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EXPLANATORY NOTES TO THE BAUHINIA DOWNS 1:250,000 SHEET AREA (Revised Edition)

Compiled by

J.W. Smith

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CONTENTS

	Page
INTRODUCTION	1
PREVIOUS INVESTIGATIONS	2
PHYSIOGRAPHY	2
Gulf Fall	2
Bukalara Plateau	3
Coastal Plains	4
STRATIGRAPHY	5
LOWER PROTEROZOIC	6
Scrutton Volcanics	6
UPPER PROTEROZOIC	6
Tawallah Group	6
McArthur Group	7
Roper Group	9
CAMBRIAN	10
Bukalara Sandstone	10
Top Springs Limestone	10
MESOZOIC	10
TERTIARY	11
Golliger Beds	11
IGNEOUS INTRUSIONS	11
STRUCTURE	12
Folding	12
Faulting	12
Jointing	14
ECONOMIC GEOLOGY	15
REFERENCES	17

Contents (cont.)

TABLES

Table 1: Stratigraphy of the Bauhinia Downs Sheet area.

Table 2: McArthur River mineral deposits.

PLATES

Plate 1: Geological map of the Bauhinia Downs 1:250,000 Sheet, N.T..

FIGURES

Figure 1: Physiographic sketch map of the Bauhinia Downs 1:250,000 Sheet area.

Figure 2: Sketch cross section showing environment of deposition of the McArthur Group.

Figure 3: Structural sketch map of the Bauhinia Downs Sheet area.

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INTRODUCTION

The Bauhinia Downs Sheet area lies within the latitudes 16°S and 17°S and longitudes 135°00'E and 136°30'E on the south-western side of the Gulf of Carpentaria, Northern Territory.

The European population is centred at Borroloola (where there is a store), Mallapunyah Homestead, O.T. Downs Homestead, a homestead in the upper Batten Creek area, and at the time of writing (1962) at McArthur River Homestead.

Road access within the area is good and has been greatly improved by the recent construction of a formed road running from Daly Waters on the Stuart Highway to Borroloola. This road continues eastwards to Robinson River Homestead on the Robinson River Sheet area but is not formed beyond Borroloola. The other main roads in the area run from Borroloola to Mallapunyah Homestead (and thence to the Barkly Tableland) and from O.T.Downs Homestead through Three Knobs to join the Borroloola - Mallapunyah track at Leila Lagoon; both are graded dirt roads.

Borroloola, McArthur River Homestead, and Mallapunyah Homestead all have dirt airstrips which are open most of the year. A weekly service by light aircraft connects them with Mt. Isa, Queensland.

Photographs and maps covering the area are:

Bauhinia Downs air photographs (Scale 1:48,000) flown by the Royal Australian AirForce in 1947 and 1952.

Bauhinia Downs photoscale maps prepared by and available from the Division of National Mapping, Department of National Development.

Bauhinia Downs 4-mile topographic Series - E53/3 Zone 5, Division of National Mapping, Department of National Development.

Bauhinia Downs 4-mile uncontrolled photo mosaic.

McArthur River 8-mile military series - E53/3-4-7-8 Zone 5.

The annual rainfall of the area, which is 20-30 inches, falls mainly in the summer months - January to March.

The average temperature is about 85° in summer and 70–75° in winter.

PREVIOUS INVESTIGATIONS

Lead-zinc-copper mineralization in the area around McArthur River Homestead was first discovered by Mr. Tom Lynott in 1887, and by 1891 the area had been well prospected for silver, but without success. Interest in the area revived in 1909, when Cook's deposit was drilled, and again in 1953 when Bald Hills prospect was drilled by Consolidated Zinc Pty.Ltd.. Little systematic work was done in the field until Mount Isa Mines Ltd. began a programme of mapping and prospecting in 1955. Two promising prospects, the Reward and H.Y.C., were discovered; subsequently the Reward was abandoned, but drilling is still proceeding at H.Y.C. (1962) by Carpentaria Exploration Ltd., a subsidiary company of Mount Isa Mines Ltd..

Until 1955 little was known of the geology of the Sheet area, apart from the region around McArthur River Homestead. Brown (1908), Woolnough (1912), and Jensen (1914) visited the area, but confined most of their observations to the route from Borroloola to the Barkly Tableland; Woolnough also travelled from Tamumbirini Homestead east to McArthur River Homestead. In 1955–6 geologists of Mount Isa Mines Ltd. (Kriewaldt, 1957) carried out reconnaissance mapping of the Bauhinia Downs Sheet area as part of a survey of the country between the Queensland Border and the Roper River.

In 1959 the Bureau of Mineral Resources completed a reconnaissance gravity survey from Burketown, Queensland to Daly Waters, crossing the Bauhinia Downs Sheet area en route, and during 1960 mapped the Sheet area. Detailed mapping of an Authority to Prospect of 600 square miles around McArthur River Homestead was begun by geologists of Carpentaria Exploration Co. Ltd. in the same year. In 1961 the Bureau of Mineral Resources conducted a geochemical survey in the McArthur River Homestead area.

PHYSIOGRAPHY

The Sheet area mainly falls in the Gulf Fall physiographic region (Stewart 1954, Dunn, Smith, and Roberts 1962) but around Borroloola the Coastal Plains extend on to the north of the Sheet area (see figure 1).

The Gulf Fall is defined as the hill country surrounding the Gulf of Carpentaria in which the drainage is towards the Gulf.

Apart from isolated ranges the country slopes gradually from about 800 feet above sea-level in the south and south-west to the Gulf Coastal Plains around Borroloola, which are between 50 feet and 70 feet above sea level. The isolated ranges are 100-500 feet above the surrounding country.

The main elevated areas can be divided into three:

(a) four isolated ranges in the centre of the Sheet area.
(b) the Favenc Range in the south-west and
(c) the Bukalara Plateau in the south-east.

The isolated ranges of (a) are the Tawallah Range, an unnamed feature to the north-north-east of Leila First Crossing, another around Mallapunyah Homestead, and the Abner Range. The first three ranges are composed of rocks of the Tawallah Group and the last of Roper Group rocks.

