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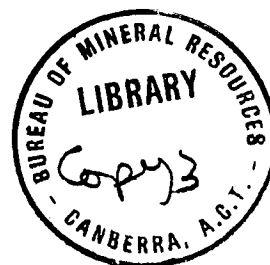
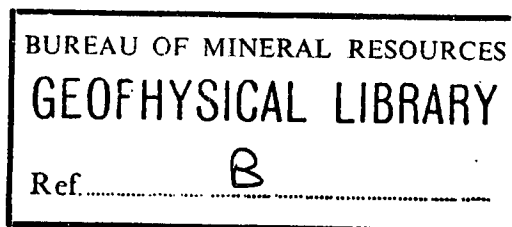
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

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NOTES ON THE STRATIGRAPHY OF THE NORTH-EAST OF
TAMBO 1:250,000 SHEET AREA

by

N.F. Exon and A.G. Kirkegaard*
*(Geological Survey of Queensland).

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Queensland)

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Notes on the Stratigraphy of the North-East part of
Tambo 1:250,000 Sheet Area.

by

N.F. Exon, and A.G. Kirkegaard (Geological Survey of Queensland)

Introduction

The north-east part of the TAMBO* 1:250,000 Sheet area was mapped in 1964 by N.F. Exon of the Bureau of Mineral Resources and A.G. Kirkegaard of the Geological Survey of Queensland. It is a triangular area bounded on the south-west side by the prominent scarp of the Precipice Sandstone, and lying between longitudes 146°E and 147°E and latitudes 24°S and 24°45'S.

There are no towns in the area but a good road connects Alpha in the north to Tambo in the south. The area drains mainly to the north via the Belyando River and its tributaries, except for the eastern part which drains to the east. Beef cattle raising is the only occupation of economic significance in this low rainfall area. In the east, where relief is high, outcrop is good, but the area becomes flatter and outcrop poorer to the north-west.

These notes, dealing mainly with the pre-Jurassic sequence, will be incorporated in a record on the entire Tambo area, after mapping during 1965. The age of the pre-Jurassic units ranges from Middle Devonian to late Triassic. The only units with probable marine affinities are the Peawaddy Formation and the lower part of the Bandanna Foundation.

Strong folds in the pre-Joe Joe Formation sequence are reflected by gentle folds in the younger sediments. The fold axes in these younger sediments are sinuous, but trend north-north-east overall and plunges to the south. Dips to the south-east are steeper than those to the west. The folding has been complicated either by basement relief, or by a secondary stress direction, or perhaps both.

Faulting is virtually confined to the Mount Beaufort Anticline. One large fault cuts out the whole of the Ducabrook Formation on the western flank.

Nomenclature of the Sedimentary Rocks : Crooks (1960) classification of arenites is followed. The term 'labile' is applied to those arenites in which quartz forms less than 75% of the total quartz-rock fragments - feldspar content; if the proportion of quartz is from 75% to 90% the term 'sublabile' is employed; and if more than 90%, 'quartzose'. 'Siltstone' is used as a grain size term (1/16 mm to 1/256). 'Mudstone' is used as a general term for sediments of the lutite class, and 'shale' is defined as a mudstone with shaly or papery fissility.

Shallow Drill Holes : Five drill holes of the order of 200 feet deep were drilled on TAMBO during the field season. The logs of these holes are shown in Figs. 3, 4 and 5. The holes were named Tambo B.M.R. Nos. 32 to 36. Dips were all less than 5° and hence no correction of thickness is necessary.

* Subsequent reference to 1:250,000 Sheet areas is signified by the use of capital letters for the geographic prefix e.g. TAMBO.

TABLE 1

TABLE OF ROCK UNITS

ERA	PERIOD	ROCK UNIT AND MAP SYMBOL	LITHOLOGY	THICKNESS feet	RELATIONSHIPS	
C A I N O Z O I C	Tertiary	Undifferentiated	Cz	Soil, sand, gravel	less than 50	
			Cza	Alluvium	less than 50	
				Laterite	less than 100	Developed only on Ta
			Ta	Quartzose sandstone, conglomerate	less than 100	Unconformably overlies pre-Tertiary units
	Triassic	Lower Jurassic	J	Quartzose sandstone, conglomerate		Unconformably overlies Rm
			Moolayember Formation Rm	Quartzose to labile sandstone, some calcareous, siltstone, mudstone	1000 ±	Conformably overlies Ro
			Clematis Sandstone Ro	Quartzose sandstone, siltstone, minor conglomerate	350 ±	Conformably overlies Rr
			Rewan Formation Rr	Sublabile to quartzose sandstone, siltstone, mudstone	400 ±	Conformably overlies Pua
	Permian	Upper Permian	Bandanna Formation Pua	Labile to quartzose sandstone, some calcareous, siltstone, mudstone	400 ±	Conformably overlies Pup
			Peawaddy Formation Pup	Quartzose to sublabile sandstone, carbonaceous siltstone, mudstone	100-200	Apparently conformably overlies Plo
		Lower Permian	Colinlea Sandstone Plo	Quartzose sandstone and conglomerate, minor siltstone	450 ±	Disconformably overlies Plj
			Reid's Dome Beds Plj	Siltstone, sandstone	50 ±	Disconformably overlies C-Pj
		Carboniferous-Permian	Joe Joe Formation C-Pj	Siltstone, shale, sandstone, conglomerate, minor tuff, limestone	1500 ±	Unconformably overlies Clu
		Lower Carboniferous	Ducabrook Formation Clu	Lithic sandstone, some tuffaceous, siltstone, shale	3500 ±	Conformably overlies Clh
			Mount Hall Conglomerate Cil	Quartzose sandstone and conglomerate	150 ±	Apparently conformably overlies Dut
		Upper Devonian	Telenon Formation Dut	Quartzose to sublabile sandstone, siltstone shale, some tuffaceous minor limestone	1000 ±	Apparently conformably overlies Ds
		Middle Devonian	Silver Hills Volcanics Ds	Basaltic, trachytic, rhyolitic flows, lithic tuffs	1500 ±	

