza	Alluvium	less than 100			Fluviatile	
		Cz	Soil; gravels; sand; 'billy' boulder gravels.	probably mainly less than 100				
		o o o o o o o	Laterite	less than 100		Developed, in places, on some Cretaceous and Tertiary units		
	TERTIARY	Ta	Friable quartz-rich pebbly sandstone; conglomerate; shale	less than 100	Plant remains. One small pelecypod.	Unconformably overlies pre-Tertiary sediments	Fluviatile	
		Tb	Basalt flows	50-800		Unconformably overlies pre-Tertiary sediments. Interbedded with Ta in some places	Terrestrial	
		Tabor Gabbro mt	Olivine microgabbro sill and stocks			Intrusive into Jlh		
MESOZOIC	LOWER CRETACEOUS	Roma Formation Klr	Grey siltstone, shale; sublabile sandstone. Some calcareous beds	200±	Abundant marine fauna in adjacent Sheet areas (e.g. Day (1964)). Spores.		Shallow water, marine	
		Blythesdale Formation Klb	White, cross-bedded in places pebbly, quartzose and sublabile sandstone. Some siltstone and claystone	400±	Fossil wood. Abundant flora on Roma Sheet (Day, 1964)		Fluviatile	Blythesdale Braystone (Jack 1895a,b)
	UPPER JURASSIC	Orallo Formation Juo	Grey siltstone, mudstone. Quartzose and sublabile sandstone; minor limestone	400±	Poor plant remains. Identifiable plants on Roma Sheet (Day, 1964)	Conformable sequence	Largely lacustrine, partly fluviatile	see Day 1964
	UPPER JURASSIC	Gubberamunda Sandstone Jug	White, crossbedded in places pebbly, quartzose and sublabile sandstone, minor siltstone	200-250	Plant impressions. Fossil wood		Fluviatile	
	MIDDLE JURASSIC	Injune Creek Beds Jmi	Grey carbonaceous siltstone and shale; lithic sandstone, calcareous in part; quartzose sandstone; coal	600-1000	Identifiable leaf remains; fossil wood; spores; vertebrate remains		Paludal	Lower (calcareous) Walloon (Jensen, 1921.) Lower Walloon Coal Measures (Reeves, 1947)

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS (feet)	PALAEONTOLOGY	RELATIONSHIPS	ENVIRONMENT OF DEPOSITION	SYNONYMOUS NAMES
MESOZOIC	LOWER JURASSIC	Hutton Sandstone Jlh	Buff quartzose sandstone with considerable feldspar in places	400-500	Plant stems; pelecypods on Taroom Sheet		Low energy fluviatile and lacustrine. Rapid deposition, little reworking	
		Evergreen Formation Jle — Westgrove Ironstone Member Jlw	Concretionary ironstone, oolitic in places, mudstone. Includes at top some Jle not separated on map	20	Plant stems; spores; hystrichospheres; pelecypods on Taroom Sheet		Shallow marine, near wave base. Iron rich ooze	
		Evergreen Formation Jle — Boxvale Sandstone Member Jlb	Buff quartzose sandstone, often micaceous; some siltstone	150-320	Plant fragments; stem impressions	Conformable sequence	Probably non-marine, fluviatile and lacustrine	
		Evergreen Formation Jle	Labile and sublabile sandstone, minor quartzose sandstone; shale; minor coal	200-400	Identifiable leaf remains; fossil wood; hystrichospheres; spores. Pelecypods and vertebrate remains on Taroom Sheet		Lacustrine, possibly in part marine	
		Precipice Sandstone Jlp	White crossbedded in places pebbly, quartzose sandstone; conglomerate, siltstone.	250-450	Plant impressions; spores	Unconformably overlies Triassic sediments. Sits directly on Rr, east of Snake Hill	Fluviatile flood plain, some lacustrine periods	Morella Sandstone (Phillips in Hill and Denmead, 1960)
	PRE-JURASSIC	pJs	Ferruginous, 'cherty' or calcareous mainly labile sediments	30 +		Underlies Jlp overlies Pzr. Probably unconformable on Pzr and probably unconformably overlain by Jlp		
	TRIASSIC	Moolayember Formation Rm	Siltstone; shale; buff quartzose to labile sandstone, calcareous in part	1000 ±	Identifiable leaf remains; spores	Conformably overlies Re	Lacustrine, fluviatile	
		Clematis Sandstone Re	White crossbedded in places pebbly quartzose sandstone, some pebbly; minor siltstone, shale	400-800	Identifiable leaf remains; spores	Conformably overlies Rr	Fluviatile	Carnarvon Red Member (Reid, 1930) Carnarvon Sandstone (Reeves, 1947) Carnarvon Series (SQD, 1952)
		Rewan Formation Rr	Red and green silty mudstone, green sublabile sandstone	1500 ±	Fragmentary plant remains; spores	Disconformably overlies Puw in places	Subsiding, shallow non-marine basin, partly fluviatile	
		Rewan Formation Rr — Brumby Sandstone Member Rb	Lenticular pebbly labile and sublabile sandstone	15-30	Fossil wood		Fluviatile	Malta Grit (SQD, 1952)

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS (feet)	PALAEONTOLOGY	RELATIONSHIPS	ENVIRONMENT OF DEPOSITION	SYNONYMOUS NAMES
PALAEOZOIC	UPPER PERMIAN	Blackwater Group Puw	Green feldspatho-lithic sandstone; siltstone; shale; coal	250-300	Abundant Glossopteris flora; spores-zone P4 (Evans, 1964) Plant fossils (White, 1961) include:- Glossopteris angustifolia Brong; G. scale leaves, Gangamopteris angustifolia	Conformably overlies Puc	Paludal	Bandanna Formation
		Black Alley Shale Puc	Black shale; claystone; minor ironstone and tuff	400	Abundant Glossopteris flora; spores and hystrichospheres-zone P3c-P3d (Evans, 1964)	Conformably overlies Pup	Low energy, partly marine	(Hill, 1957)
		Peawaddy Formation Pup	Carbonaceous sandy shale; siltstone; feldspatho-lithic sandstone in upper part	500	Marine Fauna IV (Dickins et.al., 1964); plant fragments, fossil wood; spores-sone P3b (Evans, 1964). Marine fossils include:- (a) Surface: Streblorteria sp., Lissochonetes semicircularis, Plekonella acuta, Cancellospirifer maxwelli, Cleiothyridina sp., Cladochonus sp., Thamnopora sp., and bryozoans. (b) Subsurface: (Glentulloch No.1, Westgrove Nos. 1 & 2, Warrong No.1) Parallelodon sp.nov., Chaenomya sp., Tarrakea solida., Strophalosia clarkei., S. ovalis., Plekonella cf. acuta, Ingelarella sp., Notospirifer mahutus, Cleiothyridina sp., Streptorhynchus policanonsis and bryozoans	Overlies Lower Permian and Carboniferous units	Brackish, some marine, shallow water	Upper part only of Colinlea Formation, and upper part only of Catherine Sandstone, (Hill, 1957)

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS (feet)	PALAEONTOLOGY	RELATIONSHIPS	ENVIRONMENT OF DEPOSITION	SYNONYMOUS NAMES
PALAEOZOIC	LOWER PERMIAN	Ingelara Formation Pli	Dark grey, poorly sorted sandy siltstone with pebbles and granules; shelly calcareous concretions	Outcrop 120+. Subsurface 180 Bandanna No.	Marine Fauna III (Dickins et al., 1964) plant fragments; spores-zone P3 (Evans, 1964) Marine fossils include:- Glyptoleda glomerata, G. reidi, Chaenomya sp., Platyteichum costatum, Ingelarella ingelarensis and I. angulata	Transitional to Aldebaran Sandstone (e.g. Bandanna No.1)	Low energy, near shore, rapid marine deposition	Coral Stage (Reid, 1930)
		Aldebaran Sandstone	White, quartzose sandstone; conglomerate; siltstone	Subsurface Bandanna No.1 950	Identifiable plant remains; spores-zone P2-P3b (Evans, 1964). Possible equivalent in Westgrove No.3 has fragmentary marine fossils (pelecypods and gastropods)	Apparently conformably overlies Cattle Creek Formation in Bandanna No.1	Fluviatile-deltaic	Serocold Sandstones (Reid, 1930)
		Cattle Creek Formation	Dark grey poorly sorted, pebbly sandy siltstone and silty sandstone; conglomerate; thin calcareous sandstone beds	Subsurface Bandanna No.1 680	Marine Fauna II (Dickins et al., 1964), includes Eurydesma; spores-zone P2 (Evans, 1964) Marine fossils in subsurface (Morella No.1, Westgrove No.1) include:- Strophalosia precvalis, Ingelarella cf. plica, Notospirifer aff. extensus and Cleiothyridina sp.	Apparently conformably overlies Reid's Dome Beds in Bandanna No.1	Low energy, near shore, rapid marine deposition	
		Reid's Dome Beds	Carbonaceous shale and siltstone; coal; sandstone, some pebbly	Subsurface-maximum thickness 9050+ in Westgrove No.3	Abundant Glossopteris flora; spores-zone Plc (Evans, 1964). Plant fossils (Westgrove Nos. 1 & 2, Glentulloch No.1) include:- Glossopteris browniana Brongniart, G. cf. jonesi Walkom, G. indica Schimper, G. cf. indica Schimper, G. ampla Dana, Gangamopteris cyclopteroides Feist., Noeggerathiopsis sp., hislopi (Bunbury), ? Noeggerathiopsis sp., Palaeovittaria cf. mitchelli (Walkom)	Apparent transition to overlying Cattle Creek Formation	Paludal	

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS (feet)	PALAEONTOLOGY	RELATIONSHIPS	ENVIRONMENT OF DEPOSITION	SYNONYMOUS NAMES
	PRE-PERMIAN		Andesite	Subsurface- ? basement Morella No.1		Overlain by 2 feet of conglomerate-possibly basal Cattle Creek Formation		
	CARBONI-FEROUS		Shale, sandstone; tuff; minor conglomerate; subgreywacke	Subsurface Warrong No.1 790	Plant fragments; spores-zone ? C1 (Evans, 1965)	Apparently disconformably overlain by Pup		
	UPPER DEVONIAN	Timbury Hills Formation	Siltstone and sandstone; faulted	Subsurface-basement Glentulloch No.1 Killoran No.1 Crystalbrook No.1	Plant fragments	Unconformably overlain by Permian and Triassic units		
	LOWER PALAEOZOIC	Pzr	Gabbro, sheared basic rocks, minor asbestos	Basement		Unconformably overlain by pJs		

LOWER PALAEOZOIC

The oldest rocks on EDDYSTONE crop out in an area about one mile long, in a gully joining the west bank of the Maranoa River, 9½ miles at 260° (true bearing) from Darkwater Homestead. The outcrop lies on a gravity high (United Geophysical Corp., 1964) which corresponds with the postulated Nebine Ridge (Hill, 1951), a basement high in Permian-Triassic times.

The outcrop consists essentially of diallage-rich gabbro, which is slightly sheared in places with tremolite alteration. Some sheared diallage pyroxenite, altered in part to tremolite and chlorite, is also present. Abundant veins of chlorite rock and others of fibrous tremolite, of probable metasomatic origin, cut the body. The outcrop has been loosely termed serpentinite in the past, and the tremolite attracted early prospectors.

A Lower Palaeozoic age was determined from plagioclase from the gabbro at the Australian National University, using the potassium/argon method of radioactive dating (A. Webb, pers.comm.)

UPPER DEVONIAN

The Timbury Hills Formation is the only definitely identified Devonian unit on EDDYSTONE; it has been encountered only in wells - namely A.A.O. Killoran No. 1, A.A.O. Glentulloch No. 1, and Planet Crystalbrook No. 1 wells.

On EDDYSTONE the unit consists of folded and faulted sediments, which are mostly steeply dipping. Outside EDDYSTONE the unit includes phyllites and quartzites with quartz veining. The plant fossil Leptophloeum australe was recovered from the unit in A.F.O. Purbrook No. 1, and psilophyton remains from A.A.O. Pickanjinnie No. 2. The plants indicate an Upper Devonian age for at least part of the unit.

CARBONIFEROUS.