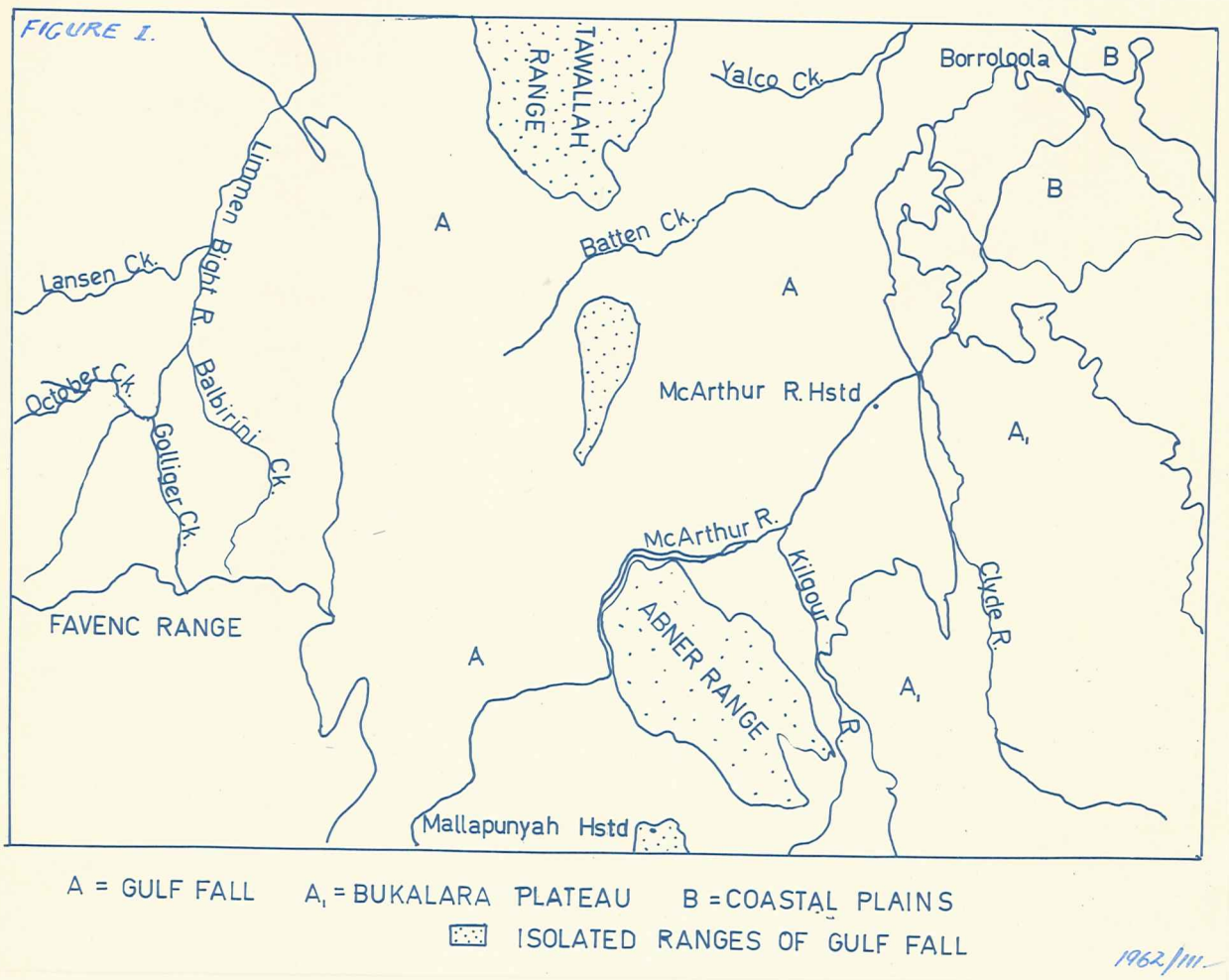
All are composed of resistant sandstone ridges, separated by steep-sided valleys formed by erosion of softer beds. The resistant sandstone ridges of the Roper Group have a characteristic strong rectangular jointing pattern which upon weathering causes the formation of isolated pillars up to 50 feet high.

The Favenc Range fringing the Barkly-Beetaloo Tableland (Dunn, Smith,and Roberts, 1962) is composed of Mesozoic sediments. The northern edge of the Range is a continuous scarp rising to about 100 feet above the plain. Southwards the Range is dissected into scattered, low, flat topped hills.

The Bukalara Plateau is a major physiographic feature of the Gulf Fall occurring in the east and south-east of the Sheet area and extending into the adjacent Walhallow, Robinson River, and Calvert Hills Sheet areas. The Range is mainly a dissected plateau of flat-lying Bukalara Sandstone standing 100-300 feet above the surrounding country. In places the rivers, in the Sheet area principally the Clyde River and its tributaries, have cut through the Bukalara Sandstone and are superimposed on the McArthur Group and Roper Group.

A lowland area in the centre of the Sheet area between the Bukalara Plateau and a north-striking line roughly through Three Knobs is largely underlain by rocks of the McArthur Group. (It is within this area that the isolated ranges, described above, see Figure (1), occur). The area, excluding the isolated ranges, is usually undulating with low rounded, rough, hills up to 50 feet high, but resistant beds such as the Tatoola Sandstone and parts of the Lynott Formation form strike ridges rising to about 200 feet above the surrounding plain.

In some places some units e.g. the Yalco Formation, have a lateritic cap. Remnants of Mesozoic sediments form scattered small plateaux, particularly in the south-west and north-east.



To the west of the line through Three Knobs a plain stretches to the western edge of the Sheet area, where low strike ridges of Tawallah, McArthur and Roper Group sediments are present. Low hills mainly of Roper Group and Mesozoic sediments project above the plain, composed of sand and lateritic soils. In the Golliger Creek - Balbirini Creek area residual black soil plains have formed on Tertiary limestone - the Golliger Beds; black soils also occur between Lansen Creek and October Creek in the extreme west of the Sheet area.

Coastal Plains, in part flood plains of the tidal McArthur River occur around Borroloola. Scattered residuals of Mesozoic and Roper Group sediments e.g. the McLeod Range, rise to 100 feet above the plain which is mainly composed of sand.

The Bauhinia Downs Sheet area is drained mainly by the McArthur River. The plain in the west of the Sheet area however is part of the drainage area of the Limmen Bight River, whilst the eastern side of the Bukalara Range is drained by tributaries of the Foelsche and Wearyan Rivers.

The McArthur River rises on the Walhallow Sheet area and floods north-eastwards across the Bauhinia Downs Sheet area. Along its central portion the river is braided, but at McArthur River Homestead it forms one main channel. The river is deeply incised, with steep banks up to 50 feet high. During the dry season scattered water-holes, some of which are permanent, are present in the upper and central reaches; by McArthur River Homestead there is a gentle flow of water for most of the year, and the river becomes tidal about 6 miles upstream of Borroloola.