Silver Hills Volcanics

The Silver Hills Volcanics are named after Silver Hills Homestead near Anakie on EMERALD (see Veevers, Mellan, Olgers & Kirkegaard, 1964B), and their type area is one mile west-south-west of the Homestead.

On TAMBO they crop out only in the southern plunge of the Mount Beaufort Anticline, in the extreme north-east. They form rounded hills and strike ridges with scrub and poor tree cover. They have a light grey photo tone.

The exposed rock types include basaltic, trachytic and rhyolitic flows and lithic tuffs. The rhyolitic flows often show flow structure and are, in places, spherulitic. Fine to coarse grained thick bedded lithic tuffs form prominent strike ridges on the eastern flank of the Anticline. On the western flank the top of the succession is downthrown by a large fault and obscured.

The volcanics are overlain, apparently conformably, by sediments of the Telemon Formation. Only the upper 1500 feet (approx.) of the unit is exposed on TAMBO - the core of the Anticline being well on to JERICHO to the north.

When Veevers et al. (1964B) mapped the Anticline they included within the Silver Hills Volcanics both the primary volcanics mentioned above, and the overlying sediments. These sediments are typical of the Telemon Formation and not of the Silver Hills Volcanics and, accordingly they have been assigned to the Telemon Formation.

The unit is overlain by the Upper Devonian Telemon Formation, and lies on the Middle Devonian Retroat Granite on CLERMONT (Veevers, Randal, Mollan & Paten, 1964A). Its age must therefore be Upper Devonian.

Telemon Formation

The type area of the Telemon Formation is on Telemon Pastoral Holding on SPRINGSURE (see Mollan, Exon & Kirkegaard, 1964).

On TAMBO it forms strike ridges on the eastern flank and southern plunge of the Mount Beaufort Anticline, but on the western flank, it is downfaulted and obscured. It has scrub and poor tree cover and a grey photo tone.

The exposed rock types are mainly green, brown, or grey, thin to medium bedded fine quartzose to sublittoral sandstone, siltstone and shale, sometimes calcareous. Red tuffaceous sandstone, fine-grained limestone and minor algal limestone also occur. Clay clasts and carbonaceous fragments are widespread in the sandstones and siltstones. Beds are often flaggy and show some minor low-angle crossbedding.

There is an apparently conformable contact with the overlying Mount Hall Conglomerate, or where that is absent, with the Ducabrook Formation. Although the red tuff, characteristic of the Ducabrook Formation, do not appear in the Telemon Formation, the boundary between the two units cannot be defined accurately purely on lithology. The contact has been traced around, on the air photos, from the pinch out of the lens of Mount Hall Conglomerate. No Raymond Sandstone lithologies crop out on TAMBO.

The unit is about 1000 feet thick in this area.
An Upper Devonian age is probable for the formation (op.cit.)

Mount Hall Conglomerate

The Mount Hall Conglomerate was named from Mount Hall in the type area in the Telemon Anticline - SPRINGSURE (Mollan et.al., 1964).

On TAMBO it is represented by a lens forming a prominent strike ridge 1000 yards long, on the southern plunge of the Mount Beaufort Anticline. The western end of this east-west trending lens has been truncated by a large fault. The formation consists largely of medium to very thick bedded, white, fine-grained to pebble quartzose sandstone, with some clay matrix. Thick to very thick bedded lenticular conglomerate beds containing pebbles of quartz and lesser chert, acid volcanics and silicified sandstone, are common.

The maximum thickness of the lens is 150 feet. The contact with the overlying Ducabrook Formation is not visible, but the two units appear to be conformable.

A Lower Carboniferous age is probable for the Mount Hall Conglomerate (op.cit.)

Ducabrook Formation

The Ducabrook Formation was named after Ducabrook Pastoral Holding on EMERALD (see Veevers et.al., 1964B).

It crops out in the extreme north-east of TAMBO in the Mount Beaufort Anticline. A north-north-west trending fault separates it into a western part dipping to the south-west, which is cut out by the fault in the north, and an eastern part dipping south-east. The formation generally forms low, lightly timbered strike ridges with a light grey photo tone.

The typical rock dykes are green, red or buff, commonly tuffaceous, sandstone, siltstone and shale. The sandstone is lithic sublabile to lithic, fine to coarse-grained, and commonly contains green, red or black volcanic fragments. Some very haematitic tuff also occurs. The sediments are thin to medium bedded and commonly flaggy. Crossbedding is rather uncommon.