More than 800 feet of sediments dipping at 10° to 20°, containing a spore assemblage of probable Carboniferous age, were penetrated in Planet Warrong No. 1 on EDDYSTONE (Meyers, N.A., 1964). They are disconformably overlain by the Upper Permian Peawaddy Formation. The sediments which consist essentially of multicoloured shale, sandstone, tuffaceous rocks, and minor quartzose conglomerate, are probably a correlate of the Lower Carboniferous Drummond Group which crops out on EMERALD and SPRINGSURE.

LOWER PERMIAN

The Ingelara Formation is the only Lower Permian unit cropping out on EDDYSTONE. The Aldebaran Sandstone, Cattle Creek Formation and the Reid's Dome Beds are well represented in the subsurface.

Deposition in the Denison Trough in the east of EDDYSTONE, commenced in the Lower Permian. Initially the Reid's Dome Beds, a very thick siltstone-shale-coal measure sequence, containing a Glossopteris flora, was deposited in a lacustrine/paludal environment. This unit is more than 9000 feet thick in A.A.O. Westgrove No. 3. A marine incursion accompanied deposition of the Cattle Creek Formation, which consists of practically unsorted, in places pebbly, siltstone and silty sandstone. The unit contains an abundant shelly fauna (Fauna II), characterised by Eurydesma.

After the sea withdrew some 600 feet of coarse quartzose sandstone and conglomerate, the Aldebaran Sandstone was deposited in a fluviatile-deltaic environment. Another marine incursion was accompanied by rapid deposition of more than 200 feet of unsorted, in places pebbly, sandy siltstone - the Ingelara Formation. The unit contains a shelly fauna (Fauna III). The unsorted sediments of the Cattle Creek and Ingelara Formations may have been supplied, in part, by a local glacier.

UPPER PERMIAN.

The Upper Permian, a conformable sequence of three units, the Peawaddy Formation, the Black Alley Shale* and the Blackwater Group* is regionally unconformable on the Lower Permian. These units crop out in the north-east corner of EDDYSTONE and are everywhere present in the subsurface in the east of the area.

The Lower Permian ended with uplift, tilting and erosion. A widespread marine transgression at the start of the Upper Permian gave rise to the Peawaddy Formation which is about 500 feet thick and consists of a lower silty part, and an upper sandy part. Sporadic shelly fossils suggest that the whole unit is marine or littoral. Fossils are more abundant higher in the unit and the uppermost part contains poor representatives of the Mantuan Productus Bed fauna. The sediments which are partly tuffaceous were deposited in shallow water. The Peawaddy Formation lies on progressively older Lower Permian units southwards; overlying the Catherine Sandstone near Reid's Dome on SPRINGSURE (Mollan et. al. 1964), the Ingelara Formation in the north of EDDYSTONE, and the Reid's Dome Beds in A.A.O. Glentulloch No. 1 where a basal conglomerate marks the unconformity.

The middle Upper Permian unit, the 400 feet thick Black Alley Shale, contains a basal hystrichosphere swarm which probably indicates some marine deposition. The formation contains an abundant Glossopteris flora and was probably deposited in a near-shore, low energy environment, in part freshwater. The unit contains, in places, typically, clay beds and tuff.

The last phase of deposition in the Upper Permian is represented by the 200 feet thick non-marine Blackwater Group, which also contains an abundant Glossopteris flora. The lower part of this unit is sandy, and the upper shaly part, which was deposited in paludal conditions, contains coal and oil shale.

*Footnote. New names: The Bandanna Formation (Hill, 1957) has been subdivided into two units, the lower being the Black Alley Shale, the upper the coal-bearing Blackwater Group.

The Black Alley Shale is named after Black Alley Peak immediately south-west of Reid's Dome on SPRINGSURE. The type section is in a small tributary of Carnarvon Creek three miles south-east of Black Alley Peak. The unit crops out in the Springsure-Serocold and Consuelo Anticlines and in a sinuous belt trending westwards across SPRINGSURE. It consists of dark grey to greenish shale and mudstone with thin interbeds of greasy clay. The clay and shale contain primary tuff and glass shards. The top of the unit is generally marked by fossil logs or a cherty leaf bed. The thickness varies from 200 to 400 feet and is 325 feet in the type section. Fossils include hystrichospheres, plants, logs and a few fish scales; the age of the unit is Upper Permian.

The unit appears to be regionally conformable with the underlying Peawaddy Formation and the overlying Blackwater Group. The sharp contact in places, with the sandstone at the top of the Peawaddy Formation, may represent local disconformity. The fossil log horizon suggests a short break in sedimentation before deposition of the Blackwater Group.

The type area of the Blackwater Group is near Blackwater on DUARINGA. The group is represented on EDDYSTONE by only a thin interval between the marine Permian Back Creek Group and the Triassic Mimosa Group, both of which are well represented on EDDYSTONE. The lithology of the Blackwater Group on EDDYSTONE is similar to that in the type area.

TRIASSIC

The Mimosa Group, consisting of three conformable formations, the Rewan Formation, the Clematis Sandstone and the Moolayember Formation, overlies the Permian sequence, disconformably in places. The three formations crop out in the north-east of EDDYSTONE and are represented, at least in part, in exploratory wells drilled in this area.

At the close of the Permian there was local erosion of the coal measures followed by deposition of some 1500 feet of ferruginous red and green mudstone and sandstone of the Rewan Formation in a subsiding non-marine basin. A new spore assemblage is contained in the sediments above the erosional break. The thin, lenticular Brumby Sandstone Member of the Rewan Formation was deposited directly on the coal measures in places; elsewhere it overlies several hundred feet of the Rewan Formation which was probably deposited in local topographic lows. Later deposition of the Rewan Formation was more widespread.

The Rewan Formation is succeeded by the 400 feet or more of coarse pebbly, quartzose Clematis Sandstone which was deposited in a fluviatile environment markedly different from that of the Rewan Formation. Then came a gradual change to lacustrine conditions with increasing deposition of siltstone. The youngest thick quartzose sandstone, which marks the top of the Clematis Sandstone, is overlain by more than 1000 feet of siltstone, shale and silty sandstone of the Moolayember Formation. Identifiable plants were preserved in the quiet conditions of sedimentation of the uppermost Clematis and throughout Moolayember times.

PRE-JURASSIC

A 30 feet thick sequence of labile sediments unconformably overlies the Lower Palaeozoic gabbro west of Darkwater Homestead. The sediments are strongly ferruginized immediately below the unconformably overlying Precipice Sandstone. They are probably equivalent to part of the Permian or Triassic sequence.

LOWER JURASSIC

Folding, uplift and erosion at the end of the Triassic preceded deposition of Lower Jurassic sediments. These consist of three conformable formations, the Precipice Sandstone, the Evergreen Formation and the Hutton Sandstone, cropping out in the north, centre and east of EDDYSTONE, and occupying approximately half the sheet area. The Lower Jurassic sediments overlap all the Triassic formations in the north-east.

The oldest Jurassic unit is the Precipice Sandstone consisting of 250 to 500 feet of quartzose, commonly pebbly, sandstone deposited in fluviatile conditions.

Fluviatile conditions were succeeded by a freshwater lacustrine environment in which the lower part of the Evergreen Formation was deposited. This part is predominantly sublabile and labile sandstone and mudstone with minor shale and coal, and varies in thickness from 250 feet in the east to less than 50 feet in the central north of EDDYSTONE. North and west of the Maranoa River it is not recognizable.

The lower part of the formation was succeeded by deposition, probably in fresh water, of up to 250 feet of the dominantly quartzose Boxvale Sandstone Member, which is thickest in the central north of EDDYSTONE. Over most of EDDYSTONE deposition of generally well sorted quartzose sandstone was interrupted by quieter conditions and deposition, in the middle of the member, of less than 50 feet of sublabile sandstone, siltstone, bedded ironstone and some coal. In the extreme east the member does not contain this break and consists almost entirely of quartzose sandstone, some 150 feet thick.

Deposition of a widespread pelletal or oolitic chamositic ironstone, the Westgrove Ironstone Member*, which generally crops out as concretionary or oolitic limonite, followed. This unit, which varies from a few inches to 20 feet thick, may represent a marine incursion and contains abundant entombed hystrichospheres.

The final, lacustrine, phase of Evergreen deposition gave a thin mudstone sequence. This has been included, on the map, with the Westgrove Ironstone Member, as it was not practicable to separate it.

* New name: The Westgrove Ironstone Member is named after Westgrove Holding, 19 miles north-north-west of Injune. Because of poor outcrop the type section is described from core cut through the entire member in shallow drill holes, Taroom BMR 46 and Taroom BMR 54. These two holes were drilled side by side in the type area of the Evergreen Formation on the Carnarvon Highway 25 miles north-north-east of Injune on TAROOM.

The member crops out in a narrow belt extending from Currajong Homestead in the centre of TAROOM to north of Mount Hopeless in the north-west of EDDYSTONE. In the type section it is essentially chamositic mudstone, commonly with pelletal or oolitic structure and sideritic cement, interbedded with green calcareous mudstone and grey calcareous siltstone. In outcrop the lithologies are chiefly concretionary and oolitic limonite and haematite. It varies in thickness from a few inches to 20 feet.

The member contains plant stems and logs, but no marine macrofossils were found on EDDYSTONE. The age, on palaeobotanical and palynological evidence, is Lower Jurassic. The member is conformable within the Evergreen Formation and immediately overlies the Boxvale Sandstone Member in the type area of the formation.

At the close of the Lower Jurassic, more than 400 feet of quartzose and sublabile Hutton Sandstone was rapidly deposited in lacustrine and low-energy fluviatile environments. Considerable feldspar and, in places, clay clasts in the sandstone indicate lack of reworking. Spore evidence (de Jersey and Paten, 1963) suggests that the uppermost Hutton Sandstone may be of Middle Jurassic age.

MIDDLE JURASSIC

The freshwater Injune Creek Beds, the only Middle Jurassic unit in the area, conformably overlies the Hutton Sandstone. The unit crops out in a wide belt across the southern part of EDDYSTONE, extending as far west as the Maranoa Anticline, and in a narrower belt from there to the north-western corner of the Sheet. It thins from about 1200 feet in the east to about 600 feet in the west.

The unit consists of buff to grey, in places calcareous, siltstone, mudstone and labile sandstone, fine quartzose sandstone, some unfossiliferous limestone and coal. The lithologies at the top and bottom of the unit are illustrated by the logs of two shallow drill holes (Enclosure 7).

Early in the Middle Jurassic, pockets of 'lithic' grit and conglomerate were deposited above the Hutton Sandstone. Later, fine grained sediments including calcareous beds and coal measures were deposited in restricted lacustrine and paludal conditions. In the east, a local change in the environment allowed several hundred feet of clean fine grained quartzose sandstone to accumulate near the top of the unit.

A Middle Jurassic age is indicated for the unit by palynological evidence (Evans, 1965). Well preserved plant remains and fossil wood are also present.

UPPER JURASSIC

The Upper Jurassic sequence, consisting of two conformable freshwater formations, conformably overlies the Injune Creek Beds. These formations, the Gubberamunda Sandstone and the Orallo Formation, crop out in a belt along the southern boundary, and in the western part of the Sheet.

The older formation is the Gubberamunda Sandstone which consists of about 200 feet of sublabile and quartzose, in places pebbly, sandstone deposited in a high-energy fluviatile environment.

The overlying Orallo Formation was deposited in a lower-energy fluviatile environment near Mount Hutton, and in a dominantly lacustrine environment farther west. Thus, in the east the formation consists of moderately coarse sublabile to labile sandstone as well as finer sediments, whereas in the west, it contains no coarse material (See Enclosure 3). Calcareous beds and concretions occur in places. The thickness of the unit is consistently about 400 feet.

These sediments are regarded as Upper Jurassic in age (Day, 1964) largely on stratigraphic grounds; they contain long-ranging species of plant fossils.

LOWER CRETACEOUS

Two conformable Lower Cretaceous units, the Blythesdale and Roma Formations, occupy a large area in the west of the Sheet; the Blythesdale Formation also crops out in a small area south-west of Mount Hutton.

The Blythesdale Formation (after Day, 1964,) which conformably overlies the Orallo Formation, consists of about 400 feet of sublabile and quartzose, in places pebbly sandstone, deposited in a high-energy fluviatile environment. Subsidence and marine transgression took place at the end of deposition of the Blythesdale Formation, and the calcareous siltstone and shale of the Roma Formation, which in adjacent areas contains a marine fauna, was deposited in shallow, quiet, partly marine conditions. Only the lowermost 200 feet of the Roma Formation crop out on EDDYSTONE and no marine fossils were found in this part of the sequence.