The present drainage system is post-Mesozoic and largely superimposed on Upper Proterozoic rocks. Erosion has removed most of the Mesozoic sediments and the superimposed drainage has been modified by the structure of the Upper Proterozoic rocks.

STRATIGRAPHY

The stratigraphy of the Bauhinia Downs Sheet area have been summarized in Table 1. General distribution of the units is shown in Fig.3..

The Upper Proterozoic rocks were laid down in the McArthur Basin (Dunn, Smith, & Roberts, 1962), which covers a large area of the south-western part of the Gulf of Carpentaria.

The basal Group of the Upper Proterozoic - the Tawallah Group - compared with the succeeding McArthur Group is relatively uniform in both thickness and lithology. Maximum thickness was possibly developed in the Bauhinia Downs and Mount Young Sheet areas indicating incipient development of a north-striking trough through the centre of the Bauhinia Downs Sheet area.

This trough was operative throughout the deposition of the McArthur Group. Subsidence was not uniform and was most rapid between two major hinge-lines - The Tawallah - Abner Fault line and the Emu Fault line. Between the Emu line and longitude 137° some subsidence occurred. The gravity traverse conducted by the Bureau of Mineral Resources indicated a sharp thinning of Upper Proterozoic sediments at about longitude 137°. From geological mapping of the Robinson River Sheet area it appears that a stable shelf may have existed east of this line during deposition of the McArthur Group (Yates, 1962).

To the west of the Tawallah-Abner line sinking was also fairly rapid. The nature of the sediments suggests that at this time the western margin of the Basin may have been only a little to the west of the Sheet area.

However, the start of the deposition of the Roper Group the axis of downwarping had shifted westwards to the western Bauhinia Downs and on to the Tanumbirini Sheet areas.

Tectonic movements ended deposition of the Roper Group. Subsequently the area was relatively stable and small thicknesses of sediments were laid down in the Cambrian, Mesozoic, and Tertiary.

LOWER PROTEROZOIC

Scrutton Volcanics.

The Scrutton Volcanics, which crop out in the Tawallah pocket to the east of old Tawallah Homestead (and on the Mount Young Sheet area) are unconformably overlain by the Yiyinti Sandstone, which basally, in places, contains pebbles and cobbles of volcanics. The Volcanics have therefore been placed in the Lower Proterozoic, but may be younger.

The Volcanics consist of fine-grained porphyritic acid to intermediate lenses and vesicular basalt, with lenses of siltstone, shale, arkose, and sandstone. Quartz gabbro is also present and may represent minor intrusions.

The thickness of the Scrutton Volcanics is not known.

UPPER PROTEROZOIC

Tawallah Group.

The most complete section (about 13,000 feet) of the Tawallah Group on the Sheet area is in the Tawallah Range; elsewhere, except for the exposure north-north-east of Leila First Crossing, only the upper part of the Group is exposed.

The Tawallah Group is mainly composed of sandstone, with subordinate volcanics, siltstone, dolomite, dolomitic and ferruginous sandstone, dolomitic and ferruginous siltstone and conglomerate. The dominant rock type is a white to pink medium-grained quartz sandstone, which occurs mainly in the Yiyinti Sandstone, Sly Creek Sandstone and Masterton Formation. In the Sheet area dolomite is entirely confined to the Wollogorang Formation and conglomerate mainly to the Masterton Formation and Rosie Creek Sandstone.

Volcanic rocks occur principally in the Peters Creek Volcanics and Settlement Creek Volcanics, but are found locally also in the Masterton Formation.

Apart from local lapilli tuff the volcanics are intermediate to basic flows; the most common rock type is an iron-rich vesicular trachyte or basalt. Microgabbro has been found within the Masterton Formation, but may be intrusive.

McArthur Group

The McArthur Group is best exposed on the Bauhinia Downs Sheet area; it extends onto the Walhallow, Mount Young, Robinson River, Calvert Hills, and Mount Drummond Sheet areas. Carbonate rocks in similar stratigraphic position in the Urapunga Sheet area, (Dunn 1962b) have also been included in the McArthur Group (Dunn, Smith, & Roberts, 1962).

The principal area of outcrop on the Sheet area is found between the Bukalara Range and a north-striking line approximately through Three Knobs; minor outcrops also occur in the extreme west around Lansen Creek, and in the south-east and east.

Within the Bauhinia Downs Sheet area the McArthur Group is conformable on the Tawallah Group. In some other places the two Groups are unconformably related e.g. the Calvert Hills and Robinson River Sheet areas.

Maximum deposition of the carbonate-rich McArthur Group took place in a trough striking north through the centre of the Sheet area. A major north-striking faulted hinge-line - the Tawallah - Abner Fault - affected sedimentation during deposition of the Group; the Emu Fault may also have affected sedimentation.

The history of deposition of the McArthur Group in the central part of Sheet area is complex. Summarized, the following seemed to have been the order of events (see also Fig.2):

1. Deposition of the Mallapunyah Formation representing a transition between the dominantly arenaceous Tawallah Group and the dominantly carbonate McArthur Group.
2. Deposition of widespread carbonate mud accompanied by the growth of large algal biostromes and much slumping. Minor lenses of alternating dolomite, siltstone, and sandstone were deposited locally (the Amelia Dolomite).
3. Minor uplift, both marginal and along the Tawallah-Abner Fault, resulting in the formation of a reef dolomite (the Top Crossing Dolomite) along the Tawallah-Abner line. Increased marginal run off in the west produced the Tatoola Sandstone.

Fore-reef sediments were deposited in the east, e.g. the Lynott Formation, Yalco Formation and Looking Glass Formation; and back reef sediments in the west - the Tooganinie Formation.

4. Minor uplift during deposition of the fore and back reef sediments, resulting in the deposition of the Stretton Sandstone in the east and the Leila Sandstone Member of the Tooganinie Formation in the west.

5. Breakdown of the reef, and of fore and back reef sedimentation, and deposition of widespread carbonate muds (Emmerugga Dolomite). However in the north-east initially a sandstone (Smythe Sandstone) was laid down before the carbonate muds-here mainly oolitic - were deposited. Locally elsewhere, as in the north side of the Abner Range, shale and chert were deposited initially (Amos Formation). In the north and north-west shallow-water sandstone, shale, and chert with dolomite and chert breccia (Billengarrah Formation) were laid down, and towards the close of McArthur Group time extended southwards to the McArthur River.