The Joe Joe Formation unconformably overlies the Ducabrook Formation cutting across trends in some places, and dipping at a much lower angle. The Ducabrook Formation in this area is approximately 3500 feet thick. Its age is Lower Carboniferous (op.cit.)

Joe Joe Formation

The type area of the Joe Joe Formation is near Joe Joe Creek on SPRINGSURE (see Mollan et.al., 1964). On TAMBO it crops out over approximately 100 square miles around Spider and Native Companion Creeks, north of the scarp of the Colinlea Sandstone. The lower, conglomeratic part of the formation forms a well rounded photo pattern

with largely grassy cover and a light grey photo tone. The upper, finer grained part, forms low strike ridges with sparse tree cover and again a light grey photo tone. The unit is shallow dipping.

The thickness of the lower part varies from place to place, probably averaging 500 feet. This lower part consists largely of greenish poorly bedded, thick bedded, fine to coarse grained, sublabile to labile sandstone and lesser siltstone. Calcareous concretions occur at some levels. Polymictic, often tillitic, conglomerates are quite common. Large agglomerate boulders, low in the formation may be glacial erratics.

The upper part shows subdivisions roughly comparable to those noted on the western part of SPRINGSURE (op.cit.). Thicknesses cited below have been estimated using dip information to the west of Garden Gully Homestead.

200' ✓	Greenish-brown to buff, poorly bedded, fine to medium grained, in places calcareous, sublabile to labile sandstone.
500'	Siltstone, shale, lesser limestone - laminated to thin bedded, in places varve-like or platy, green or grey. Some ripple marks, fine crossbedding, current striae, large nodules. Some arthropod tracks as on SPRINGSURE. Some greenish sublabile sandstone, minor hard pink tuff. Plant fragments abundant at some levels.
200'	Thin to thick bedded, fine grained greenish quartzose to sublabile sandstone, siltstone, hard pink and white tuff. Common plant remains.

In the east, for 5 miles west of Springsure, the Joe Joe Formation is overlain, apparently disconformably, by the Reid's Dome Beds comprising Vertebraria-bearing siltstone and sandstone. Elsewhere, the quartzose sandstone and conglomerate of the Colinlea Sandstone lies disconformably on the Joe Joe Formation.

The Joe Joe Formation on TAMBO has an approximate maximum thickness of 1500 feet and is of Carboniferous to lowermost Permian age (op.cit.).

Reid's Dome Beds

This unit is named from A.O.E. No.1 (Reid's Dome) where it includes the "undivided freshwater beds" and the "lower shales and mudstones". It is also penetrated in A.O.E.No.2 (Reid's Dome) and A.O.E. No.3 (Consuelo). It consists of siltstone, carbonaceous siltstone, shale and coal in the subsurface.

A Glossopteris-bearing siltstone and sandstone unit within the Reid's Dome Beds on the Springsure Shelf extends five miles on to the north-east part of TAMBO where it wedges out. It forms a soft break below the scarp of the Colinlea Sandstone, overlying the Joe Joe Formation.

The Reid's Dome Beds on TAMBO (see Fig.2) are thin to medium bedded, sometimes ripple marked, purplish-grey siltstone and white quartzose sandstone. The sandstone is fine grained, medium to thick bedded and is not crossbedded. Plant roots (Vertebraria) and poorly preserved leaf fragments are common.

The Colinlea Sandstone disconformably overlies this unit. The maximum thickness of the Reid's Dome Beds on TAMBO is less than 50 feet. The age of the unit is Lower Permian (Mollan et.al., 1964).

Colinlea Sandstone

The Colinlea Sandstone type area is on Colinlea Holding in the Springsure Sheet area (see Mollan et.al., 1964).

The unit which is a west-north-west trending belt in the north-east corner of TAMBO generally has a dark grey photo tone due to dense growth of small trees, and dipslopes and bedding trends are usually discernible on the photos. In the east it is deeply incised and cliff forming, whereas farther west it has only low relief.

The Colinlea Sandstone consists mainly of white, medium to coarse grained, medium to thickbedded, typically crossbedded quartzose sandstone with some feldspar and muscovite, and minor clay matrix. It also includes thin bedded fine-grained quartzose sandstone and siltstone which in places contain plant fragments. Thick bedded pebbly quartzose sandstone and conglomerate are very common. The pebbles are dominantly quartz, with fewer chert, porphyritic acid volcanics, quartzite and sedimentary pebbles. There is a general increase in the proportion of acid volcanic pebbles up the formation.

North-east of Glen Avon Homestead, where the contact was observed, the base of the Colinlea Sandstone is a 6 inch thick conglomerate bed composed mainly of subangular quartz pebbles, but also containing angular sandstone pebbles of similar lithology to the immediately underlying sandstone of the Joe Joe Formation.

The base of the Colinlea Sandstone near the Glen Avon-Alpha road has pebbly bands in which most of the pebbles are porphyritic volcanics, lithic clastic sediments, and a few tabular pebbles of phyllite and schist.

Torbanite crops out within the unit in a small creek two miles north of Glen Avon Homestead. The extent of this torbanite and the associated coal was proved by drilling by the Queensland Department of Mines (Connah, 1964). Estimated reserves are 150 to 180 million gallons of distillate.