Marine fossils date the Roma Formation and the uppermost member of the Blythesdale Formation in the Roma area, the Minmi Member, as Lower Cretaceous (op.cit.). However, the remainder of the Blythesdale Formation contains no positive fossil evidence and the base of the formation is arbitrarily taken as the base of the Cretaceous (op.cit.).

TERTIARY

Tertiary sediments unconformably overlie the Lower Cretaceous units in the west of the Sheet. Their thickness is less than 100 feet.

After deposition of the Cretaceous sediments there was tilting, uplift and erosion followed by widespread fluviatile deposition of quartzose sands, probably locally derived. These, and also the sandy Blythesdale Formation, were strongly affected by lateritization. Erosion before and after lateritization has reduced the Tertiary cover to the present extent.

Tabor Gabbro. In the north-west of the Sheet, north of Mount Tabor Homestead, are four masses of teschenitic olivine microgabbro. Mount Hopeless, in the extreme north, is a large stock (more than a mile across) and there is a smaller one east of it. Five miles south-east of Mount Hopeless is a basin-shaped sill some 4 miles in diameter, ranging up to 200 feet thick and surrounding Mount Yanalah (which is a basalt plug). The sill is apparently concordantly intrusive into the Hutton Sandstone. Five miles south-east of Mount Yanalah is another large stock.

Basalt. Remnants of an extensive sheet of olivine basalt and olivine-free basalt flows are found as cappings, mainly in the east of the Sheet. In the norht-east there are large areas of basalt on both sides of Carnarvon Gorge and along the scarps to the south-east. In the central north a smaller area of basalt forms the Murphy Tableland and farther west again there are basalt flows near the Tabor Gabbro outcrops. In the south-east a sinuous erosional remnant forms the large plateau of Mount Hutton and Main Top. Basalt plugs which are related to the flows, form peaks in the centre and north-east of the Sheet.

UNDIFFERENTIATED CAINOZOIC

A considerable spread of residual soil is developed over the less resistant units which form low areas, particularly the Hutton Sandstone and the Injune Creek Beds. "Billy" boulder gravel and soil cover, lying on the uppermost Hutton Sandstone north-east of Bungaringa Homestead, was probably derived from the Injune Creek Beds.

Narrow, generally thin belts of alluvium are found along some streams in the west and south, these being particularly common over the Injune Creek Beds. Extensive alluvium occurs on the Permo-Triassic sediments, especially the Rewan Formation, in the north-east of EDDYSTONE.

STRUCTURE

Gravity data (United Geophysical Corp., 1964 - see Fig. 1) suggests the presence of a basement ridge joining the Nebine Ridge in the south to the Nogoa Anticline in the north, and underlying the Maranoa Anticline. This Nogoa-Nebine ridge, which existed in pre-Permian times, has a steep eastern side which may be faulted. Gentle movement along this buried ridge has broadly warped the Jurassic sediments into the Maranoa Anticline. A small basement high of gabbro, with overlying pre-Jurassic sediments, crops out on the ridge just west of the Maranoa River.

The Merivale Fault, mapped by seismic methods (Austral Geoprospectors, 1962 - see Fig. 1), may represent the hinge line, and the western limit, of the Lower Permian Denison Trough. The seismic interpretation suggests overall displacement of marker horizons, up to the east, of about 3500 feet. The eastern block was undeniably lower than the western block in the Lower Permian, when a thick sedimentary sequence was deposited on it.

In the north-east of EDDYSTONE compression of the thick pile of Permian-Triassic sediments against a stable block to the west (Mollan et. al., 1964), gave rise to the asymmetrical Serocold Anticline, and the less pronounced Rewan Syncline and Morella-Westgrove Anticline. During folding there was some overthrusting to the west on SPRINGSURE and possibly on EDDYSTONE.

The Jurassic-Cretaceous sequence was quite gently folded and generally dips at less than 5°. Although there is a strong unconformity at the base of the Jurassic, the earlier structures are reflected in the Jurassic sequence. The Maranoa Anticline is the dominant Jurassic structure and the other folds can be considered as being on its limbs. It trends north-north-east and plunges south. Structures to the west of it trend north-east and plunge to the south-west; structures to the east of it trend north and plunge to the south. Other major Jurassic structures are the broad warps of the Chesterton Syncline, the Merivale Syncline and the Westgrove Anticline. Numerous smaller folds are present on the flanks of the major structures.

Small scale structures such as the dome 5 miles south-west of Mount Moffat Homestead, and the basin-shaped sill around Mount Yanalah are probably features related to Tertiary intrusions.

Faulting of the Jurassic-Cretaceous sequence is minor and generally parallels the fold axes.

ECONOMIC GEOLOGY

Water and petroleum are the two minerals of greatest economic interest in the area.

Both surface and underground water are of economic significance. The area has only moderate rainfall and the majority of this sinks into the porous sandstone units of the area which are intake beds for the Great Artesian Basin. Only after heavy rain is there much run off from the Great Dividing Range - Carnarvon Range area in the north, where several large rivers rise. Permanent surface water is largely confined to dams and water holes on the main aquiclude- the Injune Creek Beds.

However, the aquifers of the Great Artesian Basin are relatively near the surface and numerous subartesian and some artesian bores penetrate them. The water from these bores is generally quite palatable, and excellent for stock. Information about approximately 220 bores on EDDYSTONE, from homesteads and the Irrigation and Water Supply Commission, was collected and summarized on punch cards. This information is being tabulated and will be published in a report on the region (Mollan, Jensen, Forbes, Exon and Gregory, in prep.).

Considerable effort has been directed towards the search for petroleum. Fourteen wells have been drilled in the eastern and central parts of EDDYSTONE (Table 2). Of these, two - A.A.O. Westgrove No. 2 and A.A.O. Westgrove No. 3 - have been capped as potential gas wells with a combined open flow potential of some 6 million cubic feet per day. A.A.O. Glentulloch No. 1 yielded 7 million cubic feet a day of dry gas on an open hole test, but has been abandoned because of the presence of water. A.A.O. Kildare No. 1 yielded an oil soaked core but no production, and was abandoned. The petroliferous horizons have, so far, been in the Permian sequence and generally confined to the Cattle Creek Formation and the Aldebaran Sandstone. The three Planet wells in the central part of the Sheet, Tooloombilla No. 1., Crystalbrook No. 1 and Warrong No. 1, intersected only a relatively thin Mesozoic and Palaeozoic sequence before reaching economic basement, and it would appear that this area, and the western part of the Sheet is less prospective than the eastern part.

Coal has been worked from seams in the Injune Creek Beds at Injune, 6 miles east of the eastern EDDYSTONE boundary but these deposits are not, at present, of economic use. There is also some coal in the Blackwater Group, the Boxvale Sandstone Member and probably the Hutton Sandstone, but no workable deposits have yet been found in these units on EDDYSTONE.

Tremolite veins in the gabbroic basement outcrop west of Darkwater Homestead were prospected for asbestos early this century, but no records of production have been found.

REFERENCES

AUSTRAL GEO PROSPECTORS PTY LTD., 1962 - Seismic survey report, Merivale area (ATP 55/56P), for Mines Administration Pty. Ltd. Geol.Surv.Qld Auth.Rep., 1011 (unpubl.)

BUREAU OF MINERAL RESOURCES, 1964 - Total Magnetic Intensity, Eddystone, Queensland. Map G55/B1-28.

CROOK, K.A.W. 1960 - Classification of arenites. Amer. Jour.Sci.,258, 419-428.

DAY, R.W., 1964 - Stratigraphy of the Roma-Wallumbilla area. Publ.Geol.Surv. Qld, 318.

DE JERSEY, N.J., & PATEN, R.J., 1964 - Jurassic spores and pollen grains from the Surat Basin. Publ.geol/.Surv.Qld, 322.

DENMEAD, A.K., 1943 - Carnarvon Oil Shale. Qld Govt Min.J., 44, 70.

DICKINS, J.M., MALONE, E.J., & JENSEN, A.R., 1964 - Subdivision and correlation of the Middle Bowen Beds. Bur.Min.Resour.Aust.Rep., 70.

EVANS, P.R., 1964 - A correlation of some deep wells in the north-eastern Eromanga Basin, Central Queensland. Bur.Min.Resour. Aust.Rec., 1964/197.

EVANS, P.R., 1965 - Palynological studies in the Longreach, Jericho, Galilee, Tambo, Eddystone, Taroom and Springsure 1:250,000 Sheet areas. Bur.Min.Resour.Aust.Rec. (in prep.)

HILL, D., 1951 - Geology: in Handbook of Queensland. Aust.Ass.Adv.Sci. Brisbane, 13-24.

HILL, D., 1957 - Explanatory Notes on the Springsure 4-mile Geological Sheet, 4-mile Geological Series. Note Ser.Bur.Min. Resour.Aust., 5.

HILL, D., & DENMEAD, A.K., (eds.) 1960 - The geology of Queensland. J.geol Soc.Aust., 7.

JENSEN, H.I., 1921 - The Geology of the Country north of Roma. Qld Govt Min.J., 22, 92-93.

JENSEN, H.I., 1926 - Geological Reconnaissance between Roma, Springsure, Tambo and Taroom. Publ. Geol Surv.Qld, 277.

MAGELLAN PETROLEUM CORPORATION., 1959 - Airborne magnetometer survey, Tambo-Augathella area. Unpublished report.

MEYERS, N.A., 1964 - Planet Warrong No. 1 ATP 81P, Queensland. Completion Report. Rept. to Planet Oil Co. N.L. (unpubl.).

MOLLAN, R.G., EXON, N.F., & KIRKEGAARD, A.G., 1964 - The geology of the Springsure 1:250,000 Sheet area, Queensland. Bur.Min.Resour. Aust.Rec., 1964/27.

MOLLAN, R.G., JENSEN, A.R., FORBES, V.R., EXON, N.F., & GREGORY, C.M., in prep. - The geology of the Eddystone and Taroom 1:250,000 Sheet areas and the western part of the Mundubbera 1:250,000 Sheet area. Bur.Min.Resour.Aust.Rep.

MOLLAN, R.G., KIRKEGAARD, A.G., EXON, N.F., & DICKINS, J.M., 1964 - Note on the Permian rocks of the Springsure area and proposal of a new name, Peawaddy Formation. Qld Govt Min.J., 65 (757), 575-581.

PETTY GEOPHYSICAL ENGINEERING CO., 1964 - Blackall-Augathella Gravity survey. Report for Amoseas Petroleum Ltd. (unpubl.).

REEVES, F., 1947 - Geology of Roma district, Queensland, Australia. Bull.Amer. Assoc.Petrol.Geol., 34, 1341-1371.

ROBERTSON, C.S., 1961 - Emerald - Duaringa Seismic Survey, Queensland. Bur.Min.Resour.Aust.Rec., 1961/150 (unpubl.).

REID, J.H., 1930 - Geology of the Springsure District. Qld Govt Min.J., 31, 87-98, 149-155.

SHELL (QUEENSLAND) DEVELOPMENT PTY.LTD. (SQD), 1952 - General report on investigations and operations carried out by the Company in the search for oil in Queensland, 1940-1951. Available in Bur.Min.Resour.(Canb.), Geol/.Surv.Qld, and Univ. Qld Libraries (unpubl.).

UNITED GEOPHYSICAL CORP., 1964 - Chesterton Gravity Survey. Rept. to Alliance Oil Devpt. (Aust) N.L., Geol./Surv., Qld.Auth.Rep., 1304 (unpubl.).

WHITE, MARY, E., 1961 - Report on plant fossils from Bandanna Formation, Carnarvon Creek, Queensland. Bur.Min.Resour.Aust.Rec., 1961/9.

WHITEHOUSE, F.W., 1941 - The surface of Western Queensland. Proc.Roy.Soc.Qld., 53, 1-22.

WHITEHOUSE, F.W., 1953 - The Mesozoic Environments of Queensland. Rep.Aust. Ass. Adv. Sci., 29, 83-106.

WHITEHOUSE, F.W., 1954 - The geology of the Queensland portion of the Great Australian Artesian Basin. Appendix G to Artesian Water Supplies in Queensland. Dept.Co-ord.Gen.Public Works Qd.Parl.Pap. A, 56-1955.