The units of the back reef sediments, and sandstones deposited in the back reef area, have been combined into a sub-group (the Bauhinia Downs Sub-group), as have the fore reef sediments and associated sandstones.(the Batten Sub-Group).

In the north-east of the Sheet area the rocks below the Lynott Formation and above the Masterton Formation consist of siltstone, dolomite, quartz sandstone, and chert breccia. They do not resemble the Mallapunyah Formation and the Amelia Dolomite and have therefore been mapped as separate units - the Festing Creek Formation and the Warramana Sandstone;the topmost chert and chert breccia have been mapped as the Hammer Creek Member of the Lynott Formation. Volcanics occur in the Festing Creek Formation in the Mount Young Sheet area (Plumb and Paine 1962).

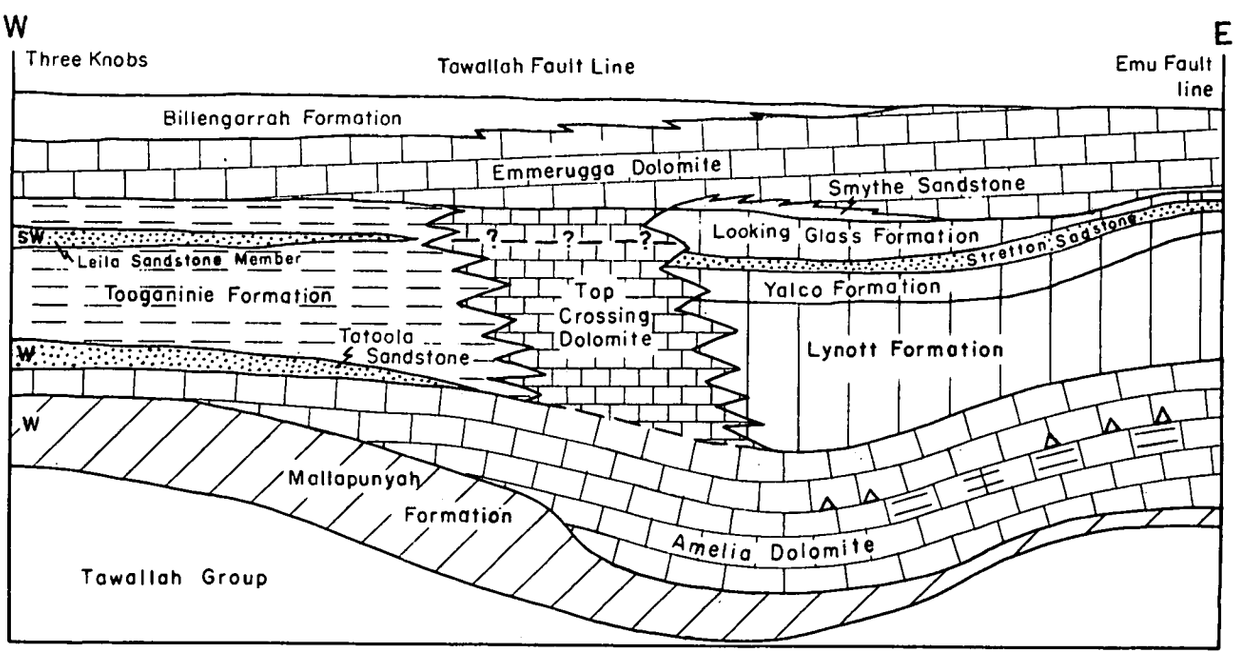
The only volcanics in the McArthur Group in the Sheet area are in the Barney Creek Member of the Amelia Dolomite. Fine-grained acid tuffs occur in the footwall of the H.Y.C. prospect.

The outcrops of the McArthur Group around Lansen Creek consist of white to brown fine-grained sandstone, white to pink chert and siltstone, flaggy pink fine-grained dolomite, rare bands of rhythmically alternating dolomitic sandstone and dolomite with halite pseudomorphs and pebble conglomerate.

Figure 2.

DIAGRAMMATIC SECTION OF THE Mc ARTHUR GROUP

(Three Knobs - Emu Fault)



Reference

- *Sediment of the Mallapunyah Formation*
- *Biohermal Reef dolomite*
- *Dolomite with biostromes*
- *Back reef sediments*
- *Fore reef sediments*
- *Sandstone incursions*
- △ △ △ *Massive chert breccia*
- E *Source of sediments*

Bureau of Mineral Resources, Geology and Geophysics. July 1962 *To accompany Record 1962/111* E53/3/14

The percentage of non-carbonate rocks is greater than in the main area of outcrop of McArthur Group rocks, and may suggest proximity to the margins of the Basin. These rocks cannot be correlated closely with the rest of the McArthur Group.

The outcrops of the McArthur Group in the extreme east of the Sheet area consist of Karns Dolomite (Firman 1959, Yates 1962).

Analyses of the carbonate rocks of the McArthur Group show them to be dolomites rather than linestones. Minor oolitic bands towards the top of the Group are limestone in composition.

The thickness of the Group in the east of the main area of outcrop, is 13,000 - 14,000 feet, in the west about 11,000 feet and in the north-west probably only about 7,000 feet.

Roper Group.

The Roper Group has a widespread distribution in the McArthur Basin. In the Bauhinia Downs Sheet area the main areas of outcrops are the Abner Range, east of the Emu Fault, and in the west.

The Roper Group is unconformable on the McArthur Group. With local exceptions the unconformity is very slight. Normally the basal unit of the Roper Group - the Limmen Sandstone - overlies the Emmerugga Dolomite, the Billengarrah Formation, or the Stott Formation. In the east the Limmen Sandstone overlies various units of the McArthur Group as low in the succession as the Lynott Formation. In the south-west a basal conglomerate contains pebbles of rocks characteristic of the McArthur Group.

The dominant rock types of the Roper Group are quartz sandstone, siltstone, and shale, with subordinate ferruginous siltstone, ferruginous sandstone, feldspathic sandstone, fine to cobble conglomerate, and glauconitic sandstone (the last being characteristic of the Crawford Formation and the coarser parts of the Mainoru Formation; glauconitic micaceous siltstone and micaceous shale are characteristic of the rest of the Mainoru Formation).

The Cobanbirini Formation is nowhere completely exposed; hence no total thickness can be estimated for the Roper Group. In the west the exposed thickness is about 10,000 feet, in the Abner Range about 6,000 feet, and east of the Emu Fault about 1500 feet.

