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1964/26

THE GEOLOGY OF THE BARALABA 1:250,000 SHEET AREA, QUEENSLAND.

by

F.Olgers, A.W.Webb, J.A.J.Smit (B.M.R.)
and B.A.Coxhead.
(Queensland Geological Survey)

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SUMMARY

Outcrop in the Baralaba Sheet area is generally poor due to the soft nature of most of the formations and the extensive oocurrence of Cainozoic deposits. The Clematis and Precipice Sandstones are the only formations to form major topographic features.

The oldest rocks are the Lower Permian Camboon Andesite in the north-east of the Sheet area. They are overlain by an unknown thickness of tightly folded Permian Back Creek Group and Upper Bowen Coal Measures, which crop out only east of the Dawson River.

The Permian rocks are overlain by up to 20,000 feet of Triassic rocks, comprising the Rewan Formation, Clematis Sandstone and Moolayember Formation. The tremendous thickness of sediments, as compared with neighbouring areas, indicates that the south of the Baralaba Sheet area was the locus of the major downwarp in the Bowen Basin.

The whole sedimentary sequence west of the Dawson River has been gently folded. The largest structure is the Mimosa Syncline.

The Jurassic Precipice Sandstone and Evergreen Formation with a total thickness of 700 feet, overlie the older units with marked unconformity.

In recent years, great interest has been shown in the area in connection with the search for oil. Practically the whole area has been covered by seismic surveys, several exploratory wells have been drilled, and a major accumulation of gas has been discovered in the Rolleston Anticline, 7 miles south of Rolleston, in the south-west of the Baralaba Sheet area.

INTRODUCTION

The Baralaba 1:250,000 Sheet area was mapped by a joint Bureau of Mineral Resources - Geological Survey of Queensland Geological party in 1963 as part of a programme to regionally map the Bowen Basin, to assist in the search for oil in Queensland. The party consisted of F. Olgers, A.W. Webb and J.A.J. Smit of the Bureau of Mineral Resources and B.A. Coxhead of the Geological Survey of Queensland. Fieldwork was done between June and October 1963.

The Baralaba Sheet area lies between latitudes 24°S and 25°S and longitudes 148°30'E and 150°E in Central Queensland, 70 miles south-west of Rockhampton. Baralaba, Rolleston , Moura and Woorabinda are the only towns in the area; Woorabinda, 25 miles west of Baralaba, is an aboriginal settlement.

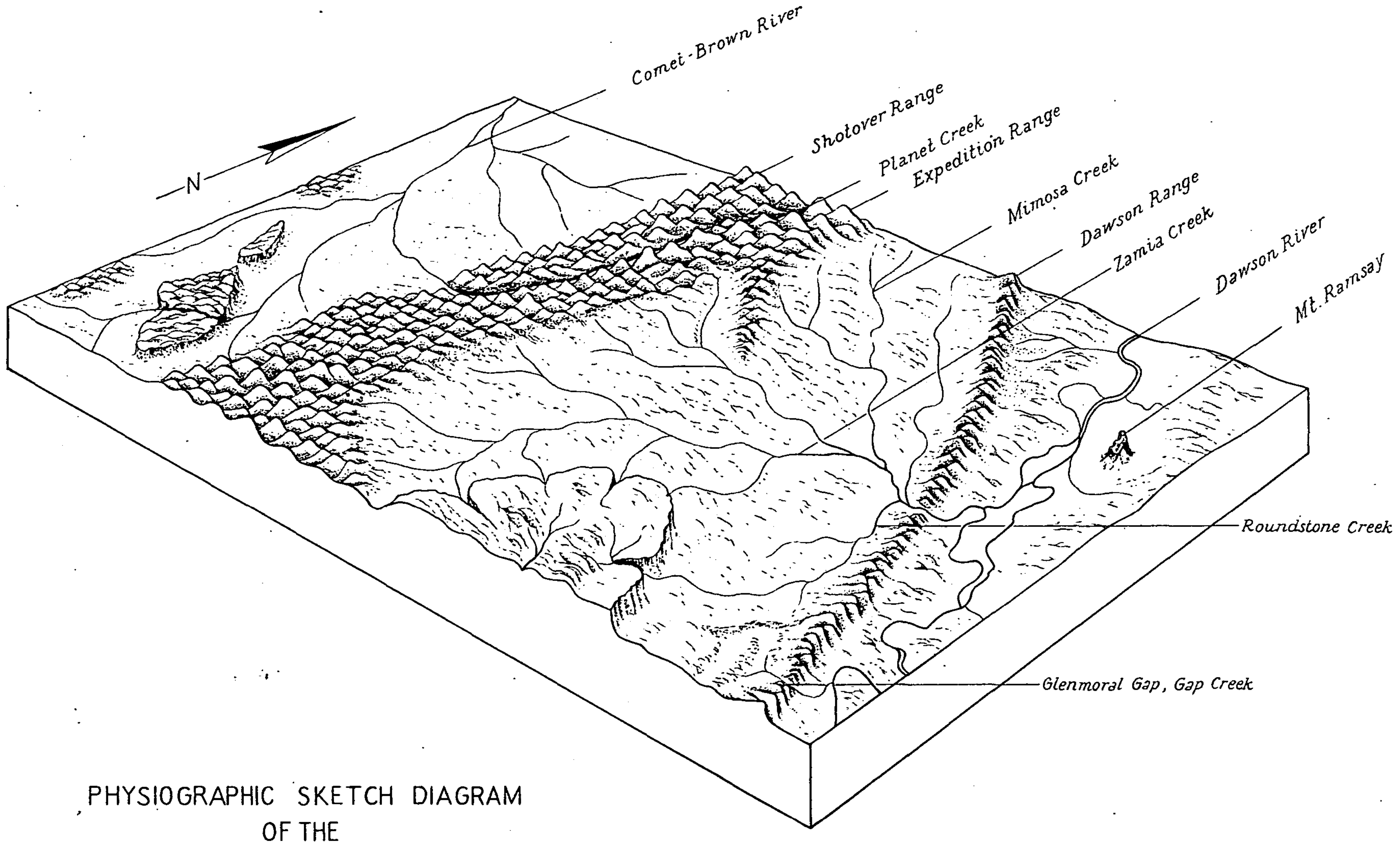
Road access to the area is good. Two main roads cross the Sheet area - the Taroom - Bauhinia Downs - Duaringa road from south to north, and the Moura-Bauhinia Downs-Rolleston road from east to west. Vehicular access within the area in the dry season is reasonable in most places. A railway line extends from Rockhampton through Baralaba and south along the Dawson River to Theodore in the Monto Sheet area. It is used mainly for the transport of coal from the Baralaba Mine and the Moura open-cut and beef cattle to the coast. The nearest commercial airfields are at Rockhampton and Emerald.

The region has a sub-humid climate with an annual rainfall of 20-30 inches, most of which falls during the summer months.

Beef cattle raising is the main industry of the area. The Dawson Valley is extensively used for the growing of crops, mainly wheat and sorghum. Coal mining at Baralaba and timber cutting are also important industries. The whole area is moderately to densely timbered. Brigalow scrub is widespread, but in recent years large areas have been cleared for pasture improvement or agricultural purposes.

The aerial photographs, at a scale of 1:85,000, taken by Adastra Airways Pty Ltd, were used during the survey. A 1:250,000 photo-geological map of the Baralaba Sheet area, and photoscale transparent compilation sheets were prepared before the survey.

FIG. 1



PHYSIOGRAPHIC SKETCH DIAGRAM
OF THE
BARALABA 1:250,000 AREA

G55/A4/1 *Bureau of Mineral Resources, Geology and Geophysics, March 1964*

To accompany Record No. 1964/26

PHYSIOGRAPHY

The Baralaba Sheet area can be subdivided into four topographic units -

a. ranges,

b. tableland,

c. plains,

d. flood plains.

a. The Dawson, Expedition and Shotover Ranges, the main ranges in the area (Fig.1), converge northwards to form the Blackdown Tableland in the south of the Duaringa Sheet area. The Dawson Range, which is in most places not more than one or two miles wide, rises up to 400 feet above the plains. It forms a water shed breached only by Mimosa and Gap Creeks. The rugged Expedition and Shotover Ranges are up to 20 miles wide and are, in many places, impenetrable. The main road crosses the ranges west of Bauhinia Downs Homestead. The highest peak in the Expedition Range is Mount Nicholson, 2524 feet above sea level. The general height is about 1800 feet above sea level, 1000 feet above local base level. The Expedition Range separates the Comet - Brown River drainage basin in the west and the Dawson River - Mimosa Creek drainage basin in the east. Some isolated ranges up to 700 feet above plain level occur south and north-west of Rolleston. Mount Ramsay, a solitary hill in the north-east of the Sheet area, rises sharply 1100 feet above the surrounding plain.

b. A tableland, bounded by precipitous cliffs up to 400 feet high, rises above the plains near the southern boundary of the Baralaba Sheet area. The surface of the tableland is gently undulating except for a few scattered mesas, and it slopes gently southwards into the Taroom Sheet area.

c. Gently rolling plains cover most of the Baralaba Sheet area. Some hills and small scarps occur.

d. Extensive floodplains occur along the Dawson River and the Comet-Brown Rivers.

The whole of the Baralaba Sheet area lies within the Fitzroy River drainage basin. The area east of the Dawson Range is drained by the Dawson River, which flows for most of the year, meandering widely and causing extensive flooding during the wet season. Oxbow lakes and anabranches are common. The plains between the Dawson and Expedition Ranges and a large portion of the southern tableland are drained by a system of creeks of which Mimosa, Zamia, Roundstone and Gap Creeks are the most important. Zamia and Roundstone Creeks join Mimosa Creek which flows through a gap in the Dawson Range 12 miles west of Moura to join the Dawson River. Gap Creek flows through Glenmoral Gap and joins the Dawson River in the south-east corner of the Sheet area. Many of the larger creeks flow for a large part of the year and waterholes are common. The Comet-Brown River System flows in a northerly direction through the western portion of the area. The river courses are in many places poorly defined and extensive flooding takes place during the wet season. A small area of the southern tableland is drained by a south-flowing tributary of Turtle Creek in the Taroom Sheet area.

PREVIOUS INVESTIGATIONS

Geological

The first written report on the Baralaba area was by Daintree (1872) who made reference to coal in the Dawson and other central Queensland rivers. He stated that 'numerous outcrops of coal have been observed in these streams. No commercial use, however, has yet been made of any of them, as the measures generally are too far inland to be made available until the railway system of the country is extended in that direction.'

The first major contribution to the geology of the area was made by Dunstan (1901) who tried to trace the coal-bearing strata of the Dawson Valley northwards to the Central Railway, where it was hoped they could be mined profitably.

Numerous items of geological interest concerning the exploration and development of the area around Baralaba appeared in the Annual Reports of the Queensland Mines Department and the Queensland Government Mining Journals over the period 1902-1924.

Jensen (1926) made a geological reconnaissance of the area between Roma, Springsure, Tambo and Taroom during which he examined the Mesozoic sediments in the southern portion of the Sheet area near Stonecroft and Bedourie Homesteads.

Reid (1939, 1944 and 1945 a,b,& c), after detailed drilling operations, reported on the geology and complicated structure of the coal measures at Baralaba. East (Appendix to Reid, 1945c) summarised the results of diamond drilling in the Baralaba area.

The western part of the Baralaba Sheet area was examined by geologists of Shell (Queensland) Development Pty. Ltd. from 1941 to 1950 as part of a regional survey covering mainly large portions of the Springsure and Emerald 1:250,000 Sheet areas (S.Q.D., 1952).

Tweedale (in Hill and Denmead, 1960, p.281) named and described the Mimosa syncline between the Dawson and Expedition Ranges.

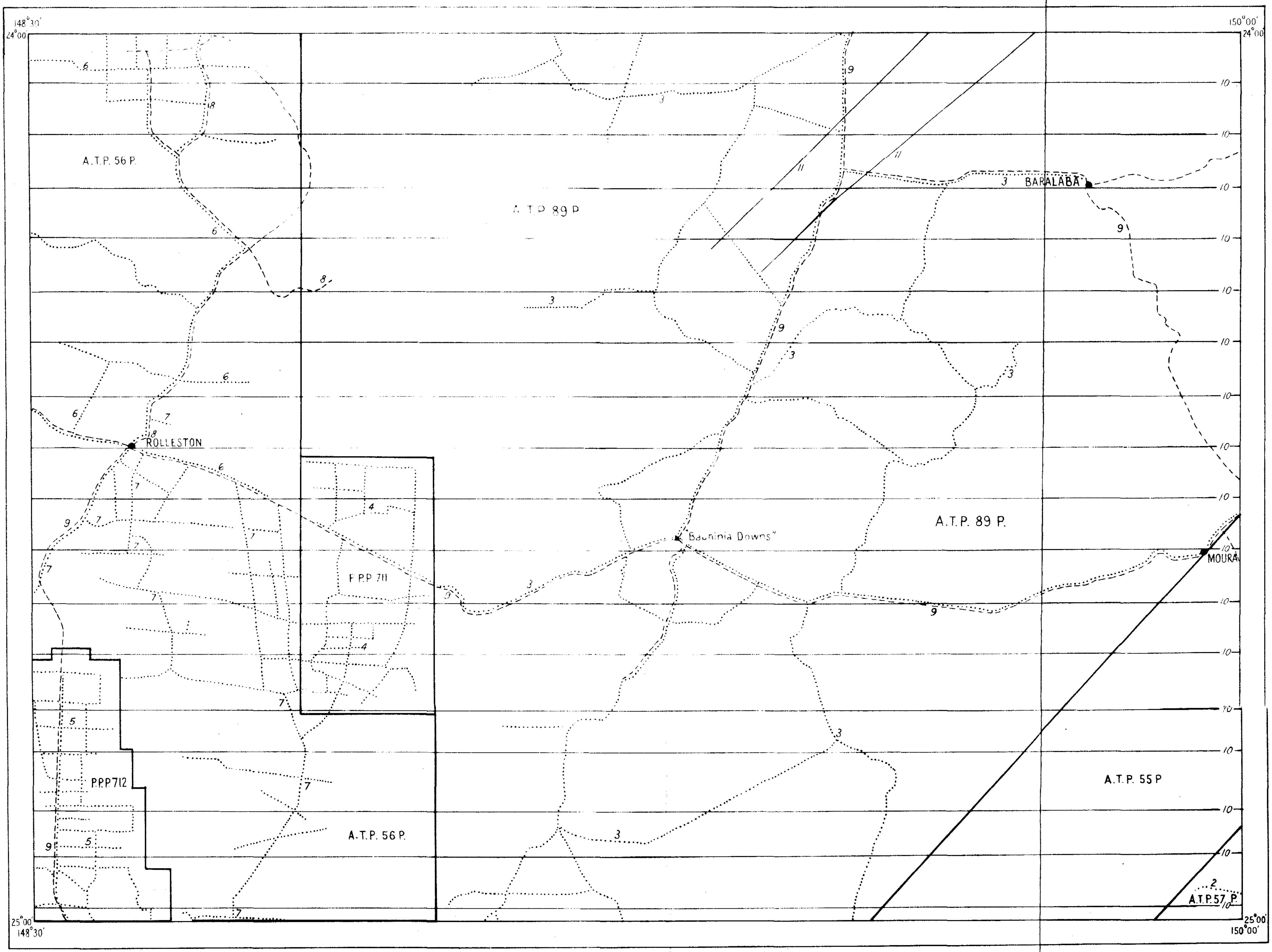
In recent years, several oil company geologists have examined portions of the Baralaba Sheet area, generally as part of more extensive regional surveys.

Geologists of Utah Development Company studied the Upper Bowen Coal Measures throughout the Bowen Basin to locate coking coal deposits suitable for open-cut mining (King, 1963).

BARALABA

PERMIT AREAS AND GEOPHYSICAL TRAVERSES

FIGURE 2



REFERENCE

SEISMIC TRAVERSE LINE

1. Mines Administration Pty. Ltd., 1962
2. Union Oil Development Co., 1962
3. Marathon Petroleum Australia Ltd., 1962
4. Planet Oil Company N.L., 1962
5. Planet Oil Company N.L., 1962 a
6. Mines Administration Pty. Ltd., 1962 a
7. Mines Administration Pty. Ltd., 1963

GRAVITY TRAVERSE LINE

8. Oldham, 1958
9. Warren, 1959

AEROMAGNETIC TRAVERSE LINE

10. Bureau of Mineral Resources, 1962
11. Hartman, 1962

A.T.P. 89 P.	Authority to Prospect No. 89 P.
P.P.P. 711	Petroleum Prospecting Permit No. 711

Scale 1:500,000

10 0 10 20 MILES

To accompany Record 1964/26

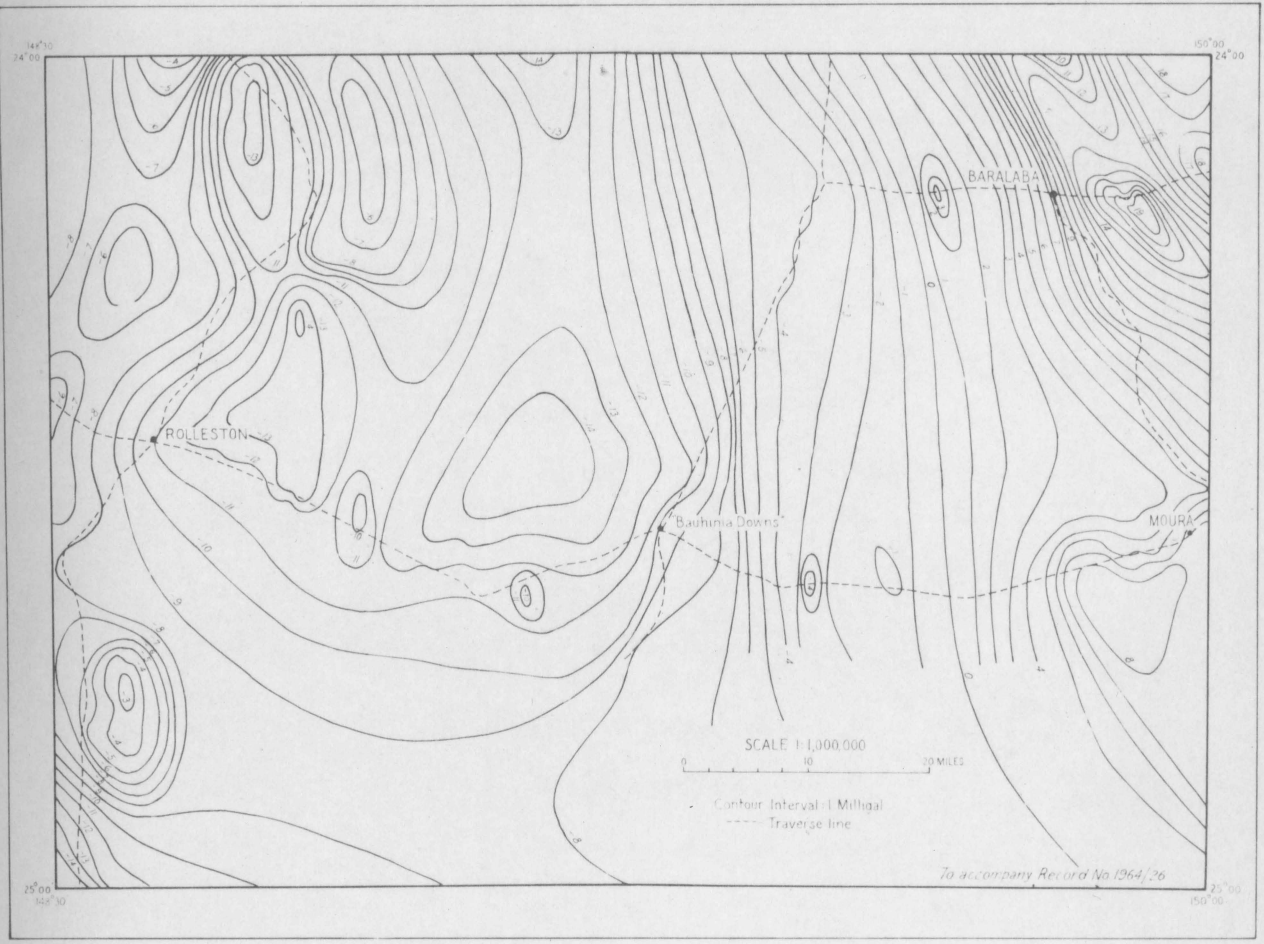
Bureau of Mineral Resources, Geology and Geophysics, March 1964

G55/A4/2

BARALABA

BOUGUER GRAVITY MAP (AFTER WARREN, 1959)

FIGURE 3



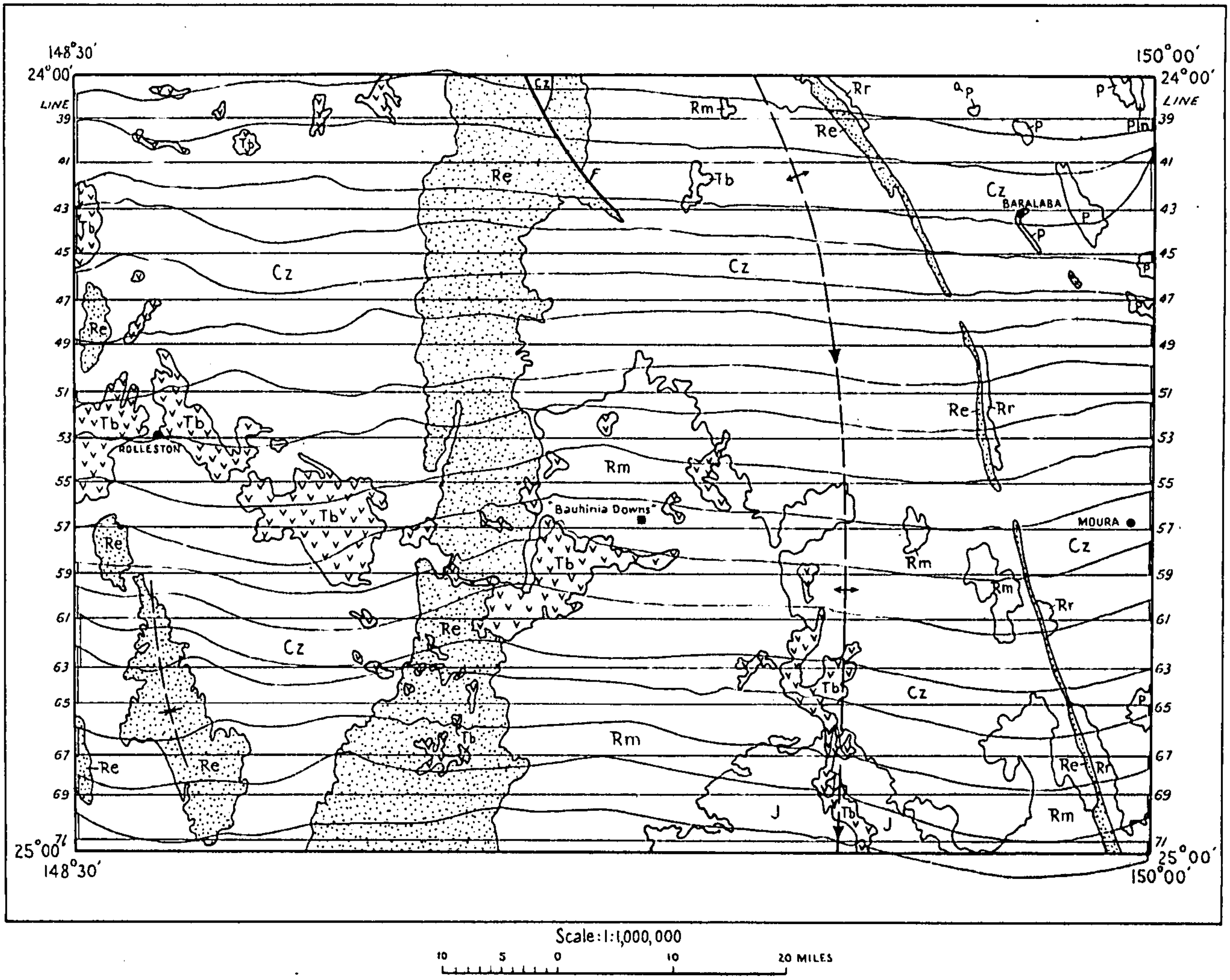
Bureau of Mineral Resources, Geology and Geophysics, March 1964

G55/A4/4

BARALABA

Total magnetic intensity profiles (B.M.R.)

FIGURE 4



Cz	CAINOZOIC DEPOSITS	Re	CLEMATIS SANDSTONE
Tb	TERTIARY BASALT	Rm	MOOLAYEMBER FORMATION
Pln	CAMBOON ANDESITE	J	UNDIFFERENTIATED JURASSIC UNITS
P	UNDIFFERENTIATED PERMIAN SEDIMENTS	x x	INTRUSION
Rr	REWAN FORMATION		

500 gammas
250 *approximate profile scale*
0

synclinal axis

fault

aeromagnetic profile

Bureau of Mineral Resources, Geology and Geophysics, March 1964　*To accompany Record No. 1964/26*　*G55/A4/8*

Geophysical

Much geophysical work has been done in the Baralaba Sheet area in recent years. Some reconnaissance surveys cover the whole of the Sheet area; other more specific surveys cover a particular petroleum prospecting tenement or, as in some cases a single structure. All geophysical traverse lines are shown on Figure 2. Seismic surveys, which cover almost the entire Sheet area west of the Dawson Range, have made the greatest contribution to geological knowledge (Enclosure 3). The results of geophysical work in progress at the end of 1963 in A.T.P.'s 55P, 56P and 89P were not available at the time of writing.

Seismic Seismic surveys were conducted in the following areas:-

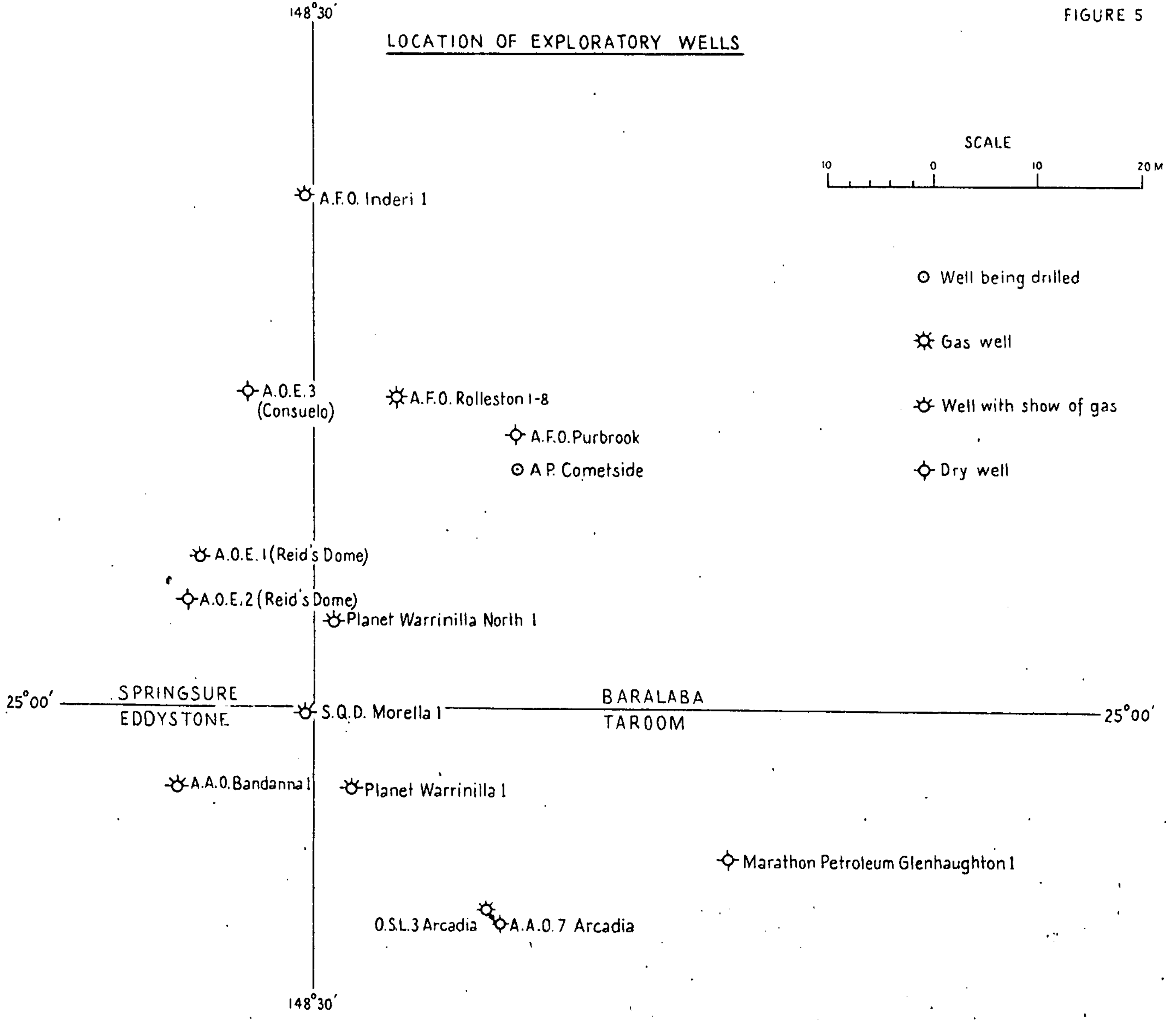
1. Moura - Banana area for Mines Administration Pty. Ltd. (1962) by Austral Geoprospectors Pty.Ltd.
2. Mimosa Syncline, between the Dawson Range and the western limit of the Expedition Range for Marathon Petroleum Australia Ltd. (1962) by United Geophysical.
3. North-west corner of the Sheet area west of the Expedition Range for Mines Administration Pty.Ltd. (1962a) by Geophysical Service International.
4. Planet Downs area for Planet Oil Company N.L. (1962) by Austral Geoprospectors Pty.Ltd.
5. Warrinilla area for Planet Oil Company N.L.(1962a) by Austral Geoprospectors Pty.Ltd.
6. Rolleston - Purbrook - Arcadia area for Mines Administration Pty.Ltd. (1963) by Geophysical Service International.
7. A small area in the south-east of the Sheet area as part of the Taroom - Theodore Seismic Survey conducted for Union Oil Development Corporation (1962).

Gravity The earliest gravity work in the area was carried out by the Bureau of Mineral Resources (Oldham, 1958). The survey covered the area between Comet in the Duaringa Sheet area, and Rolleston. A detailed gravity survey, covering the whole of the Baralaba Sheet area, was conducted by Mines Administration Pty.Ltd. between Emerald and Theodore (Warren, 1959) (Fig.3). The company also conducted a regional gravity survey covering a large portion of the Bowen Basin (Starkey, 1959).