Appendix 1

Detailed stratigraphy of the Gubberamunda Sandstone, the Orallo, Blythesdale and Roma Formations and the Tertiary sediments.

by N.F.Exon.

GUBBERAMUNDA

The name Gubberamunda Sandstone was first used for this unit by Reeves (1947) who did not designate a type area. Day (1964) designated the type area as being traversed by the main Roma-Injune road between 20 and 24 miles north of Roma.

The unit crops out in the north of ROMA and MITCHELL, in the north-east corner of AUGATHELLA and is possibly present on TAMBO. On EDDYSTONE the unit occupies a belt about two miles wide trending in a north-north-west direction across the west of the Sheet, and a smaller area west of Hidden Springs Homestead. It forms low cuestas and strike ridges rising above the plains developed on the Injune Creek Beds. The soil is very sandy, mostly white or grey, in places reddish. Generally it supports a cover of scrub giving a light photo tone but, in places, forests of cypress pine appear.

The unit consists of sandstone, lesser conglomerate, and minor siltstone and claystone. The sandstone is medium to very thick bedded, in places crossbedded and is white, soft and porous. It varies from fine to coarse grained and pebbly, with subangular grains and is sublabile to labile. In hand-specimen the sandstone appears to be essentially quartz and some feldspar set in a clay matrix. There are less abundant, but widespread black cherty fragments and, in places, a little muscovite and green soft ?glauconite. Worm casts and tubes, plant impressions and clay clasps are present in places.

The conglomerate has a sandstone matrix as above, and contains abundant quartz pebbles, numerous cherty and porphyritic acid volcanic pebbles, and lesser chalcedony and quartzose sandstone pebbles. The unit contains some thin bedded grey to buff siltstone, and white claystone beds. The claystone also occurs as large fragments in the sandstone and conglomerate, indicating short, probably local, depositional breaks. Such breaks are also indicated by irregular erosional surfaces within the unit. Ironstone beds, some concretionary, are found in outcrop but these are probably secondary and were not encountered in the shallow drill holes. Measured sections and shallow drill holes in the unit are shown in Enclosure 3.

Thin section examination of 6 sandstone specimens, with estimates of proportions of various constituents, showed that the unit is fairly homogeneous. Lithological variations revealed no significant trends across EDDYSTONE from east to west.

All specimens examined contain abundant quartz grains (including quartzite), clay matrix and pore space; most contain silty and shaly fragments; some contain feldspar. The quartz content is fairly constant around 50%, and clay matrix + port space around 30%. Feldspar content averages 5% and varies from absent to 15%; rock fragments average 10% and vary from absent to 15%. Common accessory minerals are

muscovite, biotite and zircon, and iron ore is usually present. All specimens are in the sublabile to labile range.

The unit is apparently conformable with the underlying Injune Creek Beds and the overlying Orallo Formation. The porous sands of the unit make it a good aquifer.

The large scale crossbedding and fairly coarse grainsize suggest that the Gibberamunda Sandstone was deposited in a shallow water fairly high energy environment, probably fluviatile. A number of crossbedding readings, measured at random, vary through 360 degrees and give no clue to the source area. These sediments were probably largely derived from earlier sandstones.

The thickness of the unit throughout the Sheet, calculated from dip information, and, in one case with the aid of a measured section, is between 200 and 250 feet. The unit is 200 feet thick in the type area.

No shelly fossils have been found in this formation, but it does contain some plant impressions. No spores have been identified in this unit, as yet. As the unit is conformable on the Middle Jurassic Injune Creek Beds and is 600 feet stratigraphically below the Aptian Roma Formation, it is thought to be Upper Jurassic.

ORALLO FORMATION

Day (1964) discussed the history of this unit and formalized the name Orallo Formation to replace the Orallo Coal Measures of Jensen (1960), on the grounds that the formation has no workable coal. The unit is approximately equivalent to Reeves' (1947) Fossil Wood Stage. Day designated the type area as traversed by the road from Roma to Injune via Orallo, between Nareeten and Hunterton.

The unit crops out in the north of ROMA and MITCHELL, in the south-east and west of EDDYSTONE, in the north-east of AUGATHELLA and probably on TAMBO. On EDDYSTONE it crops out to the west of Mount Hutton and in a belt trending north-north-west from Winneba Homestead through Bogarella Homestead. Outcrop width varies between one and eight miles depending on dip and topography.

This unresistant unit usually forms a slope below the hills of the Blythesdale Formation. Small cuestas occur near the top and bottom of the unit in places. It generally supports an open eucalypt cover producing a light grey photo tone; cypress pines grow on some sandier areas producing a dark photo tone.

The most common rock types of this poorly exposed formation are fine grained, soft, friable quartzose sandstone, siltstone, in places calcareous, and soft sublabile and labile sandstone. The quartzose sandstone is buff, thin to thick bedded and contains a little feldspar, muscovite and biotite and some black chert fragments. In places it contains large calcareous nodules. Commonly it is interbedded with siltstone and shows some crossbedding and contemporaneous slumping. The siltstone is grey, carbonaceous and micaceous, and grades into mudstone. It is laminated to thin bedded and in some outcrops contains discoidal ironstone concretions, which were

probably originally calcareous. Both siltstone and sandstone contain plant debris. Some thin beds of hard calcareous siltstone and fine sandstone are present in the lower part of the formation.

In the area near Mount Hutton, the unit includes abundant very soft, medium grained, grey to buff to greenish, thin to thick bedded, sometimes calcareous, clayey sublabile to labile sandstone with dark rock fragments. This is a characteristic rock type in the type area, but is not present in the west of EDDYSTONE. The unit becomes finer and more silty westwards as illustrated by the logs of two shallow drill holes which penetrated the entire succession in the west of the area (see Enclosure 3). Although pebble bands occur in the type area, none were seen on EDDYSTONE.

Eleven thin sections were examined from this formation and estimates of proportions of constituents were made. Five thin sections, from measured section E6 in the south-east of the area (Enclosure 3), illustrate the change from the lower 175 feet of clayey, in part calcareous, labile sandstone to the upper clean quartz-rich sandstone. In all five thin sections the feldspar and fine grained rock fragments content remains fairly constant (feldspar less than 10%, average 5%; shaly rock fragments less than 15%, average 10%). The quartz content increases at the change in sediment type, and the clay content falls correspondingly (quartz from about 30 to 75%, clay from about 50 to 5%). Another thin section, from the upper part of the unit some 8 miles farther east, is of a quartz-rich sandstone similar to those from the top part of the section at E6.

Thin sections from the west of the area contain markedly less feldspar (2 to 5%) and shaly fragments (average 3%). Three sections from the base of the unit are fine grained calcareous sandstones with about 30% quartz and considerable magnetite; a fourth is a fine grained quartzose sandstone with 7% magnetite. At the top of the unit is a very fine sandstone with 50% quartz and 40% clay matrix.

The Orallo Formation is apparently conformable with the underlying Gubberamunda Sandstone and the overlying Blythesdale Formation. In the west, both boundaries are clear cut, as there the interbedded siltstone and fine grained friable sandstone of the Orallo Formation are readily distinguished from the generally coarser grained, in places pebbly, crossbedded sandstone of the adjacent units. In the east, the top boundary is similar to that in the west. At the lower boundary the less resistant and more labile sandstone of the basal Orallo Formation contrasts with the more resistant Gubberamunda Sandstone.

The environment of deposition varied somewhat, as shown by the vertical and lateral variations within the formation (Enclosure 3). The finer grained sediments, especially prominent in the west, exhibit thin bedding and low angle crossbedding, and contain some calcareous beds and abundant carbonaceous material; they were probably deposited in a somewhat restricted lacustrine environment. The coarser grained sediments in the east were deposited in a higher energy environment, perhaps a partly fluviatile, partly marginal lacustrine environment.

The thickness of the unit, consistently around 400 feet, compares closely with the 350 to 450 feet in the type area.

No indentifiable plant fossils were found in this area, but numerous plants have been collected elsewhere (see Day, 1964). These have not proven of much use for correlation and age determination as yet. As the top of the formation is less than 500 feet stratigraphically below the Aptian Roma Formation, in an apparently conformable sequence, an uppermost Jurassic age seems likely. The base of the Blythesdale Formation is arbitrarily taken as the base of the Cretaceous (op.cit.)

BLYTHESDALE FORMATION

Day (1964) established the name Blythesdale Formation, replacing the Blythesdale Braystone of Jack (1895a,b) and discussed at length the many past usages of the name Blythesdale. The Blythesdale Formation includes Reeves (1947) Mooga Sandstone and Transition Stage or Series, and Day's friable marine sandstone, the Minmi Member, of ROMA. Hence it is only the upper part of Whitehouse's (1954) Blythesdale Group. Day designated the type area as near the intersection of Blyth Creek and Twelve Mile Creek on ROMA.

The unit crops out on ROMA and MITCHELL and extends north across EDDYSTONE on to AUGATHELLA and probably TAMBO. On EDDYSTONE it forms a north-north-west trending belt to the west of Winneba and Bogarella Homesteads, and also in a small area west of Hidden Springs Homestead. The topography is largely dissected plateaux with steep scarps; in many places these have lateritized tops, or are covered with lateritized Tertiary sediments. Bedding trends are obscure, and the bedding is nearly flat, except near the base of the unit where some cuestas are produced. General heavy scrub cover gives a dark photo tone. However, near the top of the unit where the topography is fairly flat, and near the base, there is light eucalypt cover and a light grey photo tone.

The dominant rock type is white, coarse grained, in places pebbly and/or clayey, sublabile sandstone. The sandstone, overall, is fine to coarse grained, and is generally medium to thick bedded and strongly crossbedded. Clayey lithic fragments are common. Mica is a very minor constituent, where present. Much of the clay matrix is probably derived from secondary breakdown of feldspar. Some worm tubes.are formed in the sandstone.

Conglomerate is widespread. It contains, generally, pebbles of quartz, porphyritic and rhyolitic acid volcanics, chert, sediments and, less commonly, fossil wood, in a white sandstone matrix. The unit contains some beds of white clayey siltstone and claystone.

The measured sections (Enclosure 3) show detailed lithologies. These are very uniform and no meaningful members could be established.

Thin sections of six sandstone specimens from the west of EDDYSTONE, in measured sections E1, E2 and E3 (Enclosure 3), were examined. They are remarkably uniform, clayey, even grained, sublabile sandstone containing subangular clasts and considerable pore space. The quartz and quartzite content varies between 40 and 60%, the feldspar content between 5 and 10%, and the clasts of fine-grained sediments between 2 and 15%. Iron ore is ubiquitous but minor and very minor mica, zircon and/or tourmaline are present in some sections.

Near the tops of hills the sediments are commonly ferruginized, mottled or leached as a result of Tertiary lateritization, and are very had to distinguish from lateritized Tertiary sediments.

The unit is apparently conformable with the overlying Roma Formation and the underlying Orallo Formation. The contact with the Roma Formation is usually obscured by Tertiary material, but the typical rolling downs topography, and the siltstone and mudstone outcrop of the Roma Formation, are very different from the topography and lithology of the Blythesdale Formation.

The thick crossbedded units and coarse sediments suggest a shallow water high energy environment of deposition - probably fluviatile. Crossbedding directions vary widely, giving no clue to the source area These sediments were probably largely derived from a pre-existing sandstone and conglomerate unit. The unit is a good aquifer.

Thickness estimates are only approximate as dips are very shallow and variable, lateritized areas are extensive and the outcrop area is wide. An average thickness of about 400 feet is indicated, somewhat less than the 500 to 550 feet in the type area (Day, 1964).

The uppermost member of the type area, the marine Minmi Member of Aptian age, does not crop out on EDDYSTONE. No identifiable plants were found, and assemblages elsewhere (op.cit.) give no precise evidence of age. Probably the uppermost Blythesdale Formation in this area, is of Cretaceous age. Microfloral analysis (A.A.O., 1961) suggests an Upper Jurassic age for the base of the formation. As no evidence of the exact boundary is available Day has arbitrarily taken the base of the Blythesdale Formation as the base of the Cretaceous.

ROMA FORMATION

The history of this unit is given in Smith et al. (1958). It was named the Roma Series by Whitehouse (1926), after the town of that name. Whitehouse (1955) renamed it the Roma Formation and designated its type area as "the banks of Bungeworgorai Creek just north and south of the railway line". Day (1964) considers these sediments to be about 150 feet stratigraphically above the base of the formation.