The Abner Sandstone, Corcoran Formation, and Bessie Creek Sandstone are markedly thinned in the last area. The Limmen Sandstone thins from about 5,000 feet in the Tanumbirini Sheet area to about 10-100 feet in the Abner Range and east of the Emu Fault.

CAMBRIAN

Bukalara Sandstone

The Bukalara Sandstone occurs widely throughout the Carpentaria region. It crops out principally on the Sheet area in the east and south-east but also occurs in the Abner Range and in the extreme north-west. The sandstone, which is commonly flat-lying or, in places, gently folded forms a plateau over the folded Upper Proterozoic rocks. It is completely uniform throughout the Sheet area, and is characterized by its slightly feldspathic nature, its long gently curving cross-bedding, and its joint pattern.

The sandstone normally ranges from 100-300 feet in thickness, but in the Abner Range, where it is folded into a syncline, it is 1000 feet thick. The sandstone was previously regarded as Upper Proterozoic; but it is related to the overlying Lower Cambrian Nutwood Downs Volcanics in the Hodgson Downs Sheet area (Dunn,1961a). It is unfossiliferous.

Top Springs Limestone.

The Top Springs Limestone crops out only in the extreme south of the Bauhinia Downs Sheet area, but occurs more widely on the Walhallow Sheet area.

The Limestone unconformably overlies units of the McArthur Group and Roper Group and, on the Walhallow Sheet area, the Bukalara Sandstone. No fossils have been found, but it is tentatively regarded as being Middle Cambrian because its geographical position suggests that it may be a basal part of the Barkly Basin sequence. The limestone is unconformably overlain by Mesozoic sediments.

MESOZOIC

Mesozoic sediments crop out extensively in the northern part of the Northern Territory as cappings on older rocks. In the Bauhinia Downs Sheet area they are best exposed in the west and south-west .

In general, claystone and clayey sandstone overlie quartz sandstone. A basal conglomerate with some boulders up to 3 feet across is present in some places; pebbles also occur intermittently throughout the quartz sandstone.

Fossils collected consist of marine mollusca and non-marine plant remains. The distribution of the fossils suggests that the quartz sandstone and conglomerate are non marine and Lower Neocomian and the claystone and clayey sandstone are marine and Middle Neocomian to Lower Aptian. (Skwarko 1960c) (see also Skwarko 1962b).

Open nomenclature has been used for fossil names, that are now being described (Skwarko, 1962b).

In most places the thickness of the Mesozoic is less than 100 feet but locally it is up to 300 feet thick, e.g. east of Tawallah Homestead. The Mesozoic sediments were deposited throughout most of the area and covered a pre-Mesozoic band surface with a relief similar to that of today. Mesozoic sediments cap parts of the Tawallah Range - about 600 feet above present sea level.

TERTIARY.

Golliger Beds.

The Golliger Beds crop out poorly in the Golliger Creek area between O.T. Downs Homestead and Three Knobs, and north-west of Bauhinia Downs Homestead in the Limmen Bight River. The Beds, which are massive white to light yellow limestone, are commonly covered by residual black soil. Black soils around Lansen and October Creeks may also overlie the Golliger Beds.

The Beds contain freshwater Tertiary gastropods and are lacustrine. Similar limestones, also considered to be Tertiary, are found elsewhere in the Carpentaria province and the Barkly Tableland, e.g. Carl Creek Limestone (Lawn Hill, Carter and Öpik, 1961) and Cleanskin Beds (Mount Drummond Sheet, Smith & Roberts, 1962).

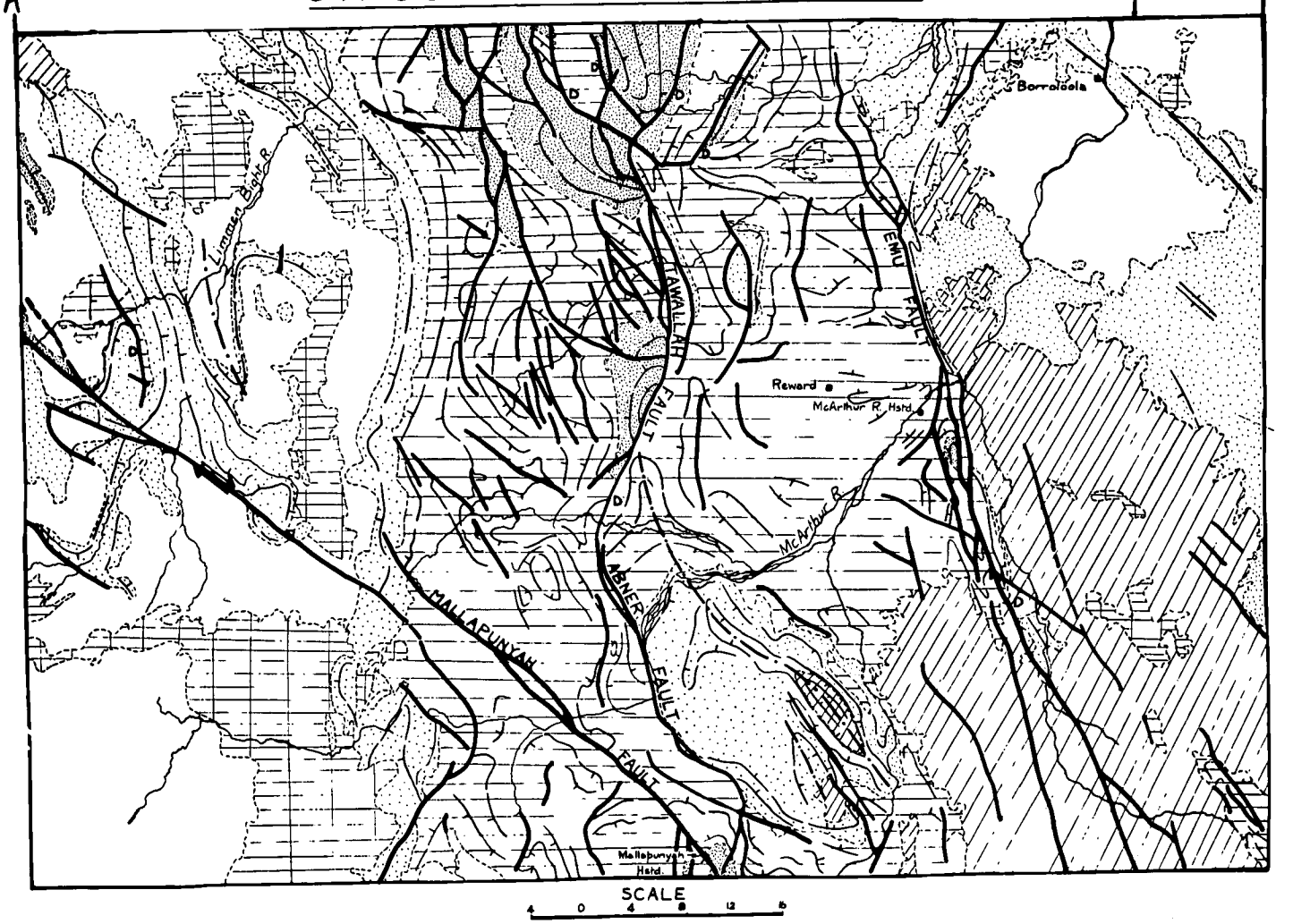
The thickness of the Golliger Beds is not known, but is probably less than 50 feet.