Aeromagnetic The Baralaba Sheet area was included in regional aeromagnetic coverage of the Bowen Basin with E - W flight lines at 2 mile spacing by the Bureau of Mineral Resources in 1961-1962 (Fig.4). Parts of two flight lines of an aeromagnetic survey of the Great Barrier Reef by the Australian Oil and Gas Corporation cross the Baralaba Sheet area (Hartman, 1962).

FIGURE 5

LOCATION OF EXPLORATORY WELLS



Bureau of Mineral Resources, Geology and Geophysics, April 1964 *To accompany Record 1964/26* *G55/A4/14*

Drilling for oil and gas

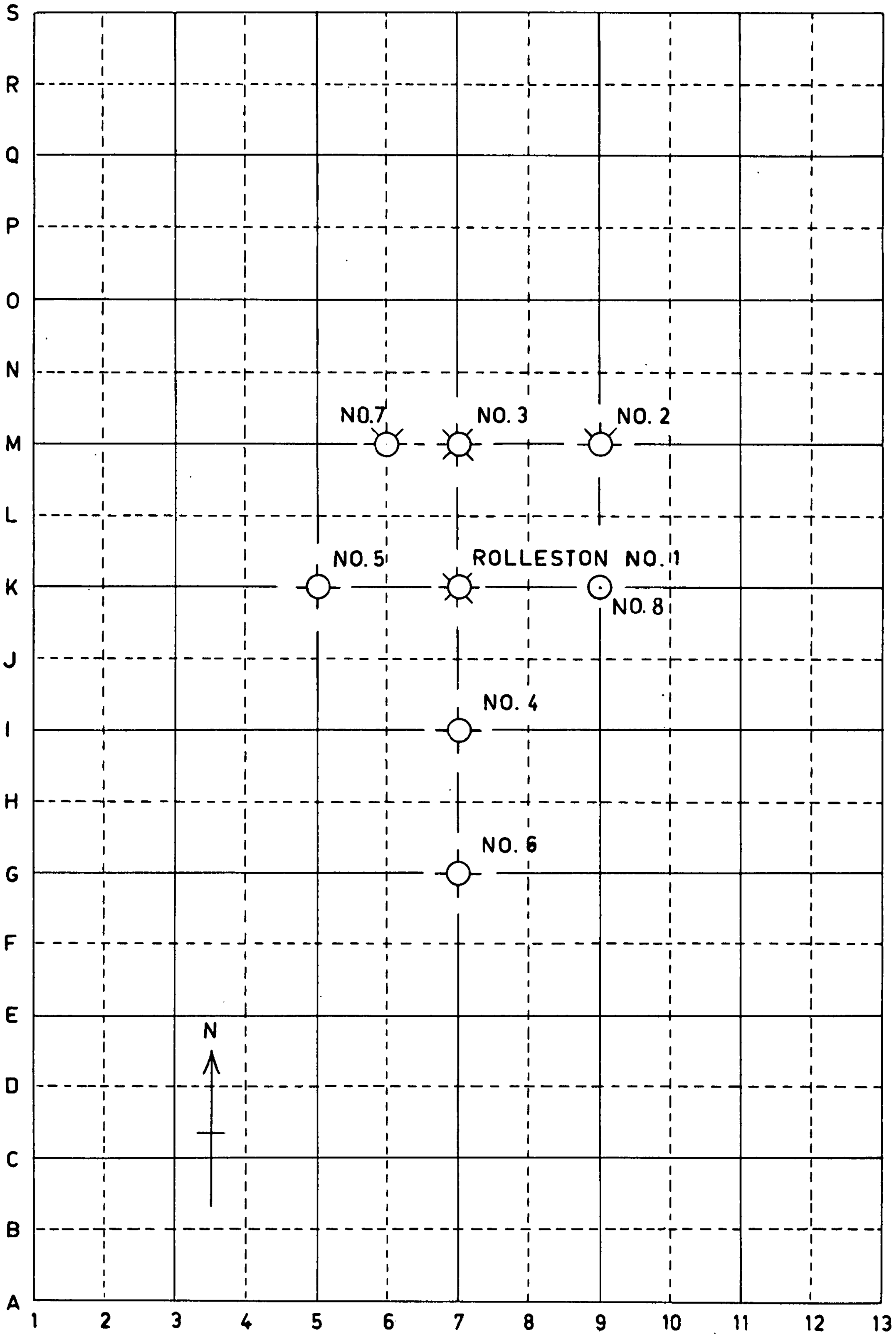
A large number of exploratory wells have been drilled in the south-west of the Baralaba Sheet area and adjoining parts of the Springsure, Taroom and Eddystone Sheet areas (Fig. 5). The composite logs of most of these have been set out in Enclosure 4. Details of these wells are shown in Table 1.

Completion reports for subsidized wells are available in the Bureau of Mineral Resources and Geological Survey of Queensland, 6 months after completion of the wells. Completion reports of the following wells are available at present: Bandanna 1, Inderi 1, Warrinilla 1, Warrinilla North 1 and Purbrook 1. Full details of wells drilled before 1963 are given in'Occurrence of Petroleum and Natural Gas in Queensland'. (G.S.Q., 1960).

Table 1: Exploratory Wells

Name	Year drilled	Total Depth in feet	Status	Commonwealth Subsidy
OSL No.3 (Arcadia)	1936-38	6025	Show of gas	No
SQD Morella 1	1951	4636	Show of gas	No
AOE 1 (Reid's Dome)	1954	9060	Show of gas	No
AOE 2 (Reid's Dome)	1955	4060	Dry	No
AOE 3 (Consuelo)	1955	4437	Dry	No
AAO 7 (Arcadia)	1957	3280	Dry	No
AFO Bandanna 1	1963	4040	Show of gas	Yes
AFO Inderi 1	1963	5433	ca 800,000 cfd	Yes
Planet Warrinilla 1	1963	6701	ca 100,000 cfd	Yes
Planet Warrinilla North 1	1963	6879	ca 160,000 cfd	Yes
AFO Rolleston 1	1963	9506	ca 20 m.c.f.d.	Yes
AFO Rolleston 2	1963	4732	Show of gas	No
AFO Rolleston 3	1964	3258	ca 3.5 m.c.f.d.	No
AFO Rolleston 4	1964	3500	Dry hole	No
AFO Rolleston 5	1964	3634	Dry hole	No
AFO Rolleston 6	1964	5490	Dry hole	No.
AFO Rolleston 7	1964	3500	Show of gas	No
AFO Purbrook 1	1963	4949	Dry	Yes
Marathon Glenhaughton 1	1963	9418	Dry	Yes

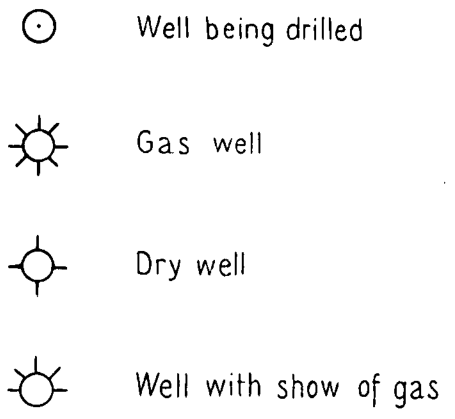
FIGURE 6



ASSOCIATED FRENEY OIL FIELDS N.L.
AUTHORITY TO PROSPECT 55/56 P

ROLLESTON GAS FIELD

SCALE
1 0·5 0 1m



Bureau of Mineral Resources
Geology and Geophysics, March 1964

To accompany Record 1964/26

TABLE 2 ROCK UNITS OF THE BARALABA SHEET AREA

			Rock Unit and Symbol	Thickness	Lithology	Distribution	Topography	Palaeontology	Relationships	Environment of Deposition
CAINOZOIC			Cz	Superficial	Sand, soil, gravel, reworked laterite.	Widespread throughout the area.	Plains, generally without relief			In situ weathering and fluviatile
			Qza	50'-100'	Gravel, sand, clay	Extensive along the major streams.	No relief			Fluviatile
	TERTIARY		Ta	200'+	Sandstone, silty and sandy claystone.	Main development in northern Mimosa Syncline in NW of Sheet area and in Baralaba and Forest Hills areas.	Gently undulating country with breakaways along edges. Some mesas.		Unconformable on Mesozoic and Palaeozoic rocks	
			Tb	Up to 200'	Olivine basalt	Main development in south of Mimosa Syncline W. and SW. of 'Bauhinia Dns.' and in Rolleston area.	Rolling black-soil plains and some mesas.			
Tertiary or Cretaceous					Trachyte	At Mount Ramsay	Mountain 1100 feet high		Intrusive into the Upper Bowen Coal Measures Some updoming.	
MESOZOIC	JURASSIC	Evergreen	Boxvale Sandstone Member (Jlb)	140'	Quartz sandstone, micaceous quartz sandstone.	Small area in southern Mimosa Syncline.	Mesas	Wood fragments	Conformable on lower Evergreen Formation.	Shallow, non-marine.
			Formation (Jle)	310'	Shale, siltstone and fine-grained micaceous sandstone.	Southern Mimosa Syncline	Gently undulating hilly country	Plant fragments, foraminifera hystrichosphaerids.	Conformable on Precipice Sandstone.	Estuarine or lacustrine. ? Marine in part.
			Precipice Sandstone (Jlp)	240'	Poorly sorted, cross-bedded quartz sandstone. some feldspathic sst. and conglomerate.	Southern Mimosa Syncline	Tableland bordered by sheer cliffs.		Unconformable on Moolayember Formation and Clematis Sandstone.	Shallow, non-marine. Probably fluviatile.
	TRIASSIC		Moolayember Formation (Rm)	5,500'+	Shale, siltstone, greywacke, conglomerate.	Mimosa Syncline	Gently undulating	Plant material (White, 1964) spores.	Conformable on Clematis Sandstone.	Estuarine or lacustrine.

			Rock Unit and Symbol	Thickness	Lithology	Distribution	Topography	Palaeontology	Relationships	Environment of Deposition
MESOZOIC	TRIASSIC		Clematis Sandstone (Ʀ e)	800' in Expedition Range; 1000' in Dawson Range	Mainly quartz sandstone some micaceous siltstone and feldspathic sandstone.	Dawson Range, Expedition Range, mesas and hills south and north-west of Rolleston.	Ranges up to 1700' above the plains.		Overlies the Rewan Formation, possibly disconformably.	Shallow water, ?fluviatile.
			Rewan Formation (Ʀ r)	Up to 12000'	Chocolate mudstone, green shale, micaceous, lithic and feldspathic sandstone.	East of the Dawson Range near northern and southern Sheet boundary, and in isolated outcrops in the south-west.	Generally flat country. Some low strike ridges.		Apparently conformable on the Upper Bowen Coal Measures in Baralaba Sheet area.	Fluviatile
PALAEOZOIC	UPPER PERMIAN	Upper Bowen Coal Measures	Baralaba Coal Measures (Pul)	1250'+	Feldspathic sandstone; siltstone; shale; coal. Nodules in sandstone and siltstone.	In Dawson River, west of Baralaba.	Outcrop in Dawson River bed only.	Rich flora	Conformable on lower part of the Upper Bowen Coal Measures.	Lacustrine
			Gyranda Formation (Puy)		Dark grey siltstone and shale and calcareous lithic sandstone. Some tuffaceous sandstone and chert.	Small area east of Baralaba and in isolated outcrops north of the town.	Gently undulating country.	Fragmentary plant remains.	Conformably overlies the Flat Top Formation.	Lacustrine or estuarine.
		Back Creek Group	Flat Top Formation (Puf)	1100'	Calcilutite, locally silicified and coquinite.	In NNW trending belt east of Baralaba.	Gentle strike-ridge up to 200' high.	Rich fauna (Appendix 1).	Conformably overlies Barfield Formation.	Marine
			Barfield Formation (Pur)		Grey calcareous silty mudstone. Some lithic sandstone. Limestone lenses.	Small areas east and south-east of Baralaba.	Plains	Rich fauna (Appendix 1).	Probably conformable on the Oxtrack Formation.	Marine.
			Oxtrack Formation (Puo)		Calcareous siltstone, limestone.	Isolated outcrops east of the Don River.	Low rises	Rich fauna elsewhere.	Probably unconformable on the Camboon Andesite.	Marine
			Undifferentiated (Pb)		Lithic sandstone, shale, limestone, tuffaceous sandstone.	Small area south-east of Baralaba and east of Don River.	Gently undulating country.	Some scattered marine fossils.	Probably unconformable on the Camboon Andesite.	Marine
	LOWER PERMIAN		Rannes Beds (Plw)		Greenish shale, siltstone and fine grained tuffaceous sandstone.	Small area in north-east of Sheet area.	Deeply incised hilly country.	-	Overlies and elsewhere interfingers with Camboon Andesite.	Crinoidal limestone elsewhere suggests marine environment.
			Camboon Andesite (Plm)		Andesite, basalt, some pyroclastics.	Small area east of the Don River.	Gently undulating country.	-	Possibly unconformable on Silurian-Devonian rocks.	Probably partly on land, partly in water.

STRATIGRAPHY

The stratigraphy of the Baralaba Sheet area is summarized in Table 2. Mapping and geophysical surveys have indicated a total thickness of 20,000 to 25,000 feet of Permian, Triassic and Jurassic sediments, the thickest accumulation of sediments in the Bowen Basin. Most of these sediments were probably laid down in non-marine shallow water environments; only the Back Creek Group contains definite marine fossils. Several unconformities and slight disconformities are present in the sequence. Only the unconformities below the Jurassic sediments and below the Tertiary rocks are obvious and can be mapped at the surface. The others are inferred from palaeontological or geophysical evidence.

PERMIAN

Camboon Andesite

The volcanics, which crop out on the Baralaba Sheet area, are part of the volcanic mass which occupies the core of the Thuriba Anticline (Enclosure 2). They are overlain by the richly fossiliferous Upper Permian Oxtrack Formation. Near Thuriba Homestead (Enclosure 2), limestone containing possible Silurian - Devonian fossils crops out (Appendix 2), but its relationship with the volcanics is not known. The volcanics may unconformably overlie them, or the limestone could also be interbedded with the volcanics. Volcanic masses similar to the one at Thuriba Homestead occur farther to the east and south-east in the Gogango Range (Olgers, Webb, Smit and Coxhead, 1964) (Enclosure 2). The southernmost ones of these masses are contiguous with volcanics on the Monto and Mundubbera Sheet areas which have been mapped as Lower Permian Camboon Andesite. In these areas, the Camboon Andesite is in places overlain by the Upper Permian Oxtrack Formation. Until the relationship between the ?Silurian - Devonian rocks at Thuriba Homestead and the surrounding volcanics has been established, the volcanics in the Baralaba Sheet area are correlated with the Lower Permian Camboon Andesite.

The name Camboon Andesite was first used by Derrington and Morgan in an unpublished report for Mines Administration and was published by Derrington, Glover and Morgan in 1959. The unit is named after Camboon Homestead in the Mundubbera Sheet area. The type area of the formation is near Camboon Homestead.

The unit, which crops out over a small area in the north-east corner of the Baralaba Sheet area, forms low lightly vegetated hills. It consists mainly of extrusives; further to the east in the Gogango Range, the unit includes some sediments and pyroclastics (Olgers <u>et al</u>., 1964). Andesite, the most abundant rock type, is generally massive, dark grey and medium-grained; less commonly it is porphyritic with phenocrysts of plagioclase. Fine-grained, dark grey basalt with calcite amygdales occurs but is a minor rock type. (Appendix 3). Rubble derived from pyroclastic deposits occurs in the southern part of the outcrop area.

The relationship between the Camboon Andesite and the overlying units is not clear due to poor outcrop. In the west limb of the Thuriba Anticline, the volcanics are overlain by the Oxtrack Formation and undifferentiated Back Creek Group, and in the east limb of the anticline by the sheared argillaceous and tuffaceous sediments of the Rannes Beds.

The Camboon Andesite was probably laid down partly on land and partly in water. It contains a Glossopteris flora in sedimentary interbeds in the Mundubbera Sheet area (Wass,1962) and Lower Permian marine fossils in interbedded limestone in the Monto Sheet area (Dear, pers. com.), and can be correlated with the Lower Permian Lower Bowen Volcanics farther to the north on age, stratigraphic position and lithology. The thickness of the unit is not known as the base is nowhere exposed.

Rannes Beds.

The name 'Rannes Altered Rocks' was first used by Dunstan (1901) to describe the slatey rocks in the Rannes Hill area, 20 miles east-north-east of Baralaba. Dunstan included these rocks in the 'Gympie Formation'. Reid and Morton(1928) used the name 'Rannes Series' for the rocks in the Gogango Range and correlated them with the Lower Palaeozoic 'Emu Park and Anakie Series'. In this report, the unit will be referred to as the Rannes Beds. The type area is in the Rannes Hill area on the Monto Sheet area.

The Rannes Beds crop out over a very small area in the north-east of the Baralaba Sheet area, but have wide distribution in the Gogango Range to the east, from where they have been fully described (Olgers et al., 1964).

In the Baralaba Sheet area, the unit consists mainly of unfossiliferous greenish shale, siltstone and fine-grained tuffaceous sandstone which have in places been intensely sheared.

On the east limb of the Thuriba Anticline (Enclosure 2) the Rannes Beds overlie the Camboon Andesite with apparent conformity, and consequently are thought to be Lower Permian in age. The unit is unfossiliferous in the Baralaba Sheet area, but in the Gogango Range it contains crinoidal limestone, indicating that at least part of the sequence was laid down in a marine environment. The thickness of the Rannes Beds is not known.

Back Creek Group

In the Mundubbera Sheet area, Glover (1954) used the name Back Creek Formation for the Middle Bowen Beds, a Permian marine unit recognised throughout the Bowen Basin. The name was later changed to Back Creek Group (Derrington et al., 1959). In the area west of Banana, 25 miles south-east of Baralaba, the Group was subdivided into three units, the Oxtrack Formation, Barfield Formation and the Flat Top Formation (Derrington et al.,1959). These units can be recognised in the north-east of the Baralaba Sheet area. In the Don River area and east of Mount Ramsay, outcrop is generally poor and the Group could not be subdivided. In these areas, the rocks were mapped as undifferentiated Back Creek Group.

Marine Permian rocks do not crop out in the western part of the Baralaba Sheet area, but have been encountered by drilling in the south-west of the Sheet area. (Enclosure 4) The marine Permian sediments in the Springsure Sheet area comprise 5 formations,namely the Peawaddy Formation, Catherine Sandstone, Ingelara Formation, Aldebaran Sandstone and Cattle Creek Formation (Mollan et al., 1964). This nomenclature has been used in the Well Correlation Chart (Enclosure 4). The Oxtrack, Barfield and Flat Top Formations are dealt with separately below.

Oxtrack Formation

The name Oxtrack Creek Member of the Back Creek/ Formation was first used by Glover (1954); it was later changed to Oxtrack Formation (Derrington et al., 1959). The unit was named after Oxtrack Creek, a tributary of the Dawson River in the Mundubbera Sheet area. The type area of the formation is also in Oxtrack Creek.

The Oxtrack Formation crops out over a very small area in the north-east corner of the Baralaba Sheet area, on the west flank of the Thuriba Anticline. It does not form any topographic features and occurs mainly as rubble. The unit has no distinct airphoto pattern.

In the Baralaba Sheet area, the formation consists of fossiliferous grey and light brown calcareous siltstone. North-east of the Baralaba Sheet area, near Thuriba Homestead, it includes limestone containing a rich fauna of crinoids, corals, brachiopods and bryozoa (Olgers, et al.,1964).

The Oxtract Formation overlies the Camboon Andesite and is overlain by undifferentiated Back Creek Group. The contacts between the units are not exposed. The Oxtrack Formation is equivalent to part of Unit C (Dickins, Malone & Jensen, 1962) and is of/ probable Upper Permian age. The unit is probably thin.

Barfield Formation

Glover first used the name Barfield Formation in the Monto 1:250,000 Sheet area, east of the Baralaba Sheet area (Unpublished report to Mines Administration Pty.Ltd.). The name was later published by Derrington, Glover and Morgan 1959). The formation is named after Barfield Homestead in the Banana District, the type area is also located at Barfield Homestead.

In the Baralaba Sheet area, the Barfield Formation has been recognized in two areas - in the core of the anticlinorium 6 miles east of Baralaba, and 12 miles east-south-east of of Baralaba. It forms fairly low country and has no distinct airphoto pattern.

The dominant lithology is grey and greenish-grey calcareous silty mudstone containing calcareous nodules and interbeds of fine to medium-grained greenish calcareous lithic sandstone. Some lenses of limestone, largely made up of Cladochonus, are present. The lithic sandstone is richly fossiliferous containing pelecypods, gastropods, brachiopods corals, crinoids and bryozoa (Appendix I).

The Barfield Formation is conformably overlain by the Flat Top Formation. The contact with the underlying Oxtrack Formation is conformable where exposed in the Monto Sheet area, but it is not exposed in the Baralaba Sheet area. The thickness of the formation in this area is not known; up to 2900 feet is present in the type area and 7000 to 14000 feet has been reported from east of the Banana Fault in the north-west of the Monto Sheet area (Derrington and Morgan in Hill and Denmead, 1960, p.207). The age of the formation is Upper Permian.

Flat Top Formation

The name Flat Top Formation was first used by Glover in an unpublished report to Mines Administration Pty.Ltd. and was published by Derrington, Glover and Morgan (1959). The formation was named after Flat Top Mountain in the Banana district. The type area of the unit is 4 miles east of Banana beside the Dawson Highway.

In the Baralaba Sheet area, the formation crops out in two, narrow north-north-west trending belts, one about 4 miles east of Baralaba and the other 6 miles south-east of Mount Ramsay. It forms low, lightly vegetated ridges, rising about 200 feet above the surrounding country.

East of Baralaba, the lithology of the Flat Top Formation is very uniform, consisting mainly of well-indurated blue-grey richly fossiliferous calcilutite, generally silicified with some interbeds of coquinite. The calcilutite consists of 80% argillaceous carbonate material, the remainder being quartz, feldspar and rock fragments (Appendix 3). South-east of Mount Ramsay, the outcrops of the formation are not as prominent and consist of interbedded, fossiliferous, white, fine-grained sandstone and siltstone, fossiliferous limestone, and some acid and intermediate volcanics showing varying degrees of shearing (probably sills). Some greenish, medium-grained, quartz lithic sandstone and brown and grey cherty siltstone are also present.

The Flat Top Formation crops out in the west limb of the anticlinorium 6 miles east of Baralaba. It conformably overlies the Barfield Formation and is conformably overlain by the Gyranda Formation.

Near Baralaba, the formation is about 1100 feet thick. It is richly fossiliferous (Appendix I) containing pelecypods, gastropods, brachiopods, corals and crinoids and is of Upper Permian age.

Undifferentiated Back Creek Group

Sediments of the Undifferentiated Back Creek Group were mapped near the Don River in the north-east of the Sheet area and in an area twelve miles east-south-east of Baralaba; outcrops are very poor. In the Don River area, they consist of interbedded shale and fine-grained, medium-bedded, dark grey lithic sandstone. The shales are highly deformed. East-south-east of Baralaba, the unit consists of sheared olive green and purple shale, containing some polyzoa, interbedded with fine-grained greenish quartz lithic sandstone. Volcanic rocks, mainly flow banded rhyolite, occur with the sediments. A few miles to the north-east in the Monto Sheet area, a stock (Mount Cooper) and associated dykes intrude the sediments (Enclosure 2).

Upper Bowen Coal Measures

The name 'Upper Bowen Formation' was first used by Jack and Etheridge (1892) to describe the upper freshwater division of Etheridge's (1872) 'Bowen River Series', which had previously been referred to by Jack (1879) as 'Upper (freshwater) Series'. The name Upper Bowen Coal Measures was used on the Geological Map of Queensland (1953) and has since been used by the Bureau of Mineral Resources - Geological Survey of Queensland in the Bowen Basin regional survey. In the Baralaba area, the name has been used for rocks which occupy the same stratigraphic position as the Upper Bowen Coal Measures further to the north, in the Duaringa Sheet area, that is between the Lower to Upper Permian Back Creek Group below and the Triassic Rewan Formation above.

A study of the Upper Bowen Coal Measures throughout the Bowen Basin has been made by geologists of Utah Development Co. (King, 1963). In the Baralaba Sheet area, the unit was studied in great detail by Reid (1939, 1944 and 1945 a,b & c) who made the following two-fold division (1944):

(i) '<u>Calcareous Series</u>': the informal name given to the lower part of the formation. The area of outcrop lies between Baralaba and the marine Permian rocks four miles to the east, and

(ii) <u>Baralaba Coal Measures</u>: the upper unit containing the coal and cropping out over a small area along the Dawson River near Baralaba.

(In 1945 (a), Reid applied the name Baralaba - Kianga Coal Measures to the upper unit, but in a later report (1945,c) he reverted to Baralaba Coal Measures).

A similar two-fold division of the Upper Bowen Coal Measures is used in this report. The upper part of the unit will be referred to as the Baralaba Coal Measures. The lower part, Reid's 'Calcareous Series', is lithologically similar to the lower part of the Upper Bowen Coal Measures in the Monto Sheet area (Jensen et al., 1964) where the name Gyranda Formation (Derrington et al., 1959) was used. This latter name is also used in this report. Both divisions are dealt with separately below.

The Upper Bowen Coal Measures do not crop out in the west of the Baralaba Sheet area. Their equivalent, the upper part of the Bandanna Formation (Hill, 1957), has been recorded in the exploratory wells drilled in the south-west of the Sheet area (Enclosure 4).

Gyranda Formation

The name Gyranda Formation was first used by geologists of Mines Administration Pty. Ltd. in the Cracow area in 1954, and was published in 1959 by Derrington, Glover and Morgan. The unit was named after Gyranda Homestead and the type area is in Back Creek in the Mundubbera Sheet area.

The formation crops out in a series of isolated outcrops which lie in a north-north-west trending belt east of Baralaba. Outcrop is generally poor and confined to creek beds. The best outcrops occur east and south-east of Baralaba in the Dawson River, in Banleith Creek and west of Mount Ramsay. The unit has no distinct airphoto pattern; it produces a flat topography and carries a moderately dense vegetation.

The unit consists essentially of dark, thinly-bedded shale, sandy shale and siltstone, interbedded with grey calcareous lithic sandstone. The sandstone is medium to thick-bedded and contains in places small rounded nodules up to 3 inches in diameter. The sandstone consists of approximately 75% lithic material, including fragments of quartzite, granite, argillaceous material (most common) and volcanics, 10%-15% quartz, and 5% feldspar in a micaceous matrix (Appendix 3). Some bands of chert and greenish-yellow calcareous tuffaceous sandstone are present near the base of the unit near Kalewa Siding. Secondary calcite is common in the sandstones and some veins of calcite are present.

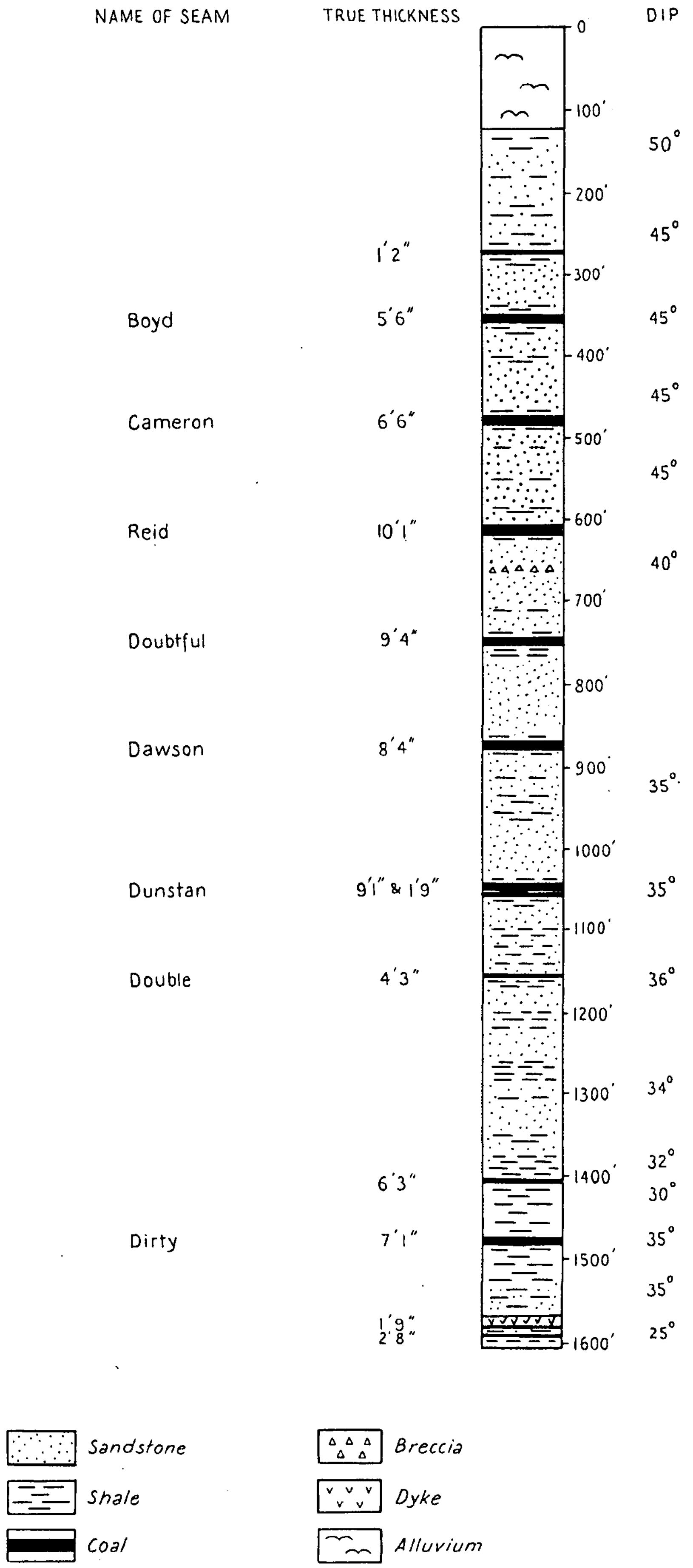
The unit is tightly folded with east dips generally less than west dips (Enclosure 2, cross section GH). The amplitude of the folding decreases westward. Overturning has taken place near Kalewa Siding where the contact between the Gyranda Formation and the underlying Flat Top Formation dips eastward. The Gyranda Formation conformably overlies the Flat Top Formation and is conformably overlain by the Baralaba Coal Measures. It can be correlated with parts of the Banana and Wiseman Formations of the Banana area (Derrington et al., 1959).

At Mount Ramsay, the unit is intruded by a trachyte stock. A soda trachyte dyke, probably associated with the Mount Ramsay intrusion, intrudes the sediments 4.5 miles east of Baralaba. The trachyte contains blocky fragments of siltstone (Appendix 3).

FIGURE 7

TYPICAL SECTION OF COAL SEAMS
DAWSON VALLEY COAL MINE

Scale : 1" = 200'



Bureau of Mineral Resources, Geology and Geophysics, March 1964 *To accompany Record 1964/26* *G55/A4/7*

The Gyranda Formation does not contain marine fossils. Plant material, mainly fragmentary, and wood are abundant, and the unit is thought to have been laid down in a shallow water lacustrine or estuarine environment.