The unit crops out through much of the Great Artesian Basin. It covers a few square miles in the extreme south-west of EDDYSTONE, where it is commonly overlain by lateritized Tertiary sediments. It forms low black soil plains with very poor outcrop and the typical "rolling downs"

topography, well grassed with very few trees, except where sand and gravel cover from the Tertiary, or along streams, allows dense scrub to develop. Bedding trends are not discernible, and the unit has a light photo tone.

The formation consists largely of soft grey laminated siltstone and shale, which weather to a yellow-brown colour. It also includes thin bedded, fine grained, hard, in places nodular, calcareous sediments, and soft, khaki, probably lithic sandstone. Thin ironstone beds probably represent originally calcareous material.

The unit is apparently conformable with the underlying Blythesdale Formation and there is a sharp change in rock type at the boundary. The contact with the overlying Tambo Formation is not present on EDDYSTONE. Heavily lateritized Tertiary sediments unconformably overlie the Roma Formation. A strongly leached, structureless, white clayey rock below the coarser Tertiary sediments may be an altered Roma Formation lithology.

The fine grain size and thin bedding of the unit indicate deposition in moderately quiet water; abundant shelly fossils found elsewhere indicate marine conditions.

There are no more than a couple of hundred feet of section in the Roma Formation on EDDYSTONE.

An Aptian age for the formation is based on its abundant marine fauna (see Day, 1964) but no fossils have been found on this Sheet.

TERTIARY SEDIMENTS

The Tertiary sediment usually crop out as flat cappings, mostly in the west and south-west of the Sheet. They are generally lateritized, are typically structureless and show ferruginized, leached, and sometimes mottled zones. The outcrops generally have a light grey photo tone and sparse scrub cover, but where they are being eroded they may have dense scrub cover.

The low scarp two miles north of Booka Homestead, immediately east of the road, shows a typical section. At the scarp base is friable quartz-rich sandstone, granular in places, and conglomerate, grading upwards into laterite. Pebbles are quartz and ferruginized and silicified sediments. Immediately above this is a 5 foot thick leached zone, than 5 feet of mottled zone, and then 10 feet of ferruginized zone. Above is a red soil platform with red ferruginous pellets.

The Tertiary is readily distinguished a lithology where it overlies the Roma Formation, but it is not everywhere recognizable where it overlies the friable sandstone and conglomerate of the lowermost Cretaceous and the Upper Jurassic units. In unlateritized sediments the crossbedding, the presence of plant fragments, the lack of marine fossils and the coarse grainsize of the sediments points to fluviatile deposition.

Tertiary lateritization affected the porous Cretaceous sediments exposed at that time, and remnants of this material still remain. Only definitely Tertiary sediments have been shown as such on the map, but many other lateritic outcrops are probably Tertiary sediments too. Without visiting every outcrop, interpretation is very difficult.

The thickness of the Tertiary sediments is generally less than 100 feet.

REFERENCES

ASSOCIATED AUSTRALIAN OILDIFLEDS N.L., 1961 - Footnote 3; in Eumamurrin (North Roma) Seismic Survey, Queensland. 1959-1960. Bur.Min. Resour.Aust.Petrol Search Subs. Acts. Publ., 27.

DAY, R.W., 1964 - Stratigraphy of the Roma-Wallumbilla area. Publ. geol.Surv.Qld, 318.

JACK, R.L., 1895a - Artesian Water im the Western Interior of Queensland. Bull. geol.Surv.Qld, 1.

JACK, R.L., 1895b - Report of the Government Geologist In Annual progress report of the Geological Survey for the year 1894. Publ. geol.Surv.Qld, 103.

JENSEN, H.I., 1960 - Geology and oil indications of the Roma district. Qld Geogr.J., 60, 13-20.

REEVES, F., 1947 - Geology of Roma district, Queensland, Australia. Bull.Amer.Assoc. Petrol.Geol., 34, 1341-1371.

SMITH, E.M., 1958 - Queensland. Lexique Stratigraphique International 6(5a). 20th Int.Geol.Congr.Mexico.Strat.Comm.

WHITEHOUSE, F.W., 1926 - The Cretaceous Ammonoidea of Eastern Australia. Mem.Qld.Mus.,8(3), 195-242.

WHITEHOUSE, F.W., 1954 - The geology of the Queensland portion of the Great Artesian Basin. Appendix G to "Artesian water supplies in Queensland". Dept. Co-ord.Gen.Public Works Qld.

Appendix 2

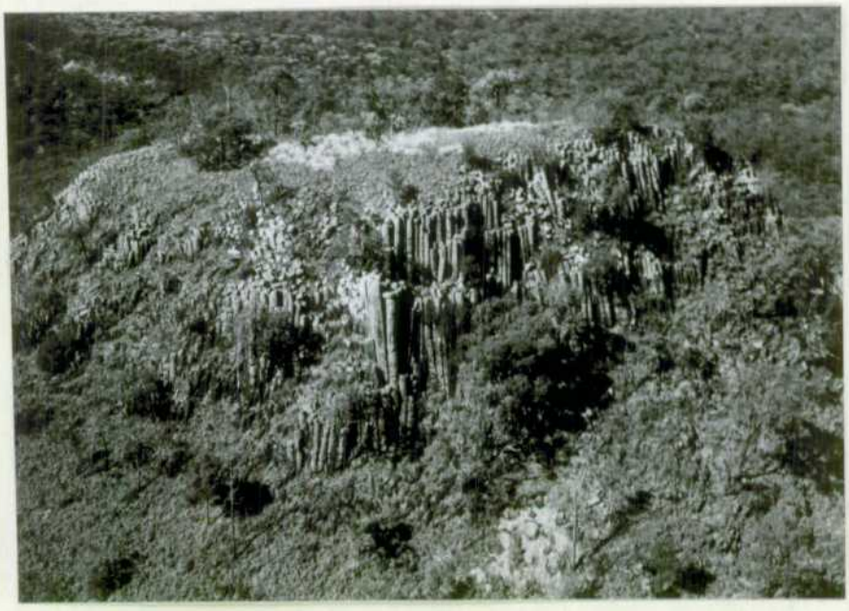
Photographs of Geological Features

Cliffs of Precipice Sandstone in Carnarvon Gorge, Eddystone Sheet area; aerial view, looking east (neg.no. G/7612).

Natural arch in Precipice Sandstone, four miles north-west of Mount Moffatt Homestead, Eddystone Sheet area. (neg.no. G/7613).

Black stain on cliffs of Precipice Sandstone in Carnarvon Gorge, about 4 miles from the mouth of the gorge. The stain is reputed to be an oil seep; an analysis for hydrocarbons of samples collected in 1964 was inconclusive (neg.no. G/7710).

Permian rocks in Reids Dome, a culmination on the Serocold Anticline, Springsure and Eddystone Sheet areas; aerial view looking south (neg. no. G/7611).



Aerial view of well-exposed columnar basalt at the summit of a probable Tertiary plug forming Mount Clift, Eddystone Sheet area. Columns are commonly hexagonal in section, two to three feet across, and over 30 feet long. (neg.no. G/7614).

Appendix 3

Notes to explain Enclosures 2 and 4 to 10.

This appendix briefly explains Enclosures 2,4,5,6,7,8,9, and 10, which are primarily intended for publication (Mollan, Jensen, Forbes, Exon, and Gregory, in preparation). The enclosures are more detailed descriptions of the Triassic and Jurassic sequences briefly described in the main text of this record. Three of the enclosures show information obtained from the Taroom and Mundubbra Sheet areas during the 1963 and 1964 field seasons.

Enclosure 2

A reference for symbols and abbreviations used in columnar measured sections and shallow drill hole logs presented in this Record.

Enclosure 4

A measured section in the type area of the Triassic Moolayember Formation. This section has been nominated as the type section of the formation (Mollan et.al., in preparation).

Enclosure 5

A lithological drill hole log of the Westgrove Ironstone Member from B.M.R. 46 and B.M.R. 54. This section was nominated as the type section of the member in the formal submission of the name "Westgrove Ironstone Member", which was approved by the Queensland Stratigraphic Nomenclature Committee in 1965.

Enclosure 6

A correlation of selected measured sections and shallow drill hole sections in the Lower Jurassic sequence in the Eddystone, Taroom, and Mundubbra Sheet areas. A threefold subdivision of the Boxvale Sandstone Member is shown.

Enclosure 7

This enclosure presents lithological logs of shallow drill holes, B.M.R. 47 and B.M.R. 48, which penetrated the bottom and top parts of the Middle Jurassic Injune Creek Beds. The enclosure illustrates in detail the lithologies present in the poorly outcropping unit.

Enclosures 8, 9, and 10

These enclosures are photo-scale compilation sheets covering the main area of outcrop of the Lower Jurassic formations in the Eddystone Sheet area. A threefold subdivision of the Boxvale Sandstone Member, not shown in the Eddystone 1:250,000 Sheet is shown in these enclosures. The threefold subdivision is the same as that shown in Enclosure 6 where the lithologies of the three divisions are described.

EDDYSTONE

QUEENSLAND

AUSTRALIA 1:250,000

1:250,000 GEOLOGICAL SERIES SHEET SG 55-7

PRELIMINARY EDITION, 1965

SUBJECT TO AMENDMENT

Reference

Era	Period	Unit	Symbol	Description
CAINOZOIC	QUATERNARY		Cz	Thick residual soil, billy boulder gravel
			Qa	Alluvium
	TERTIARY			Laterite
			Ta	Pebbly quartzose sandstone
			Tb	Basaltic flows
		Tabor Gabbro	Tt	Olivine gabbro sill and stocks
MESOZOIC	LOWER CRETACEOUS	Roma Formation	Klr	Siltstone, sublabile sandstone, shale
		Blythesdale Formation	Klb	Quartzose and sublabile sandstone, pebbly in part, minor siltstone
	UPPER JURASSIC	Orallo Formation	Juo	Siltstone, mudstone, quartzose sandstone, minor limestone
		Gubberamunda Sandstone	Jug	Quartzose and sublabile sandstone, pebbly in part
	MIDDLE JURASSIC	Injune Creek Beds	Jmi	Lithic sandstone, calcareous in part, quartzose sandstone, siltstone, shale, coal seams
	LOWER JURASSIC	Hutton Sandstone	Jlh	Quartzose and sublabile sandstone
		Westgrove Ironstone Member	Jlw	Concretionary ironstone, oolitic in places, mudstone; includes at top some Jle (not separated on map)
		Boxvale Sandstone Member	Jlb	Quartzose sandstone, commonly micaceous, minor siltstone, and coal
		Evergreen Formation	Jle	Labile and sublabile sandstone, carbonaceous shale, minor coal
		Precipice Sandstone	Jlp	Cross-bedded pebbly quartzose sandstone
	PRE-JURASSIC		pJs	Ferruginous and calcareous sediments
	TRIASSIC	Moolayember Formation	Rm	Labile sandstone, calcareous in part, siltstone, shale
		Clematis Sandstone	Re	Cross-bedded pebbly quartzose sandstone, red silty mudstone
		Rewan Formation	Rr	Red and green silty mudstone, green sublabile sandstone
		Brumby Sandstone Member	Rb	Pebbly labile and sublabile sandstones
PALAEOZOIC	UPPER PERMIAN	Blackwater Group	Puw	Green feldspatho-lithic sandstone, siltstone, shale, coal seams
		Back Creek Group: Black Alley Shale	Puc	Dark shale, claystone, tuff
		Back Creek Group: Peawaddy Formation	Pup	Carbonaceous sandy shale, siltstone, feldspatho-lithic sandstone in top part
	LOWER PERMIAN	Back Creek Group: Ingelara Formation	Pli	Sandy siltstone with pebbles and granules, shelly calcareous concretions
	LOWER PALAEOZOIC		Pzr	Gabbro, and ultrabasic plutonic rocks