The Colinlea Sandstone is overlain, probably conformably, by the Peawaddy Formation.

The thickness of the sandstone, computed from dip information, is about 450 feet, probably decreasing slightly westwards. The age of the unit is, at least partly, Lower Permian (Mollan et.al., 1964).

Peawaddy Formation

The type area of the Peawaddy Formation is in the region of the Consuelo and Springsure Anticlines. The unit is named from Peawaddy Creek in which the type section is exposed (Mollan et.al., 1964).

It crops out in a narrow west-north-west trending belt in the north-east corner of TAMBO, as a softer unit above the Colinlea Sandstone north of the black soil plains of the Bandanna Formation. The unit forms a sparsely timbered terrain with low relief, and a light grey photo tone. The uppermost Colinlea Sandstone has a similar photo pattern in places.

Outcrop is poor, and consists mainly of white to buff, fine to medium grained, medium bedded, soft quartzose to feldspathic sublabile sandstone with clay matrix and some muscovite and minor lithic fragments. A few very clayey sandstones are probably altered feldspathic sandstones. The unit also includes some laminated, finely crossbedded grey siltstone, in places with carbonized plant fragments. The soft break above the Colinlea Sandstone in places, is due to the presence of fine grained carbonaceous sandstone.

The logs of two shallow drill holes (Fig. 3) provide additional lithological information about this unit. In Tambo BMR No.33, drilled through the formation halfway across the belt of outcrop on TAMBO, the Peawaddy interval is 150 feet thick. The upper half of the unit is quartzose sandstone (in places clayey), and the lower half is inter-laminated, crossbedded, dark grey carbonaceous micaceous siltstone and mudstone, and grey quartzose sandstone and siltstone. This lower half is typical of the Peawaddy Formation on SPRINGSURE.

In Tambo BMR. No.32, near Durrandella Homestead at the western limit of Peawaddy outcrop, there is only minor carbonaceous siltstone, the unit being mainly quartzose sandstone. Here the unit is softer than the Colinlea Sandstone, has feldspathic beds and does not contain conglomerate but the difference between the two formations is not very striking. Probably this is the western limit of distinctive lithologies in the Peawaddy Formation.

The Peawaddy Formation thins westwards on TAMBO from an estimated 200 feet in the far east to 150 feet at B.M.R. No.33, and 100 feet at B.M.R. No.32, where the siltstone and mudstone component has practically disappeared. This compares with an estimated thickness of 450 feet near Tanderra Homestead halfway across SPRINGSURE (op.cit.).

The base of the formation is immediately above the highest conglomeratic bed of the Colinlea Sandstone. There is a sharp contrast between the quartzose sandstones of the Peawaddy Formation and the conformably overlying labile sandstones and dark grey mudstones of the Bandanna Formation.

A few fish scales were found in sandstone in a small creek east-north-east of Alpha Homestead, but no shelly fossils were found on TAMBO. Shell fragments had previously been reported near Alpha Homestead (Woolley, 1941) and equated with the Mantuan Productus Bed fauna.

The age of the formation is Upper Permian (Mollan, et.al., 1964).

Bandanna Formation

The type area of the Bandanna Formation is near Rewan Homestead on SPRINGSURE (Mollan et.al., 1964).

On TAMBO this unit forms a narrow belt, slightly sinuous because of gentle plunging folds, trending in a general north-west direction from the eastern boundary of this map. It forms a belt of well grassed black soil downs with rare trees, except in areas of sand outwash. This poorly exposed unit is known only from a few outcrops in deeply entrenched creeks and gullies.

The distinctive two-fold subdivision of the Bandanna Formation in the type area is not obvious here. The basal part of the formation consists of grey mudstone (weathering to brown,) and claystone (Fig.3 - drill hole Tambo B.M.R. No.32). The bands of light-coloured montmorillonite clay, characteristic of the lower part of the formation in the type area, do not appear to be present in this area. The mudstone is overlain by fine to medium grained, thin to medium bedded, brown labile sandstone. The sandstone contains concretions, lenses, and thin interbeds of calcareous feldspathic sandstone and sandy limestone, generally containing Glossopteris fragments. Silicified wood "float" is common near the sandstone. The top part of the formation consists mainly of grey carbonaceous siltstone and mudstone. Coal seams, characteristic of the upper part of the formation in the type area, were not seen.

The Bandanna Formation conformably overlies the Peawaddy Formation, and is conformably overlain by the Rewan Formation. The estimated thickness is 400 feet. Plants collected from the formation on SPRINGSURE (see Appendix 2, Mollan et.al., 1964) indicate an Upper Permian age.

Rewan Formation

The type area of the Rewan Formation is near Rewan Homestead on SPRINGSURE (Mollan et.al., 1964). The unit forms a west to north-west trending belt from the eastern boundary of the map to Merrijig Creek, and then trends north. This belt is mostly lightly timbered and has a light air photo tone. Resistant sandstone beds form small cuestas and mesas. In places the basal part of the unit forms a **scarp** because it is more resistant than the underlying, Bandanna Formation. Soft beds within the unit are poorly exposed.