The thickness of the unit cannot be determined accurately because of the deformation, but it is estimated to be about 1500 feet.

The Gyranda Formation lies between identified Upper Permian units and is therefore of Upper Permian age.

Baralaba Coal Measures

The Baralaba Coal Measures crop out over a small area in the bed of the Dawson River near Baralaba. Outcrop is good where the main Baralaba - Duaringa road crosses the Dawson River. Elsewhere it is very poor. Only the basal part of the unit is exposed. The top of the formation and the base of the overlying Rewan Formation are covered by Cainozoic deposits.

The most striking rock type in the Baralaba Coal Measures at Baralaba is massive, buff coloured, medium to coarse-grained, medium to thick-bedded, feldspathic sandstone containing bands of concretionary ironstone and large nodules of fine-grained calcareous sandstone. This rock type forms prominent outcrops at the Baralaba bridge. The sandstone is similar to the feldspathic sandstone overlying the coal being mined at the Moura open-cut. Interbedded with the sandstone at Baralaba are dark grey shale, coal, lithic feldspathic sandstone and multicoloured siltstone containing large ferruginous nodules. Eight coal seams over 5 feet thick totalling about 66 feet, have been disclosed by recent drilling in the area (Fig. 7). Some dykes, probably associated with the Mount Ramsay intrusion, have been encountered in the drill holes.

The structure of the Baralaba Coal Measures is complicated by folding and faulting, and has been described in great detail by Reid (1945 c). The rocks have been folded into a series of north-north-west trending anticlines and synclines. In places, the folding is tight and dips up to 80° have been recorded. Folding is asymmetrical with east dips averaging 40° and west dips 60°. Some faulting has taken place; a high angle reverse fault is exposed in the Dawson River at Baralaba. It dips 70° in a south-westerly direction, and drilling records indicate a vertical displacement of about 380 feet.

The Baralaba Coal Measures conformably overly the Gyranda Formation and are overlain by the Rewan Formation; the contact between the Baralaba Coal Measures and the Rewan Formation has not been observed in the field because of extensive cover. The relationship is possibly disconformable in the Mundubbera Sheet area (Jensen <u>et al</u>., 1964).

Marine fossils have not been recorded from the Baralaba Coal Measures. The unit was laid down in a shallow lacustrine environment which favoured the preservation of plant material. The interbedding of coal with thick beds of coarse feldspathic sandstone indicates alternating slow and rapid sedimentation. King (1963) suggests that the coals were not formed in situ but are of drift origin, mainly because of the sorting of the plant material and the absence of soil horizons with stumps and roots below the coal seams.

The total thickness of the Baralaba Coal Measures in the Baralaba area is not known as the top of the formation is not exposed. A thickness of at least 1250 feet has been proven by drilling.

Abundant plant material is present in the formation, and collections from Baralaba have been described by Rigby (1962) and White (1964). Palaeontological evidence indicates that the Baralaba Coal Measures are of Upper Permian age.

TRIASSIC

Triassic rocks are the most widespread in the Baralaba Sheet area and form most of the topographic features. The sequence probably overlies the Permian rocks with a slight unconformity (S.Q.D., 1952, p. 32; Planet Exploration Co.Pty. Ltd., 1963, p.50; and Woolley, 1944, p.12) however, this contact is not exposed in the Baralaba Sheet area. The Triassic sequence, consisting, from the base upward, of the Rewan Formation Clematis Sandstone and the Moolayember Formation, is overlain, with marked unconformity, by Jurassic rocks.

Rewan Formation

The name Rewan Formation was first published by Hill (1957). The unit was named after Rewan Homestead in the south-east corner of the Springsure Sheet area. The type area of the unit is in the vicinity of Rewan Homestead. In the south-west of the Baralaba Sheet area, outcrop is poor but the lithologies present are characteristic of the Rewan Formation in the type area. East of the Dawson Range, the Rewan Formation is also lithologically similar to sediments of the type area, and is contiguous in outcrop with rocks mapped as Rewan Formation in the Duaringa Sheet area (Malone _et al_, 1963).

The Rewan Formation is best exposed along the eastern side of the Dawson Range, where bedding trend lines are conspicuous on the airphotos. The formation also crops out between the Mimosa and Nuga Nuga Synclines and the Nuga Nuga and Rewan Synclines, in creek exposures, and in gullies which undercut the base of the cliff-forming Clematis Sandstone, as at Mount Panorama. Because of the predominantly soft argillaceous nature of the sediments, the Rewan Formation is usually covered by a deep in situ soil. The Formation supports a moderate to dense vegetation and has no distinct airphoto pattern, except east of the Dawson Range.

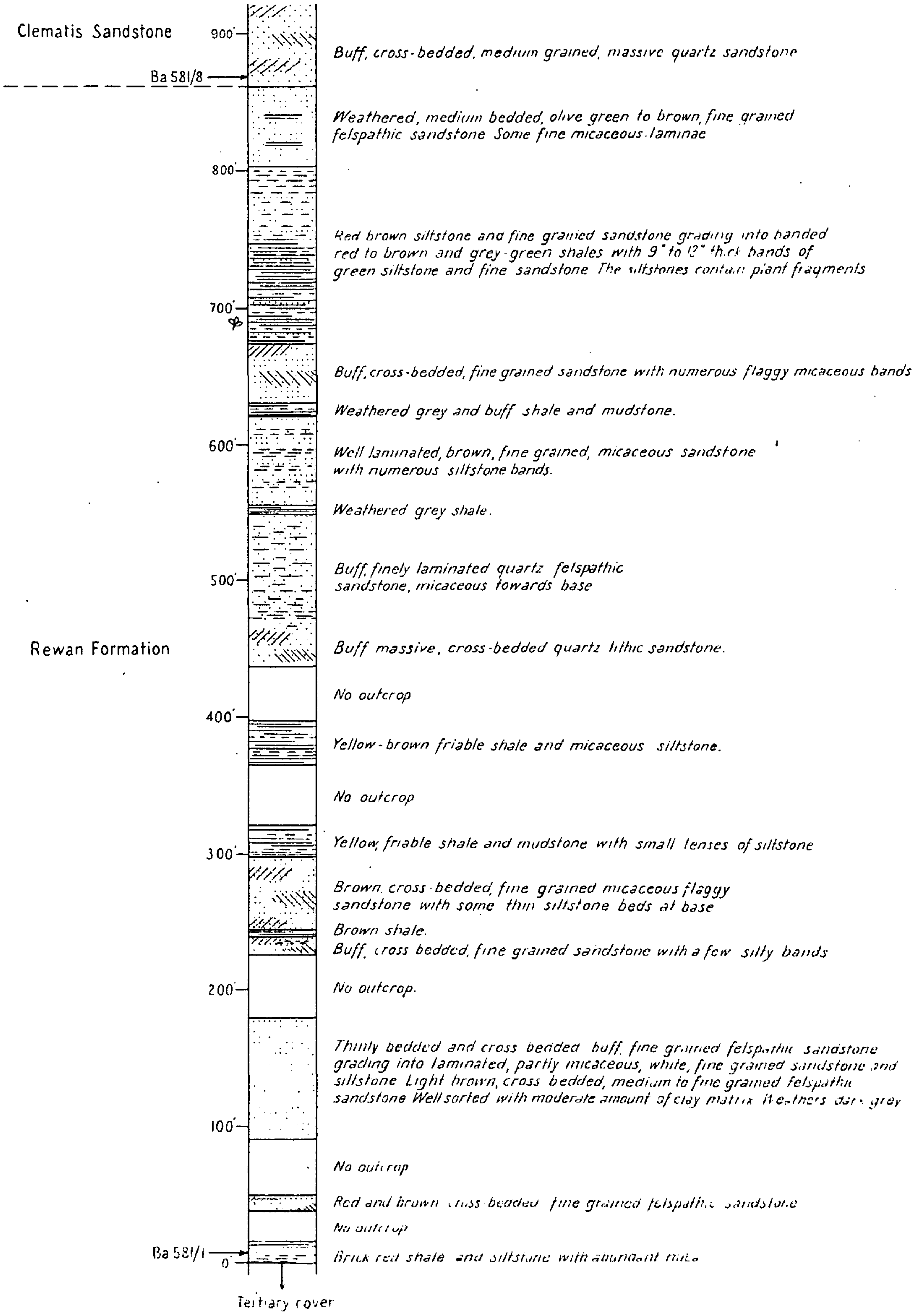
Shell (S.Q.D., 1952) divided the Rewan Formation in the type area into a 'Lower Rewan Group' and 'Upper Rewan Group': the former is characterized by coarse-grained, polygenic sandstone and grit with thin intercalations of chocolate brown clay; the latter by massive chocolate-coloured clay with occasional grey, white and green silty bands and lenses of sandstone.

In the Baralaba Sheet area, outcrop is poor, particularly in the south-west of the Sheet area and the unit could not be subdivided. Unlike the type section, the formation east of the Dawson Range, contains abundant sandstone towards the top. However soft chocolate coloured mudstone is the characteristic and most common lithology of the formation.

FIGURE 8

SECTION THROUGH TOP OF THE REWAN FORMATION
DAWSON RANGE

(Baralaba, Run I, Photo 5010, Points Ba 581/1-8)



Buff, cross-bedded, medium grained, massive quartz sandstone

Weathered, medium bedded, olive green to brown, fine grained felspathic sandstone Some fine micaceous laminae

Red brown siltstone and fine grained sandstone grading into banded red to brown and grey-green shales with 9" to 12" thick bands of green siltstone and fine sandstone The siltstones contain plant fragments

Buff, cross-bedded, fine grained sandstone with numerous flaggy micaceous bands

Weathered grey and buff shale and mudstone.

Well laminated, brown, fine grained, micaceous sandstone with numerous siltstone bands.

Weathered grey shale.

Buff, finely laminated quartz felspathic sandstone, micaceous towards base

Buff massive, cross-bedded quartz lithic sandstone.

No outcrop

Yellow-brown friable shale and micaceous siltstone.

No outcrop

Yellow, friable shale and mudstone with small lenses of siltstone

Brown, cross-bedded, fine grained micaceous flaggy sandstone with some thin siltstone beds at base

Brown shale.

Buff, cross bedded, fine grained sandstone with a few silty bands

No outcrop.

Thinly bedded and cross bedded buff, fine grained felspathic sandstone grading into laminated, partly micaceous, white, fine grained sandstone and siltstone Light brown, cross bedded, medium to fine grained felspathic sandstone Well sorted with moderate amount of clay matrix Weathers dark grey

No outcrop

Red and brown cross bedded fine grained felspathic sandstone

No outcrop

Brick red shale and siltstone with abundant mica

Bureau of Mineral Resources, Geology and Geophysics, March, 1964 *To accompany Record 1964/26* [illegible]

The mudstone is massive and contains thin lenses of pale green shale and greenish, medium-grained sandstone. Interbedded with the mudstone, and particularly near the base and the top of the formation, arethick beds of sandstone. This sandstone weathers brown and is commonly micaceous, lithic and feldspathic. Near the top of the formation is some lithic quartz sandstone which is commonly thinly bedded, medium to coarse-grained,poorly sorted, finely crossbedded, and contains some flattened clay pellets.

Shell (S.Q.D., 1952) reports evidence of a gentle regional angular unconformity at the base of the Rewan Formation in the type area and in the Arcadia area of the Taroom Sheet (Woolley, 1944), and Planet Exploration Co. Pty.Ltd. (1963) suggests that an unconformity is present in Warrinilla No.1 Well. In the Theodore area, 30 miles south of Moura, the Rewan Formation appears concordant with the underlying Upper Bowen Coal Measures; both units dip gently to the west at angles of 10° to 15°. Farther to the north, north-west of Baralaba, the Rewan Formation dips gently to the south west, but the underlying Baralaba Coal Measures are tightly folded and even overfolded. The contact between these formations is not exposed and it is not known whether, or to what extent, the folding has affected the Rewan Formation. In the type area, the formation is unconformably overlain by the Clematis Sandstone. In the Baralaba Sheet area, there is no evidence to indicate such an unconformity. Bedding trends in both formations are concordant near the contact trending about N 20°E. in the north and from N.15°E. to N. 20°E. in the south. At the contact, the change in lithology from brown lithic sandstone in the Rewan Formation to clean quartz sandstone in the Clematis Sandstone is very marked and indicates a change in provenance which suggests that a disconformity may be present.

Red beds are generally accepted to be non-marine terrigenous deposits which owe their red colour to finely divided hematite. The hematite was probably derived from red residual soils which formed under hot humid conditions in neighbouring areas. Sedimentation was possibly fluviatile with deposition of the fine red muds away from the channels and the lenses of brown weathering sandstone near and in the channels. The sandstone is finely crossbedded. Intraformational conglomerate and dessication cracks were observed in the Duaringa Sheet area (Malone et al., 1963) indicating shallow water conditions during sedimentation and periodic drying up of at least part of the depositional area enabling oxidizing conditions to be maintained and the red bed nature of the sediments to be preserved.

The thickness of the Rewan Formation in the type area is 1600 feet (Mollan et al., 1964). In the north-eastern part of the Baralaba Sheet area, the measured thickness of an incomplete section was 850 feet (Fig.8) which approximates to the thickness of the formation in the Duaringa Sheet area (Malone et al., 1963). In the south-east corner of the Baralaba Sheet area and the adjoining portion of the Monto Sheet area around Theodore, the base and top of the Rewan Formation, which are reasonably well exposed, can easily be recognized on the airphotos. The central part of the formation is poorly outcropping. Dips at the base and top of the Formation are about 20°. In the central part, a 7° dip was recorded in the Baralaba Sheet area and a 45°dip in the north-east of the Mundubbera Sheet area (Jensen et al., 1964), where faulting may be present. A reliable thickness for the Rewan Formation in the south-east of the Sheet area cannot be given, but seismic surveys in this area (Marathon Petroleum Australia Ltd. 1962) show about 12,000 feet of section which may be assigned to this unit. This indicates a tremendous easterly thickening of the Rewan Formation from its type area.

Probable Triassic plants and spores were found in the Rewan Formation in the Duaringa Sheet area (Malone et al.,1963), but no fossils have been found in the Baralaba Sheet area. Latest spore evidence suggests that the formation is of Lower Triassic age (Evans in Mines Administration Pty.Ltd., 1962 c).

Clematis Sandstone

Jensen (1926) first used the term 'Clematis Series' for beds above the 'Upper Bowen' and below the 'Ipswich Beds'. Later authors used the name 'Carnarvon' for beds equivalent, at least in part, to beds named 'Clematis' by Jensen. Whitehouse (1955) discussed the application of the various names and preferred Clematis Sandstone on grounds of priority and convenience. Whitehouse designated the type area as the Gorge of Clematis Creek, in the Expedition Range near the southern margin of the Baralaba Sheet area.

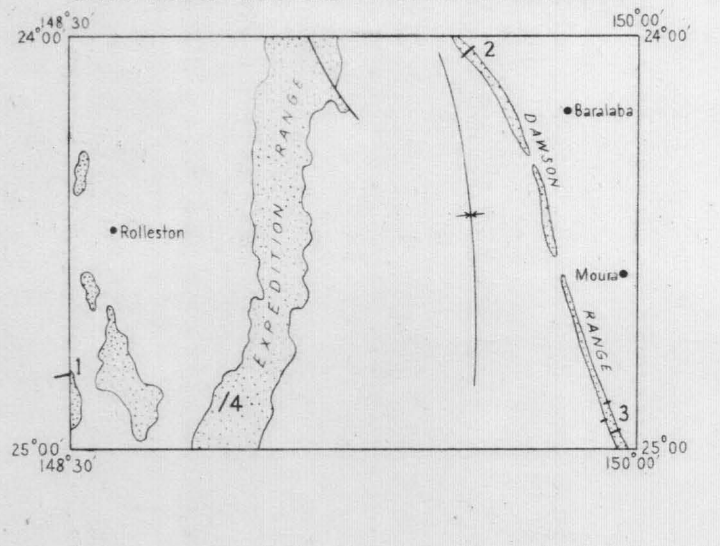
The main outcrops of the Clematis Sandstone are along the limbs of the broad Mimosa Syncline, and form two approximately north-south trending ranges; the Dawson Range in the east and the Expedition and Shotover Ranges in the west. To the north, in the Duaringa Sheet area, these ranges join in the Blackdown Tableland, which forms the nose of the Mimosa Syncline. To the south in the Taroom Sheet area, they are blanketed by the Precipice Sandstone. Elsewhere in the Baralaba Sheet area the Clematis Sandstone forms mesas in the broadly folded Nuga Nuga Syncline, and in the Rewan Syncline on the adjoining Springsure Sheet area. The formation is a massive, cliff-forming unit, especially in the Expedition and Shotover Ranges where sheer cliffs and caves (many with aboriginal paintings) produce spectacular scenery. The Dawson Range is lower and consists mainly of a series of cuestas.

The Clematis Sandstone consists mainly of massive to thickly bedded, white to yellow-brown, medium-grained, micaceous quartz sandstone, but varies widely from well compacted, well sorted, clean, fine to medium-grained quartz sandstone to very friable, unsorted, porous, coarse-grained, kaolinitic quartz sandstone with numerous bands of small milky quartz pebbles. Thin interbeds of soft, ferruginous, micaceous siltstone and brown, medium-grained, feldspathic quartz sandstone are common throughout the unit (Fig. 9). The sandstone generally exhibits festoon or planar bedding or both (Fig.10). This cross bedding is best developed in the more massive, coarse-grained quartz sandstone, especially in the Expedition and Shotover Ranges. Systems of prominent vertical jointing in the Clematis Sandstone strike N.50°E. and S. 35°E.

Figure 9

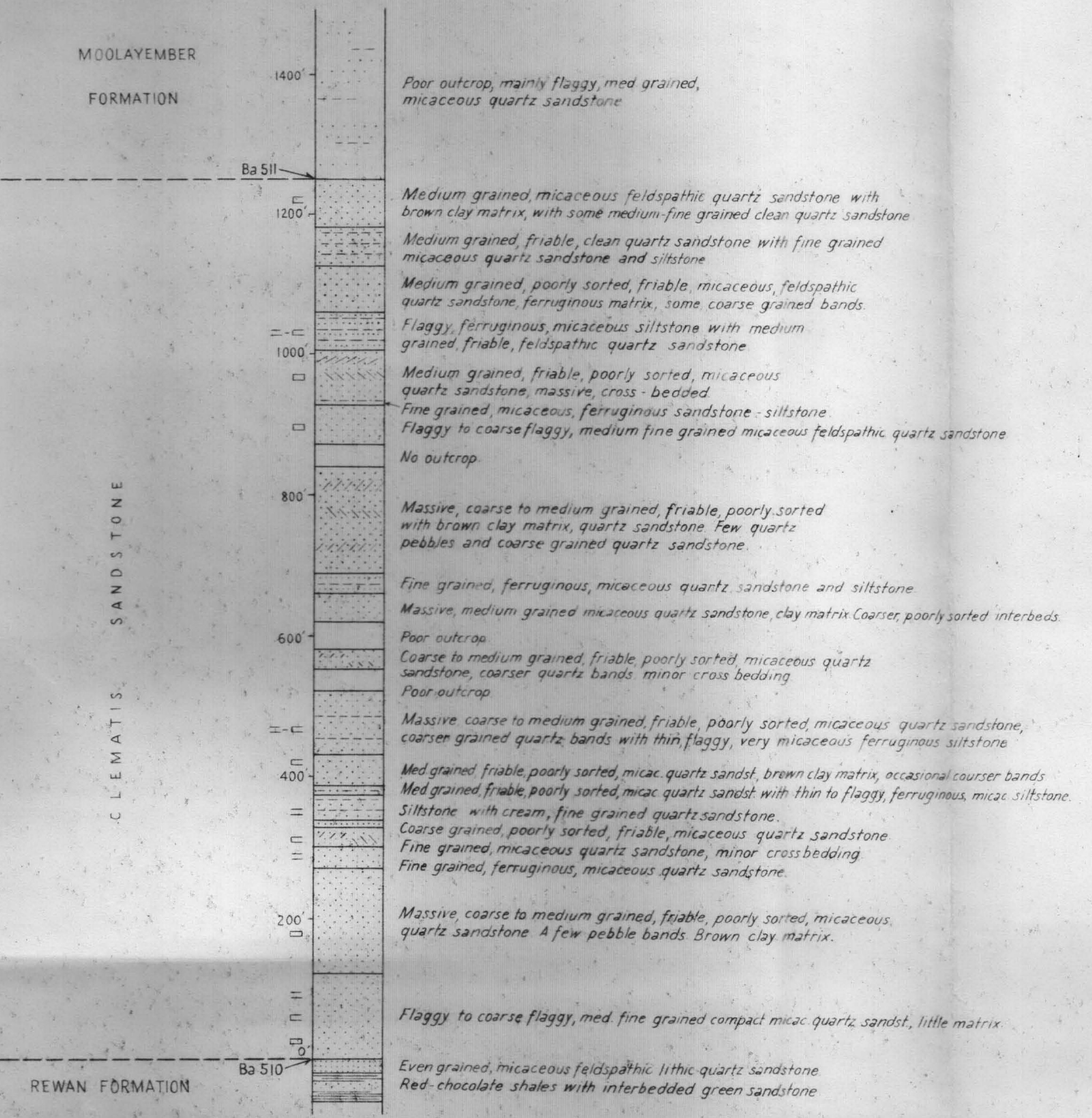
MEASURED SECTIONS IN THE CLEMATIS SANDSTONE

LOCALITIES OF SECTIONS IN CLEMATIS SANDSTONE



1

East limb of Rewan Syncline, Springsure Sheet Area
Baralaba Run 8, Photo 5036
Points Ba 510 - Ba 511



Poor outcrop, mainly flaggy, med grained, micaceous quartz sandstone

Medium grained, micaceous feldspathic quartz sandstone with brown clay matrix, with some medium-fine grained clean quartz sandstone

Medium grained, friable, clean quartz sandstone with fine grained micaceous quartz sandstone and siltstone

Medium grained, poorly sorted, friable, micaceous, feldspathic quartz sandstone, ferruginous matrix, some coarse grained bands.

Flaggy, ferruginous, micaceous siltstone with medium grained, friable, feldspathic quartz sandstone

Medium grained, friable, poorly sorted, micaceous quartz sandstone, massive, cross - bedded

Fine grained, micaceous, ferruginous sandstone - siltstone

Flaggy to coarse flaggy, medium fine grained micaceous feldspathic quartz sandstone

No outcrop

Massive, coarse to medium grained, friable, poorly sorted with brown clay matrix, quartz sandstone. Few quartz pebbles and coarse grained quartz sandstone.

Fine grained, ferruginous, micaceous quartz sandstone and siltstone

Massive, medium grained micaceous quartz sandstone, clay matrix. Coarser, poorly sorted interbeds.

Poor outcrop

Coarse to medium grained, friable, poorly sorted, micaceous quartz sandstone, coarser quartz bands minor cross bedding

Poor outcrop

Massive coarse to medium grained, friable, poorly sorted, micaceous quartz sandstone, coarser grained quartz bands with thin, flaggy, very micaceous ferruginous siltstone

Med grained friable, poorly sorted, micac. quartz sandst., brown clay matrix, occasional courser bands

Med grained, friable, poorly sorted, micac quartz sandst. with thin to flaggy, ferruginous, micac siltstone.

Siltstone with cream, fine grained quartz sandstone.

Coarse grained, poorly sorted, friable, micaceous quartz sandstone

Fine grained, micaceous quartz sandstone, minor cross bedding

Fine grained, ferruginous, micaceous quartz sandstone.

Massive, coarse to medium grained, friable, poorly sorted, micaceous, quartz sandstone. A few pebble bands. Brown clay matrix.

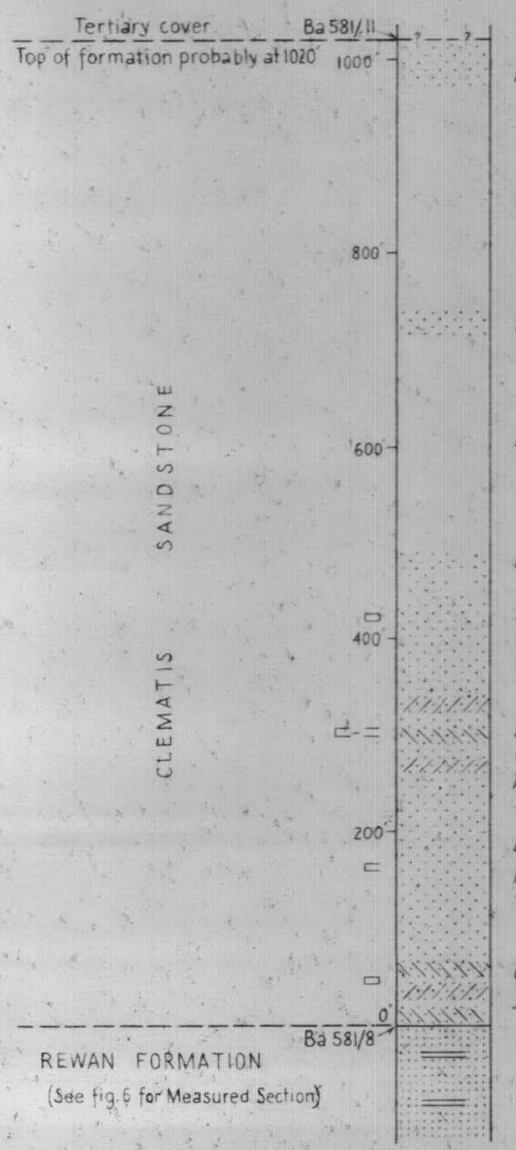
Flaggy to coarse flaggy, med. fine grained compact micac. quartz sandst., little matrix.

Even grained, micaceous feldspathic lithic quartz sandstone

Red-chocolate shales with interbedded green sandstone

2

Dawson Range
Baralaba Run 1, Photo 5010
Points Ba 581/8 - Ba 581/11



(See fig. 6 for Measured Section)

Iron stained, coarse to medium grained quartz sandstone.

No outcrop

Heavily iron stained coarse grained quartz sandstone.

No outcrop

Poor outcrop. Mainly coarse grained quartz sandstone.

Mottled cream and red brown, coarse grained, poorly consolidated quartz sandstone. Large white sub-angular quartz pebbles scattered throughout.

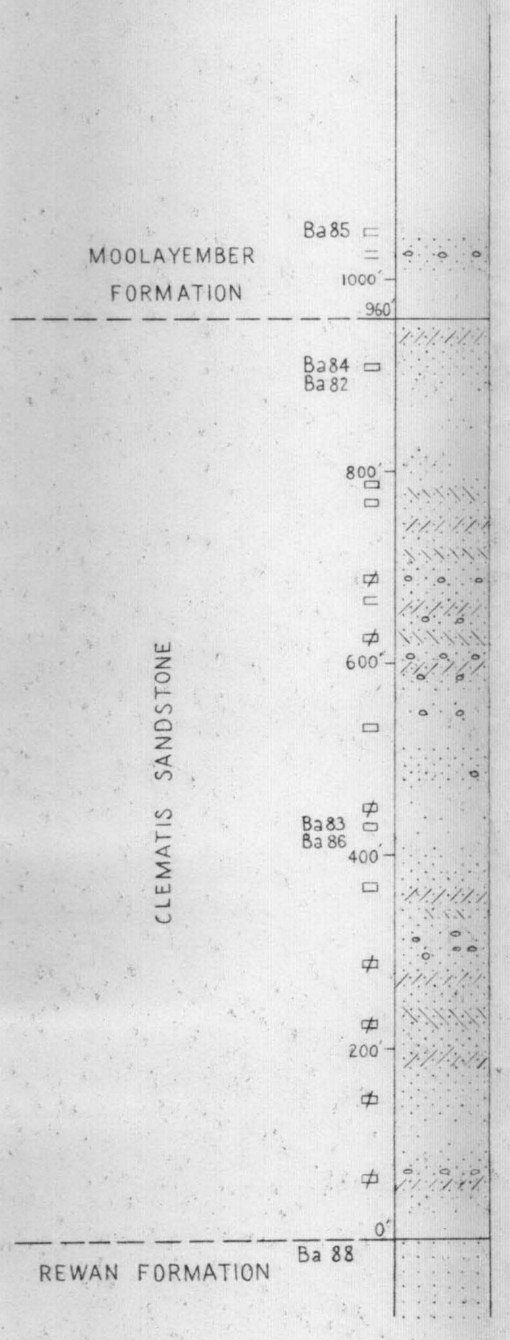
Banded yellow to red-brown, medium grained quartz sandstone with small amount white mica, especially in the occasional flaggy beds.

Buff, medium and fine grained, sub-angular, often poorly sorted quartz sandstone, porous in the coarser beds, with a yellow, limonitic clay cement.

Cream, medium grained quartz sandstone, prominent joints filled with limonitic clay and white mica.

3

Composite Section, Dawson Range
Baralaba, Run 8, Photo 5057
Run 9, Photo 5104
Points Ba 88 - Ba 85



No outcrop

Fawn, very poorly sorted, feldspathic, lithic quartz sandstone with quartz pebbles and clay pebbles.

No outcrop.

Medium and fine grained quartz sandstone, in places very feldspathic and micaceous, poorly sorted in places

Poor outcrop.

Coarse to fine, mainly medium grained, poorly and well sorted, sub-rounded, semi-friable, mainly clean quartz sandstone, porous in the coarser beds with a yellow limonitic clay cement. Some very coarse layers with quartz pebbles

Numerous pebble bands.

Poor outcrop

Cream, coarse to fine, mainly medium grained quartz sandstone with some pebble bands.

Poor outcrop.

Poor outcrop. Buff, coarse to medium grained, well rounded, well sorted quartz sandstone. Some very coarse grained layers with quartz pebbles.

Coarse to fine, friable and cavenous quartz sandstone, some iron oxide bands.

Some very coarse layers with quartz pebbles and clay pellets.

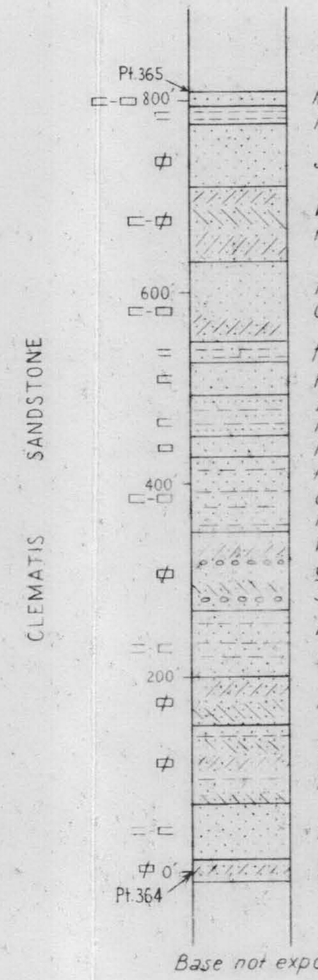
Poor outcrop

Dark greyish-brown, medium to fine grained, hard to semi-hard feldspathic lithic sandstone. Some partings are very micaceous

4

Type area, Clematis Creek
Baralaba, Run 9, Photo 5089
Points Ba 364 - Ba 365

Top removed by erosion



Med. grained micaceous quartz sandstone

Ferruginous, micaceous siltstone and fine grained quartz sandstone.