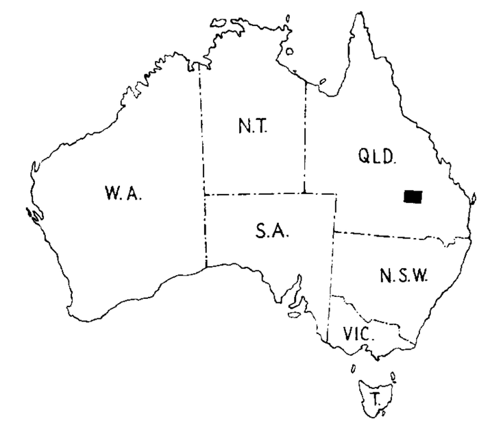
Geological boundary
Anticline
Syncline
Plunge of fold axis
Fault (D, U indicate relative movement down, up)
Where location of boundaries, folds and faults is approximate, line is broken; where inferred, queried; where concealed, boundaries and folds are dotted, faults are shown by short dashes
Strike and dip of strata
Horizontal strata
Dip < 5° } *air-photo interpretation*
Dip 5°-15°
Dip 15°-45°
Horizontal strata
Trend lines
Joint pattern
Macrofossil locality (ED 675 - reference number)
Vertebrate fossil locality
Plant fossil locality
Fossil wood locality
Basalt dyke
Basalt plug
Prospect: little production asbestos-amphibole
Outcrop: C-coal, Ol-oil-shale
Measured section

Dry oil well - abandoned
Gas well
Abandoned well with show of gas
B.M.R.50 *Shallow stratigraphic drill hole*

Bore
Artesian bore, flowing } *Where circle is broken, position is approximate*
Subartesian bore
Abandoned bore
- I.W.S. registered waterbore number
- Waterbore reference number
Windpump
Earth tank
Earth dam
Spring
Swamp

Road
Vehicle track
Landing ground
Homestead
Building
Yard
Height in feet - instrument levelled } *datum: mean sea level*
Height in feet - barometric
Air-photo centre point - run/number

Compiled and issued by the Bureau of Mineral Resources, Geology and Geophysics, Department of National Development, in conjunction with the Geological Survey of Queensland. Base map compiled by the Division of National Mapping, Department of National Development. Aerial photography by Adastra Airways Pty. Ltd.; complete vertical coverage at 1:85,000 scale. Transverse Mercator Projection.



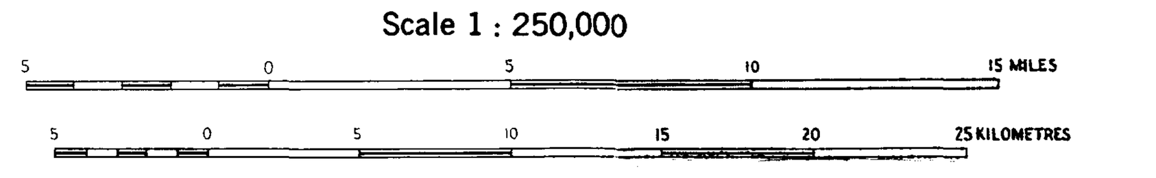
INDEX TO ADJOINING SHEETS

Showing Magnetic Declination

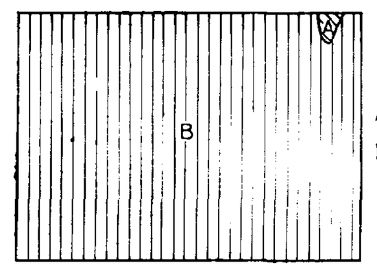
LONGREACH SF 55-13	JERICHO SF 55-14	EMERALD SF 55-15	DUARINGA SF 55-16	ROCKHAMPTON SF 56-13
BLACKALL SG 55-1	TAMBO SG 55-2	SPRINGSURE SG 55-3	BARALABA SG 55-4	MONTO SG 56-1
ADAVALE SG 55-5	AUGATHELLA SG 55-6	EDDYSTONE SG 55-7	TAROOM SG 55-8	MUNDUBBERA SG 56-5
QUILPIE SG 55-9	CHARLEVILLE SG 55-10	MITCHELL SG 55-11	ROMA SG 55-12	CHINCHILLA SG 56-9
TOOMPINE SG 55-13	WYANDRA SG 55-14	HOMEBOIN SG 55-15	SURAT SG 55-16	DALBY SG 56-13

ANNUAL CHANGE 3'00" E

Scale 1 : 250,000



GEOLOGICAL RELIABILITY DIAGRAM



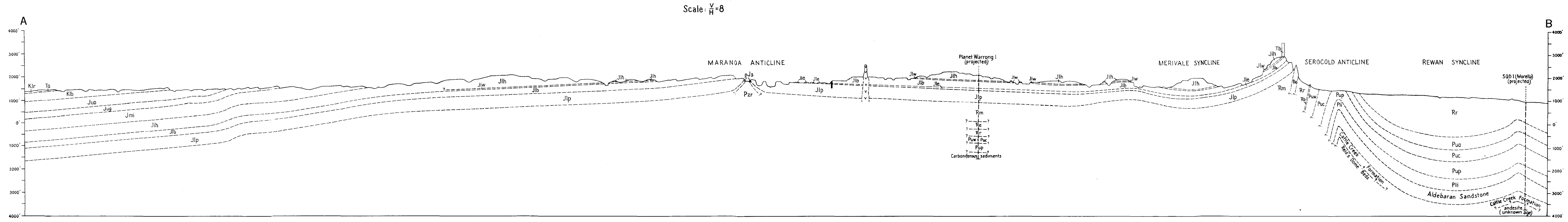
A Detailed mapping
B Detailed reconnaissance

Geology and compilation, 1964, by: R.G. Mollan, N.F. Exon, (B.M.R.), and V.R. Forbes, (G.S.Q.)
Drawn by: E.H.J. Feeken

Section

(Cz and Qa omitted)

Scale: $\frac{V}{H}=8$



EDDYSTONE

SHEET SG 55-7

ENCLOSURE 2

REFERENCE FOR COLUMNAR MEASURED SECTIONS AND LOGS OF SHALLOW DRILL HOLES

sandstone — grain size (mm)

v.f.	very fine	0·06 – 0·12
f.	fine	0·12 – 0·25
m.	medium	0·25 – 1·00
c.	coarse	1·00 – 2·00

quartzose sandstone > 90% clasts of quartz
sublabile (feldspathic, lithic) 75-90% clasts of quartz
labile (feldspathic, lithic) < 75% clasts of quartz

conglomerate

	granule	2·0 – 4·0
	pebble	4·0 – 64·0
	cobble	64·0 – 256
	boulder	> 256

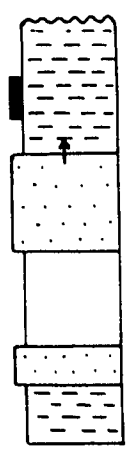
shale
mudstone
claystone
siltstone
coal
limestone
tuff
calcareous lens/bed

Bedding Structure

	very thick	> 40 inches
	thick	12 – 40 inches
	medium	4 – 12 inches
	thin	0·4 – 4 inches
	laminate	< 0·4 inches
	cross-bedded	
	cross-laminated	
	festoon bedded	
	graded bedded	
	undulate	
	slumped	
	scour and fill	
	ripple marks - oscillatory	
	ripple marks - current	
	fluting	
	load cast	
	trails	
	burrows	

Other Symbols

- ferruginous concretion
- calcareous "
- oolitic or pellotal ironstone
- shelly fossil
- plant fossil
- fossil wood
- palynological sample



Abbreviations

a abv	as above
a blw	as below
arg	argillaceous
blk	black
bldrs	boulders
bnded	banded
c	coarse
c/	with
calc	calcareous
carb	carbonaceous
cgt	conglomerate
cham	chamosite (ic)
choc	chocolate
cl, cln	clean
cly	clay (ey)
col	colour (ed)
concret	concretions (ary)
crm	cream
drk + dk	dark
ev + evn	even
f	fine
fe	ferruginous
feld	feldspar (athic)
fe-st	ironstone
flgy	flaggy
gn, grn	green
gr	grained
gran	granules
grns	grains
gy, gry	gray
hd	hard
hm	heavy minerals
lab	labile
lt	light
m	medium
mi, mic	micaceous
mudst, mdst	mudstone
o/c	outcrop
ool	oolite (itic)
pk	pink
p srtd	poorly sorted
purp	purple
Q, qose	quartzose
Qtz	quartz
rf	rock fragments
sft	soft
sh	shale
si, sil	siliceous
siltst	siltstone
slty	silty
srtd	sorted
ss, sst	sandstone
stnd	stained
sublab, subl	sublabile
vp	very poor
v thin	very thin
wh	white
w srtd	well sorted

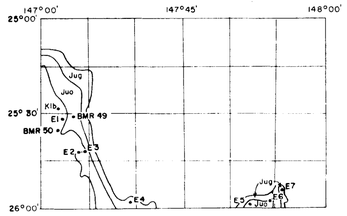
Bureau of Mineral Resources, Geology and Geophysics, May 1965. To accompany Record 1965/98 G55/17/6

Enclosure 3

CORRELATION CHART OF MEASURED SECTIONS & SHALLOW DRILL HOLES IN UPPER JURASSIC AND CRETACEOUS SEDIMENTS, EDDYSTONE SHEET AREA

Sections measured by N.F. Exon and V.R. Forbes using anaeroid barometer
Lithological samples e.g. Ed 351B, examined in thin section

LOCALITY SKETCH



BLYTHESDALE FORMATION

ORALLO FORMATION

GUBBERAMUNDA SANDSTONE

950' 900' 850' 800' 750' 700' 650' 600' 550' 500' 450' 400' 350' 300' 250' 200' 150' 100' 50' 0'

Section E1

Flat hill top - red brn soil

Ed 522 — m — Ferruginised, mottled. No bedding apparent. Some quartz pebble bands

v-f, f-m, f-c — White and purple, ferruginised clayst, siltst., sst

f-m, f-c — White and purple, ferruginised sst. & clay clasts ≐ to SW. Iron stained f. to pebbly. Pebbles quartz, some chert. ≐ variable, often to SW.

Sand, sst, and conglom scree slope

f — Friable brown soil platform. Minor white sst

fe, m-c — Felds, sublabile sst, 'grit' and conglom. Pebbles quartz, chert and clayey.

Ed 521B — f, f-m — Poor outcrop white siltst., felds sublabile sst

As below

Ed 521A, Ed 521 — m — Lt. gry felds sublabile & abundant clay clasts. Pebbles, quartz, chert, clayey.

Scree slope

Base of slope

White or ironstained Clayey quartzose sst & feldspar. Lt. gry clayey siltst. and some mudst

Eddystone BMR # 50

m-c, f-m, m-c, v-f — White quartz sand & felds, black chert, v. minor pink mineral. Grains subangular

Grey, often carb, mic siltst and silty mudst

Core: Rec 100%, dip 5° max ≐ dip 20° Grey carb mic clayey siltst. Some brn coarser lenses - harder, ? silic. Minor v.f. clayey ≡ lenses & pale grn. ? glauconite, felds. Microfoults, much contemporaneous slumping. Some clayey grey mudst

Grey siltst. and dk. gry sl. carb. silty mudst

Calc — Trace coal 2' above v. hard thin calc bed

v-f — Soft, grey quartzose sst & biotite, musc, felds.

Dk grey sl. carb. silty mudst. and minor grey siltst.

Soft grey quartzose sst. & felds, biotite, musc

Eddystone BMR # 49

vf-m — Weathered brn. often ironstained clayey sst. Quartz and ferruginised pebbles and granules

Dk. gry. mic., carb. silty mudst. Lt. gry siltst. and v.f. clayey quartzose sst.

Calc

Dk. gry. carb. siltst. and mudst

Calc — V.f. soft, off white quartzose sst. Some musc., biotite

Dk. gry carb., siltst. and mudst

Core: Rec 80% dip 5° Off white, quartz rich carb siltst. & mica. Sometimes clay matrix. Dark biotite, carb layers in ≐

Lt. gry quartz rich, carb mic siltst. Some dk. gry. mic. carb siltst. and silty mudst

v-f, f, f-m — White to lt. gry quartzose to feldspathic sublabile sst. & clay matrix, musc. soft green ? glauconite. Derived sand. Some dk. gry. siltst.

Section E2

Hill top

Ed 430 — f-c — Sst, siltst, clayst. Sst leached, quartz rich

Pebbly sst and conglom. Pebbles quartz, minor acid volcs, seds. Clay, ? felds. matrix.

f-c — White, often ferruginised. Jagged weathering

f — Siltst, clayst As below

f — Ferruginised and leached sst. Some feldspar. Siltst and white clayst.

f — Ferruginised sst and minor silty bands.