Sandstone is the dominant lithology of the Rewan Formation on TAMBO. It is mainly brown, fine to medium grained, sub-labile to quartzose sandstone; labile sandstone is rare. Some sandstone is poorly sorted and coarse to granular. Clay cherts are common, either scattered through particular sandstone beds or in thin bands. The sandstone is generally micaceous. Muscovite is usually the dominant mica, but in some sandstone beds biotite is dominant. The sandstone is thin to medium bedded, and flaggy in places. Thin cross-beds are common, and some fine-grained quartzose sandstone is festoon bedded. Siltstone and mudstone beds are more common near the eastern map boundary. When unweathered the mudstone is light to bright green, pink or purple, but it has mostly weathered to an oak-grey colour in outcrop. Thin beds of tough ferruginous siltstone occur throughout the unit.

There is a gradual facies change in the Rewan Formation from the western part of SPRINGSURE to the northern boundary of TAMBO. Near the SPRINGSURE/TAMBO boundary the unit consists of interbedded labile sandstone and reddish-brown and green mudstone, but to the west quartzose sandstone becomes a major constituent.

Two shallow drill holes - Tambo B.M.R. No.34, 2 miles south-west of Alpha Homestead, and Tambo B.M.R. No.36, on the Alpha-Tambo road - penetrated the formation (Figs. 4,5). Tambo B.M.R. No.36 passed into the upper part of the Rewan Formation conformably beneath the fine grained quartzose sandstones of the lower Clematis Sandstone. Here the Rewan Formation consists of an upper 25 feet of red and grey siltstone underlain by 70 feet of largely fine grained reddish quartzose sandstone, the base of the unit was not reached. Tambo B.M.R. No.34 in the lower part of the Rewan Formation penetrated bluish-grey or greenish-grey very fine grained quartzose sandstone, siltstone and mudstone.

The Rewan Formation conformably overlies the Bandanna Formation and is conformably overlain by the Clematis Sandstone. Its computed thickness is 400 feet. Palynological studies of the Rewan Formation in the type area indicate a Lower Triassic age (op.cit.).

Vine, Jauncey, Casey & Galloway (1965) have mapped, on JERICHO, a quartzose sandstone unit near the top of the Rewan Formation as the Dunda Beds. Further mapping in the coming field season should determine whether this is a mappable unit on TAMBO.

Clematis Sandstone

The Clematis Sandstone is named from Clematis Creek BARALABA and TAROOM. The type section is in cliffs bordering Clematis Creek (Olgers, Webb, Smit & Coxhead, 1964).

On TAMBO the Clematis Sandstone occupies a belt running west-north-west from the TAMBO/SPRINGSURE map boundary to the west of Merrijig Creek and then north to Wild Horse Creek in the north of the area. It usually forms densely timbered low ridges and dip slopes, separated by low, sandy, lightly timbered areas. In the east, where dips are extremely low, flat lightly timbered sandy benches are developed.

The dominant rock types are white to buff, fine to coarse grained, thin to very thick bedded, crossbedded quartzose sandstone and fine conglomerate. The sandstone may be micaceous, feldspathic or clayey and is strongly crossbedded. Some ripple marks and clay clasts were found. Quartz pebble beds and conglomerate are fairly common. At some levels these are quartz-rich siltstone and mudstone beds. The unit contains thin tough ferruginous bands; one thicker band contained concretions up to 12 inches across.

The unit is an aquifer of moderate importance. The crossbedding dips in many different directions in the far north, showing current flow to the west, north and east. In the south of the area crossbedding directions are quite consistent, generally being to the north-west.

The upper contact is generally obscured but where seen the change from the white ~~quartzose~~ Clematis Sandstone to the buff sublabile, or clayey quartzose sandstone of the Moolayember Formation is quite sharp. The change to the light grey photo tone of the timbered plains is also sharp where it is not obscured by superficial deposits. The contact appears to be conformable.

Near Morrijig Creek the base of the Clematis Sandstone consists of a 4 inch thick kaolinitic clay bed. In general the change from the thickbedded, crossbedded Clematis Sandstone to the more labile, thinner bedded Rewan Formation is quite clear.

Two shallow drill holes (Figs. 4, 5) provided good sections of this unit. Tambo B.M.R. No.35, 2 miles north of Skye Homestead intersects the sharp contact between the overlying thin bedded grey siltstone and fine clayey sandstone of the Moolayember Formation and the coarse grained, thick-bedded, white quartzose sandstone of the Clematis Sandstone. Tambo B.M.R. No.36 penetrates the uniform fine grained quartzose sandstone of the basal Clematis Sandstone apparently conformably overlying the uppermost siltstones of the Rewan Formation.

The thickness of the unit, computed from dip information, is about 350 feet throughout the area. The age of the formation is probably Middle Triassic (Mollan et.al., 1964).

Moolayember Formation

The Moolayember Formation is named after Moolayember Creek, the type section being near the Carnarvon Highway, in the valley of Bullaroo Creek a tributary of Moolayember Creek, on TAROOM (Mollan, Exon & Forbes, 1965).

The formation crops out in a north-west trending belt some ten miles wide, north of the scarp of the Precipice Sandstone. Relief is low and outcrop poor. There is sparse brigalow-wilga vegetation and the unit has a light photo tone. Soil cover is especially extensive in the north. A few quartzose sandstone beds form low cuestas, but bedding trends are usually not discernible on the photos.