Jointed, friable, micaceous, med. to course grained quartz sandstone.

Well jointed, friable, slightly cavernous micaceous med. grained quartz sandstone.

Friable, fine to med. grained, micaceous quartz sandstone. Clayey matrix. Current ripple marks, fine scale cross bedding in more massive rock.

ferruginous micaceous siltstone with some ⊏ fine to med grained qtz. sandst

Flaggy, fine to med. grained micaceous quartz sandstone.

Flaggy, med. to coarse grained micaceous quartz sandstone.
Interbedded = ferruginous, micaceous siltstone.

Massive, friable, poorly sorted, med. to course grained, micaceous qtz. sandst.

Flaggy - compact, fine to med. grained, micaceous quartz sandstone with friable, coarse grained sandstone.
Interbedded = ferrug. micaceous siltstone.

Well jointed, cavernous, poorly sorted, friable, med. to coarse grained, micaceous quartz sandstone. Pebbly bands, becoming conglomeratic. Strong planar cross bedding. Cross bed units 12", foreset beds 4" thick.

Flaggy, fine to med grained quartz sandstone.
Interbedded = ferruginous, micaceous siltsfone.

Massive, well jointed, friable, med. grained, micaceous qtz. sandstone

Massive, brown, friable, micaceous med. grained quartz sandstone with clay matrix.
Minor ferruginous, micaceous siltstone.

Flaggy - course flaggy, friable, brown, fine grained quartz - sandstone.

Medium grained, micaceous, quartz sandstone; friable.

Base not exposed

Bureau of Mineral Resources, Geology and Geophysics, March 1964

To accompany Record No 1964/26

G55/A4/11

The results of a detailed study of the orientation of current structures are illustrated in Figure 11. Each point represents a locality at which readings were made and each concentric circle represents 5% of readings. The readings taken in the east in the Dawson Range were stereographically corrected for bedding plane dip. The ones in the Expedition Range were obtained from crossbeds in practically horizontal beds and adjustment was not necessary. The dip of the crossbeds is remarkably constant and averages 20°. The number of readings taken at each point is as follows: 1-110, 2-100, 3-150, 4-120, 5-100, 6-100, 7-150, 8-80, 9-50, 10-100, and 11-110. Figure 11 clearly shows that the current direction in the east was south-south-easterly and in the west east-south-easterly to south-easterly. At point 11, an anomalous south-westerly current direction is indicated.

Four sections were measured in the Clematis Sandstone (Fig.9). The roughness of the terrain and the probability of faulting along Planet Creek prevented the measurement of a complete section in the Expedition - Shotover Ranges. The incomplete section of about 800 feet measured in the type area in Clematis Creek differs lithologically from the other measured sections. Lying between the two main cavernous and cliff forming sandstones in the Expedition Range is a very massive, strongly current bedded, well-jointed, friable, medium to coarse-grained sandstone which is not present elsewhere in the Sheet area. This sandstone weathers readily along joint planes to form rows of isolated, rounded, pillar-like outcrops. This sandstone crops out in the Expedition Range from the type area in the south to the northern Sheet boundary.

The Clematis Sandstone crops out on the flanks of the Mimosa Syncline. On the east limb, dips range from 10° to 15°, while on the west limb, they vary from near-horizontal to 10°. The Shotover Anticline is a small anticlinal fold developed on the western flank of the Mimosa Syncline. It has flank dips of about 20° and is faulted along the east flank parallel to the axial plane. Dips near the fault are as high as 65°. Some small faults occur also in the Expedition Range. A large north-south fault in this area is suggested by the very straight course of Planet Creek. In the south-west of the Sheet area, the Clematis Sandstone occurs in the shallow dipping Nuga Nuga Syncline and the east limb of the Rewan Syncline.

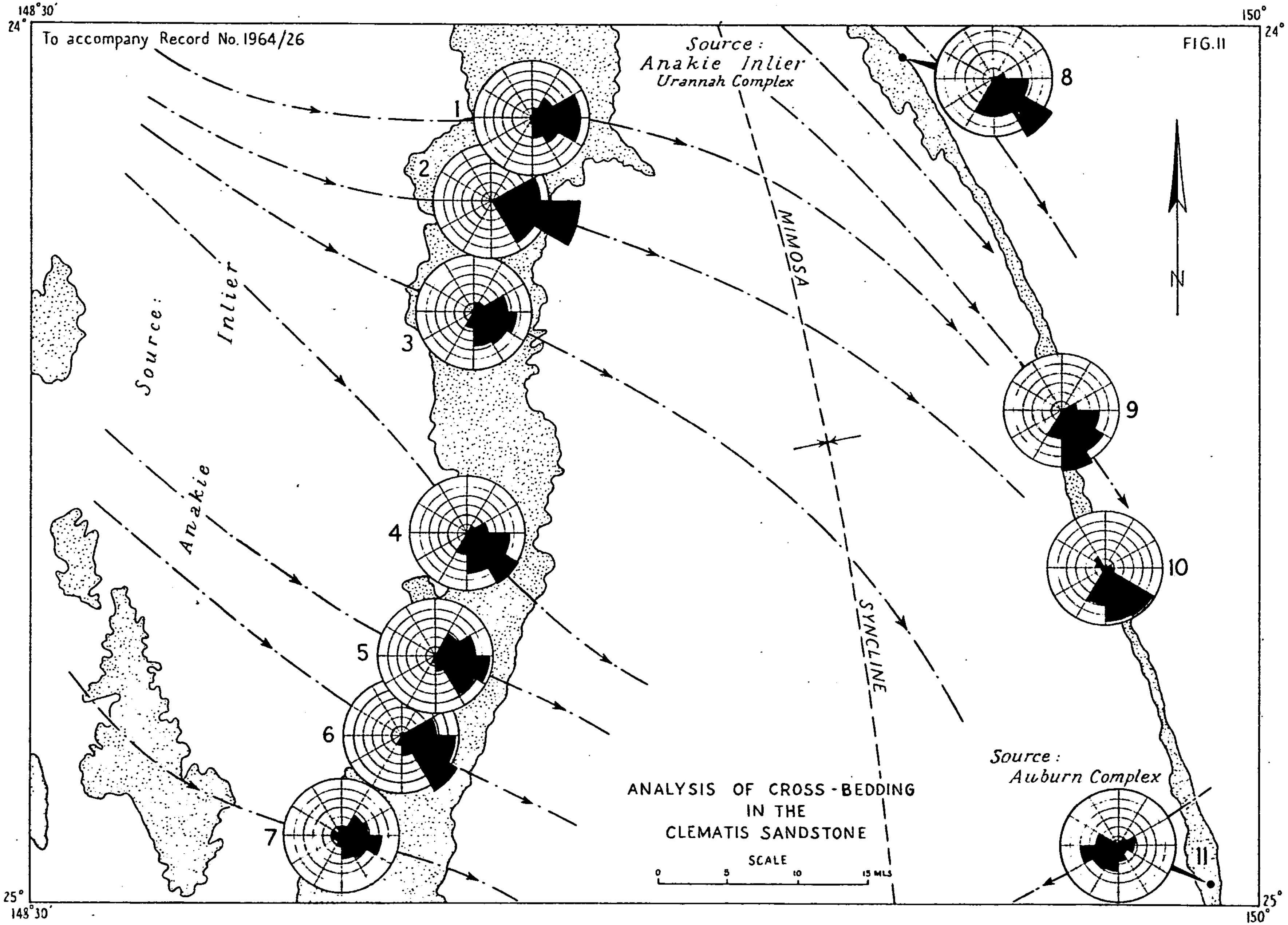
The Clematis Sandstone overlies the Rewan Formation, possibly with a slight disconformity (see under 'Rewan Formation') and is overlain, probably conformably, by the Moolayember Formation in the Mimosa Syncline and unconformably by the Precipice Sandstone in the Nuga Nuga Syncline.

The Clematis Sandstone represents a marked change in both provenance and depositional environment. The abundant current bedding, ripple marking and cut and fill structures suggest sorting, spreading and deposition by relatively fast flowing streams. The general angular nature of the grains and the absence of labile minerals probably indicates extensive chemical weathering of a granitic terrain. The current bedding study (Fig.11) has shown that the sand was derived from a northerly source area, probably the Anakie Inlier and Urannah Complex.

Figure 18: Cross bedding in the Clematis Sandstone, Expedition Range.
(Neg.No.M/323)

To accompany Record No. 1964/26

FIG.II



ANALYSIS OF CROSS-BEDDING
IN THE
CLEMATIS SANDSTONE

Bureau of Mineral Resources, Geology and Geophysics, March 1964

G55/A4/3

The thickness of the Clematis Sandstone varies considerably from 100 feet in the west of the Springsure Sheet area to 500 feet in the Reid's Dome area (Mollan *et al.*,1964), at least 800 feet in the Expedition Range and possibly up to 1000 feet in the Dawson Range (Fig.9).

Plant fossils from the formation in the Springsure Sheet area indicate a Triassic age (Hill, 1957, p.12), and recent palynological work suggests a late Lower or early Middle Triassic age (Evans, pers.com.).

Moolayember Formation

Reeves (1947) first used the name 'Moolayember Shale' for a sequence of olive-green, sandy, tuffaceous shale and thin calcareous sandstone which he correlated with the Ipswich Series in the Roma District. The type locality of the formation is along the main Injune-Rolleston road where it descends to Moolayember Creek, north of Injune.

The Moolayember Formation crops out in the Mimosa Syncline. Outcrop is generally poor because of the soft nature of the sediments. The main area of outcrop is in the southern part of the syncline where exposures are present in deep creek beds and along low strike ridges. The few small outcrops in the Wooroonah Homestead area near the northern Sheet boundary are the most northerly outcrops of the formation in the Bowen Basin. In most areas, the formation is covered by thick in situ soils which support, in places, a dense brigalow scrub. The formation erodes to form flat country which has, in places, a distinctly banded airphoto pattern due to alternating sandy and shaly beds.

The Moolayember Formation consists essentially of a sequence of shale, siltstone and greywacke with several beds of conglomerate, mainly towards the base. The finer grained sediments crop out poorly but are best exposed near Wooroonah Homestead. Greenish, grey and yellow-brown shale and siltstone crop out in the deeper creek beds. Some thin beds of greywacke and layers of calcareous and ferruginous nodules are present. Plant remains occur in some of the argillaceous sediments and nodules. The finer grained rocks crop out poorly in the south but are generally similar to those described from the Wooroonah Homestead area. In the south, resistant greywacke interbeds can be traced over long distances on the airphotos. The greywackes contain from 10% to 55% lithic material (extrusive volcanics, tuffs and fine-grained sediments) (Appendix 3). Lithic feldspathic sandstone, feldspathic quartz sandstone and quartz sandstone are also present, the last only near the base of the unit. The sandstone frequently has a calcareous cement. Conglomerate is present, mainly towards the base, and crops out as beds, up to 200 feet thick, in Roundstone Creek at the Moura - Bauhinia Downs road crossing and at a locality 3 miles west of Glenmoral Gap. The pebbles and cobbles are up to 6 inches in diameter, and consist mainly of chert and basic volcanics.

In the Baralaba Sheet area, the Moolayember Formation is found only in the Mimosa Syncline, where it conformably overlies the Clematis Sandstone. In the south-western part of the Sheet area, the Moolayember Formation was stripped by erosion and the Jurassic Precipice Sandstone was deposited directly and unconformably on the Clematis Sandstone.

The boundary between the Clematis Sandstone and the Moolayember Formation is sharp on the aerial photographs and in the field has been placed where the massive quartz sandstone (Clematis Sandstone) gives way to isolated outcrops of feldspathic quartz sandstone, greywacke, shale and some isolated beds of quartz sandstone.

Below the unconformity surface between the Precipice Sandstone and the Moolayember Formation, the formation has been deeply weathered. The rocks are frequently silicified and the weathering zone can easily be recognised on the airphotos along the edge of the Jurassic tableland. The zone is up to 200 feet thick and was produced after Triassic orogeny and before the Precipice Sandstone was laid down. The weathering profile is well exposed in the Taroom and Mundubbera Sheet areas (Jenson et al.,1964) where it affects the whole stratigraphic sequence between the Moolayember Formation and the Camboon Andesite.

Little can be deduced about the environment of deposition of the formation mainly because of poor outcrop. The presence of fragmental plant material, some thick beds of conglomerate, and current structures in the sandstone, suggests that deposition possibly took place in relatively shallow water, perhaps in a lacustrine or estuarine environment. No marine fossils have been found in the formation but the presence of hystrichospherids suggests periodic marine incursions(Evans, 1962).

The thickness of the formation is greatest in the centre of the Mimosa Syncline, where in the Bauhinia Downs area, seismic surveys by Marathon Petroleum Australia Ltd. (1962) indicate about 5,500 feet. A greater thickness is probably present near the southern Sheet boundary. In the Springsure Sheet area, the formation is only a few hundred feet thick. This tremendous easterly thickening suggests that sedimentation was taking place while a major downwarp was developing.

A plant fossil collection from this unit in the Wooroonah Homestead area has been described by White (1964). The Moolayember Formation is of Triassic age, not older than Middle Triassic (Evans in Mines Administration Pty.Ltd., 1962 c).

JURASSIC

Introduction

The Triassic Clematis Sandstone and Moolayember Formation in the southern Mimosa Syncline are unconformably overlain by rocks which have in the past been correlated with the Triassic Bundamba Group of the Ipswich area and were referred to as the "Bundamba Series" (Reeves, 1947). The 'Series' was sub-divided by Reeves into four members, namely: the Bundamba Sandstone (at the base), an unnamed shale unit, Boxvale Sandstone and Hutton Sandstone. Whitehouse (1955) examined the sequence in the southern Bowen Basin in detail and renamed the Bundamba Sandstone the Precipice Sandstone, named the overlying unit the Evergreen Shale and retained the names Boxvale Sandstone and Hutton Sandstone. Whitehouse equated the Hutton Sandstone with the Marburg Formation and made it a separate unit above the Bundamba Group.

Recent mapping in the Taroom Sheet area (Jensen <u>et al</u>., 1964), south of the Baralaba Sheet area, has shown that the Boxvale Sandstone is lenticular, and is not directly overlain by the Hutton Sandstone. Up to 100 feet of sediment, lithologically similar to the Evergreen Shale, is present between the units. These sediments were included in the Evergreen Shale and the Boxvale Sandstone was mapped as a member within this formation. Consequently the Evergreen Shale was renamed the Evergreen Formation.

Recent work (Mines Administration Pty.Ltd., 1962,b) has shown the formations in the Bundamba Group to be of Jurassic age.

The Bundamba Group, in its type area near Ipswich, consists of a basal conglomerate, the Aberdare Conglomerate and two dominantly sandy units, the lower Bundamba Sandstone and the upper Bundamba Sandstone. The Group is lithologically dissimilar to the rocks in the south of the Baralaba Sheet area which have in the past been referred to as Bundamba Group, and this correlation can no longer be accepted. The name Bundamba Group has therefore not been used in this report.

The Jurassic units will be discussed separately in the following pages.

Precipice Sandstone

The unit was first referred to by Reeves (1947) who called it the Bundamba Sandstone; it was later changed by Whitehouse (1955) to Precipice Sandstone. The formation derives its name from Precipice Creek. The type area of the unit is in the gorge of Precipice Creek, a tributary of the Dawson River in the Taroom Sheet area.

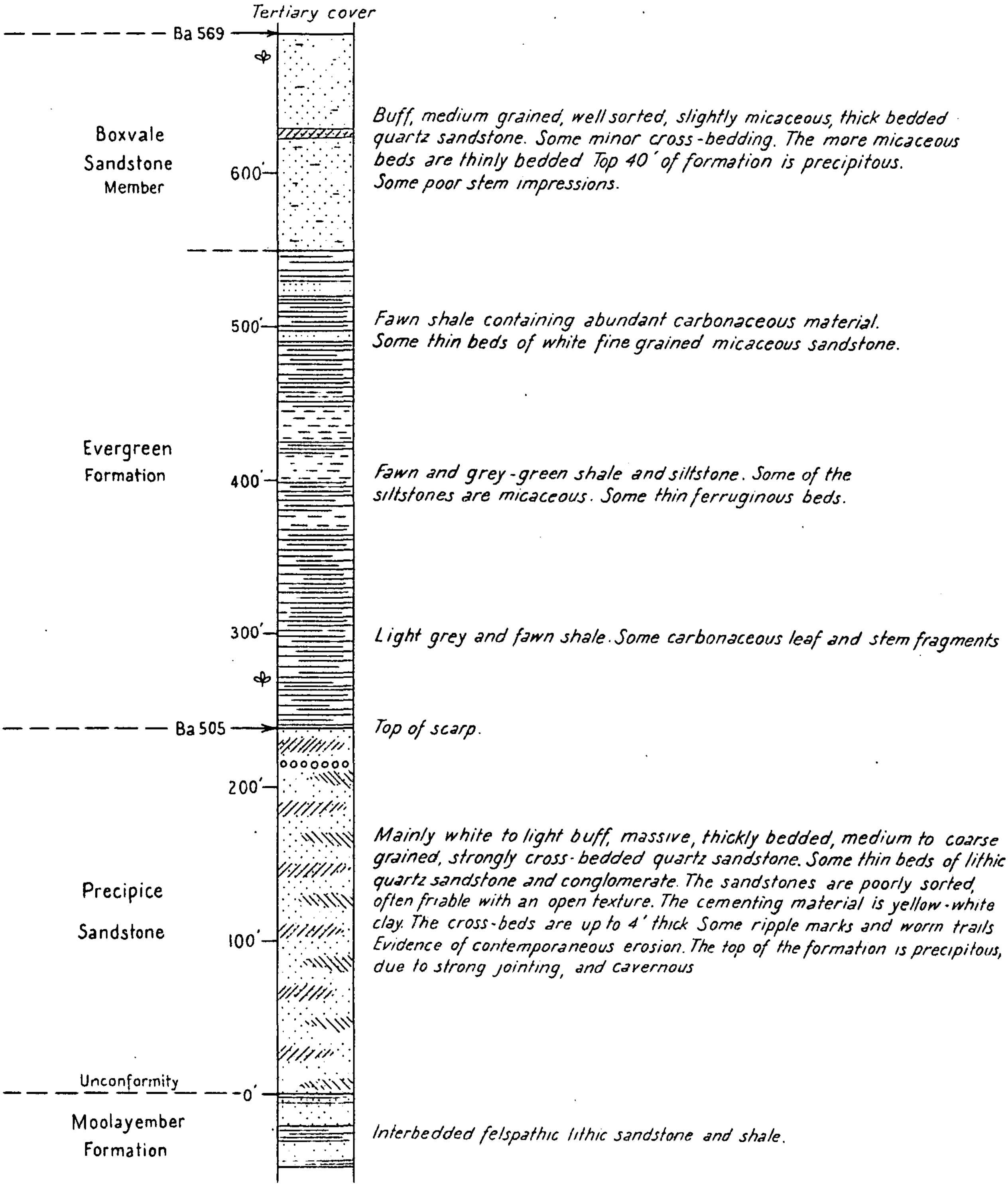
The Precipice Sandstone crops out in a series of steep breakaways, buttes and mesas in the axial region of the Mimosa Syncline near the southern margin of the Baralaba Sheet, and as large mesas on the Clematis Sandstone in the Nuga Nuga Syncline. The breakaways in the south of the Sheet area occur along the northern margin of a tableland which slopes gently towards the south. The Sandstone crops out in the steep cliffs and in a narrow rim along the top of the tableland. Away from the edge, it is overlain by the Evergreen Formation.

FIGURE 12

COMPOSITE SECTION - JURASSIC UNITS

STONECROFT HOMESTEAD AREA

(Baralaba, Run 9, Photo 5098)



Buff, medium grained, well sorted, slightly micaceous, thick bedded quartz sandstone. Some minor cross-bedding. The more micaceous beds are thinly bedded Top 40' of formation is precipitous. Some poor stem impressions.

Fawn shale containing abundant carbonaceous material. Some thin beds of white fine grained micaceous sandstone.

Fawn and grey-green shale and siltstone. Some of the siltstones are micaceous. Some thin ferruginous beds.

Light grey and fawn shale. Some carbonaceous leaf and stem fragments

Top of scarp.

Mainly white to light buff, massive, thickly bedded, medium to coarse grained, strongly cross-bedded quartz sandstone. Some thin beds of lithic quartz sandstone and conglomerate. The sandstones are poorly sorted, often friable with an open texture. The cementing material is yellow-white clay. The cross-beds are up to 4' thick Some ripple marks and worm trails Evidence of contemporaneous erosion. The top of the formation is precipitous, due to strong jointing, and cavernous

Interbedded felspathic lithic sandstone and shale.

Bureau of Mineral Resources, Geology and Geophysics, March 1964   G55/A4/6   To accompany Record 1964/26

Near Stonecroft Homestead, the formation is 240 feet thick and consists mainly of white and cream, poorly sorted, prominently crossbedded quartz sandstone, commonly containing coarse milky quartz grains (Fig.12). The sandstone is open-textured and has a small amount of light coloured kaolinitic clay cement. Caves are quite common, particularly where the unit is coarse-grained and current bedded; the sand grains are relatively easily removed by water action along joints.

Some thin beds of feldspathic sandstone and conglomerate are present. Coarse crossbedding, with individual crossbeds up to 4 feet thick, is a prominent feature of the sandstone. No detailed study was made of the crossbedding orientation because most of the areas of outcrop are inaccessible The alignment of the precipitous cliffs along the edge of the tableland is controlled by prominent vertical joint systems which strike S. 70°E.and S.25°E. approximately.

In the Nuga Nuga Syncline, the formation is 150 feet thick and has the same lithology as in the Mimosa Syncline. At the base of the formation are two one foot thick beds of conglomerate with well-rounded, white and cream milky quartz pebbles and a matrix of quartz sandstone.

In the axial region of the Mimosa Syncline near the southern boundary of the Baralaba Sheet area, the Precipice Sandstone lies unconformably on the Moolayember Formation. Farther south, in the Taroom and Mundubbera Sheet areas, the Precipice Sandstone blankets the Mimosa Syncline and is unconformable on the Clematis Sandstone, Rewan Formation, Upper Bowen Coal Measures (Baralaba Coal Measures and Gyranda Formation), Back Creek Group and the Camboon Andesite. The formation is conformably overlain by the Evergreen Formation.

In the Nuga Nuga Syncline, the Precipice Sandstone unconformably overlies the Clematis Sandstone; the Moolayember Formation having been completely removed before the Jurassic sedimentation commenced.

The Precipice Sandstone was the first unit to be laid down in the area after the Upper Triassic folding and subsequent erosion. The formation consists essentially of quartz sandstone probably derived from pre-existing sandstones such as the Clematis Sandstone and sandstones of the Upper Bowen Coal Measures, which were exposed on the edges of the basin farther to the north following the orogeny. Erosion of granitic terraines may also have contributed sediment to the formation. The dominance of quartz suggests that the climate and topography of the source area were such as to allow thorough chemical weathering. The areal extent of the formation and the uniformity of its lithology indicate that most of the sand was transported over great distances and the conditions in the depositional area were fairly uniform. Current bedding is characteristic of the formation and cut and fill structures were observed in places. Deposition was probably fluviatile by currents capable of removing most of the finer fractions.

During the 1963 season, an attempt was made to determine whether the Precipice Sandstone directly overlies the Clematis Sandstone in the Black Down Tableland in the south of the Duaringa Sheet area as was first suggested by Tweedale (in Hill and Denmead, 1960, p. 282). The critical area could not be reached during the 1962 field season (Malone <u>et al.</u>,1963) but could be reached during the 1963 field season through Planet Downs and Shotover Homesteads.

The airphotos suggest that near the southern boundary of the Duaringa Sheet area, the top sandstone beds in the Black Down Tableland lie horizontally unconformable on the east dipping Clematis Sandstone in the east limb of the Shotover Anticline. This relationship was confirmed in the field, however the actual unconformity surface was not observed. The Clematis and Precipice Sandstones are lithologically similar, have similar photo patterns, and are therefore difficult to distinguish. The authors are of the opinion that the Precipice Sandstone covers most of the Black Down Tableland.

Evergreen Formation

The unit was first referred to by Reeves (1947) as an unnamed shale unit in the 'Bundamba Series', but was later named Evergreen Shale by Whitehouse (1955) after Evergreen Homestead, 21 miles north-east of Injune in the Taroom Sheet area. Jensen *et al.*, (1964) included the Boxvale Sandstone in the formation as a member. The upper part of the formation, overlying the Boxvale Sandstone Member, is not present in the Baralaba Sheet area. The lower part of the Evergreen Formation and the Boxvale Sandstone Member will be discussed separately.

Lower part of the Evergreen Formation.

The type area of the Evergreen Formation is in the valley of the Dawson River immediately below Evergreen Homestead in the Taroom Sheet area.

In the Baralaba Sheet area, the formation crops out over a small area on the southern tableland where it forms moderately vegetated, gently undulating country.

The lower part of the formation crops out poorly. It consists of 310 feet of fawn and grey-green shale, containing abundant carbonaceous plant remains, flaggy siltstone, and thin interbeds of white fine-grained micaceous sandstone.

The Evergreen Formation conformably overlies the Precipice Sandstone in the Mimosa Syncline but is not present in the Nuga Nuga Syncline.

The lower part of the Evergreen Formation was probably laid down in an estuarine or lacustrine environment with periodic marine incursions as indicated by the presence of foraminifera and hystrichospherids (Evans, 1962).

Boxvale Sandstone Member.

The name Boxvale Sandstone was first used by Reeves (1947). The type locality is around Boxvale Station in the Roma District.

The Boxvale Sandstone Member of the Evergreen Formation crops out over a small area near the southern Sheet boundary and forms precipitous mesas up to 100 feet high.

The Member consists of 140 feet of thickly bedded, buff, fine to medium-grained quartz sandstone with some thin interbeds of fine-grained micaceous quartz sandstone (Fig.12).

The sand grains are well-rounded, clear and milky quartz. The sandstone is well-sorted, shows little cross-bedding and has little matrix. Abundant wood impressions are present.

In the Baralaba Sheet area, the Member dips southerly at a very low angle and is overlain by Tertiary sediment and basalt.

The well-sorted and rounded nature of the sands and the presence of wood fragments and some hystrichospherids indicate that the Member was laid down in a shallow, essentially non-marine area where considerable reworking and sorting of the sand took place, and which was invaded by the sea for short periods.

TERTIARY

Sediments

The earliest work on the Tertiary rocks in the Central Bowen Basin was done by Dunstan (1913) who referred to these rocks in the Duaringa area, north of Baralaba, as the 'Nerang - Duaringa Series'. Reid and Morton (1928) used the name 'Duaringa - Emerald Series' for the same sequence. On the Geological Map of Queensland (1953), the name 'Duaringa Formation' was used for the Tertiary rocks along the Dawson and Mackenzie Rivers on the Baralaba and Duaringa Sheet areas. The Tertiary sequence in the Dawson River area is identical to those elsewhere in the Baralaba Sheet area. No formal name has been used for these sediments on the accompanying 1:250,000 Geological Sheet.

Tertiary sediments have a wide distribution on the Baralaba Sheet area and occur mainly in a narrow belt east of the Dawson Range, in the northern part of the Mimosa Syncline and the north-west corner of the Baralaba Sheet area. Isolated areas of outcrop occur in the south-west and south-east of the Sheet area. The topography developed on these sediments is generally flat with a slight slope away from the ranges. Breakaways are formed in places along the Dawson River and an isolated area of tableland occurs in the Forest Hills area. Most of the areas mapped as Tertiary sediments are covered by thick sand which carries a moderately dense vegetation.

Outcrops are generally poor and confined to the breakaways and deep creek beds. The sediments consist mainly of white, yellow and buff quartz sandstone, in places pebbly or conglomeratic, and silty and sandy claystone. Close to the ranges, the sediments are often conglomeratic and contain large blocks of Clematis Sandstone. A curious deposit of probable Tertiary age occurs one mile east of Wooroonah Homestead. It consists of an accumulation of huge boulders, up to 20 feet across,of crossbedded quartz-sandstone, mixed with smaller boulders and cobbles which were all derived from the Clematis or Precipice Sandstones. A few similar boulders, different only in that they are silicified, occur two miles south-west of Wooroonah Homestead. The origin of these deposits is not known but it has been suggested (Tweedale, pers. com.) that they could be landslide deposits.

Taken by: G.W. Tweedale, (Q.G.S.)

Figure 13: 'Billy' boulders in the mottled zone of the laterite profile in Tertiary rocks at Nulalbin Homestead. (Neg.No.G/6454)

Most of the Tertiary sediments have been lateritised and exposures of the mottled zone are common. This zone, containing 'billy' boulders up to two feet in diameter, is well exposed in the bank of Perch Creek at Nulalbin Homestead (Fig.13), 13 miles west-south-west of Baralaba.

The Tertiary sediments are interbedded with basalt flows, unconformably overlie Permian, Triassic and Jurassic rocks, and are in most places covered by superficial deposits of sand. The sediments dip gently away from the principal ranges. Elsewhere, they are mainly flat lying. East and north-east of Baralaba, dip slopes of up to 20° occur in the Tertiary sediments, which, on the air photos, appear to be gently folded. Poor outcrop prevents the correlation of surface slopes and the internal structure of the beds. The 'folds' probably parallel a laterite profile developed on an undulating surface.

The sediments nearest the ranges are piedmont deposits containing large blocks and boulders of Clematis Sandstone and Precipice Sandstone. Away from the ranges, finer sediments were laid down as alluvial fans and lake deposits.

The maximum thickness of the deposits is not known; at least 200 feet is present north-west of Baralaba but elsewhere in the Baralaba Sheet area, it is probably much less. At least 600 feet has been reported farther to the north from the Duaringa Bore (Dunstan, 1901). David (1932) examined fish remains from the Duaringa Bore and assigned these to the Oligocene. Other fossil fish remains were examined by Hills (1934) who could only assign a Tertiary age to them.

Basalt

Basalt is widespread in the Baralaba Sheet area. The main developments are in the Rolleston-Planet Downs-Bauhinia Downs area, and in the Stonecroft Homestead area extending northwards to Boonberry Homestead. Smaller outcrops occur west and south of Woorabinda in the north-west of the Sheet area and in the Expedition Range east of Glenidal Homestead. Basalt does not occur east of the axis of the Mimosa Syncline. The basalt forms a black soil which generally supports a dense grass cover and few trees. The airphoto pattern is light in tone and distinctive. The weathered basalt is an excellent shallow source of potable water.