IGNEOUS INTRUSIONS

As well as the probable basic intrusions already mentioned as being associated with the Scrutton Volcanics and possibly also with volcanics in the Masterton Sandstone, more acid intrusions, not obviously associated with vulcanism, occur on the east side of the Tawallah Range and in the Emu Fault zone, east of McArthur River Homestead.

SKETCH 3

STRUCTURAL SKETCH MAP



SCALE

4 0 4 8 12 16

LEGEND

- Synclinal axis
- Anticlinal axis
- D Fault (with downthrow side)
- Trend line
- Geological boundary

- Recent
- Mesozoic
- Cambrian
- Roper Group
- McArthur Group
- Tawallah Group

Both occurrences are close to large faults and intrude the Tawallah Group. The intrusions appear to be microsyenites and syenites and form dykes up to 200 feet thick.

STRUCTURE

The structure of the area is shown in Figure 3.

Folding

Folding in the probable Lower Proterozoic Scrutton Volcanics is slightly greater than the Upper Proterozoic, but still relatively gentle, with dips under 50°. The direction of folding of the Upper Proterozoic rocks has been controlled by the Tawallah - Abner Fault and the Emu Fault, both of which were active during Upper Proterozoic sedimentation. The general strike of the rocks is north, but in the Reward area it is west.

The Upper Proterozoic rocks are folded into a broad central anticline with synclines to the east and west. The anticline is faulted on the east by the Tawallah Fault, and the eastern syncline is bounded by the Emu Fault. The Amelia Dolomite is exposed in the core of a broad west-south-west-trending anticline south of Reward. The centre of the western syncline is modified by a north-striking anticlinal flexure. East of the Emu Fault the Upper Proterozoic rocks are largely covered by the Bukalara Sandstone, but they appear to be folded, with very shallow dips, along north-west axes.

Folding in the main north-trending anticline and eastern syncline has been much affected by faulting.

Dips within the Upper Proterozoic rocks are generally shallow and average about 20°. They steepen to about 50°on the western limb of the western syncline and in the Abner Range, where the Roper Group crops out in a closed syncline. Elsewhere dips are steeper where affected by faulting; in places they are overturned adjacent to major faults.

The Cambrian, Mesozoic, and Tertiary sediments are usually flat-lying, but in places the Bukalara Sandstone is gently folded, in particular in the Abner Range, where it is folded into a syncline with dips of up to 20°.

Faulting

The two major faults are the Tawallah-Abner Fault and the Emu Fault. Both were probably active throughout the Upper Proterozoic.

The Tawallah - Abner Fault runs north through the centre of the Sheet area. The Tawallah Fault runs from the south Tawallah Range (where its continuation northwards is obscured by other major faults) southwards to west of Cape Crawford, where it joins the Abner Fault. The latter persists southwards to near Mallapunyah Homestead in the south of the Sheet area.

Movement on the fault is east side down, but is variable in magnitude with the largest throw north-north-east of Leila Creek First Crossing; the Fault appears to be dying out around Mallapunyah Homestead.

There is little evidence as to whether the fault was active during the deposition of the Tawallah Group - the unusual thickness of the north-north-east of Leila First Crossing suggests that the Fault may have been operative towards the end of the deposition of the Tawallah Group. During the deposition of the McArthur Group the Tawallah-Abner line played a major role in determining the distribution of the units of the Group. A reef dolomite (Top Crossing Dolomite) was developed along the line, lagoonal sediments were deposited to the west of it, and fore-reef sediments to the east.

The fault appears to have had no effect on sedimentation during deposition of the Roper Group, but movement may have occurred in Cambrian times, as indicated by the unusual thickness of Bukalara Sandstone developed in the Abner Range.

The Emu Fault lies in the central east of the Sheet area and strikes north-north-east. In the north the Fault is a single shear plane, but in the Coxco Valley, east of McArthur River Homestead, where movement is greatest, at least three parallel fault-lines exist. Farther south the fault bifurcates. Movement on the fault is east side down.

Observed displacement on the fault is nowhere great, although the adjacent rocks are considerably distorted. The apparent sense of movement on the fault is not in agreement with sedimentary indications that the region between the Tawallah and Emu Faults was a sinking trough; and it is possible that initially the Emu Fault may have been west side down.

The Upper Proterozoic on the eastern side of the fault if largely obscured by the Cambrian Bukalara Sandstone and the effect the fault had on sedimentation is difficult to ascertain. Variations in the Lynott Formation across the fault and sharp thinning in parts of the Roper Group suggest that it may have been active spasmodically in Upper Proterozoic time. Some movement occurred after the Bukalara Sandstone was deposited, but this may not have been great.

Other faults in the area trend north-west to north. Major faults occur around Mallapunyah Homestead and in the Tawallah Range; and some of these have throws of more than 7000 feet. Faults with the largest throw commonly trend north. Faults trending north-west usually have small movement; but exceptions occur such as the Mallapunyah Fault - a transcurrent fault on which the movement is south side west. North-west-trending faults are particularly common on the west limb of the central anticline; and these may be complementary to the Tawallah Fault, suggesting that there may have been some lateral movement on the fault.

Faulting in the Tawallah and McArthur Groups is more severe than in the Roper Group and may be a result of stabilization in the sinking embayment. Movement in post-Cambrian times appears to have been, at least in part, along established fault lines such as the Emu Fault. Minor movement, mostly along pre-existing faults, occurred after the deposition of the Mesozoic.

Jointing

The sandstones of the Tawallah Group, the Abner and Bessie Creek Sandstones, and the Bukalara Sandstone, all have characteristic joint patterns. Jointing in the sandstones of the Tawallah Group is inconsistent; in places it is strongly developed but in general it is patchy. The joints are commonly normal to the bedding, but in some places two joint directions are present and form a rectangular pattern.