Siltstone and sandstone are the dominant lithologies. The poorly exposed siltstone is khaki-brown or buff in outcrop, grey when fresh. It is generally thin bedded. Purple siltstone, weathering to an ash-grey colour is more abundant in the upper part of the section.

Commonly the sandstone is brown to greenish, fine to medium grained, sublabile to labile and contains abundant feldspar. In many places it is calcareous or argillaceous and may contain biotite and, sometimes, clay clasts. It is medium to thick bedded. Concretions, lenses and beds of tough brown, grey when fresh, calcareous, in places carbonaceous sandstone grading to sandy limestone, are present; some thin beds of fine grained tough grey limestone are also present. Resistant beds of buff, very fine grained quartzose sandstone occur throughout the unit particularly in the north-west. These are thin to medium bedded, and are rarely ripple marked.

One shallow drill hole, Tambo B.M.R. No.35 (Fig. 4) intersects the lower part of the unit - a monotonous sequence of siltstone, mudstone and fine quartzose sandstone, with traces of coal.

The Precipice Sandstone lies unconformably on the Moolayember Formation and the folding in the lower unit is not always reflected in the upper. The junction with the pebbly quartzose Precipice Sandstone is often obscured by scree of Tertiary sediments. Pre-Jurassic weathering may account for the leached labile sandstone and pink and ash-grey siltstone seen at the top of the unit in places.

In the east of the area the thickness of the unit is more than 1000 feet; soil cover makes it impossible to estimate the thickness in the north-west. The formation is of Triassic (post Lower Triassic) age (Mollan et.al., 1964).

Tertiary Sediments

Tertiary sandstone and conglomerate is widespread in this area.

In the far north east, where they overlie the Colinlea Sandstone and the Joe Joe Formation, these sediments form mesas of extremely poorly sorted breccia-like conglomerate and quartzose sandstone. Large included fragments of quartzose sandstone indicate that these sediments were probably derived from the Colinlea Sandstone.

In the Glen Aven Homestead area thin Tertiary boulder deposits rest apparently conformably on low dipping cuestas of pre-Tertiary sediments. They contain "billy" boulders, and cobbles and boulders of silicified wood. The conglomerates are overlain by poorly sorted lateritised sandstone.

In many mesas the basal part of the Tertiary sediment comprises breccia-like conglomerate consisting of angular fragments of sandstone similar to that in the Rewan and Moolayember Formations. Most of these fragments are only a few inches in maximum dimension, but some are several feet across. The upper part of the mesas consists of mostly medium grained quartzose sandstone showing moderate sorting but generally lacking bedding.

Where they overlie the Moolayember Formation the sediments are generally better sorted, with only minor conglomerate, and reach thicknesses of about 100 feet. These sediments are mainly clayey, leached and structureless quartz-rich sandstones. Some are crossbedded, thick bedded and ripple marked, and some contain wood fragments.

In general, laterite profiles are developed and the sediments are structureless. Where bedding is visible it is usually thick and crossbedding may be present. 'Billy' boulder deposits are often found around some of the mesas in the north-east.

Low mounds of quartzose sandstone, of probable Tertiary age, have formed at the base of the Precipice Sandstone escarpment.

Cainozoic

Alluvium is widespread in the north, especially on the Bandanna and Moolayember Formations. The Moolayember Foundation has soil cover over much of its north-western area. Sand outwash has accumulated near the base of the scarps of the Precipice Sandstone, on and around Clematis Sandstone, and around the Tertiary mesas.

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REFERENCE FOR COLUMNAR MEASURED SECTION
AND SHALLOW DRILL HOLE LOGS

sandstone		grain size (mm)
	very fine	0.06 - 0.12
	fine	0.12 - 0.25
	medium	0.25 - 1.0
	coarse	1.0 - 2.0

quartzose sandstone > 90% clasts quartz
sublithic (feldspathic, lithic) 75-90% " "
lithic (feldspathic, lithic) < 75% " "

- conglomerate
- siltstone
- shale
- mudstone
- claystone
- limestone

bedding structure

- very thick > 40"
- thick 12-40"
- medium 4-12"
- thin 0.4-4"
- laminar < 0.4"
- cross bedded
- slumped
- ripple marks
- trails

brackets around symbol indicate poor development

gaps in sections are concealed areas

other symbols

- calcareous concretion
- plant fossil

abbreviations

- si siliceous
- fe ferruginous
- mic micaceous
- calc calcareous
- feld feldspathic
- carb carbonaceous
- st sandstone
- siltst siltstone
- mudst mudstone
- clayst claystone
- grnd grained
- r.f. rock fragments
- conc concretionary