The basalt is massive, fine-grained, dark brown to purplish-grey (Appendix 3) and in places is vesicular or amygdaloidal. Columnar jointing is common. The flows are interbedded with sediments as is well shown in Blackboy Gully, 11 miles south of Woorabinda.

In most places on the Baralaba Sheet area, the basalt occurs in large sheets of varying thickness. In the Expedition Range, west of Bauhinia Downs Homestead, and in the southern tableland in the Stonecroft Homestead area, the basalt occurs in long, thin, sinuous belts which probably represent old valley fills. A shallow drill hole (BMR 16) in the Expedition Range, and seismic shotholes just to the west of BMR 16 penetrated basalt indicating that the basalt sheets east and west of the Expedition Range are connected through this valley. The basalt on top of the range east of Glenidal Homestead also indicates that the basalt was probably laid down over the south-west corner of the area in one continuous sheet which has since largely been eroded away. Some of the basalt hills in the Bauhinia Downs area may be volcanic vents.

The basalts in the Baralaba Sheet area are probably continuous with the basalts of the eastern Springsure Sheet area, the south-east of the Emerald Sheet area and the south-west of the Duaringa Sheet area, and is of Tertiary age.

CAINOZOIC DEPOSITS

Cainozoic deposits, consisting of alluvium along the rivers and creeks and soil and sand elsewhere, cover large areas in the Baralaba Sheet area.

The Clematis Sandstone and Precipice Sandstone are the only resistant rocks in the area and form the main topographic features. All other soft sediments weather and erode readily to produce extensive soil cover.

Blacksoil (Cz) plains are widespread; in the north-east,mainly over the Permian rocks, in the south-east, mainly over the Moolayember Formation and in the south-west mainly over the Rewan Formation. Soil is also extensively developed over areas mapped as Moolayember Formation and Tertiary basalt.

Large areas, mainly covered by sandy soil and sand, in the northern half of the Sheet area between the Dawson and Expedition Ranges and west of the Expedition Range were mapped as Tertiary sediments which they overlie.

Wide flood plain deposits of clay and silt, which occur along the Dawson, Comet and Brown Rivers, are probably not more than 100 feet thick.

INTRUSIONS

The Permian sequence in the Baralaba area is intruded by a stock at Mount Ramsay, and dykes at Baralaba and 4.5 miles to the east.

The intrusion at Mount Ramsay, 7 miles south-east of Baralaba, rises sharply about 1100 feet above the surrounding plain. It is about 2 miles long and one mile wide at its widest point; the long axis of the intrusion trends north-north-westerly. Viewed from the north, the intrusion appears to dip steeply towards the north-east. Considerable updoming of the country rocks around Mount Ramsay has taken place.

The intrusion consists of massive fine and coarse grained trachyte; full descriptions of these rock types are set out in Appendix 3.

A north-west trending trachyte dyke (Appendix 3), containing blocky fragments of country rock, crops out 4.5 miles east of Baralaba along the main road. A similar dyke or sill was encountered in diamond drill holes in the Baralaba area (Fig.7).

The Mount Ramsay intrusion and the dykes which intrude the Upper Bowen Coal Measures are probably related. Age determination (Potassium-Argon) indicates a Tertiary or Upper Cretaceous age for the intrusion.

STRUCTURE

The Baralaba Sheet area lies nearly entirely within the Bowen Basin. Near the southern Sheet boundary, the Bowen Basin, occupied by Permian-Triassic rocks, is overlapped by the Jurassic sediments of the Surat Basin.

Recent geophysical work (Enclosure 3), and the surface mapping show that the sediments in the Baralaba Sheet area, except in the north-east corner, are gently folded. The Mimosa Syncline, the largest structure, occupies more than half the Sheet area. West of the Syncline are several low amplitude anticlines and synclines. North-east of the Mimosa Syncline, the beds are tightly folded, overturned, and faulted. Fold axes in the north-east of the Sheet trend north-north-west, generally parallel to the trend of fold axes in the remainder of the Sheet area. The profoundly different types of folding in the Mimosa Syncline in the west and near Baralaba in the north-east is of major tectonic significance; they may be separated by a low angle east dipping thrust zone. The principal plane of thrusting probably lies west of Baralaba and trends north-north-west. It may be the northern extension of the Banana Fault which has been mapped near Banana in the Monto 1:250,000 Sheet area, 25 miles south-east of Baralaba (Glover, in Hill and Denmead, p. 205). There is very little outcrop between Baralaba and the Dawson Range, and no surface expression of the thrust. However, the effect of the thrusting must die out between these two points as the Clematis Sandstone in the Dawson Range dips gently westward without major disturbance. Geophysical work (Marathon Petroleum Australia Ltd, 1962) (Enclosure 3) has shown that a series of north-west trending faults are present in the subsurface between Baralaba and the Dawson Range. They are reverse faults, with east blocks up.

In the following paragraphs, short descriptions are given of the individual structures in the Baralaba Sheet area:

Thuriba Anticline: The anticline lies on the corner of the Baralaba, Duaringa, Rockhampton and Monto 1:250,000 Sheet areas (Enclosure 2). ?Silurian-Devonian rocks occur in the core of the structure which has been fully described in 'The Geology of the Gogango Range' (Olgers et al., 1964.).

Anticlinorium east of Baralaba: The west limb and north plunge of a small anticlinorium, in which three anticlinal axes were mapped, are exposed 5 miles east of Baralaba (Enclosure 2). The structure is outlined by the strongly outcropping, richly fossiliferous Flat Top Formation. The soft siltstone of the Barfield Formation is exposed in the core. Flank dips on the northern nose range from 20° to 50°; west dips in all cases being greater than east dips. The west limb of the anticlinorium is slightly overturned indicating that deformation was produced by stress from the east or north-east.

<u>Mimosa Syncline</u>: The Mimosa Syncline is the dominant structure of the Baralaba Sheet area and the largest in the Bowen Basin. It extends from just south of Bluff in the Duaringa Sheet area through the Baralaba Sheet area into the Taroom Sheet, and can be traced in the subsurface into the Roma Sheet area, a total distance of about 150 miles.

In the Baralaba Sheet area, the Mimosa Syncline is outlined by the Clematis Sandstone which forms the Expedition and Shotover Ranges in the west and the Dawson Range in the east. The Syncline ranges in width from 30 miles in the north to 60 miles in the south.

The stratigraphy of the Syncline is well known from the surface geology. Permian and Triassic sediments are unconformably overlain by Jurassic sediments. The greatest thickness of Permo-Triassic sediments in the Mimosa Syncline is in the Bauhinia Downs-Moura area and is estimated to be about 25,000 feet (Marathon Petroleum Australia Ltd., 1962). The Jurassic rocks, which overlie the Permo-Triassic sequence with a marked unconformity, attain the thickness of about 700 feet in the Baralaba Sheet area.

Seismic surveys by United Geophysical Corporation for Marathon Petroleum Australia Ltd (1962) (Fig.2, Enclosure 3) show that the Mimosa Syncline is an asymmetric syncline with a south-easterly to southerly plunge. The synclinal structure is clearly shown on reflecting horizons at the top of the Clematis Sandstone and at the top of the Upper Permian Coal Measures. The axis of the Mimosa syncline at the Clematis Sandstone horizon lies to the west of the axis at the Coal Measures horizon. Towards the northern boundary of the Sheet, the trend of the axis of the syncline changes gradually from a northerly direction to a north-westerly direction; the structure contours on the Coal Measures horizon (Enclosure 3) show that the syncline bifurcates.

The western flank of the syncline shows several minor dip reversals and possible reversals and two closed high zones referred to as the Shotover and Glenhaughton Structures. The Shotover Structure is extensively faulted and lies just north of the Baralaba Sheet area in the Duaringa Sheet; the south plunge of the anticline, which is manifest at the surface by Clematis Sandstone, lies in the Baralaba Sheet area. The Glenhaughton Structure is 16 miles south of the Baralaba Sheet area in the Taroom Sheet. Glenhaughton No.1 was drilled by Marathon Petroleum on the structure in 1964 to a depth of 9418 feet. No hydrocarbons were encountered.

No reversals of dip are present on the eastern limb of the Mimosa Syncline. Seismic reflections from the Coal Measures horizon show that the eastern flank of the syncline in the north-east of the area is extensively faulted. These faults have not been detected at the Clematis Sandstone horizon mainly due to poor reflections from this horizon at shallow depths and it is not known what effect the Permian faults have on the younger formations. There is no outcrop in the area due to extensive Cainozoic cover. Some faults cutting the Moolayember Formation were mapped a few miles to the north-west near Wooroonah Homestead.

Planet Downs Structure: Previously compiled geological maps covering the Planet Downs area, west of the Expedition Range, invariably show an anticlinal axis just west of the Expedition Range between Rolleston and Bauhinia Downs Homestead (e.g., Tweedale and Isbell in Hill and Denmead, Fig. 27). There is no evidence at the surface for this structure. The Clematis Sandstone in the Expedition Range dips consistently to the east and the area west of the ranges is covered by Cainozoic basalt and sediments.

A seismic survey was conducted by Austral Geo Prospectors Pty.Ltd. for Planet Oil Company N.L. (1962) in the Planet Downs area. Reflection quality was good except in areas of basalt cover. The survey suggests the presence of an anticline with the apex lying west of the south-western edge of the permit area (ppp.711) (Enclosure 2). A small positive structural anomaly, dependent on minor faulting for critical west dip, is present in the south-western corner of ppp 711 on the eastern flank of the anticline, and a pronounced positive anomaly was postulated to lie in the central north-west of ppp.711. Some faults are present in the south-west corner of the Permit area.

Purbrook - Arcadia Anticline: The Purbrook - Arcadia structure is a regional anticline which has been delineated in the subsurface by seismic surveys over a distance of 50 miles in the south-west of the Baralaba Sheet area and the north-west of the Taroom Sheet. The anticline lies between the Mimosa Syncline to the east and the Nuga Nuga Syncline to the west. The whole area is covered by Cainozoic deposits and only a few poor outcrops of Rewan Formation are present. A seismic survey conducted by Geophysical Service International for Mines Administration Pty.Ltd. (1963) shows that the axis of the structure is sinuous and its trend varies from north-east to north-west.

The Purbrook Anticline is the main culmination in the Baralaba Sheet area and lies 15.5 miles south-east of Rolleston. A.F.O. Purbrook No.1 was drilled in 1963 on the crest of the structure which has an estimated closure of 1000 feet over 250 sq.miles. No hydrocarbons were encountered in the well (Enclosure 4). Smaller culminations occur on the axis near the southern Sheet boundary. The main culmination in the Taroom Sheet area is the Arcadia Anticline, on which O.S.L. No.3 (T.D. 6025') and A.A.O. No.7 (T.D. 3280') were drilled from 1936 - 1938 and in 1957 respectively. Gas was encountered in the Permian in O.S.L. No.3 between 1187' and 3955'.

Warrinilla Anticline: This structure is in the south-west corner of the Baralaba and north-west corner of the Taroom Sheet areas. It lies between the Nuga Nuga Syncline to the east and the Rewan Syncline to the west both of which are outlined by the boldly out-cropping Clematis Sandstone. Some poor outcrops of Rewan Formation are present in the core of the anticline.

Seismic work by Austral Geoprospectors Pty.Ltd. for Planet Oil Company N.L. (1962, a) shows that the structure is a broad anticline which plunges in a north-north-westerly direction. It is asymmetrical with a gentle east flank and a steep west flank. A major fault has been postulated along the west flank of the structure between it and the Morella Anticline to the south-west.

A few culminations are present along the crest of the main structure. The largest culmination lies in ppp 712, 30 miles south of Rolleston, with closure ranging from 120 feet on Horizon AF1 (about 100 feet below the top of the Ingelara Formation), to 60 feet on Horizon AF 3 (top of the Cattle Creek Formation). Planet Warrinilla North No.1 (T.D. 6879') was drilled in 1963 on this culmination. Planet Warrinilla No.1 (T.D. 6701') was drilled in 1963 on a culmination on the Warrinilla Anticline 16 miles south of the Baralaba Sheet area in the Taroom Sheet area. Gas was obtained in drill stem tests in Warrinilla No.1 from the Aldebaran Sandstone (3367'-3434'), and the Cattle Creek Formation (4172' - 4212') (Enclosure 4).

Rolleston Anticline: The Rolleston Anticline is a broad, north-south trending structure. Its culmination lies six miles south of Rolleston. The structure has no surface expression and was located by a seismic survey by Geophysical Service International for Mines Administration (1963). Subsequent detailed seismic work was done in the area and A.F.O. Rolleston Nos. 1-8 were drilled on the structure (Fig. 6), which was estimated to have a closure of 400 feet over about 20 sq. miles. The objective of Rolleston No.1 Well was to test the fluid content of the Permian formations, the prime target being the Aldebaran Sandstone. A considerable flow of gas, reported to be about 20 million cubic feet per day, was obtained from the interval 2945' to 2980'. Rolleston No.3 produced about 3 million cubic feet of gas per day. The other Rolleston Wells were either dry or yielded small shows of gas. Drilling on the Anticline is continuing (Fig.6).

Structures in the north-west of the Baralaba Sheet area.

The area north of Rolleston in ATP 56P is covered by Cainozoic deposits and there are no surface indications of the structures present at depth. A seismic survey by Geophysical Service International for Mines Administration Pty.Ltd.(1962) has shown that the area is gently folded (Enclosure 3) and represents the southern extension of the Comet Platform (Derrington and Morgan in Hill and Denmead, p.209). The axes of the structures are sinuous about a general north-south direction. Several culminations occur on the two main anticlinal axes. The syncline between the two anticlines is the extension of the Nuga Nuga Syncline which is expressed at the surface further to the south.

HISTORICAL SKETCH

The oldest rocks in the Baralaba Sheet area are the Lower Permian Camboon Andesite and closely associated Rannes Beds in the core and east limb of the Thuriba Anticline in the north-east corner of the Sheet area. The volcanics are interbedded with sediments which, in some places in the Monto Sheet area, contain marine fossils. The volcanics were probably laid down on land and in shallow coastal waters along the western edge of the Yarrol Basin. The volcanism was probably closely associated with the gradual subsidence of the area to the west which led to the formation of a marine sedimentary basin, the Bowen Basin. Subsidence in the Bowen Basin was most pronounced along the eastern edge where the greatest thickness of sediment accumulated. In the Baralaba area, the Camboon Andesite is directly overlain by the Upper part of the Back Creek Group (Middle Bowen Beds), the Oxtrack, Barfield and Flat Top Formations (equivalent to Unit C of Dickins et al., 1962). The lower part of the Back Creek Group (Units A & B), which is farther to the north represented by about 5000 feet of sediments, was either not laid down in the Baralaba Sheet area, or was removed before the Oxtrack Formation was deposited. Farther to the south in the Monto and Mundubbera Sheet areas, there is evidence that a large portion of the section was removed by erosion, (Jensen et al.,1964), and similar events may have occurred in the Baralaba area.

Early in the Upper Permian, the basin gradually lost its connection with the sea and changed from a marine basin with a varied fauna to a fresh water basin in which sediments containing abundant plant material were deposited. The lower part of the Upper Bowen Coal Measures (Gyranda Formation) was probably laid down in a paralic environment (Malone et al., 1963) The upper part of the unit, the Baralaba Coal Measures, was laid down in a lacustrine environment. Volcanic activity occurred during the deposition of the Upper Bowen Coal Measures as shown by the tuffaceous nature of some of the sediments.

In the Lower Triassic, conditions within the basin and in the provenance areas changed, and the redbed sequence of the Rewan Formation, consisting mainly of purplish-red mudstone and greenish lithic sandstone, was laid down. Wood and plant remains are present in the formation but are not nearly as common as in the Upper Bowen Coal Measures. The lithology and organic content of the formation indicate deposition in a shallow non-marine environment.

A considerable change of provenance and depositional environment took place, probably in the Middle Triassic, as indicated by the deposition of crossbedded quartz sandstone, the Clematis Sandstone. A detailed study of the cross bedding (Fig.11) has indicated that the provenance of the formation was to the north and north-west of the Baralaba Sheet area, possibly the Urannah Complex and Anakie Inlier respectively. The Auburn Complex may also have contributed some of the material. Deposition was probably fluviatile.

In the Middle to Upper Triassic, the shale, lithic sandstone and conglomerate of the Moolayember Formation were laid down, signifying another major change in provenance. Sedimentation probably took place in a generally shallow, but rapidly subsiding non-marine basin.

The orogenic phase of the Bowen Basin, involving folding, uplift and minor intrusion, began after or towards the end of deposition of the Moolayember Formation. Extensive erosion followed, removing most of the Moolayember Formation except from the trough of the Mimosa Syncline.

Early in the Jurassic, the Precipice Sandstone was laid down in a shallow non-marine environment, unconformably on the deeply weathered Moolayember Formation and Clematis Sandstone. The quartz sandstone of the Precipice Sandstone was probably derived from the same source as the Clematis Sandstone and laid down under very similar conditions.

Later in the Jurassic, sedimentation changed slightly and the siltstone and shale of the Evergreen Formation and the quartz sandstone of the Boxvale Sandstone Member were laid down. Plant material is abundant. The presence of hystrichospherids and foraminifera in the Evergreen Formation indicates that marine incursions took place during the Jurassic.

The subsequent history of the Baralaba Sheet area is epeirogenic. Tertiary basalt was poured out over large areas in the Mimosa Syncline and west of the Expedition Range. The basalts are interbedded with Tertiary sediments, which were deposited as alluvial fans and lake deposits between the main ranges over most of the Sheet area. A trachyte stock and associated dykes, intruding the Upper Bowen Coal Measures south-east of Baralaba, were probably emplaced in the Upper Cretaceous or Tertiary.

ECONOMIC GEOLOGY

Coal is the most important mineral in the Baralaba Sheet area. It has been mined at Baralaba since 1921. In 1958, Thiess Brothers discovered large deposits of coking coal near Moura and Kianga, just east of the Baralaba Sheet area. Production from the Moura open-cut will reach 1,000,000 tons per year in the near future. The Moura coal is being exported to Japan through the port of Gladstone.

The water resources of the Baralaba area are fair. Landholders generally rely on surface water conserved in waterholes, tanks or dams, or shallow small supplies from bores or wells in alluvium along the creeks. Baralaba and Moura obtain their town water supplies from the Dawson River.

Gas was found in the Rolleston area at the end of 1963. The potential of the area is good and drilling is continuing.

The oil, coal and water potential of the area will be discussed separately in the following pages.

Oil Prospects

The history of oil exploration in the Baralaba Sheet area and surrounding regions has been dealt with on page 6. The longstanding interest in the area shows that the chances of locating economic oil or gas accumulations in the area are generally regarded to be good.

The emphasis of oil exploration in the Bowen - Surat Basins is shifting northwards into the southern Bowen Basin since most of the known closed structures in the Surat Basin have been drilled. More exploratory holes were drilled in the southern Bowen Basin in 1963/64 than ever before. (S.W. Baralaba 11, S.E. Springsure 1, N.E. Eddystone 1, and N.E. and N.W. Taroom 2) Seismic surveys are presently being undertaken in the Baralaba Sheet area in ATP's 55P, 56P and 89P (Fig.2).

Geological mapping and extensive geophysical investigations indicate that numerous closed structures are present west of the Expedition Range in the Baralaba Sheet area (see under'Structure', and Enclosure 3). Owing to the gentle nature of the folding, closure is generally small but extends over large areas.

The marine Permian units in the Bowen Basin contain a considerable thickness of black shale and are regarded to be the source beds of oil and gas that have been encountered in some of the bores in the Bowen and Surat Basins.

Reservoir rocks occur throughout the Permian section in the Bandanna Formation, Catherine Sandstone, Aldebaran Sandstone and Cattle Creek Formation (these units do not occur in outcrop on the Baralaba Sheet area. See Mollan et al., 1964). Drilling has shown that the Aldebaran Sandstone and Catherine Sandstone have the best reservoir characteristics and are therefore the prime targets in most drilling operations, however all other above mentioned formations may be prospective. The porosity of the reservoir rocks is very variable as was clearly shown in the Rolleston Anticline (Fig.6). The sands in A.F.O Rolleston Nos. 1 and 3 were porous and yielded 20 million and 3 million cubic feet of gas per day respectively. However, the sands in Rolleston Nos. 2, 4, 5, 6 and 7 were either tight or yielded small quantities of gas (Fig.6). The Precipice Sandstone, which crops out in the south of the Baralaba Sheet area, is the best reservoir rock further to the south in the Surat Basin. It is producing sand at the Moonie Oil Field.

The Ingelara and Peawaddy Formations, (Mollan *et al.*, 1964) provide the caprocks to the reservoirs. Lithological changes within the Permian formations also provide capping.

The area of greatest interest in the Mimosa Syncline lies along the western boundary of Permit 89P on the western flank of the structure. Several minor reversals, possible reversals and closed structural high areas, aligned in a north-south direction, are present. The possibility of stratigraphic traps in the area cannot be overlooked since thinning towards the west takes place as indicated on an isopach map of the Clematis Sandstone - Coal Measures interval prepared by Marathon Petroleum (1962).

The north-east corner of the Baralaba Sheet area is of little interest for oil exploration because of its tectonic history. The rocks are tightly folded and have been intruded. The east flank of the Mimosa Syncline and the area east of the Dawson Range and south of Mount Ramsay have not received much attention in connection with the search for oil. In this area, the rocks dip gently to the west and geophysical work has shown the presence of strike faults. The oil potential of the eastern region is probably not great but the possibility of accumulations of hydrocarbons in structural or stratigraphic traps should not be overlooked.

Coal

Coal, the main mineral product of the Baralaba Sheet area, was first noted in the area by Daintree (1872). The first detailed work on the coal bearing strata was done between 1898 and 1901 by Dunstan (1901). Dunstan's work in the area encouraged two companies to take up coal prospecting leases near Baralaba. They were :

(1) Dunstan Coal Mining Syndicate which had leases around the present site of the township of Baralaba.

(2) Dawson River Anthracite Coal Prospecting Co. with leases about 3 miles further south.

From 1902-04 the Dunstan Company sank 7 shafts and 7 bores and the Dawson River Company, 4 shafts and 7 bores on their respective leases and proved the existence of a number of seams.

Figure 14: Thiess-Peabody's Moura open-cut. The coal dips westerly, and the overburden consists of hard feldspathic sandstone. (Neg. No. M/323).

(Prominent joint planes in the overburden dip steeply to the east to produce an erroneous impression of unconformity at the top of the coal.)

The State Government conducted a diamond drilling programme from 1908 to 1911 and some 43 bores were sunk. The southern part of the area drilled was later chosen as the site for a State coal mine.

In 1917-18, sixteen diamond drill holes were sunk on the northern part of the old Dunstan Company leases at Baralaba for a new company, the Dawson Valley Coal Mine, a subsidiary of Mount Morgan Ltd.

In 1920 a State Coal Mine was formed and a shaft sunk approximately 1 mile south of the Baralaba Hospital. The mine commenced production in 1921 and continued producing until 1928 when it was forced to close because of severe damage by flooding. During its eight years of operation the mine produced 215,180 tons of coal.

The Dawson Valley Coal Mine commenced production in 1922. Except for the period 1929-1932, coal has been mined continuously; the total production to the end of 1962 was 824,300 tons.

The coal is a soft, low volatile, non-coking type which ranges in rank from a semi-anthracite in the south of the field to a semi-bituminous coal in the north.

In the most southern area of the field, the fuel ratio ranges from 9.1 to 12.0 (volatile matter 7.8 to 9.9%), while in the north around Baralaba itself, the ratio is 5.2 to 6.5 (volatile matter 13.3 to 16.2%), which represents a change from semi-anthracite to semi-bituminous coal. Proximate analyses of three seams are shown below :

Dawson Seam (8')

Moisture at 105°C	1.5%
Volatiles	11.9%
Fixed Carbon	74.1%
Ash	12.5%

Dunstan Seam (10')

Moisture at 105°C	1.7%
Volatiles	10.5%
Fixed Carbon	77.0%
Ash	10.8%

Dawson Seam

Moisture at 105°C	1.8%
Volatiles	11.4%
Fixed Carbon	76.3%
Ash	10.5%

Workable reserves were estimated by Reid (1945,c) to be contained within an area of 5.6 square miles. Probable reserves are of the order of 200 million tons in five seams exceeding 5 feet in thickness (Fig.7). Of this total, approximately 93 million tons are probably contained in the Dunstan and Dawson seams which range from 7 feet to about 10 feet in thickness. These two seams have provided nearly all coal mined to date.

Recent deep drilling in the Baralaba area has revealed the presence of 1250 feet of coal measures containing ten identifiable seams which can be correlated over most of the area around Baralaba; eight of the seams exceed 5 feet in thickness (Fig.7). Drilling by Thiess Brothers south of Baralaba led to the discovery in 1958 of coking coals at Kianga and Moura (Fig,14). Large quantities of coking coal have since been taken from the field and exported to Japan.

Surface and Underground Water

The underground water potential of the Baralaba Sheet area is probably greater than is generally appreciated by landholders in the area, who rely mainly on earth tanks, dams, and permanent waterholes for stock water supplies. The average annual rainfall of 20 to 30 inches is sufficient to keep most of these reservoirs filled the year round. The Dawson, Comet and Brown Rivers and many of the larger creeks, including Planet and Mimosa Creeks flow for a large part of the year and contain permanent waterholes.

The details concerning 237 known bores, dug wells and spears in the Baralaba Sheet area have been set out in Table 3, and their positions have been plotted in Figure 15. Most of the information was made available by the Queensland Lands Department. In many cases it was difficult to determine in which units the aquifers lie, because the depth of the bores is unknown. Most bores are from 100 to 200 feet deep. The deepest bores, at 1100 feet, occur 2 miles east of Bauhinia Downs Homestead (Nos. 75 and 76).

The map (Fig.15) shows that most of the bores in the Sheet area were put down between the Expedition and Dawson Ranges in the Moolayember Formation and Tertiary basalt. Very few bores were sunk within these ranges. The bores west of the Expedition Range, were drilled mainly into Tertiary rocks, and only two bores are known from the area east of the Dawson Range.

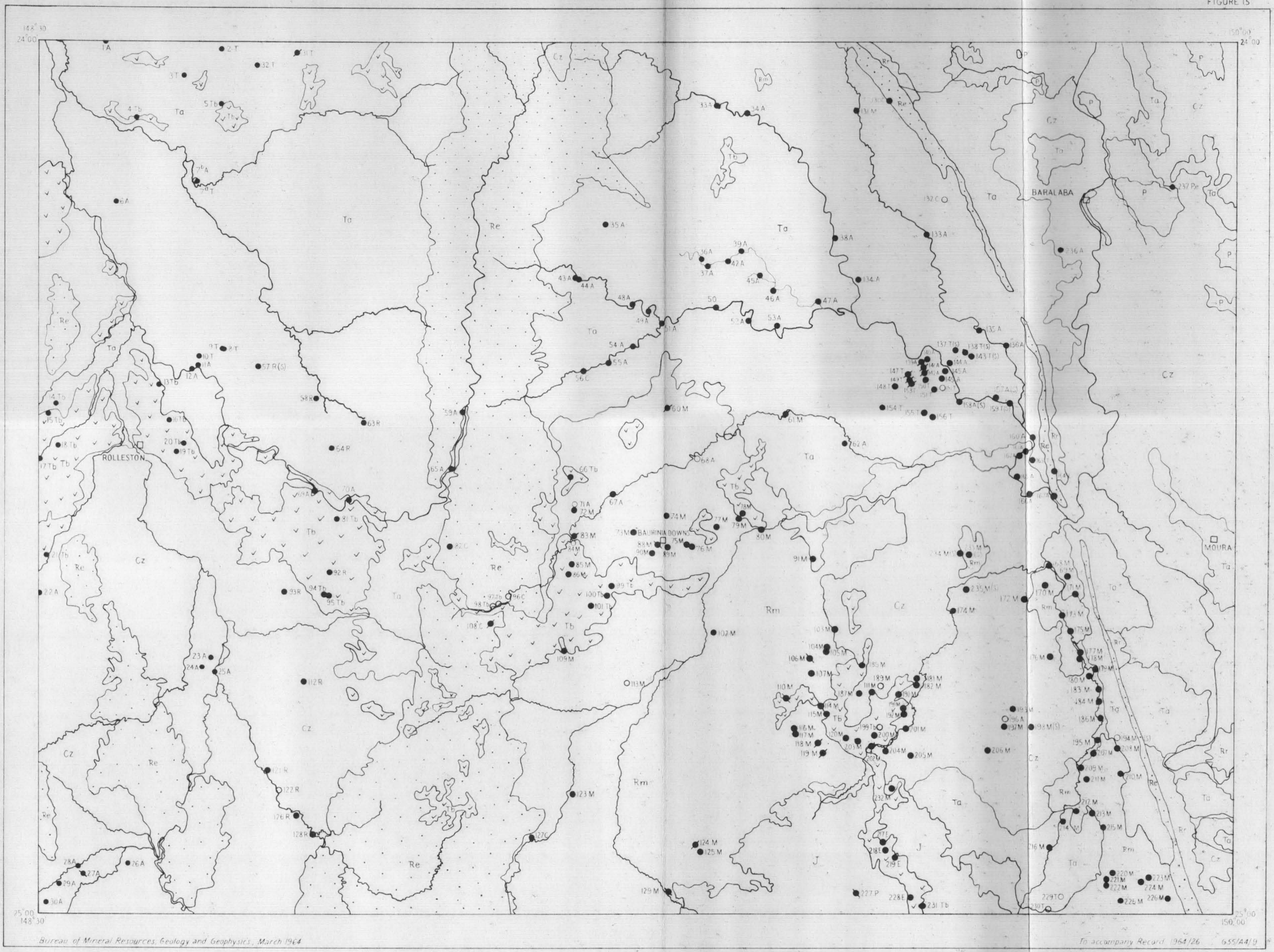
The water potential of the different units will be discussed separately:

Alluvium: Many of the bores and wells and all spears in the Baralaba Sheet area were put down to a shallow depth in alluvium along the rivers and creeks. Good supplies of fresh water are generally obtained.

BARALABA

LOCATION OF WATER BORES AND WELLS

FIGURE 15



Bureau of Mineral Resources, Geology and Geophysics, March 1964

To accompany Record 1964/26 655/A4/9

Scale 1:500,000

5 0 5 10 15 MILES

ALLUVIUM along streams not shown

Cz	Thin superficial deposits
Ta	Tertiary Sediments
Tb	Tertiary Basalt
J	Precipice Sandstone, Evergreen Formation, Boxvale Sandstone Member
Rm	Moolayember Formation
Re	Clematis Sandstone
Rr	Rewan Formation
P	Upper Bowen Coal Measures, Middle Bowen Beds and Lower Bowen Volcanics

● 53 A — Bore 53 (see Table I)
○ 98 Tb — Well (dug) 98 (see Table I)
Aquifer probably in A — Alluvium
T — Tertiary Sediments
Tb — Tertiary Basalt
E — Evergreen Formation
P — Precipous Sandstone
M — Moolayember Formation
C — Clematis Sandstone
R — Rewan Formation
Pe — Permian Sediments

● — Abandoned bore
● — Unsuccessful bore
(S) — Salty supply

Tertiary Sediments: Only a few bores produce water from Tertiary sediments, and most of these are in the north-west of the Sheet area and in the Mimosa Syncline near Pine Hut Homestead. Most of the 'dud' bores in the Baralaba Sheet area were put down in Tertiary sediments. Some of the bores in the north-west may actually produce from interbedded basalt.