Strong rectangular jointing is characteristic of both the Abner and Bessie Creek Sandstones. The strike of the joints varies with the strike of the bedding, one joint commonly being normal to the bedding. Pillars up to 50 feet high are formed by weathering of the rock along the joint planes.

The Bukalara Sandstone is strongly jointed in a west to north-west direction. In many places the joints persist over several miles and appear in places to show displacement by faulting.

ECONOMIC GEOLOGY

Lead, zinc, and copper mineralization occurs mainly in the McArthur River Homestead area. Table 2 lists the main occurrences. Most of the prospects are small and of no economic value; the three largest are Reward, Cooks, and H.Y.C.. The Reward and Cooks have been tested and found to be of no economic value; but the H.Y.C. is considered to be highly promising and at the time of writing (1962) Carpentaria Explorations Co.Ltd. are conducting an extensive drilling programme to determine the extent of the ore horizon on the eastern limb of the anticline on which H.Y.C. is situated. As a supplement to this work geologists of Carpentaria Exploration Co.Ltd. are mapping the area around McArthur River Homestead and the Bureau of Mineral Resources conducted a geochemical survey in the same area in 1961.

The prospects in the area may be divided into two groups - those in the Coxco Valley and those in the Reward - H.Y.C. area. The Coxco Valley prospects are Cooks, Coxs, Turnbull, Squib, and Cooleys (Cooleys is not in the Coxco Valley but in the same general area), and are all close to the Emu Fault Zone and may be remobilized syngenetic deposits, e.g. Cooks, which is at the Junction of two faults. The second group occurs in the Amelia Dolomite and includes the H.Y.C., Reward, W. Fold, Bald Hills, Barneys, and Teena prospects. The H.Y.C. and W. Fold prospects are stratigraphically controlled and lie in the Barney Creek Member of the Amelia Dolomite.

The Barney Creek Member is composed of dolomitic ferruginous shale, fine-grained tuff, dolomite breccia, and flaggy dolomite. Mineralization at H.Y.C. consists mainly of zinc, with subordinate lead and minor copper and silver. At depth it is in pyritic shale. Elsewhere in the McArthur River area the ferruginous shale, which is probably also pyritic at depth, crops out at W.Fold prospect and in a south-west-plunging syncline two miles south-west of McArthur River Homestead.

TABLE 2

MCARTHUR RIVER MINERAL DEPOSITS

DEPOSIT	MINERALS	OCCURRENCE	STRUCTURE OF HOST ROCK
COOLEY	Galena, minor malachite and hydrozincite.	Small veins and vughs in massive, grey to brown Amelia Dolomite.	Steeply dipping - adjacent to Emu Fault.
COOKS	Galena, hydrozincite, cerussite, smithsonite, amorphous lead carbonate.	Vughs and veins with some gossanous loam in siliceous and ferruginous cap rock. Extends along north-striking line bounded by massive dolomites and silty dolomites from Amelia Dolomite.	Junction of two faults.
COXS	Hydrozincite, galena, smithsonite.	Veins and vughs within massive Amelia Dolomite.	Flat-lying. Adjacent to north-striking fault passing through Cooks.
TURNBULL	Malachite, galena, cerussite.	Vughs in massive Amelia Dolomite below contact with a massive chert breccia within Amelia Dolomite.	Steeply dipping east.
SQUIB	Malachite, cuprite, chalcocite.	Veins and stringers in Amelia Dolomite below contact with a chert breccia within Amelia Dolomite. Same stratigraphic position to Turnbull.	As above.
H.Y.C.	Sphalerite, pyrite, galena at depth. Hemimorphite, hydrozincite and smithsonite on surface.	Disseminated fine sphalerite and galena confined to pyritic shales at depth. Supergene enrichment at surface with complete removal of ore minerals from shales and redeposition within dolomite breccias enclosed by shales. Within Barney Creek Member of Amelia Dolomite.	Steeply dipping beds on eastern limb of north-pitching anticline. Inferred fault about 600 yards to the east.
BARNEYS	Galena	Disseminated crystals and veins within brown, massive Amelia Dolomite. Immediately underlying Barney Creek Member.	Moderately dipping beds on western limb of H.Y.C. anticline.
W. FOLD	Cerussite, and lead oxide. Minor hydrozincite and ankerite.	Disseminated low grade mineralisation in pyritic shale. Same stratigraphic position as H.Y.C.	Tightly folded overturned synclinal structure.
BALD HILLS	Galena Minor sphalerite	Veins, vughs and disseminated crystals of galena in ferruginous gossan within massive dolomite of the Amelia Dolomite. Same stratigraphic position as Barneys.	Moderate dip to south.
TEENA	Cerussite. Anglesite.	Disseminated low-grade mineralisation in silicified pyritic shales of the Barney Creek Member. Same stratigraphic position as H.Y.C.	Low dips to east.
REWARD	Cerussite, anglesite, pyromorphite and lead oxides. Argentite and cerargyrite.	High grade supergene enrichment of silicified chert breccia overlying pyritic shale of Barney Creek Member.	Low dips to south. Small faults in vicinity.

In the latter area the shale has also been proved to be pyritic at depth. Poor outcrop and probable faulting east of the H.Y.C. make the extent of the ore-bearing rocks uncertain. The Member appears to be restricted to the McArthur River Homestead area, but the possibility of other similar horizons elsewhere within the Amelia Dolomite cannot be ignored. The ore is considered to be syngenetic in origin. Promising copper, bornite, and chalcopyrite occurs associated with dolomite and chert in the Wollogorang Formation south east of Tawallah Homestead in the Tawallah Range, and secondary copper- malachite occurs in the Billengarrah Formation at Darcy's prospect in the south of the Sheet area. Malachite is present with barytes filling cavities in the Leila Sandstone. Barytes also have been observed in one place in the Mallapunyah Fault zone. Manganese occurs locally in small amounts in the Stott Formation.

Iron Ironstone of probable economic importance has been found elsewhere in the Gulf of Carpentaria region - in the Roper River area (Dunn, 1962(a), 1962 (b))-and in the South Nicholson Basin (Carter & Zimmerman 1960, Smith & Roberts 1960). In the Bauhinia Downs Sheet area ferruginous fine conglomerate, sandstone, and shale occur at the top of the Abner Sandstone in the Roper Group, and ferruginous sandstone and shale are also found in the Mallapunyah Formation at the base of the McArthur Group. These occurrences are probably uneconomic. Coarse-grained siderite bands occur in the McArthur Group - mainly in the Mallapunyah Formation and the Amelia Dolomite - but are not persistent and are probably too small to be economically important at present.