Purple and white.

f — Mottled, leached. Some clay matrix. Jagged weathering.

f — Ironstained interbedded siltst and felds. sst. No r.f. Jagged weathering

m-c — White felds., no r.f. High angle ≐ generally to S or SW

f-c — Soft. As below

Purple

f-c — White, felds., no r.f. Minor quartz pebbles

Ed 429D — Conglom pebbles, quartz, acid volcs, some seds. Matrix clayey, felds, sublabile.

m-c — White clayey, some felds, no lithics. Pebble bands contain acid volcs., quartz some f.gr. sediments.

Scree slope

Ed 429B — m — White, felds. V. minor r.f. ≐ to NW sublabile

Ed 429A — f — Soft, white, quartzose. Plant frags.

Ed 429 — f — Ironstone and ferruginised sst. Soft white clayey (? feldspathic)

Base of hill

Section E3

Hill top

Ed 428 — m — White, sublabile. High angle ≐

Ed 427C — m — Buff, felds, sublabile (quartz rich) Contorted clayst. lenses and clay pellets. Low angle ≐

Ed 427B — Scree slope

f-m — White quartzose. Some feldspar

Scree slope

Ed 427 — Sublabile sst. Pebbles are quartz, chert, minor sst. Brown

Scree

Section E4

Hill top

Gentle slope. Strongly ferruginised material - ? sst

Ed 488 — m — As below. Silty sst. minor

m — Ferruginised, clayey, ? feldspathic. Some sandy siltst. - 'chunky' weathering. Small pebbles in thin bands.

f-m — Ferruginised, ? felds. Some granules

c — Conglom and pebbly sst. Angular pebbles quartz, chert, fe. seds. Clayey sst. matrix.

As below, some large quartz and chert pebbles.

m — As below. Also quartz granules and small pebbles

m — Heavily ferruginised, uneven gr. felds. sublabile.

f-m — "Chunky" weathering, ironstained, felds, sublabile.

f-c — White, clayey felds. sublabile. Some clay clasts ≐ to S.

Ed 487E — White, coarse to pebbly, clayey felds sublabile

Ed 487D — f-m — White, v. soft, felds clayey labile. Minor clayst. Extensive irregular scalloped surface (amplitude some feet)

m — White, v. soft, clayey, felds sublabile. V. minor dark frags. Clay clasts ≐ to S

m-c — White, soft, clayey felds sublabile. V. minor dark frags. Some f.gr. partings ≐ to S

Ed 487A, Ed 487 — No outcrop. Injune Ck beds < 50' below

Section E5

Flat hill top

Ed 352/2 — f-c — fe. Lateritic leaching and ironstaining

As below

Ed 352E — White clayst

Ed 352C — f-c — White-gry., quartzose, some pebbles. Even bedded ≐ to S

fe — Hard, ferruginised.

Scree slope

Ed 352B — f — White, quartzose. Fairly hard. Some sublabile

f — Soft, white, quartzose.

Scree slope

m — V. soft, sublabile. Felds and r.f.

No outcrop

Section E6

Base of 150' Tertiary basalt

Ed 351/2 — Basalt scree

Sporadic outcrop, f-m quartzose sst. Largely basalt scree

f — Quartzose sst. Lt. buff siltst.

f — White quartzose. Minor felds and mi. ≐ to SE and S.

Ed 351G — Poor outcrop, greenish gry. ≡ siltst. and buff sst.

v-f — Buff quartzose, some feld, mi. Some sublabile

Ed 351F — Basalt scree slope.

vf-m — Poor outcrop, brn quartzose.

vf-m — White, felds, ? labile

Ed 351D — White, clayey. Probably feldspathic labile

f-m — White, felds, ? labile. Black r.f. Poorly bedded.

f-m — As below

calc. — f-m — Soft, white, clayey, sublabile to labile

Ed 351B — Largely scree. Buff sublabile clayey v. soft ≡ grey siltst.

f — Pale grn, felds. Dark r.f.

m — Poor outcrop. V. soft, as below

f-m — Sporadic outcrop, deeply weathered. As below

f-m — Poor outcrop, weathered soft grn sublabile. No matrix. Felds and r.f.

Ed 351/1 — No outcrop

Section E7

Plateau top

Ed 675 — Mottled, lateritised

White or yellow-brn, floggy. Conchoidal fract. Clayey porosity. Uneven gr. quartzose, clay matrix. White, floggy, clayst.

m-c — Lt. gry, uneven gr. porous, quartzose. Quartz pebbles. Some clay matrix.

Lt. gry silicified. Sharp contacts.

c — Friable, uneven gr. pebbly quartzose - v. minor matrix.

Uniform silty (?), clayey porosity, low S.G. Concentric ironstaining.

m-c — V. hard, limonitised. Upper contact sharp, lower not. Friable, uneven gr. quartzose, pebbly in places.

m — V. hard, silicified (?), clayey quartzose sst.

Ed 675E — f-m — Mod. well size sorted, quartzose. Little clay matrix.

f-m — Soft, as above, much clay matrix. Clayey porosity.

Ed 676 — f-m — Quartzose, clay matrix.

No outcrop scree. Probable Injune Ck. beds.

Bureau of Mineral Resources, Geology and Geophysics, April 1965

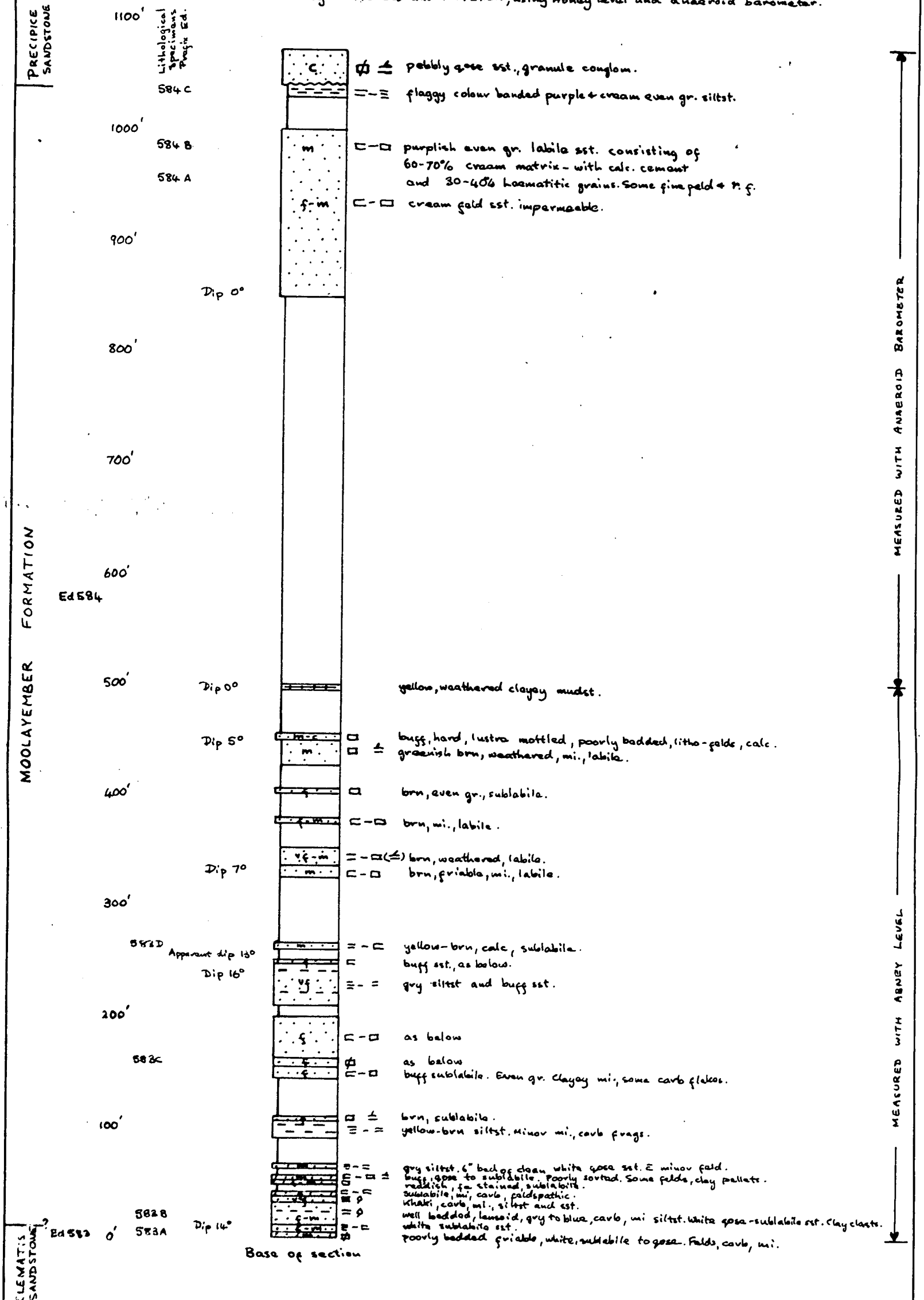
To accompany Record 1965/98

G55/A7/3

ENCLOSURE 4

TYPE SECTION – MOOLAYEMBER FORMATION

Measured across valley of Bullaroo Ck., a tributary of Moolayember Ck., on the Carnarvon Highway 58 miles south of Rolleston (Taroom, Rum 2, Photo 5043)
Measured by V.R. Forbes and N.F. Exon, using Abney level and aneroid barometer.



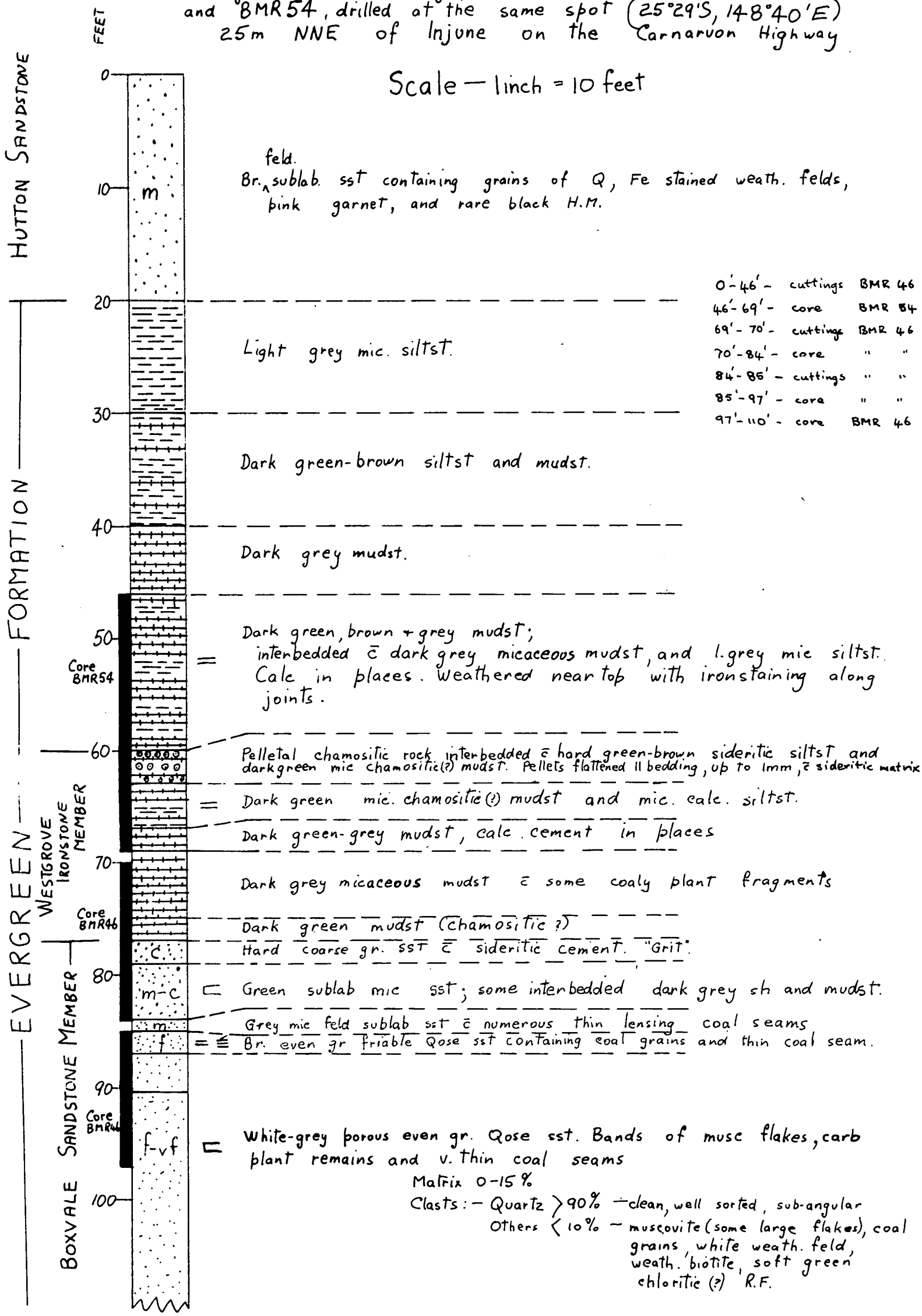
Bureau of Mineral Resources, Geology and Geophysics, May 1965. To accompany Record 1965/98