Tertiary Basalt: The Tertiary basalt in the Baralaba Sheet area is, as elsewhere in the Bowen Basin, a good producer of excellent water.

Jurassic Formations: Not many bores have been put down in the southern tableland where the Precipice Sandstone and Evergreen Formation crop out. One bore (No. 227) bottomed in the Precipice Sandstone, but was abandoned because of its salinity. Four bores (Nos. 217, 218, 219 and 228) bottomed in the Evergreen Formation. All are in use for stock watering.

Moolayember Formation: The majority of bores in the area were put down in this formation, which consists of conglomerate, sandstone and shale. Most of the bores are good producers (up to 1000 gallons per hour) of stock water. BMR 19, drilled in the formation 7 miles north of Stonecroft Homestead, encountered water at 40 and 115 feet; the potential production probably exceeds 200 gallons per hour.

Clematis Sandstone: Only six bores (Nos. 56, 82, 108, 127, 130 and 164) are known to have bottomed in the Clematis Sandstone. All except one (No.108) are good producers. BMR 16, drilled in the Expedition Range alongside the main road to a depth of 200 feet, was a dry hole. BMR 20 and 21 were drilled in the Dawson Range in Glenmoral Gap in the south-east of the Sheet area (Fig.16). Both holes encountered good supplies but were drilled close to a deep waterhole.

Rewan Formation: Several bores west of the Expedition Range probably bottomed in the Rewan Formation. All except one are in use. BMR 18, 22 and 23 were put down in the Rewan Formation east of the Dawson Range without striking water. The water potential of the formation east of the Dawson Range is regarded to be low.

Permian Formations: The water potential of the Upper Bowen Coal Measures, Back Creek Group and Camboon Andesite is unknown. Only one bore (No.237) is known to have been drilled in these rocks.

Table 3 Water Bore Information

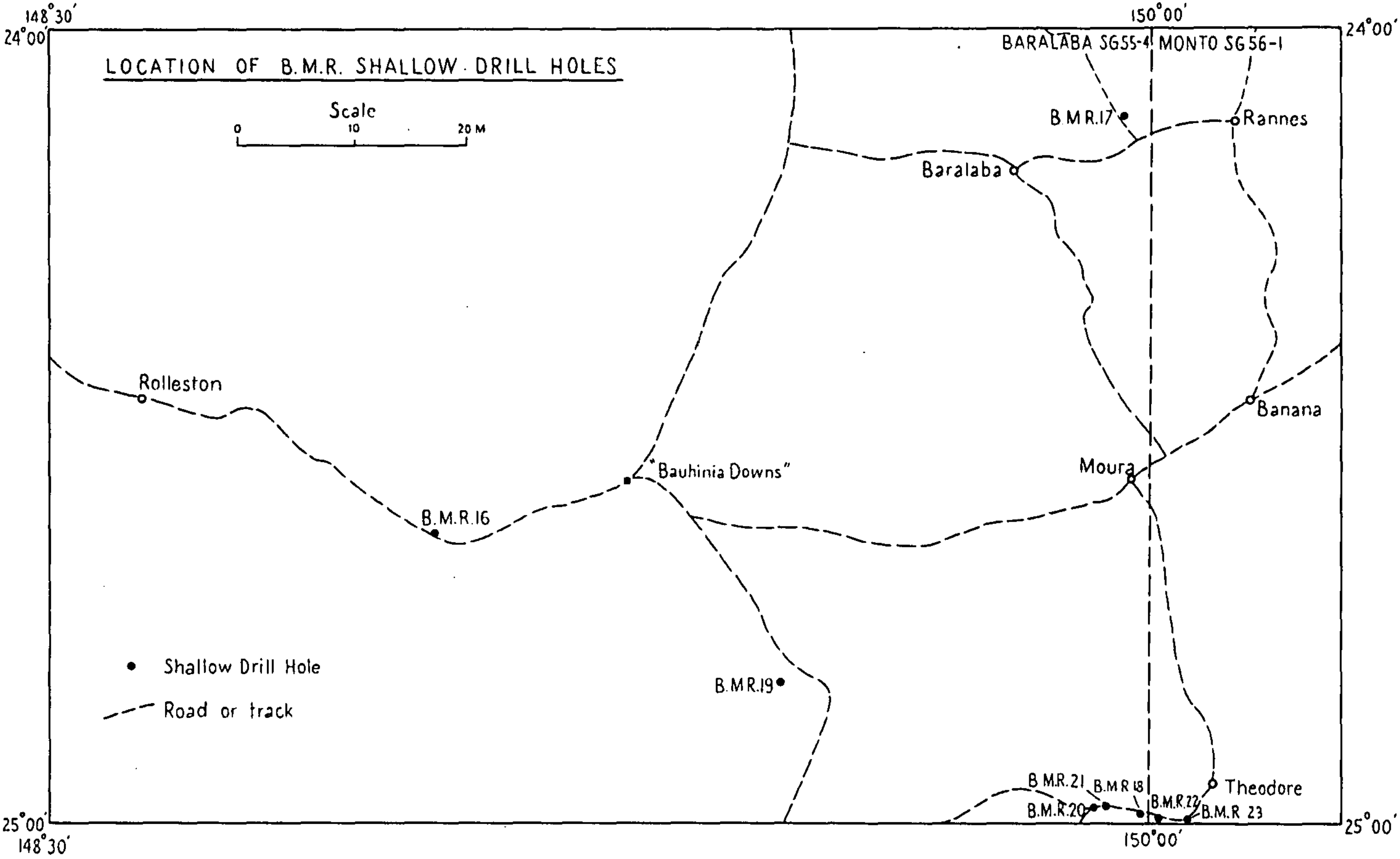
Bore No. (fig.15)	2-mile Sheet No.	Property or Holding	Type of Supply	Depth in feet	Formation
1	206	Comet Downs	Bore		Alluvium
2	206	Memooloo	Bore		Tertiary
3	206	Togara	Bore		Tertiary
4	206	Comet Downs	Bore		Tertiary basalt
5	206	Memooloo	Bore		Tertiary basalt
6	206	Yandine	Bore	73	Alluvium
7a	206	Mira	Bore	70	Tertiary
7b	206	Mira	Well	24	Alluvium
8	168	Coonabar	Bore	117	Tertiary
9	168	Coonabar	Bore	117	Tertiary
10	168	Coonabar	Bore	115	Tertiary
11	168	Coonabar	Bore		Alluvium
12	168	C & W Res.	Bore		Alluvium
13	168	GH3215	Bore	85	Tertiary basalt
14	168	Meteor Downs	Bore		"
15	168	Meteor Downs	Bore		"
16	168	GH 3218	Bore		"
17	168	Meteor Downs	Bore		"
18	168	Meteor Downs	Bore		"
19	168	GF 3232	Well	200	"
20	168	GF 3232	Bore	112	"
21	168	Mt Pleasant	Bore	98	"
22	168	Mt Pleasant	Bore	95	Alluvium
23	168	Nogun	Bore	83	Alluvium
24	168	Nogun	Bore		Alluvium
25	168	Cometside	Bore	36	Alluvium
26	166	Warrinilla	Bore	112	"
27	166	Wysbey	Bore	100	"
28	166	Wysbey	Bore)	59-100	"
29	166	Wysbey	Bore)		"
30	166	Wysbey	Bore)		"
31	205	Lalcham	Bore		Tertiary
32	205	Lalcham	Bore	130	Tertiary
33	205	GF 9092	Spear		Alluvium
34	205	GH 9093	Spear		Alluvium
35	205	Brackenby	Spear		Alluvium
36	205	Box Gully	Spear		Alluvium
37	205	Box Gully	Spear		"
38	205	Mimosa Pk.	Spear		"
39	167	Central Ck.	Spear		"
42	167	Central Ck.	Bore		"
43	167	Glenbower	Spear		"
44	167	Glenbower	Spear		"
45	167	Central Ck.	Spear		"
46	167	Oaklands	Spear		"
47	167	Mimosa Park	Spear		"
48	167	Glenbower	Spear		"
49	167	Goomally	Spear		"
50	167	Goomally	Spear		"
51	167	Goomally	Spear		"
52	167	Oaklands	Spear		"
53	167	Oaklands	Spear		"
54	167	Goomally	Spear		"
55	167	Repulse	Spear	22	"
56	167	Repulse	Bore	360	Clematis Sandstone
57	168	Coonabar	Bore	240	Rewan Formation
58	167	Planet Downs	Bore	400	"
59	167	Planet Downs	Spear	45	Alluvium

Bore No. (fig.15)	2-mile Sheet No.	Property or Holding	Type of Supply	Depth in feet	Formation
60	167	Barranja	Bore	75	Moolayember Formation
61	167	Barranja	Bore	220	Moolayember Formation
62	167	Bandera	Bore		Alluvium
63	167	Planet Downs	Bore	200	Rewan Formation
64	167	Planet Downs	Bore	200	"
65	167	Planet Downs	Spear	12	Alluvium
66	167	Glen Elgin	Spear		Tertiary Basalt
67	167	Glen Elgin	Spear		Alluvium
68	167	Conciliation	Well		Alluvium
69	167	Planet Downs	Spear		Alluvium
70	167	Planet Downs	Spear		Alluvium
71	167	Glen Elgin	Well	8	Alluvium
72	167	Glen Elgin	Bore	69	Moolayember Formation
73	167	Bauhinia Downs	Bore	170	Moolayember Formation
74	167	Bauhinia Downs	Bore	200	Moolayember Formation
75	167	Bauhinia Downs	Bore	1100	"
76	167	Muggine	Bore	1100	"
77	167	Muggine	Bore	78	"
78	167	Muggine	Bore	150	"
79	167	Muggine	Bore	93	"
80	167	Laurel Hills	Bore	76	"
81	167	Planet Downs	Well	60	Tertiary Basalt
82	167	Planet Downs	Bore	180	Clematis Sandstone
83	167	Oakland Park	Bore	120	Moolayember Formation
84	167	Oakland Park	Well	100	Moolayember Formation
85	167	Oakland Park	Bore	195	Moolayember Formation
86	167	Corramar	Bore	120	"
87	167	Oakland Park	Well	40	"
88	167	Bauhinia Downs	Bore	130	"
89	167	Bauhinia Downs	Bore	130	"
90	167	Bauhinia Downs	Bore	100	"
91	167	Loatta	Bore	200 - 400	"
92	167	Planet Downs	Bore	190	Rewan Formation
93	167	Basalt Creek	Bore	87	Rewan Formation
94	167	Basalt Creek	Bore	105	Tertiary Basalt
95	167	Basalt Creek	Bore	54	Tertiary Basalt
96	167	Lenore Hills	Well		Clematis Sandstone
97	167	Lenore Hills	Well		Tertiary Basalt
98	167	Lenore Hills	Well		Tertiary Basalt
99	167	Carramar	Bore		Tertiary Basalt
100	167	Carramar	Bore	70	Tertiary Basalt
101	167	Carramar	Bore		Tertiary Basalt
102	167	Carramar	Bore		Moolayember Formation
103	167	Kidell Plains	Bore	137	Moolayember Formation
104	167	Kidell Plains	Bore	154	Moolayember Formation
105	167	Kidell Plains	Bore	335	Moolayember Formation
106	167	Kidell Plains	Bore	200	Moolayember Formation
107	167	Boonberry	Bore	200	Moolayember Formation
108	167	Lenore Hills	Bore	380	Clematis Sandstone
109	167	Fairfield	Bore	320	Moolayember Formation
110	167	Booroomen	Bore	245	Moolayember Formation
111	167	Boonberry	Bore	375	Moolayember Formation
112	167	Cometside	Bore	175	Rewan Formation
113	167	Fairfield	Well	90	Moolayember Formation
114	165	Spottswood	Bore	97	Moolayember Formation
115	165	Spottswood	Bore	104	Moolayember Formation
116	165	Spottswood	Bore	113	Moolayember Formation
117	165	Spottswood	Bore	110	Moolayember Formation
118	165	Spottswood	Bore		Moolayember Formation
119	165	Spottswood	Bore		Mollayember Formation

Bore No. (fig. 15)	2-Mile Sheet No.	Property or Holding	Type of Supply	Depth in feet	Formation
120	165	Spottswood	Bore	160	Moolayember Formation
121	165	Deep Creek	Bore	105	Rewan Formation
122	165	Deep Creek	Well	55	Rewan Formation
123	165	Mt Aldis	Bore		Moolayember Formation
124	165	Palmgrove	Bore		Moolayember Formation
125	165	Palmgrove	Bore		Moolayember Formation
126	165	Deep Creek	Bore		Rewan Formation
127	165	Mt Aldis	Bore		Clematis Sandstone
128	165	Deep Creek	Bore		Rewan Formation
129	165	Palmgrove	Bore	26	Moolayember Formation
130	202	G.H. 9058	Bore	200	Clematis Sandstone
131	202	G.H. 9058	Bore	350	Moolayember Formation
132	202	G.H. 9083	Bore	250	Clematis Sandstone
133	202	G.H. 9083	Spear		Alluvium
134	164	Redcliffe	Spear		Alluvium
135	164	Olenga	Spear		Alluvium
136	164	Olenga	Spear		Alluvium
137	164	Pine Hut	Bore		Tertiary
138	164	Pine Hut	Bore	70	Tertiary
139	164	Pine Hut	Bore		Alluvium
140	164	Pine Hut	Bore		Alluvium
141	164	Pine Hut	Bore		Alluvium
142	164	Pine Hut	Bore		Alluvium
143	164	Pine Hut	Bore	110	Tertiary
144	164	Pine Hut	Spear		Alluvium
145	164	Pine Hut	Bore		Alluvium
146	164	Pine Hut	Bore		Alluvium
147	164	Pine Hut	Bore		Tertiary
148	164	Pine Hut	Bore		Tertiary
149	164	Pine Hut	Bore		Tertiary
150	164	Pine Hut	Bore	140	Tertiary
151	164	Pine Hut	Bore	57	Tertiary
152	164	Pine Hut	Well	24	Tertiary
153	164	Pine Hut	Bore	140	Tertiary
154	164	Pine Hut	Bore	110	Tertiary
155	164	Pine Hut	Bore		Tertiary
156	164	Pine Hut	Bore	140	Tertiary
157	164	Pine Hut	Spear		Alluvium
158	164	Mimosa Vale	Spear		Alluvium
159	164	Mimosa Vale	Spear		Alluvium
160	164	Avoca	Spear		Alluvium
161	164	Avoca	Spear		Alluvium
162	164	Avoca	Bore	40	Alluvium
163	164	Avoca	Bore	127	Tertiary
164	164	Avoca	Bore	130	Clematis Sandstone
165	164	Beckersley	Spear		Alluvium
166	164	Beckersley	Spear		Alluvium
167	164	Beckersley	Spear		Alluvium
168	164	Roundstone	Bore	220	Moolayember
169	164	Roundstone	Bore	130	Moolayember
170	164	Roundstone	Bore	200	Moolayember
171	164	Roundstone	Bore	200	Moolayember
172	164	Roundstone	Bore	150	Moolayember
173	164	Roundstone	Bore	250	Moolayember
174	164	Thalmera North	Bore	194	Moolayember
175	164	Junedale	Bore	242	Moolayember
176	164	Junedale	Bore		Moolayember
177	164	Junedale	Bore		Moolayember
178	164	Junedale	Bore	92	Moolayember
179	164	Junedale	Bore		Moolayember

Bore No. (fig.15)	2-mile Sheet No.	Property or Holding	Type of Supply	Depth in feet	Formation
180	164	Junedale	Bore	209	Moolayember
181	164	Thalmera North	Bore	68	Moolayember
182	164	Thalmera North	Bore	74	Moolayember
183	164	Junedale	Bore	114	Moolayember
184	164	Junedale	Bore	215	Moolayember
185	164	Boonberry	Bore	375	Moolayember
186	164	Junedale	Bore	120	Moolayember
187	164	Spottswood	Bore	140	Moolayember
189	162	Thalmera South	Well	35	Moolayember
190	162	Thalmera South	Bore	130	Moolayember
191	162	Thalmera South	Bore	250	Moolayember
192	162	Thalmera South	Bore	190	Moolayember
193	162	Rhyddings	Bore	125	Moolayember
194	162	G.H. 8477	Well	105	Moolayember
195	162	G.H. 8477	Bore	127	Moolayember
196	162	Rhyddings	Well	45	Alluvium
197	162	Rhyddings	Bore	120	Moolayember
198	162	Rhyddings	Bore	160	Moolayember
199	162	G.H. 1477	Well	70	Tertiary Basalt
200	162	G.H. 1477	Bore	120-370	Moolayember
201	162	Thalmera South	Bore	413	Moolayember
202	162	G.H. 1477	Bore	360	Moolayember
203	162	G.H. 1477	Bore)	120-370	Moolayember
204	162	G.H. 1477	Bore)		Moolayember
205	162	Thalmera South	Bore	62	Moolayember
206	162	Rhyddings	Bore	820	Moolayember
207	162	G.H. 8477	Bore	111	Moolayember
208	162	G.H. 8477	Bore	202	Moolayember
209	162	G.H. 8477	Bore	105	Moolayember
210	162	Thomby	Bore	150	Moolayember
211	162	Thomby	Bore	130	Moolayember
212	162	Thomby	Bore	335	Moolayember
213	162	Thomby	Bore	335	Moolayember
214	162	Thomby	Bore	120	Moolayember
215	162	Thomby	Bore		Moolayember
216	162	Forest Hills	Bore	350	Moolayember
217	162	G.H. 1502	Bore)	258 to 320	Evergreen Formation
218	162	G.H. 1502	Bore)		Evergreen Formation
219	162	G.H. 1502	Bore)		Evergreen Formation
220	162	G.H. 9409	Bore		Moolayember
221	162	G.H. 9409	Bore)	120 to 350	Moolayember
222	162	G.H. 9409	Bore)		Moolayember
223	162	G.H. 9409	Bore)		Moolayember
224	162	G.H. 9409	Bore)		Moolayember
225	162	G.H. 9409	Bore)		Moolayember
226	162	G.H. 9409	Bore)		Moolayember
227	162	G.H. 1502	Bore	320	Precipice Sandstone
228	162	G.H. 1502	Bore	258-320	Evergreen Formation
229	162	Forest Hills	Well	75	Tertiary
230	162	Forest Hills	Well	32	Tertiary
231	162		Bore		Tertiary Basalt
232	162	Punchbowl	Bore	98	Moolayember
233	164	Pegunny	Bore		Moolayember
234	164	Pegunny	Bore		Moolayember
235	164	Pegunny	Bore		Moolayember
236	202	G.H. 9390A	Bore		Permian sediments
237	202	Benleith	Bore		Alluvium

FIGURE 16



LOCATION OF B.M.R. SHALLOW DRILL HOLES

Bureau of Mineral Resources, Geology and Geophysics, April 1964 *To accompany Record 1964/26* *G55/A4/13*

B.M.R. SHALLOW DRILLING

Eight shallow holes were drilled in the Baralaba and south-west Monto Sheet areas during the 1963 field season (Fig.16) as part of a regional drilling programme covering the Springsure, Baralaba, Monto Mundubbera and Taroom 1:250,000 Sheet areas (Malone, 1963). The object of the drilling was to obtain stratigraphic and lithological information in areas of poor outcrop, and to obtain fresh samples for palynological investigation. The holes, which ranged in depth from 90 to 220 feet, were drilled by Geophysical Service International with a truck-mounted Mayhew 1000 air-water drilling rig. BMR 20 and 21 were the only holes drilled with water. Cuttings were collected generally at 10 feet intervals and cores were obtained from the bottom of each hole, except BMR 16 and 17. Cuttings and core samples are kept in the collections of the Geological Survey of Queensland and the Bureau of Mineral Resources. The cuttings of BMR 16 - 23 were examined with a binocular microscope and the logs of the bores have been set out in the following pages.

B.M.R. No.16

Location		Point 916, Baralaba 1:85,000 Photos, Run 6, No.5071 Beside Rolleston - Bauhinia Downs Road, 29 miles east of Rolleston.
Stratigraphic Position		Base of the Clematis Sandstone.
Log	40' - 60'	yellow-brown fine-grained quartz sandstone with high percentage of ironstained clay matrix. Some limonitic nodules. Quartz grains angular to sub-angular. Av. grains size .05 mm. Sorting moderate.
	60' - 70'	As above with a few blocky fragments of iron impregnated sandstone.
	70' - 80'	As above, Poor sorting with grains up to 5 mm.
	80' - 90'	Buff coloured, fine grained quartz sandstone. Iron stained clay matrix 40%. Subangular grains av. size .07 mm. Some grains up to 3 mm. in diameter.
	90' - 100'	As above, slightly more impregnated with iron oxide. Some yellow clay pellets. Sorting moderate. Av. grain size .07 mm.
	100' - 110'	Brown and red-brown fine-grained sandstone with ? shale pellets.
	110' - 130'	Mustard coloured fine-grained quartz sandstone. Clay matrix 45%. Little iron staining. Grains subangular, av. size .05 mm. Sorting good.
	130' - 150'	Light cream fine-grained quartz sandstone. Mustard coloured matrix 20%. Av. grain size .05 mm. Some up to 7 mm. Sorting poor to moderate.

Log 150' - 170' As above with moderate sorting. Numerous flakes of muscovite present.

170' - 180' Cream fine-grained quartz sandstone. Yellow clay matrix. Sorting good. Subrounded grains with av. size .05 mm.

180' - 190' Medium to coarse quartz sandstone. Some clay matrix sorting poor. Av. size .07 mm, some grains up to 8 mm.

No core

B.M.R. No.17

Location: Point 917, Baralaba 1:85,000 Photos, Run 2, No.5094. Two miles north of Kokotungo Siding, beside road.

Stratigraphic Position: From Tertiary sediments into ? Lower Bowen Volcanics.

Log 20' - 40' Light grey clay with some scattered quartz grains. Some nodules of iron oxide.

40' - 100' Light grey to brown and purple clay containing few rounded quartz grains.

100' - 140' Light grey to brown clay and ? weathered shale.

140' - 174' Iron stained pale green clay with red-brown limonitic nodules, possibly from highly weathered andesite.

174' - 180' Altered and weathered andesite or andesitic tuff.

180' - 200' Altered andesite or andesitic tuff. Numerous fragments of colourless to white calcite.

No core

B.M.R. No.18

Location: Point 918, Baralaba 1:85,000 Photos, Run 9, No. 5105. Beside Theodore - Forest Hills Homestead road, about 8 miles from Theodore.

Stratigraphic Position: About middle of the Rewan Formation.

Log 40' - 60' Red-brown mudstone containing fragments of calcite.

60' - 80' Brown and grey weathered fine-grained quartz feldspathic sandstone, Minor yellow limonitic clay matrix. Fragments of weathered biotite Av. grain size .05 mm. Sorting moderate. Grains subangular.

80' - 90' As above. Some dark lithic fragments.

90' - 100' Fine grained quartz-lithic sandstone with fragments of dark red-brown shale. Some biotite flakes. Quartz grains sub-rounded, av.size .05mm.

Log	100' - 110'	As above. No shale fragments.
	110' - 130'	As for 90' - 100'.
	130' - 170'	Fine grained sandstone consisting of weathered feldspar, green hornblende, brown biotite and minor amount of quartz. Av. grain size .05 mm. Sorting moderate to good. Some fragments of grey siltstone and rare fragments of chocolate-brown shale.
	170' - 200'	Dark chocolate-brown to red-brown shale with rare fragments of quartz feldspathic sandstone.
	200' - 210'	Cored (10' recovered) Massive chocolate-brown mudstone, dark grey mudstone and greenish-grey fine-medium grained feldspathic-lithic sandstone.

B.M.R. No.19

Location		Point 919, Baralaba 1:85,000 Photos, Run 8, No.5051. Two miles south of Leichhardt Highway, 59 miles from Theodore via Forest Hills Homestead road.
Stratigraphic Position		Uppermost Moolayember Formation.
Log	60' - 70'	Fine-grained grey sandstone consisting mainly of weathered feldspar, quartz and biotite. Clay matrix. Av. grain size .05 mm. Sorting good. Grains subangular. Some fragments of siltstone and shale.
	70' - 80'	As above with veins of calcite. Partly a calcareous cement.
	80' - 90'	Grey to dark grey shale and siltstone with fragments of fine-grained sandstone consisting of feldspar, quartz, biotite and clay minerals.
	90' - 100'	Grey and dark grey siltstone.
	100' - 110'	Slightly calcareous grey and white fine grained sandstone with fragments of grey and dark grey siltstone and shale. Av. grain size in sandstone is .05 mm. with moderate sorting. Grains subangular.
	110' - 115'	As above. Less sandstone. Fragments of black carbonaceous shale.
	115' - 120'	Water entered hole. No recovery.
	120' - 130'	Cored (5' recovered) Cobble conglomerate and dark grey mudstone.

B.M.R. No. 20

Location: Point 920, Baralaba 1:85,000 Photos, Run 9, No.5105. Beside Theodore - Forest Hills Homestead road, 10 miles from Theodore, in Glenmoral Gap.

Stratigraphic Position: Base of Clematis Sandstone.

Log. Water was struck at 20' (at least 200 gals per hour) and no cuttings were collected. The following are on site descriptions of sludge material.

20' - 50'	Mainly friable medium to coarse grained quartz sandstone.
50' - 80'	Interbedded quartz sandstone and dark grey-blue mudstone with light grey sandy laminae.
80' - 90'	Cored (6' recovered) medium to coarse grained, gritty, kaolinitic quartz sandstone.

B.M.R. No. 21

Location: Point 921, Baralaba 1:85,000 Photos, Run 9, No. 5105. Beside Theodore - Forest Hills Homestead road, 9¾ miles from Theodore in Glenmoral Gap, about ¼ mile east of B.M.R. No.20.

Stratigraphic Position: Bottom of the Clematis Sandstone and the top of the Rewan Formation.

Log

30' - 35'	Weathered iron stained fine-grained sandstone consisting of weathered feldspar, ironstained quartz and biotite. Av. grain size .05 mm. Sorting Good. Grains rounded. Water was struck at 35' and no more cuttings were collected. The following are onsite descriptions of sludge material.
35' - 100'	Dark, blue-grey, hard, fine-grained lithic sandstone, dark grey mudstone and dark purple mudstone.
100' - 110'	Cored (10' recovered) Medium grained kaolinitic feldspathic quartz sandstone, dark grey to black mudstone grading to muddy fine sandstone containing some plant remains, and grey green muddy white sandstone with abundant carbonaceous fragments and some biotite.

B.M.R. No.22

Location: Point 922, Baralaba, 1:85,000 Photos, Run 9, No. 5105. Beside Theodore - Forest Hills Homestead road, about 7 miles from Theodore. About ¼ mile east of B.M.R. No.18.

Stratigraphic Position: About the middle of the Rewan Formation.

Log	20' - 30'	Cream coloured fine grained quartz feldspar sandstone with yellow clay matrix (about 40%). Fragments of blue-grey quartzite and a few fragments of iron stained quartz sandstone. Av. grain size .05 mm. Sorting good.
	30' - 40'	As above but with numerous flakes of weathered biotite.
	40' - 50'	Khaki to fawn coloured shale and quartz lithic sandstone. Fragments of quartzite and weathered flakes of biotite. Av. grain size of sandstone 0.5mm. Sorting good grains subangular.
	50' - 60'	Dark grey shale with fine grained quartz lithic sandstone. Calcareous clay matrix.
	60' - 70'	As for 40' - 50'.
	70' - 80'	Red-brown shale with rare fragments of quartz lithic sandstone.
	80' - 110'	Red-brown shale.
	110' - 120'	Fine grained lithic sandstone. Av. grain size .03 mm. well sorted.
	120' - 150'	Chocolate brown to dark red-brown shale.
	150' - 160'	Fine-grained grey-green quartz lithic sandstone containing abundant biotite. Av. grain size.05 mm. Sorting good. Grains rounded. Few fragments of red-brown shale.
	160' - 170'	Chocolate brown shale.
	170' - 180'	Quartz lithic sandstone with fragments of hornblende and weathered biotite. Av. grain size .05 mm. Grains rounded. Martix calcareous in part.
	180' - 190'	As above. No calcareous cement. Few fragments of red-brown shale.
	190' - 210'	Red brown to chocolate brown shale.
	210' - 220'	Quartz lithic sandstone with hornblende and biotite. Av. grain size .05 mm. Sorting good. Grains rounded.
	220' - 230'	Cored (10' recovered) Chocolate brown mudstone.

B.M.R. No.23

Location	Point 923, Baralaba 1:85,000 Photos, Run 9, No. 5105. At junction of Forest Hills Homestead road with Theodore - Taroom Road.
Stratigraphic Position	Lower part of the Rewan Formation.

Log	20' - 40'	Brown to chocolate brown weathered shale.
	40' - 60'	As above. Few fragments of grey fine-grained feldspathic sandstone containing biotite flakes.

<u>Log</u>	60' - 80'	Chocolate brown and light grey-green shale.
	80' - 90'	Fine grained speckled buff-coloured quartz lithic sandstone with numerous flakes of weathered biotite. Some shale fragments.
	90' - 100'	Brown and light grey-green shale with fragments of quartz lithic sandstone, containing brown biotite. Av. grain size .05 mm. Well sorted. Grains rounded.
	100' - 120'	Chocolate brown mudstone.
	120' - 130'	Cored (10' recovered) Medium grained, feldspathic -lithic sandstone. Dark grey mudstone laminae.

GRANITE SAMPLING

84 rock samples, mainly of granite, were collected during the season for age determination work, which is now in progress. Some details concerning these samples, which were collected throughout the Bowen Basin, have been set out below.

1:250,000 Sheet	Lithology			
	Granite	Volcanic	Shale	Total
Bowen	9	-	-	9
Mt. Coolon	2	-	-	2
Proserpine	6	-	-	6
Mackay	9	-	-	9
Clermont	4	-	-	4
St. Lawrence	11	2	-	13
Emerald	8	-	-	8
Duaringa	4	-	4	8
Rockhampton	1	-	-	1
Springsure	1	-	-	1
Baralaba	1	-	-	1
Monto	13	-	-	13
Mundubbera	7	2	-	9

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APPENDIX 1

PERMIAN MARINE MACROFOSSILS FROM THE BARALABA SHEET AREA

by

J.M. Dickins

Fossils are recorded from two formations only, the Barfield and Flat Top Formations and the collections have been made from a relatively restricted area north-east of Baralaba township. Only two localities contain material from the Barfield and these are from its upper part : the rest are from the Flat Top. As the samples from the Flat Top are close together stratigraphically and there is little doubt on their position, the localities are not considered separately. The positions, however, of all the localities are shown on the Baralaba 1:250,000 Geological Sheet.