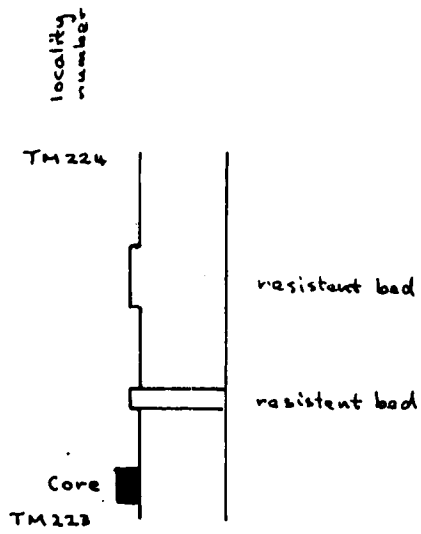
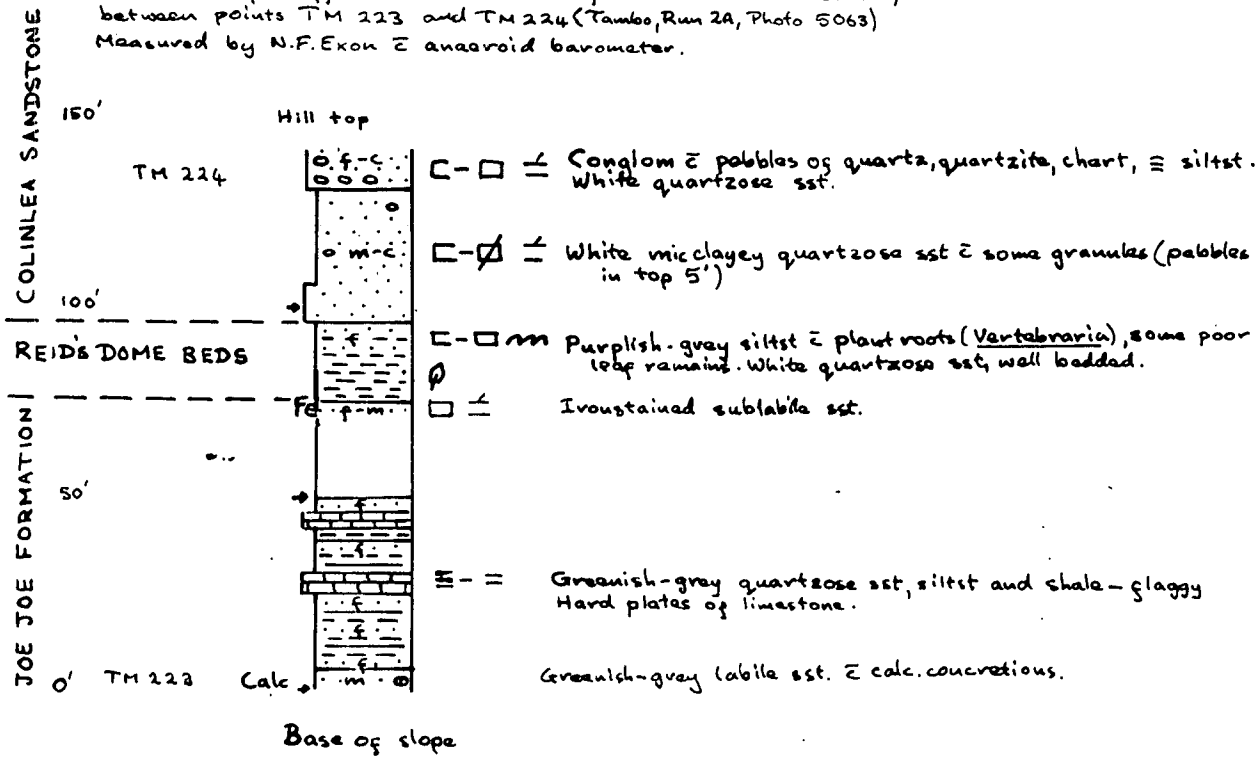