G55/A7/7

ENCLOSURE 5

TYPE SECTION - WESTGROVE IRONSTONE MEMBER

Lithological logs of stratigraphic drill holes TAROOM BMR46 and BMR54, drilled at the same spot (25°29'S, 148°40'E) 25m NNE of Injune on the Carnarvon Highway



Bureau of Mineral Resources, Geology and Geophysics, May 1965. To accompany Record 1965/98

G55/A7/8

CORRELATION OF SHALLOW DRILL HOLES AND MEASURED SECTIONS IN LOWER JURASSIC FORMATIONS - EDDYSTONE, TAROOM AND MUNDUBBERA 1:250,000 SHEETS

E 8 ..... Eddystone Sheet, section no. 8
TA 23 ..... Taroom Sheet, section no. 23
ED BMR 51 ..... Stratigraphic drill hole, no.51, Eddystone Sheet
TA BMR 46 ..... Stratigraphic drill hole, no.46, Taroom Sheet
MU BMR 29 ..... Stratigraphic drill hole, no. 29, Mundubbera Sheet
T 766 ..... Shelly fossil collection number
T 641 ..... Plant fossil collection number
T 643 ..... Sample for palynological examination
Ab ..... Section measured using Abney Level
Ba ..... Section measured using Aneroid Barometer

For other symbols and abbreviations see Enclosure 2

LOCALITY MAP
Showing locations and lines of sections, and areas of outcrop of Lower Jurassic formations (unshaded)

Note: Exact locations of sections shown on 1:250,000 Sheets

INJUNE CREEK BEDS

HUTTON SANDSTONE Jlh

TA 25
TYPE SECTION HUTTON SANDSTONE
Measured up southern slope of the valley of Hutton Creek 12 mls. E.N.E. of Injune, between points Ed 581 and Ed 582 (Taroom, Run 7, Photo 5106) measured by V.R. Forbes and N.F. Exon with Abney Level

TYPE SECTION
WESTGROVE IRONSTONE MEMBER
Measured by E.R. Burley from cores from drill holes on Cenarvon Highway about 6 mls. south of Roma
TA BMR 40 and 54

WESTGROVE IRONSTONE MEMBER Jlw

TA 24
TYPE SECTION PRECIPICE SANDSTONE, EVERGREEN FORMATION (from to top of Boxvale Sandstone Member)
Measured in a tributary of the Dawson River 2 mls. E.S.E. of Fairview Homestead between points Ed 604 and Ed 603 (Taroom, Run 6, Photo 5127). Measured with Abney Level by R.S. Mollan, V.R. Forbes and N.F. Exon

BOXVALE SANDSTONE MEMBER Jlb

EVERGREEN FORMATION Jle

PRECIPICE SANDSTONE Jlp

MOOLAYEMBER FORMATION Rm

COMPOSITE SECTION FROM FIELD OBSERVATIONS MUNDUBBERA SHEET

DULYMBAH MEMBER Jld

ENCLOSURE 6

VERTICAL SCALE (in FEET)
0 50 100 150 200 250 300 350

Bureau of Mineral Resources, Geology and Geophysics, May 1965 To accompany Record No. 1965/98

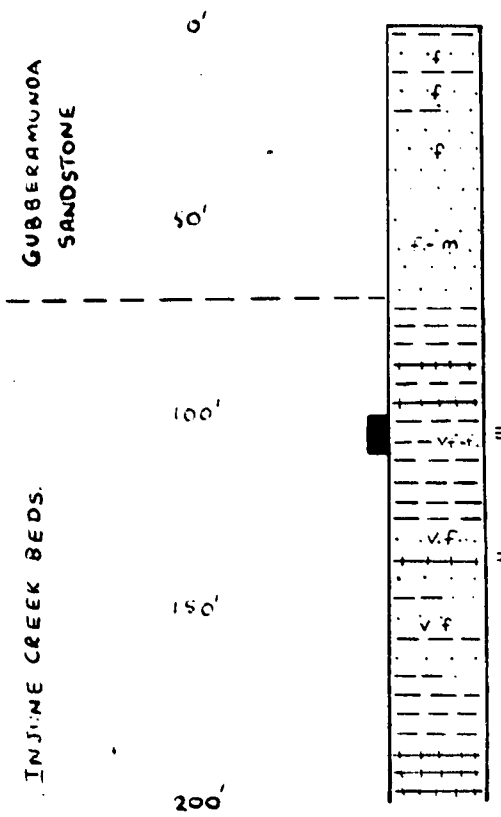
655/1870

ENCLOSURE 7.

LOGS OF SHALLOW DRILL HOLES AT TOP AND BOTTOM OF INJUNE CREEK BEDS.

B.M.R. # 47 on road 6 miles N of "Wombiebank", (Eddystone Run 6 Photo 5131)
B.M.R. # 48 on road 4 miles SE of Tooloombilla, (Eddystone Run 9 Photo 5126)

Eddystone B.M.R. # 48



Weathered brown clayey sst. and siltst.

Quartzose sst as above. Some sand.

Weathered clayey quartzose sst ± feldspar, v.f., biotite

Buff quartz sand as above.

Lt. gry quartz rich siltst ± some mica. Dk. gry. carb, mic. siltst and mudst.

Core - 100-110, Rec 10'6"
Grey, carb, mic. siltst and mudst ± plant fragments. Lt. greenish grey quartzose sst ± v.f. musc. pale green ?glauconite pink euhedral mineral, occasionally clayey. Small scale slumping.
Lt gry. quartz rich siltst and dk-gry. carb mic. siltst.

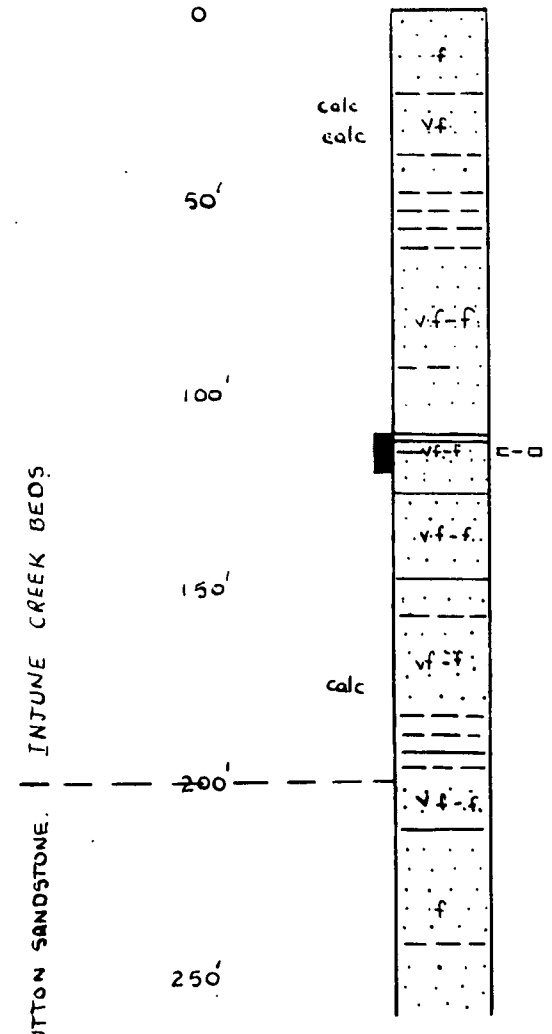
Lt. gry quartzose sst. (cf. core). Dk gry carb mic siltst. and silty mudstone.

Water

Dk. gry carb. puggy silty mudst. More water.

Calcareous and non-calcareous labile sst., siltst, shale v minor limestone, coal probably 500' of section.

Eddystone B.M.R. # 47



Weathered soft, lt. brn. clayey sublabile sst. ± feldspar, black cherty v.f. musc.

Yellow brn. or khaki mudst ± mica, Blue grey sublabile to labile sst and siltst ± felds carb material musc biotite.

Grey siltst ± wood, musc, biotite, black and red nf.

Labile sst. as above.

Core: 110-120'. Rec. 10'
Greenish gry. quartzose to sublabile sst. ± feldspar, black and white v.f. mica occassionally minor clay, v. minor green ?glauconite. Thin grey siltst and shale lenses ± mica, carb material grey shale near top — coal just above core.

Greenish grey sublabile sst. as above. Grey often carb. siltst. and shale.

Lt. grey siltst and shale. Sublabile sst. as above.

White quartzose sst. ± clay matrix, feldspar, minor mica Some carbonaceous. Grey carbonaceous shale and siltst. Some coaly laminae. Water. Minor quartz granules.

White quartzose sst., siltst. and shale and coaly laminae as above.

Bureau of Mineral Resources, Geology and Geophysics, May 1965. To accompany Record 1965/98

PHOTO-SCALE COMPILATION OF THE EASTERN PORTION OF THE NORTH-WEST QUADRANT OF THE EDDYSTONE SHEET

ENCLOSURE 8

SCALE 1 0 1 2 3 4 MILES

"Carnarvon" 28 M

147°45'

25°30'

MOUNT EMILY

BALLY LETHBRIDGE B740

Dooloogarah

MOUNT HOPELESS

B737

"Barngo"

MURPHY TABLELAND

"Binalong"

MOUNT YANALAH

MOUNT PP KING 2646

"Mount Tabor" B747

MOUNT TABOR

MOUNT BULLOCK

"Attica" B38

BMR No. 52

BMR No. 51

MT CLIET

MOUNT OWEN

BENDEE MTN

"Chesterton"

"Derbyshire" B515

Sandy Creek

Bullock Creek

Chesterton Creek

Sandy C

Western Creek

Owen Gully

Borer C

Sleepy Creek

B519

B518

B517

B516

B463

B745

1137

1847

7186

1911

2056

2053

2330

2322

1437

2365

2287

2854

2491

2139

1475

8479

8477

7226

Jlh Jlb Jlp Jlw Jmi Cz Cza Tb Tg Tt E8 E9 E10 E11 E12

PHOTO-SCALE COMPILATION OF THE NORTH-EAST QUADRANT OF THE EDDYSTONE SHEET

ENCLOSURE 9

147°45'

148°30'

25°00'

25°30'

1 0 1 2 3 4 MILES

Mount Moffatt

THE OBSERVATORY

MT MOFFATT

THE CRATER

MT MC LEAY

MT EDEN

Eden Vale

Emu Bends

Mt McLeay

Warrong

Forfar

MOUNT OGILVIE

MT EDDYSTONE

OGILVIE KNOB

Charlies Creek

Parkwales

East Sunrise

Sunrise

Springvale

Glendonald

Myrtleville

MT HOWE

Eglinton

Punchbowl

Charley Creek

MERIVALE RIVER

Ogilvie

Diego Gully

Eglinton Creek

Stockyard

Punchbowl Dam

Rocky

Jmi

30'

147°45'

PHOTO-SCALE COMPILATION OF THE SOUTH CENTRE OF THE EDDYSTONE SHEET

ENCLOSURE 10

SCALE 1:50 0 1 2 3 4 MILES

147° 45' 148°00' 25°30'

"Mt.Owen" 10758
Jlw Jlh Jlb
10757
10756
E19
8475
8474
14508 "Crystalbrook"
Bundara Creek
Colquhoun Gully
14253
"Bedbank"
B398
B397
B366
B903
B902
Rocky
14526
MARANOA RIVER
Simpsons Creek
B374
"Oakvale"
8472
15122
Doyle
Gully 14297
MERIVALE
B910