The identifications are standardized with those used in other reports on the fossils from the Bowen Basin.

IDENTIFICATIONS

Upper Part of the Barfield Formation

Ba 814

Pelecypods

- *Anthraconeilo* sp.
- *Glyptoleda* cf. *glomerata* Fletcher 1945
- *Chaenomya* sp. (Fauna IV type)
- *Palaeosolen*? sp.
- *Atomodesma* sp.(uni- or bilsulcate form)
- Astartidae gen et sp. nov B?

Gastropods

- *Warthia* sp.

Upper Part of Barfield Formation and Flat Top Formation.

Ba 321

This locality is in the Barfield Formation and most of the fossils are from the Barfield. A few, however, seem to have rolled down the hill from the overlying Flat Top.

Pelecypods

- *Glyptoleda* *glomerata* Fletcher 1945
- *Astartila* cf. *cytherea* Dana 1847
- *Chaenomya* sp?
- *Pyramus* sp. (similar to species in CL 12/2 and CL 14 of Clermont area and to specimens from Monto Sheet - Lonesome Creek Road quarry.
- *Atomodesma* sp. (no anterior grooves)
- *Stutchbura* *compressa* (Morris) 1845
- Astartidae gen. et. sp. nov. B

- Gastropods
  - *Stachella* sp.
  - Indet. pleurotomarian
- Brachiopods
  - *Terrakea solida* (Etheridge & Dun) 1909
  - "*Martinia*" sp.
  - *Licharewia* sp.nov.
- Crinoids
  - *Calceolispongia* sp.nov.

Flat Top Formation

Localities Ba 312, 320, 323, 806 (same as Ba 1), 810, 811, 813, and 834

- Pelecypods
  - *Nuculopsis (Nuculopsis)* sp.
  - *Parallelodon* sp.nov. B
  - *Myonia carinata* (Morris) 1845
  - *Chaenomya*? cf. *carinata* Etheridge Jnr. 1892.
  - *Aviculopecten* sp.
  - Astartidae gen.et sp.nov. B.
- Gastropods
  - *Platyteichum coniforme* (Etheridge Jnr.) 1892
  - *Peruvispira* sp.
- Brachiopods
  - *Terrakea solida* (Etheridge & Dun) 1909 (Contains specimens which vary considerably in dimensions and the development of the adductor muscle platform).
  - Productidae gen., sp. nov.
  - *Strophalosia clarkei* var. *minima* Maxwell 1954
  - *Strophalosia ovalis* Maxwell 1954
  - *Lissochonetes* sp.
  - *Neospirifer* sp. A
  - *Neospirifer* sp. B?
  - *Licharewia* sp.nov.
  - *Ingelarela ingelarensis* Campbell 1960
  - *Ingelarella mantuanensis* Campbell 1960
  - *Notospirifer minutus* Campbell 1960
  - "*Martinia*" sp.
  - *Streptorhynchus pelicanensis* Fletcher 1952
  - *Plekonella* sp.
  - Terebratuloids
- Crinoid Ossicles
- Fenestellid Bryozoans
- Single Corals

CONCLUSIONS

The relationships of the faunas from the Oxtrack, Barfield and Flat Top Formations are considered fully elsewhere (Dickins 1964). The faunas from these formations are all closely related - the Flat Top differs in containing Productidae gen.,sp. nov. and "*Martinia*" sp.. The strata considered in this report appear to represent the upper part of the Barfield Formation and the Flat Top Formation, as both the lithological and faunal sequence is essentially the same as that found in the Monto and Mundubbera Sheet areas even though the distance to the nearest other outcrop of these formations is considerable.

The faunas from both formations belong to Fauna IV from the upper part (Unit C) of the Middle Bowen Beds (Dickins, in press, and Dickins, Malone and Jensen, in press), and are probably of lower Upper Permian age. Elsewhere in the Bowen Basin they are closest to the faunas from the Mantuan *Productus* Bed and the stratigraphic interval containing the Big *Strophalosia* Zone and the *Streptorhynchus pelicanensis* Bed.

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APPENDIX 2

REPORT ON FOSSIL CORALS COLLECTED BY THE DUARINGA PARTY, 1962

by

Dorothy Hill
(University of Queensland)

Du 600F: Limestone near Armagh Homestead, Duaringa 1:250,000 Sheet

Heliolites daintreei, first group.
Favosites sp. cf. goldfussi
F. sp.
Tryplasma sp.
?Fletcheria sp. or ?Fletcherina sp.
Stromatoporoid
Algae

Age: Silurian or Lower Devonian. The fauna is of long-ranging types. H. daintreei ranges from Middle Silurian to Lower Middle Devonian. The large-celled Favosites is perhaps closer to the Lower and Middle Devonian F. goldfussi than to the Silurian and Lower Devonian F. gotlandica. The solitary Tryplasma indicates Silurian or Lower Devonian. The cylindrical fragments called ?Fletcheria or ?Fletcherina are probably from a fasciculate corallum, having very negative characters such as extremely short septa they are difficult to place generically. The type species of Fletcheria is Silurian and that of Fletcherina is Devonian. On the whole I incline to a Lower Devonian age, but the possibility of a Silurian age cannot be discarded.

Du 948: Grey limestone. Two miles north-west of Craigilee Homestead Duaringa 1:250,000 Sheet.

Lithostrotian ex.gr. stanvellense Etheridge.

Age: Lower Carboniferous, probably Visean.

Du 513/5: Near Armagh Homestead, Duaringa 1:250,000 Sheet.

Lithostrotion arundineum Eth.
Syringopora, 2 species.

Age: Lower Carboniferous, probably Visean.

Du 160: Grey limestone near west bank of Fitzroy River, near Craigilee weir-crossing. Duaringa 1:250,000 Sheet.

Lithostrotion columnaro Etheridge
Symploctophyllum sp.

Du 146: Near Thuriba Homestead, Duaringa 1:250,000 Sheet area.

The limestone is very sheared and determination is hazardous.

The following were identified.

Alveolites ? three fragments.
Tryplasma? pieces of corallites from a cylindrical corallum
Cladochonus? pieces of corallites
Favosites sp. (very small fragment)

Cerioid Rugose coral, indet.
Solitary zaphrentoid Rugosa, gen. et.sp. indet.
Small, sparse fragments of branching Polyzoa.

As the first two genera mentioned are not known younger than the Devonian, and as both are common to Silurian and Devonian, I regard the age of the limestone as probably Silurian or Devonian.

APPENDIX 3

Petrography

by

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Lower Bowen Volcanics

Field number:	Ba 99, G.S.Q./R 2429, slide 3300.
Airphoto :	Baralaba R1/5003.
Location :	7 miles N. of Kokotungo Siding.

Macro:- A massive, fine-grained, purplish-grey rock with abundant irregular white amygdales.

Micro:-

Texture:-	Extremely altered, intersertal, grain size about 0.2 mm. Amygdales make up about 10% of rock and are 0.2 to 4 mm.
Constituents:-	Intermediate plagioclase: about 50% of rock; extremely altered lath-shaped and acicular crystals. Iddingsite and serpentine: about 15% of rock ? altered olivine. Epidote and clinozoisite: about 10% of rock distributed at random. Secondary minerals: about 15% of rock; filling interstices.
Amygdales:-	Calcite.
Veins:-	Calcite and/or quartz: about 10% of rock.

Origin:- Volcanic, extrusive.

Name:- ALTERED OLIVINE BASALT.

Field number: Ba 102, G.S.Q./R 2430, slide 3301

Airphoto : Baralaba R 1/5003

Location : 7 miles N. of Kokotungo Siding.

Macro:- A massive, medium-grained, brownish-grey, igneous rock.

Micro:-

Texture:- Porphyritic; the phenocrysts (about 20% of rock) are 0.25 to 2 mm., subhedral to anhedral, extremely altered. The groundmass is intersertal, about 0.0075 mm. About 5% irregular patches of secondary mosaic (about 0.08 mm.) occur.

Phenocrysts:- Andesine: about 15% of rock; lath-shaped crystals, extremely altered.

Microperthite: about 5% of rock; anhedral.

Groundmass:- Feldspar: altered
Chlorite: filling interstices } can be recognised; somewhat iron-stained.

Secondary Mosaic :- Quartz

Origin:- Alteration of a volcanic extrusive.

Name:- SILICIFIED ANDESITE

Flat Top Formation

Field number : Ba 806, G.S.Q./R 2447, slide 3318.

Airphoto : Baralaba R2/5093.

Location : Main road, 4 miles east of Baralaba.

Macro:- A massive, very fine-grained, khaki-coloured rock with calcareous shell remains.

Micro:-

Texture:- Clastic; the clasts (about 90% of rock) are angular to rounded, of low to moderate sphericity, about 0.02 mm. Detrital matrix is difficult to distinguish but appears to make up about 10% of rock.

Clasts:- Argillaceous carbonate: about 70% of rock.

Quartz: about 5% of rock.

Feldspar: > 5% of rock.

Lithic material: < 10% of rock; very fine-grained unidentifiable.

Matrix:- Argillaceous: about 10% of rock; iron-stained.

Origin:- Sedimentary.

Name:- SILTY CALCILUTITE.

Undifferentiated Middle Bowen Beds

Field number: Ba 353, G.S.Q./R 2448, slide 3319.

Airphoto : Baralaba R2/5095.

Location : 6 miles S. of Kokotungo Siding.

Macro:- A massive, fine-grained, brown-grey, thinly-bedded rock with marked cleavage inclined at about 70°to the bedding.

Micro:-

Texture:- The bedding is not noticeable microscopically but the cleavage is marked; there is a dist distinct "drawing out" of the clasts parallel to that direction.

In its other features the rock is essentially similar to GSQ 3317 except in the following:-

1. Grain size is about 0.08 mm.
2. Detrital matrix makes up about 5% of rock.
3. Argillaceous-calcareous cement makes up about 45% of rock.

Origin:- Shearing of a calcareous sediment.

Name:- SHEARED CALCAREOUS SUBGREYWACKE

Gyranda Formation

Field number: Ba 751, G.S.Q./R 2446, slide 3317.

Airphoto : Baralaba R3/5045.

Location : At Mt. Ramsay.

Macro:- A massive, fine-grained, khaki-coloured rock with broken fossil remains.

Micro:-

Texture:- Clastic; the clasts (about 80% of rock) are 0.02 to 0.2mm. (dominantly about 0.15mm.), rounded to subangular, of moderate to low sphericity. The detrital matrix is very fine-grained (about 15% of rock), About 5% crystalline cement occurs also.

Clasts:- Quartz: < 5% of rock.

Feldspar: > 5% of rock.

Lithic material: about 70% of rock.

As in GSQ 3316.

Calcite: minor

Matrix:- Argillaceous: about 15% of rock; heavily ironstained.

Cement:- Calcite: about 5% of rock.

Origin:- Sedimentary.

Name:- GREYWACKE.

Rewan Formation

Field number: Ba 2, G.S.Q./R 2449, slide 3320.

Airphoto : Baralaba R4/5091.

Location : 16 miles S. of Baralaba.

Macro:- A massive, fine-grained, dark red-brown, clastic rock.

Micro:-

Texture:- Clastic; the clasts (about 90% of rock) are subangular to subrounded, of moderate to low sphericity, 0.12 to 0.3 mm. The detrital matrix is very fine-grained.

Clasts:- Quartz: about 65% of rock; strained, with abundant minute inclusions.

Mica: <5% of rock; altered.

Feldspar: <5% of rock.

Lithic material: about 20% of rock; very fine-grained, altered, including:-

Mica phyllite
Devitrified volcanic glass
Altered tuff
Chert
Quartzite

Matrix:- Argillaceous: about 10% of rock; heavily hematite-stained.

Origin:- Sedimentary.

Name:- SUBGREYWACKE

Field number: Ba 51, G.S.Q./R 2445, slide 3316.

Airphoto : Baralaba R8/5057.

Location : approx. 16 miles S. of Moura.

Macro:- A massive, fine-grained, grey-brown rock.

Micro:-

Texture:- Clastic; the clasts (about 70% of rock) are rounded to angular, of low to moderate sphericity, 0.15 to 1 mm.(dominantly about 0.3 mm.). The cement is crystalline, about 0.6 mm.

Clasts:- Quartz: minor.

Feldspar: about 5% of rock.

Biotite: minor.

Lithic material: about 65% of rock; the following can be identified:-

Volcanics - extrusive and pyroclastic; none can be correlated with any volcanics described from the sheet area except, perhaps, in the abundance of secondary ironstaining.

Mica phyllite

Micaceous sediments

Chert

Cement:- Calcite: about 30% of rock.

Origin:- Sedimentary.

Name:- CALCAREOUS SUBGREYWACKE

Note:- Several of the volcanic fragments are somewhat similar to spilitic rocks previously described from this region.

Field number: Ba 55 B, G.S.Q./R 2453, slide 3324.

Airphoto : Baralaba R8/5050.

Location : 19 miles S.S.W. of Moura.

Macro:- A massive, medium-grained, greenish-grey, bedded clastic rock.

Micro:-

Texture:- Clastic; the clasts (about 55% of rock) are angular to rounded, of moderate to low sphericity, 0.04 to 0.2 mm. (dominantly about 0.15 mm.). The finely crystalline cement (about 45% of rock) has corroded and partially replaced some of the lithic clasts.

Clasts:- Lithic material: about 35% of rock; very fine-grained, extremely altered; including:-
- Ironstained volcanics
- Low-grade metamorphics

Feldspar: about 10% of rock; dominantly alkali.

Quartz: about 5% of rock.

Mica: about 5% of rock; altered, ironstained.

Cement:- Argillaceous Calcite: about 45% of rock.

Origin:- Sedimentary

Name:- CALCAREOUS SUBGREYWACKE.

Field number: Ba 89/4, G.S.Q./R 2450, slide 3321.

Airphoto : Baralaba R4/5091.

Location : Approximately 16 miles S. of Baralaba.

Macro:- A massive, fine-grained, light brown clastic rock.

Micro:- Essentially similar to GSQ 3320 except in that the matrix is less heavily ironstained; the lithic clasts, however, are commonly hematite-stained, as in GSQ 3320.

Name:- SUBGREYWACKE

Field number: Ba 89/4a, G.S.Q./R 2451, slide 3322.

Airphoto : Baralaba R4/5091.

Location : Approximately 16 miles S. of Baralaba.

Macro:- Essentially similar to GSQ/R 2450.

Micro:- Essentially similar to GSQ/R 3321.

Name :- SUBGREYWACKE.

Field number: Ba 581/1, G.S.Q./R 2454, slide 3325

Airphoto : Baralaba R1/5010.

Location : Dawson River, 20 miles N.W. of Baralaba.

Macro :- A massive, very fine-grained, buff to brown, thinly-bedded micaceous rock.

Micro :-

Texture:- Thinly-bedded, about 0.6 mm. Two distinct beds are recognisable - these are essentially similar except in grain size. In the coarser bed, the clasts (about 80% of rock) are essentially subrounded, of moderate sphericity, 0.03 to 0.09 mm. (dominantly about 0.04 mm.).

In the finer bed, clasts make up about 30% and are about 0.02 mm. The remainder of each bed is fine-grained detrital matrix.

Clasts:- Quartz: predominant.

Lithic material: minor; very heavily ironstained, very fine-grained.

Mica: fairly abundant.

Matrix:- Argillaceous: heavily ironstained in the coarser bed.

Argillaceous (micaceous): lightly ironstained in finer bed.

Origin:- Sedimentary.

Name:- SILTY SHALE AND FERRUGINOUS SILTSTONE

Field number: Ba 581/7, G.S.Q./R 2452, Slide 3323.

Airphoto : Baralaba R1/5010.

Location : Dawson R, 20 miles N.W. of Baralaba.

Macro:- A massive, fine-grained, light brown, thinly-bedded clastic rock.

Micro:- Essentially similar to GSQ 3321. The bedding is not evident in thin section.

Name:- SUBGREYWACKE

Clematis Sandstone

Field number: Ba 89/1, G.S.Q./R 2457, slide 3328

Airphoto : Baralaba R4/5091.

Location : Approximately 16 miles S. of Baralaba.

Macro:- A massive, fine-grained, salmon-coloured, clastic rock.

Micro:- Essentially similar to GSQ 3326 except in the following details:-

1. The clasts in GSQ 3328 are 0.04 to 0.6 mm. (dominantly about 0.3 mm.).
2. Detrital matrix is slightly more abundant in GSQ 3328 and is heavily ironstained.

Name:- PROTOQUARTZITE (Pettijohn).

Field number: Ba 89/2, G.S.Q./R 2456, Slide 3227.

Airphoto : Baralaba R4/5091.

Location : Approximately 16 miles S. of Baralaba.

Macro :- A massive, fine-grained, buff-coloured clastic rock.

Micro :- Essentially similar to GSQ 3226.

Name :- PROTOQUARTZITE (Pettijohn).

Field number: Ba 581/8, G.S.Q./R 2455, slide 3326.

Airphoto : Baralaba R1/5010.

Location : Dawson River, 20 miles N.W. of Baralaba.

Macro:- A massive, fine-grained, light pinkish-grey, thinly-bedded rock.

Micro:-

Texture:- Clastic; the clasts (about 95% of rock) are 0.02 to 0.17 mm. (dominantly about 0.08 mm.). The grain boundaries are irregular due to interlocking of the grains caused by pressure welding. The matrix is very fine-grained, about 5% of rock.

Clasts:- Quartz: about 85% of rock.

Feldspar: < 5% of rock.

Mica: <5% of rock.

Lithic material: about 5% of rock; chert and very fine-grained micaceous rock.

Matrix:- Argillaceous (micaceous): about 5% of rock.

Origin:- Sedimentary.

Name:- PROTOQUARTZITE (Pettijohn)

Moolayember Formation

Field number: Ba 74, G.S.Q./R 2422, slide 3293.

Airphoto : Baralaba R9/5104,

Location : 2 miles W. of Glenmoral Gap.

Macro:- A massive, fine-grained, pinkish-grey, clastic rock.

Micro:-

Texture:- Clastic; the clasts (about 90% of rock) are 0.15 to 1 mm. (dominantly about 0.5 mm.), subrounded to rounded, of moderate to low sphericity. The percentage of grain boundary contacts is very high but detrital matrix makes up about 10% of rock.

Clasts:- Quartz: about 50% of rock.

Lithic material: about 35% of rock; extremely fine-grained micaceous sediments with minor volcanics and quartzite.

Feldspar: about 5% of rock.

Matrix:- Argillaceous : about 10% of rock; ironstained.

Origin:- Sedimentary.

Name:- SUBGREYWACKE

Field number: Ba 251, G.S.Q./R 2425, Slide 3296.

Airphoto : Baralaba R5/5015.

Location : Approximately 10 miles N.N.E. of Bauhinia Downs Homestead.

Macro:- A massive, fine-grained greenish-grey clastic rock.

Micro:- Essentially similar to GSQ 3294 except in the following details:-

1. The clasts in GSQ 3296 are dominantly about 0.15 mm.
2. Quartz and feldspar are less abundant and lithic grains more abundant in GSQ 3296.
3. A number of lithic grains in GSQ 3296 can be identified as follows:-

    Porphyritic extrusives
    Fluidal basic extrusives
    Tuff
    Crystal tuff
    Micaceous siltstone
    Quartzite

4. Minor chlorite cement is present in GSQ 3296.

Name:- LITHIC GREYWACKE

Field number: Ba 263, G.S.Q./R.2423, slide 3294.
Airphoto : Baralaba R 6/5069.
Location : Approximately 12 miles S.W. of Bauhinia Downs Homestead.

Macro:- A massive, fine-grained, greenish-buff, micaceous clastic rock.

Micro:-

Texture:- Clastic; the clasts (about 75% of rock) are 0.02 to 0.3 mm. (dominantly about 0.08 mm.) rounded to subangular, of low to moderate sphericity. The detrital matrix is very fine-grained, about 25% of rock.

Clasts:- Lithic material: about 40% of rock; very fine-grained volcanics, sediments and ?low-grade metamorphics.

Quartz: about 20% of rock; strained.

Acid feldspar: $>$5% of rock; grains and broken crystals.

Mica: $<$10% of rock; muscovite and ironstained altered biotite.

Matrix:- Argillaceous: about 25% or rock; micaceous in part, ironstained.

Origin:- Sedimentary.

Name:- LITHIC GREYWACKE

Field number: Ba 280, G.S.Q./R 2424, slide 3295.
Airphoto : Baralaba R5/5015.
Location : 8 miles N. of Bauhinia Downs Homestead.

Macro:- A massive, fine-to medium-grained, greenish-grey clastic rock with rare rounded pebbles up to about 10mm.

Micro:-

Texture:- Clastic; the clasts (about 80% of rock) are rounded to subrounded, of moderate to low sphericity, 0.08 to 0.6 mm. (dominantly about 0.4 mm.). The cement is finely crystalline.

Clasts:- Lithic material: about 55% of rock; including
Fine-grained extrusive volcanics.
Tuff
Fine-grained sediments
Quartzite (minor)

Feldspar: about 15% of rock; oligoclase and microperthite.
Quartz: $<$10% of rock.

Mica: minor; altered.

Cement:- Calcite: about 20% of rock.

Origin:- Sedimentary.

Name :- CALCAREOUS SUBGREYWACKE

Field number: Ba 502, G.S.Q./R 2426, slide 3297.
Airphoto : Baralaba R 9/5102.
Location : 3½ miles S. of Forest Hills Homestead.

Macro:- A massive, fine-grained, medium grey clastic rock.

Micro:- Essentially similar to GSQ 3298 except in the following details :-

1. GSQ 3297 contains less feldspar and more lithic clasts than GSQ 3298.
2. Mica is slightly more abundant in GSQ 3297.
3. The clasts in GSQ 3297 are 0.06 to 0.15, dominantly about 0.12 mm.
4. Minor dendritic staining is obvious in GSQ 3297.

Name:- CALCAREOUS SUBGREYWACKE

Field number: Ba 518, G.S.Q./R 2428, slide 3299.
Airphoto : Baralaba R 9/5094.
Location : Approximately 25 miles S.W. of Bauhinia Downs Homestead.

Macro:- A massive, weathered, light brown coarse-grained clastic rock with rounded fragments up to 5 mm.

Micro:- Essentially similar to GSQ 3295 except in the following details:-

1. The clasts in GSQ 3299 are of two size ranges -
   (i) 0.08 to 0.25 mm.
   (ii) 1.0 to 4.0 mm. (dominantly about 2 mm.).
2. The cement in GSQ 3299 is somewhat ironstained.

The clasts in GSQ 3299 have been identified as follows:

(a) Very fine-grained chloritised and hematitic volcanic intrusive with acicular acid plagioclase (Trachyte or Spilite).
(b) Chloritised and/or clacitised crystal tuff.
(c) Silicified hematitic tuff (very fine-grained).
(d) Fine-grained, poorly-sorted sediments showing crude graded-bedding.
(e) Micaceous sandstone.
(f) Calcitised volcanic extrusive.
(g) Porphyritic intermediate or basic volcanic extrusives.
(h) Extremely altered spherulitic ? devitrified rhyolite.

Name:- LITHIC-GRANULE CONGLOMERATE

Field number: Ba 558, G.S.Q./R 2427, slide 3298.

Airphoto : Baralaba R8/5050.

Location : Approximately 8 miles N.N.W. of Stonecroft Homestead.

Macro :- A massive, fine-grained, grey-brown calcareous sediment.

Micro:-

Texture:- Clastic; the clasts (about 55% of rock) are subrounded to angular (commonly somewhat corroded), of low to moderate sphericity, 0.04 to 0.35 mm. (dominantly about 0.1 mm.). The cement is finely crystalline.

Clasts:- Feldspar: about 25% of rock; oligoclase and microperthite.

Quartz: about 15% of rock unstrained.

Lithic material: about 10% of rock; very fine-grained, argillaceous ? sediments.

Biotite: about 5% of rock; altered flakes, chloritised in part.

Cement:- Calcite: about 45% of rock.

Origin:- Sedimentary.

Name:- CALCAREOUS ARKOSE

Tertiary Basalt

Field number: Ba 254, G.S.Q./R 2444, slide 3315.

Airphoto : Baralaba R6/5067.

Location : Approximately 2 miles S. of Bauhinia Downs Homestead.

Macro:- A massive, very fine-grained, blue-grey rock with feldspar phenocrysts up to 1 cm and "clots" of olivine up to 2 cm.

Micro:-

Texture:- Porphyritic; the phenocrysts (about 10% of rock) are subhedral to anhedral, 0.08 to 1.2 mm. The groundmass is intergranular, about 0.02 mm. Rare amygdules occur.

Phenocrysts:- Hypersthene: about 10% of rock.

Groundmass :- Plagioclase: about 75% of rock.

Pyroxene: about 5% of rock; granular, commonly altered to bastite.

Opaques: about 10% of rock.

Amygdules :- ? Chalcedony.

Origin:- Volcanic extrusive.

Name:- OLIVINE-HYPERSTHENE BASALT

Field number: Ba 268, G.S.Q./R 2434, slide 3305.

Airphoto : Baralaba R6/5071.

Location : Main road Expedition Range, 17 miles W.S.W. of Bauhinia Downs Homestead.

Macro:- A massive, fine-grained, heavily ironstained, mauve to red-brown rock.

Micro:- This rock cannot be described satisfactorily due to heavy ironstaining. The following points are significant:-

1. The outlines of relic feldspar crystals (about 0.5 mm.) and of iddingsitised olivine crystals (up to 1.5 mm.) can be reoognised.
2. Abundant limonite-hematite-iddingsite-stained serpentine occurs.
3. Abundant limonite-hematite-stained devitrified glass (? chloritic) occurs.

Origin:- Volcanic extrusive.

Name:- ALTERED OLIVINE ? BASALT

Field number: Ba 270, G.S.Q./R 2436, slide 3307.

Airphoto : Baralaba R6/5073.

Location : Approximately 3 miles S.E. of Planet Downs Homestead.

Macro:- A massive, fine-grained, amygdaloidal, purplish-brown rock; the filling of most of the amygdales has been leached but a green colouration remains in and about them.

Micro:-

Texture:- Hyaloophitic to intergranular; grain size 0.08 to 0.6 mm.

Constituents:- Labradorite: about 60% of rock; fresh lath-shaped to acicular crystals.

Olivine: about 5% of rock; subhedra pseudomorphed by iddingsite and serpentine.

Clinopyroxene: about 15% of rock; granular; with abundant associated secondary hematite.

Glass: about 20% of rock; greenish to red-brown, devitrified in part.

Origin:- Hydrothermal alteration of a volcanic, extrusive.

Name :- ALTERED BASALT.

Field number: Ba 273, G.S.Q./R 2437, slide 3308.
Airphoto : Baralaba R6/5073.
Location : Approximately 11 miles S. of Planet Downs Homestead.

Macro:- A massive, fine-grained, dark grey rock.

Micro:-

Texture:- Intergranular, 0.04 to 0.8mm.

Constituents:- Labradorite: about 75% of rock; fresh.

Mafic minerals: about 20% of rock; subhedral prismatic and very fine granular; including:-

Olivine: iddingsitised and serpentinised in part; commonly with overgrowth rims of hypersthene showing schiller structure in part.

Hypersthene: also occurring as prismatic crystals and granular.

Clinopyroxene: anhedra.

Opaques: about 5% of rock; fine, granular, subhedral to anhedral.

Origin:- Volcanic; high-level intrusive or extrusive.

Name:- HYPERSTHENE-OLIVINE BASALT.

Intrusions

Number : GSQ/R 1479, slides 2584 and 2585.
Location : Mt. Ramsay 8 miles S.E. of Baralaba.

Macro:- A massive, apparently coarse grained, pinkish grey igneous rock.

Micro:-

Primary Rock (60% of total rock)

Texture:- Porphyritic with a pilotaxitic groundmass, the phenocrysts are subhedral, about .9 mm. and occupy 5% of the rock; the groundmass consists of acicular microlites which have flowed round the phenocrysts.

Phenocrysts: Albite < 5% of rock; subhedral lathshaped crystals, somewhat altered; about Ab_{80}.

Groundmass: Albite about 95% of rock; unaltered, acicular microlites with a preferred orientation.

Aegerine: < 5% of rock; green microlites aligned parallel to the feldspar crystals.

Later material: (40% of total rock).

Superimposed on the original material are comparatively coarse crystals which make up an estimated 40% of the whole rock. These crystals cut across the original flow lines and obviously crystallised later than the above material.

Aegerine: about 55% of the later material; occurs as elongate subhedral, bladed crystals (up to 1.2 mm.), as "spongy" crystals, (up to 1.2 mm.) and as irregular, anhedral and subhedral prismatic crystals.

Riebeckite: about 30% of later material; occurs as "spongy" crystals, associated with aegerine and as very fine prisms.

Nepheline: about 10% of later material; anhedral with abundant fine inclusions; associated with the mafic minerals.

Sphene: about 5% of later material; fine subhedra and anhedra associated with the other minerals.

Origin:- This rock appears to signify a volcanic rock. Soda (albite) trachyte flowed upwards and crystallised in the neck. At a later stage, reaction with soda rich solutions caused the coarse crystals to grow. These volatiles were probably derived from the same magma and thus represent late stage volcanic activity.

Name:- Altered AEGERINE-ALBITE TRACHYTE.

Number : GSQ/R 1480 slides 2586, 2587.

Location : Mt. Ramsay 8 miles S.E. of Baralaba.

Macro:- Essentially similar to the above rock. The weathered surface is "pitted" due to the leaching of the mafic minerals.

Micro:- Essentially similar to the above rock. A second period of alteration has affected the rock as evidenced by minor replacement by Chalcedony and the presence of veins of ? zeolite.

Name:- Altered AEGERINE-ALBITE TRACHYTE.

Number : GSQ/R 1481 slides 2588 and 2589.

Location : Mt. Ramsay 8 miles S.E. of Baralaba.

Macro:- A massive, fine grained, grey crystalline rock.

Micro:- Essentially similar to the previous two rocks, in that the dominant constituent is albite which occurs as acicular crystals up to 0.6 mm. in length; the texture is pilotaxitic.

Aegerine makes up about 30% of the rock and occurs as subhedral and anhedral prismatic crystals, 0.1 to 0.6 mm. The mineral appears to be late stage; it is fairly regularly distributed throughout the rock.

Nepheline: anhedral about 0.6 mm., crystallised before the aegerine; the crystals are enclosed by a fringe of ? felspathic material, which appears to be a reaction rim.

Chalcedony occurs in small amounts replacing the groundmass, in part.

Name:- Altered ALBITE TRACHYTE

Field Number: Ba 363/1, G.S.Q./R 2441, slide 3312.

Airphoto : Baralaba R2/5093.

Location : A dyke approximately 5 miles E. of Baralaba along main road.

Macro:- A massive, very fine-grained, grey crystalline rock with numerous xenoliths (up to 1 cm) of fine-grained black material.

Micro:- Essentially similar to GSQ 3311 except in the following:-

1. The albite crystals in GSQ 3312 are dominantly lath-shaped, about 0.25 mm.
2. The aegerine crystals are subhedral to euhedral, 0.02 to 0.06 mm.