Fig. 2

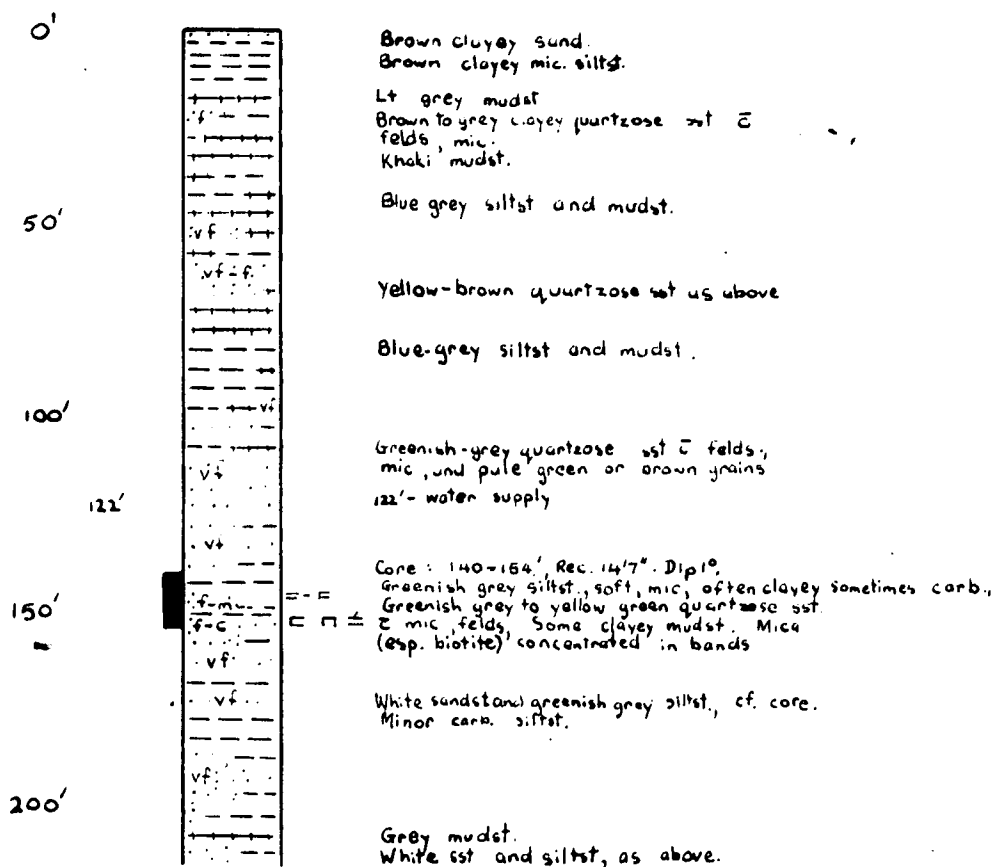
MEASURED SECTION IN
JOE JOE FORMATION,
COLINLEA SANDSTONE,
REIDS DOME BEDS

Measured up cliff 5 1/2 miles East of Glen Avon Homestead,
between points TM 223 and TM 224 (Tambo, Run 2A, Photo 5063)
Measured by N.F. Exon \bar{c} aneroid barometer.



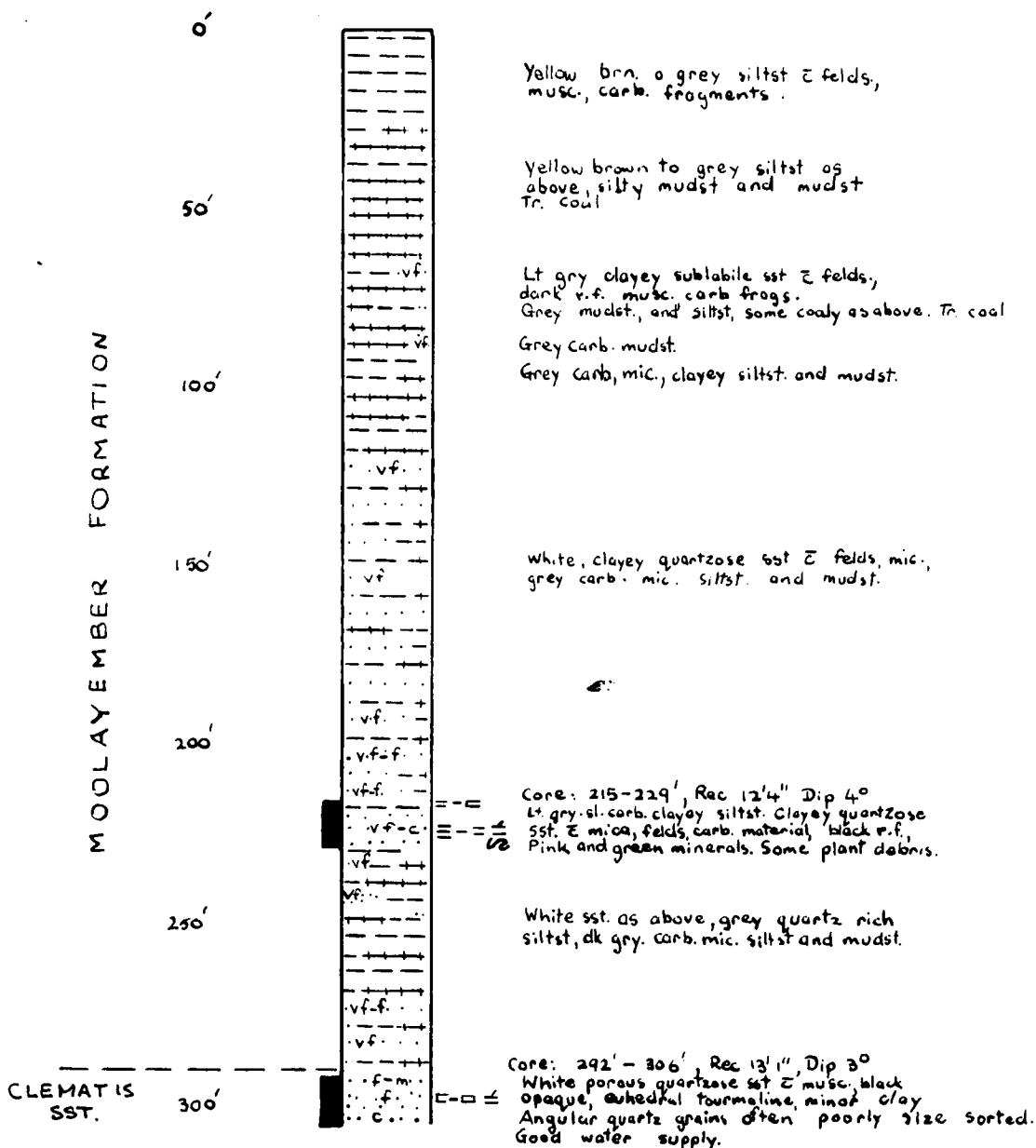
SHALLOW DRILL HOLE LOGS

REWAN FORMATION



TAMBO B.M.R. # 35

MOOLAYEMBER FORMATION



TAMBO B.M.R. # 36

Fig. 5

SHALLOW DRILL HOLE LOG