Name:- SODA TRACHYTE

XENOLITHS

Texture:- Hornfelsic; about 0.01 to 0.03 mm. with about 10% relic grains (about 0.02 to 0.1mm.)

Grains:- Feldspar and ? lithic material

Matrix:- Riebeckite: about 90%; granular.

Origin:- Contact metamorphism of siltstone or silty mudstone.

Name:- RIEBECKITE HORNFELS

Field number: Ba 363/2, G.S.Q./R. 2440, slide 3311.

Airphoto : Baralaba R2/5093.

Location : A dyke approximately 5 miles E. of Baralaba along main road.

Macro:- A massive, fine-grained, grey and white mottled rock.

Micro:-

Texture:- Pilotaxitic, subophitic with aligned acicular crystals (about 0.5 mm. in length) and anhedral prismatic crystals (about 0.5 mm.) partly enveloping numerous acicular crystals.

Constituents:- Albite: about 75% of rock; acicular crystals, slightly altered.

Nepheline: about 5% of rock; altered.

Aegerine: about 20% of rock; prismatic crystals.

Riebeckite: minor; very fine crystals.

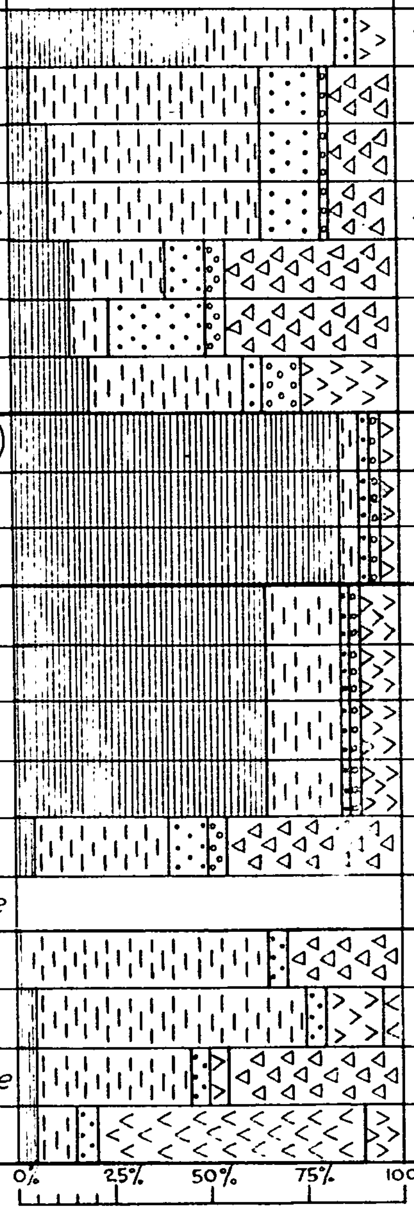
Origin:- High-level intrusive.

Name:- SODA TRACHYTE

DIAGRAM SHOWING

ESTIMATED PERCENTAGE COMPOSITION OF MISCELLANEOUS SEDIMENTS

BARALABA 4 MILE SHEET AREA



MICROSLIDE	FORMATION	NAME	EST. PERCENTAGE COMPOSITION	LITHICS	REMARKS
GSQ 3293	MOOLAYEMBER FORMATION	*Subgreywacke*		*Micaceous Sediments, minor volcanics and quartzite*	*Detrital matrix = argillaceous*
" 3296		*Lithic greywacke*		*Porphyritic extrusives, fluidal basic extru., tuff (cryst.), micaceous slst., qtzt.*	
" 3295		*Calcareous Subgreywacke*		*Fine extrusive volcanics, tuff, fine sediments, minor quartzite*	*Feldspar = oligoclase + microperthite*
" 3299		*Lithic-granule Conglomerate*		*Altered extrusives and tuffs; sediments*	*Feldspar = oligoclase + microperthite*
" 3297		*Calcareous Subgreywacke*		*Argillaceous sediments*	*Feldspar = oligoclase + microperthite, mica = biotite*
" 3298		*Calcareous Arkose*		*Argillaceous sediments*	*Feldspar = oligoclase + microperthite mica = biotite*
" 3294		*Lithic greywacke*		*Very fine volcanics, sediments, ? low grade metamorphics*	*Feldspar = acid mica = muscovite & biotite*
" 3326	CLEMATIS SANDSTONE	*Protoquartzite (Pettijohn)*		*Chert, fine micaceous rock*	*Detrital matrix — argillaceous (micaceous)*
" 3327		*Protoquartzite*		*Chert, fine micaceous rock*	*Detrital matrix — argillaceous (micaceous)*
" 3328		*Protoquartzite*		*Chert, fine micaceous rock*	*Detrital matrix – argillaceous (micaceous)*
" 3320	REWAN FORMATION	*Subgreywacke*		*Mica phyllite, devitrified glass, altered tuff, chert, quartzite*	*Detrital matrix - argillaceous*
" 3321		*Subgreywacke*		*Mica phyllite, devitrified glass, altered tuff, chert, quartzite*	*Detrital matrix – argillaceous*
" 3322		*Subgreywacke*		*Mica phyllite, devitrified glass, altered tuff, chert, quartzite*	*Detrital matrix – argillaceous*
" 3323		*Subgreywacke*		*Mica phyllite, devitrified glass, altered tuff, chert, quartzite*	*Detrital matrix - argillaceous*
" 3324		*Calcareous Subgreywacke*		*Ironstained volcanics, low grade metamorphics*	*Cement = argillaceous calcite*
" 3325		*Silty shale & ferrug siltstone*		*Very fine unidentifiable*	
" 3316		*Calcareous Subgreywacke*		*Extrusive and pyroclastic volcanics, mica phyllite, micaceous sediments, chert*	*Mica = (biotite) minor*
" 3317	*Gyranda Formation*	*Greywacke*		*Extrusive and pyroclastic volcanics, mica phyllite, micaceous sediments, chert*	*<<< - calcite clasts minor, detrital matrix – argillaceous*
" 3319	*Undiff. Middle Bowen Beds*	*Sheared Calcareous greywacke*		*Very fine unidentifiable*	*Detrital matrix = argillaceous; arg. calcareous cement*
" 3318	*Flat Top Formation*	*Silty Calcilutite*		*Very fine unidentifiable*	*Argillaceous calcite clasts <<< detrital matrix – argillaceous*

▥ *Quartz* ⁞ *Lithics* ⁙ *Feldspar* ⚬ *Mica* >>> *Matrix* ◁◁◁ *Cement (calcite)*

To accompany report by B.R. Houston B.Sc Geologist

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

THE GEOLOGY OF THE BARALABA 1:250,000 SHEET AREA, QUEENSLAND.

BY

F. OLGERS, A. W. WEBB, J. A. J. SMIT (Bureau of Mineral Resources)
and B. A. COXHEAD (Geological Survey of Queensland)

RECORDS 1964/26

ENCLOSURES

1. Baralaba 1 : 250,000 Geological Sheet.
2. Geological Map of the Gogango Range.
3. Structure Contours on Upper Permian Seismic Reflector.
4. Well Correlation Chart.

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

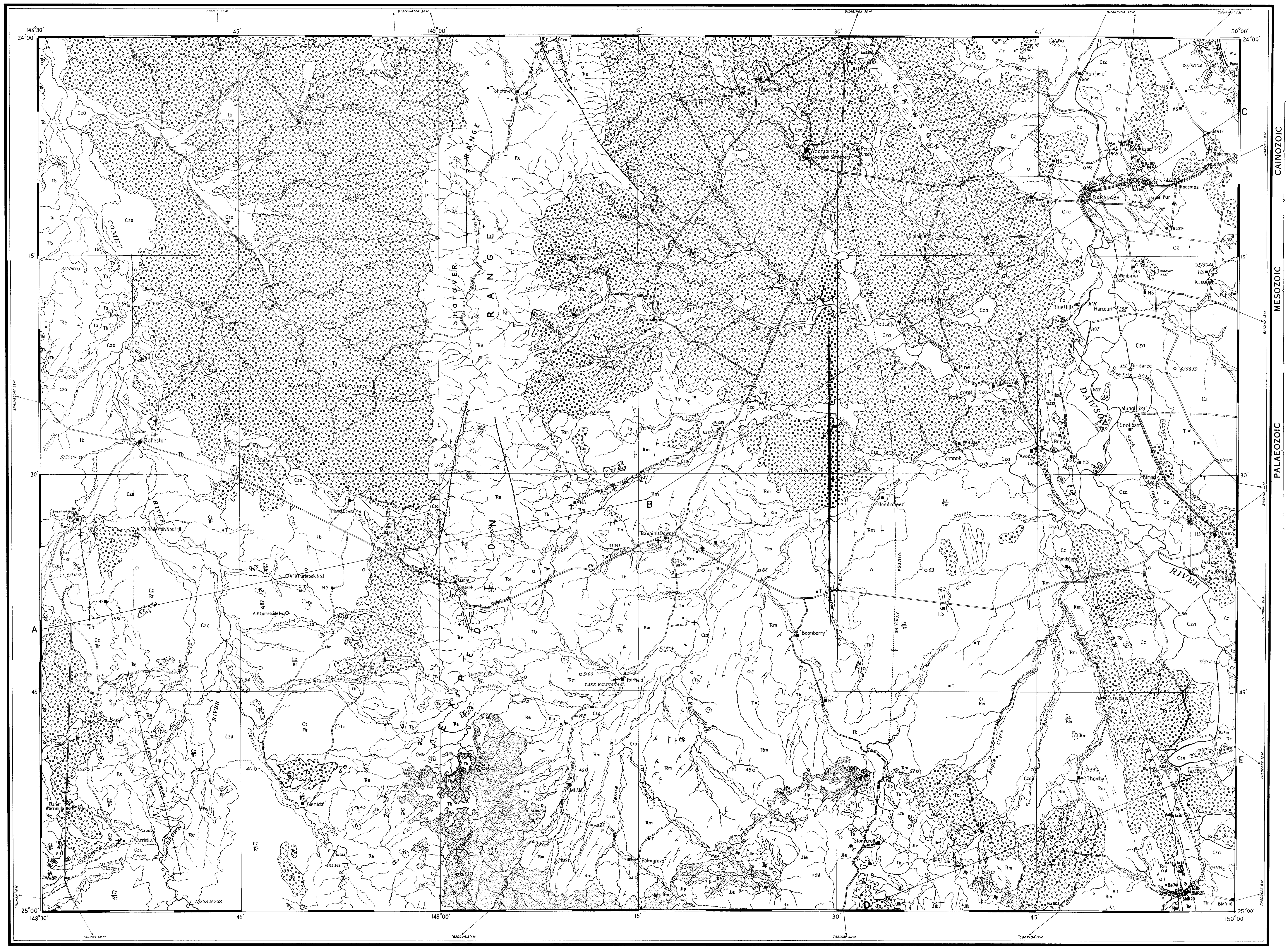
AUSTRALIA 1:250,000

BARALABA
QUEENSLAND

1:250 000 GEOLOGICAL SERIES SHEET SG 55-4

PRELIMINARY EDITION, 1964

SUBJECT TO AMENDMENT.



Reference

CAINOZOIC			Cz	*Soil, sand, gravel, alluvium*
			Cza	*Alluvium*
	TERTIARY		○○	*Laterite*
			Ta	*Sandstone, siltstone, claystone, conglomerate; some volcanics*
			Tb	*Basalt*
	TERTIARY OR CRETACEOUS		⫽	*Trachyte*
MESOZOIC	JURASSIC	Evergreen Formation	Jle	*Grey shale, white, fine grained, micaceous sandstone. Abundant plant fragments*
		Boxvale Sandstone Member	Jlb	*Clean, fine-medium grained quartz sandstone; fossil wood*
		Precipice Sandstone	Jlp	*Poorly sorted, strongly cross-bedded quartz sandstone; some conglomerate*
			░	*Weathered profile (mainly silicification)*
	TRIASSIC	Moolayember Formation	Rm	*Lithic sandstone, grey shale, conglomerate. Plant fossils*
		Clematis Sandstone	Re	*Medium grained, cross-bedded quartz sandstone, micaceous shale*
		Rewan Formation	Rr	*Buff, lithic sandstone and siltstone, red siltstone and shale*
PALAEOZOIC	UPPER PERMIAN	Upper Bowen Coal Measures Baralaba Coal Measures	Pul	*Feldspathic sandstone, coal, lithic feldspathic sandstone, siltstone, shale. Plant fossils*
		Gyranda Formation	Puy	*Lithic feldspathic sandstone, greywacke, shale. Plant fragments*
		Back Creek Group Undifferentiated	Pb	*Lithic sandstone, grey and olive green shale, green quartz lithic sandstone*
		Flat Top Formation	Puf	*Richly fossiliferous calcilutite. Some coquinite*
		Barfield Formation	Pur	*Calcareous silty mudstone with calcareous nodules. Limestone lenses*
		Oxtrack Formation	Puo	*Fossiliferous limestone and grey and light brown calcareous siltstone*
	LOWER PERMIAN	Rannes Beds	Plw	*Greenish shale, siltstone, fine grained tuffaceous sandstone, slate*
		Camboon Andesite	Pln	*Andesite, basalt, crystal tuff, tuff*

Geological boundary

Anticline, showing plunge

Syncline, showing plunge

Fault

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

30 *Strike and dip of strata*

Vertical strata

Horizontal strata

80 *Strike and dip of overturned strata*

Dip <15° } *air-photo interpretation*
Bedding trend line
Joints

Macrofossil locality } Ba 473 - *Locality reference number*
Plant fossil locality

Fossil wood

× Ba 750 *Specimen locality and number*

tr *Trachyte dyke*

c *Coal mine*

Dry exploratory hole (abandoned) } *drilled for oil or gas*
Gas well
Abandoned well with show of gas
Well being drilled

● BMR17 *B.M.R. shallow drill hole*

Measured section. Where dashed, section transferred along strike

▪ T *Tank*

Dam

WH *Waterhole*

Road

Vehicle track

Railway with siding

Quarry

▪ "Avoca" } *Homestead*
▪ HS

Landing ground

·640′ *Height in feet, instrument levelled. Datum: Mean sea level*

○ 6/5058 *Air-photo centre point - run/number*

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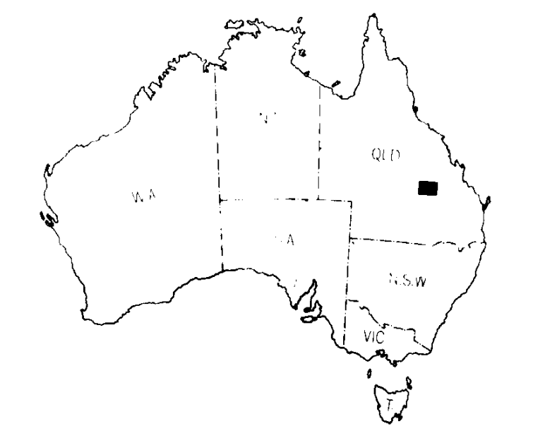
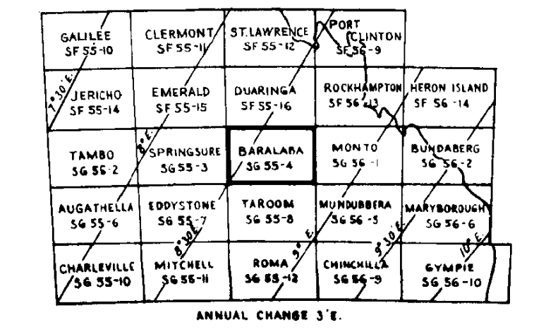
Geology and compilation, 1963, by: F. Olgers, A.W. Webb, and J.A.J. Smit, (B.M.R.), and B.A. Coxhead, (G.S.Q.)
Drawn by: E.H.J. Feeken



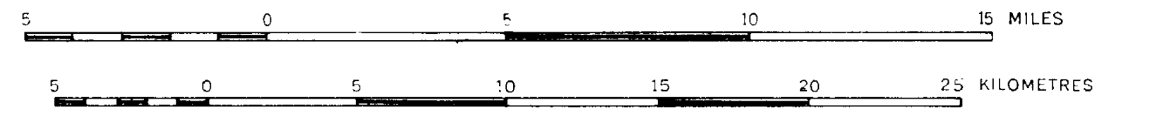
INDEX TO ADJOINING SHEETS

Showing Magnetic Declination

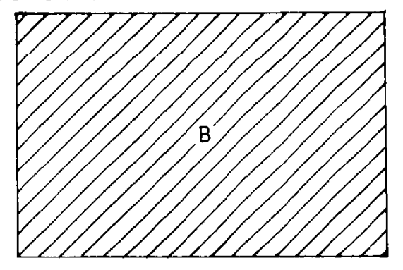


ANNUAL CHANGE 3′E.

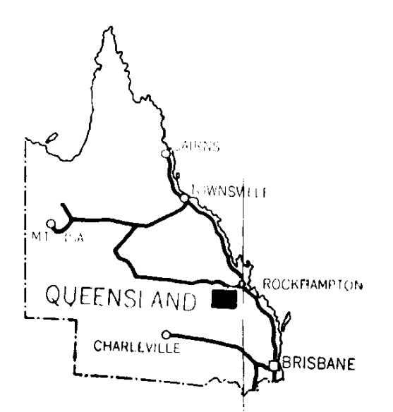
Scale 1 : 250,000



GEOLOGICAL RELIABILITY DIAGRAM.

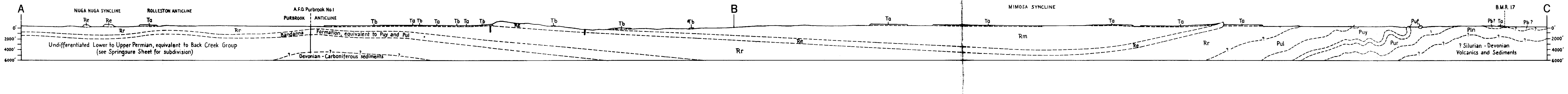


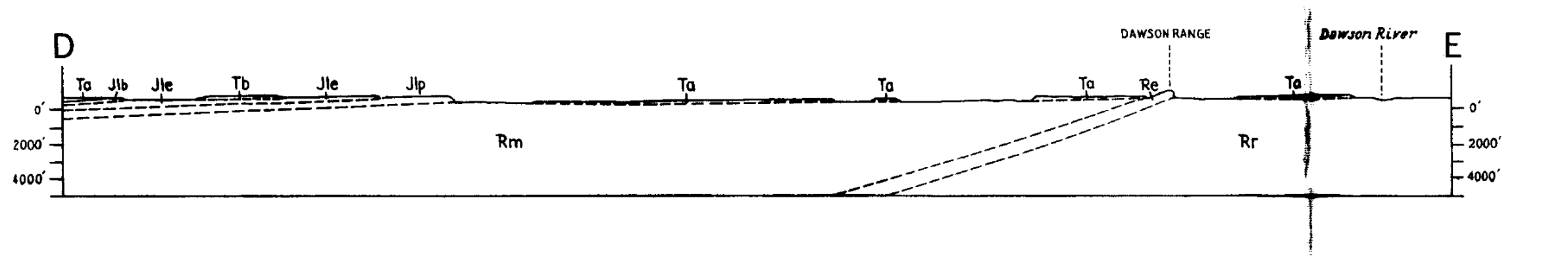
B Detailed reconnaissance, numerous traverses, air-photo interpretation



Sections

Folding partly diagrammatic
(Cz and Cza omitted from sections)
Scale: $\frac{V}{H} = 2$

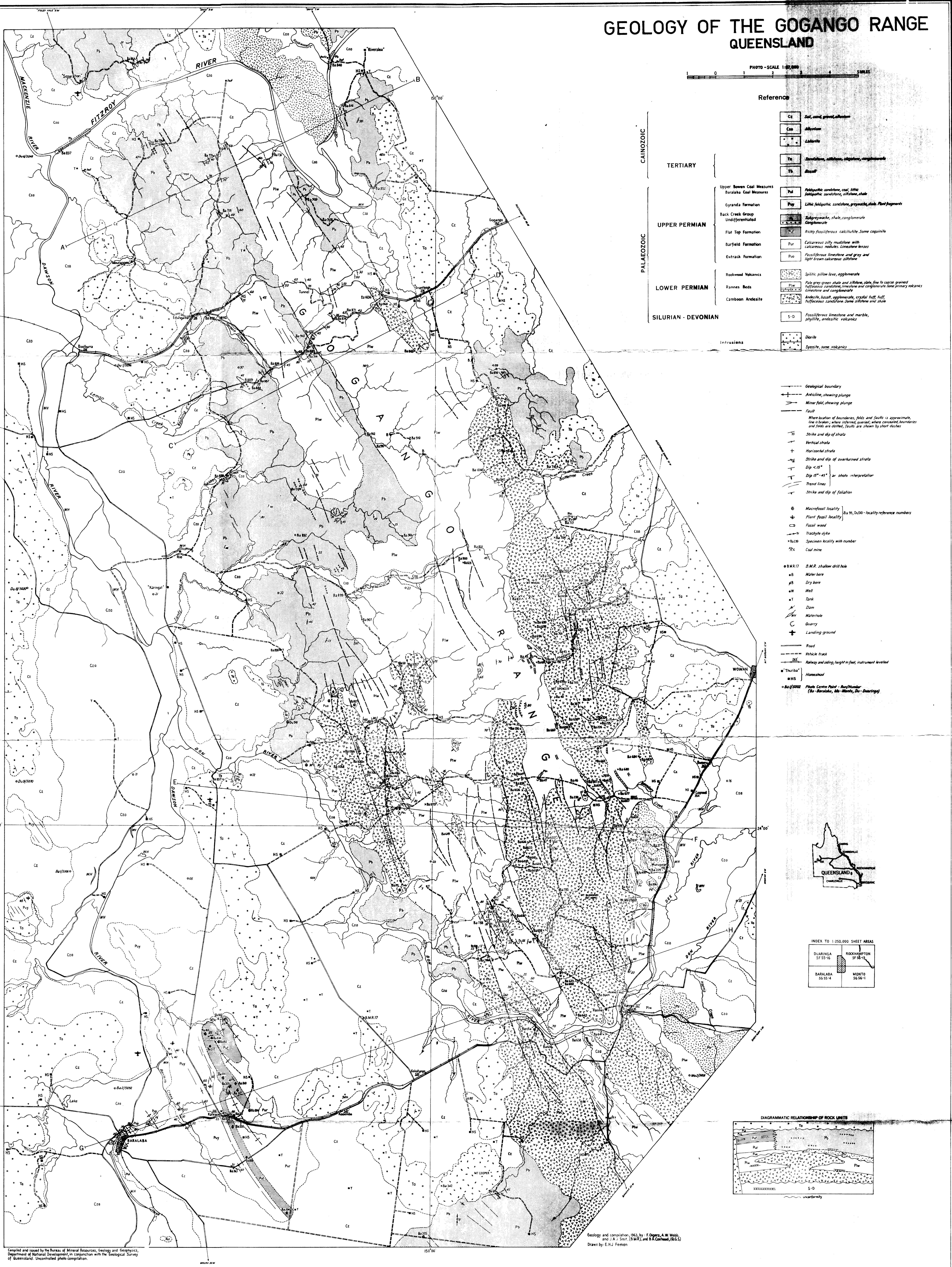




BARALABA
SHEET SG55-4

ENCLOSURE 2

GEOLOGY OF THE GOGANGO RANGE
QUEENSLAND



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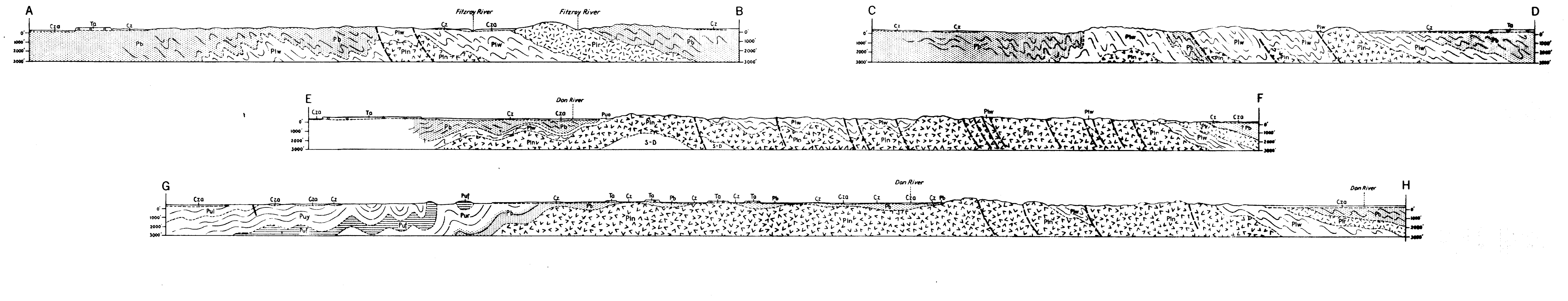
Geology and compilation, 1963, by: F. Olgers, A.W. Webb, and J.A.J. Smit, (B.M.R.), and B.A. Coxhead, (Q.G.S.)
Drawn by: E.H.J. Feeken

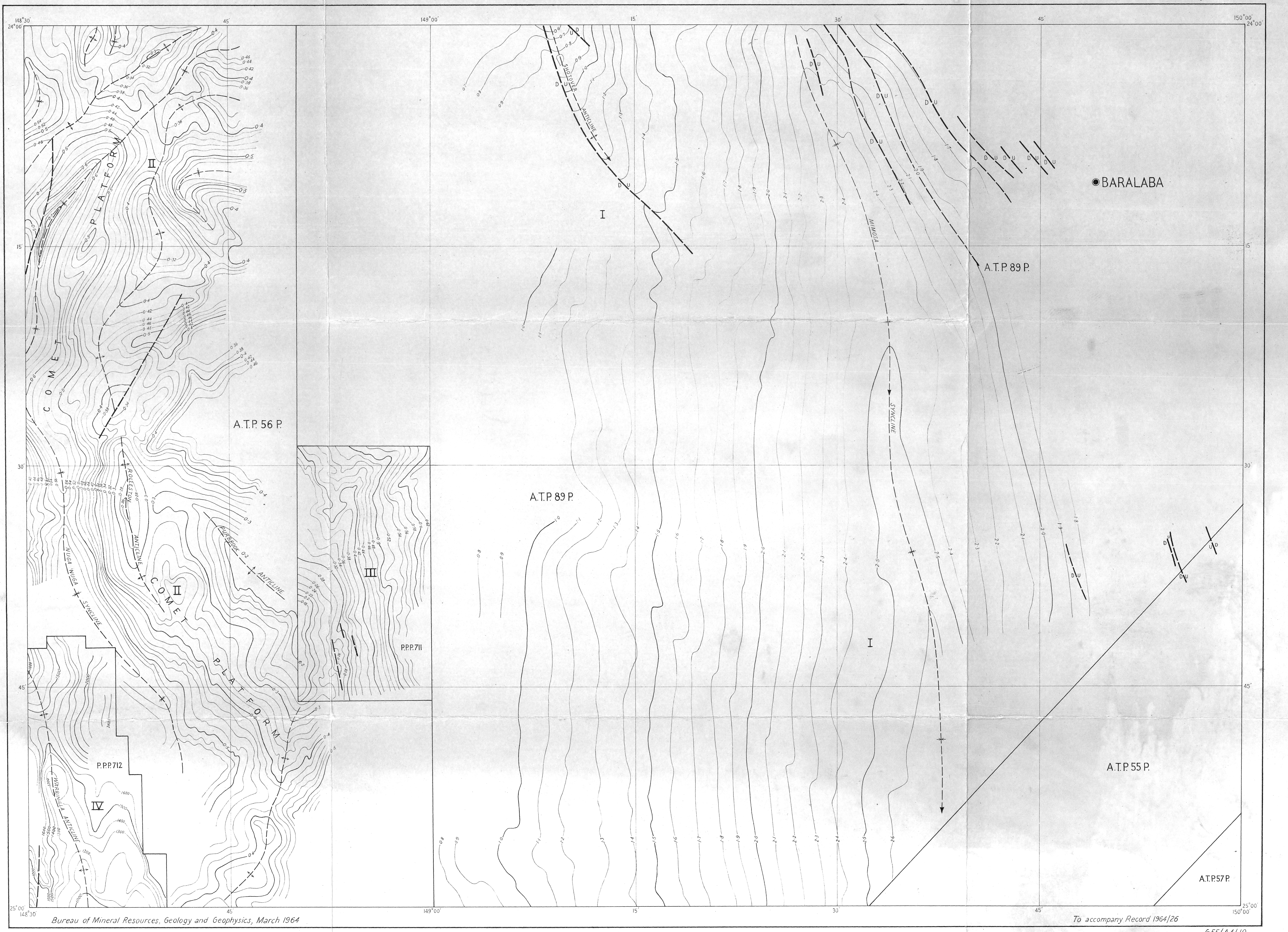
Sections
(partly diagrammatic)
Scale: $\frac{V}{H} = 1$



ENCLOSURE 3

BARALABA

STRUCTURE CONTOURS ON UPPER PERMIAN SEISMIC REFLECTOR



Bureau of Mineral Resources, Geology and Geophysics, March 1964

To accompany Record 1964/26

G55/A4/10

Scale 1:250,000

I

MARATHON PETROLEUM AUSTRALIA LTD. (1962)

A.T.P 89 P, Mimosa Syncline.
Horizon: 'P' (near top of Permian).
Datum: +300 feet.
Contour Interval: 0·1 sec.

II

MINES ADMINISTRATION (1962 a, 1963)

A.T.P. 56 P, Western portion Baralaba Sheet area.
Horizon 'A' (Bandanna Formation).
Datum: +600 feet.
Contour Interval: 0·1 sec.

III

PLANET OIL CO. N.L. (1962)

P.P.P. 711, Planet Downs area.
Horizon 'A' (in Bandanna Formation).
Datum: +700 feet.
Contour Interval: 0·2 sec.

IV

PLANET OIL CO. N.L. (1962a)

P.P.P. 712, South-west Baralaba Sheet area.
Horizon 'A' (in Bandanna Formation).
Seismic datum: +600 feet.
Contour Interval: 100 feet
Map datum: Mean Sea Level.

ENCLOSURE
4

WELL CORRELATION CHART

VERTICAL SCALE 1" = 500'

Correlations based on outcrop mapping in the Springsure Anticline and Reid's Dome, oil company data, Tissot (1962, 1963) and discussions with J.M. Dickins, P.R. Evans, and E.J. Malone.

LITHOLOGICAL REFERENCE

▤	Shale and claystone
▦	Siltstone
⁘	Sandstone
⁙	Conglomerate
▥	Limestone
▬	Coal
≈	Marl
▼	Anhydrite
⊠	Igneous rocks

○ Gas Show
● Oil Show

Electric logs shown:
SP log on left
SN log on right

Bureau of Mineral Resources, Geology and Geophysics, April 1964

To accompany Record 1964/26 and 1964/27

Q-A58