Water Most of the lower ground is suitable for cattle raising and sufficient surface water is available for stock needs. Only ore bore (at O.T. Downs Homestead) has been sunk for water. Bores were sunk at Borroloola in the early part of the century in the hope of finding coal in the Cretaceous rocks (which were then considered to be Carboniferous).

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TABLE 1

STRATIGRAPHY OF THE BAULINIA DOWNS SHEET AREA

ERA	PERIOD	NAME	THICKNESS IN FEET	ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
CAINOZOIC			Usually thin - under 50	Sand and recent alluvium	Flat Spinifex & grass-covered plains	Widespread	Mainly transported, possibly partly residual.
			50 maximum about	Alluvium	Flat grass-covered plains with gilgais	Lynott - McArthur River Hstd. area Also south-east of Borroloola.	
	QUATERNARY		Thin	Black soil	Flat grass-covered plains with gilgais	Mainly Balbirini Creek-Gollinger Creek and south of Lansen Creek.	Overlying the Gollinger Beds. Residual.
			Thin	Lateritic soil including pisolitic ironstone rubble.	Flat low country with covering Mesozoic caps.	Mainly west of Sheet area and Tawallah Range.	
	TERTIARY?	Golliger Beds	Thin, possibly 50 or less	Massive limestone		Low outcrops. Usually only black soil cover	Contains gastropods. Probably lacustrine.
					UNCONFORMITY		
MESOZOIC	LOWER CRETACEOUS?		300 about	White medium-grained quartz sandstone, yellow fine-grained sandstone, some claystone, conglomerate	Flat-topped hills to 300 feet high. Caps on U.Proterozoic sediments.	Widespread, isolated outcrops.	Marine mollusca and freshwater plant remains. Probable Lower Cretaceous age.
					UNCONFORMITY		
PALAEOZOIC	LOWER TO MIDDLE CAMBRIAN?	Top Springs Limestone	Not known	Massive cavernous limestone, laminated cherty limestone.	Flat lying with large boulders	Extreme south of Sheet area	Possibly part of sequence underlying the Barkly Tableland.
					UNCONFORMITY		
		Bukalara Sandstone	1-300. 1000 in Abner Range	Jointed medium to coarse-grained friable quartz sandstone quartz greywacke.	Flat-lying plateau to 300 feet with steep gorges	Bukalara Range, within the Abner Range and extreme north-west corner of Sheet.	Probably Lower Cambrian
					UNCONFORMITY		
UPPER PROTEROZOIC	ROPER GROUP	Cobanbirini Formation	West Centre East about 4000	Flaggy siltstone, medium-grained quartz sandstone	Poor outcrop. Sandstone forms low ridges to 50 feet high.	Universal	Nowhere fully exposed. Probably equivalent to the Kaiwok Sub-group (Urapunga, Hodgson Downs Sheet areas)

TABLE 1. (cont.)

ERA	PERIOD	NAME	THICKNESS IN FEET			ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
		Bessie Creek Sandstone	West about 1200	Centre 580	East 140	Strongly jointed medium-grained quartz sandstone	Ridges to 300 feet high. Isolated pillars, 50 feet high, formed by jointing.	Universal	
UPPER PROTEROZOIC		Corcoran Formation	about 1170	800	60	Flaggy brown siltstone, medium-grained quartz sandstone, ferruginous sandstone.	Poor outcrop, Sandstone forms low ridges.	Universal	
		Abner Sandstone	about 1385	725	220	Strongly jointed medium-grained quartz sandstone. Minor siltstone, ferruginous sandstone, fine conglomerate.	Ridges to 300 feet high. Isolated pillars, 50 feet high, formed by jointing.	Universal	
		Hodgson Sandstone Member	about 725	-	-	Strongly jointed medium-grained quartz sandstone	Ridges to 200 feet high	Members only required recognised in West	
		Jalboi Member	about 230	-	-	Purple ferruginous sandstone. Occasional shale bands.	Less resistant than other two members.	Jalboi Member present only in the west.	
		Arnold Sandstone Member	about 350	-	-	Strongly jointed medium-grained quartz sandstone.	Ridges to 200 feet high.		
		Crawford Formation	about 700	740 Three Knobs 450 Abner Range	430	Glauconite quartz sandstone, quartz greywacke, feldspathic sandstone. Siltstone	Sandstone Ridges to 100 feet high. Scarp slope in Abner Range.	Universal	
		Mainoru Formation	about 1830	1780 thinning east to about 800		Flaggy purple and green micaceous siltstone & shale fine-grained glauconitic sandstone, quartz greywacke.	Very poor outcrop - low rounded hills. Mainly soil cover	Universal	
		Kilgour Sandstone Member	about 200 in the Abner Range			Fine to medium-grained sandstone siltstone.	Dip & scarp ridge to 150 feet high	The Abner Range and Emu Fault area. Not present in west.	

TABLE 1 (Cont.)

ERA	PERIOD	NAME	THICKNESS IN FEET	ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
	R O P E R G R O U P	Limmen Sandstone	1400 to 3800 380 Three Knobs 0-100 Abner Range & farther east	Fine to medium grained quartz sandstone. Flaggy micaceous siltstone conglomerate	Resistant ridge to 200 feet high	Universal distribution	Conglomerate base in south-west Poorly outcropping siltstone at base in places.
U				UNCONFORMITY			
P P E R P R O T E R O Z O I C	M c A R T H U R	Billengarrah Formation	Variable. To Maximum 4000 in Three Knobs area	Chert, fine to medium-grained sandstone, siltstone, dolomite.	Low hills, occasional strike ridges to 100 feet.	Widespread irregular distribution	Distribution slightly more local in east. Facies change with Emmerugga Dolomite in north-west.
		Emmerugga Dolomite	2700	Massive dolomite, often algal. Also chert breccia, dolomite breccia, dolomite conglomerate, sandstone, siltstone.	Rough low hills to 100 feet high	Widespread irregular distribution. Not present in the Butter Creek area in the north-east.	
		Amos Formation	1150	Dolomitic siltstone, dolomitic sandstone, dolomite.	Low hills to 50 feet high	North and west of Abner Range	Siderite-bearing cherts form local markers. Part equivalent to Stott Formation.
		Stott Formation	about 2500	Oolitic chert, minor dolomite	Poor outcrop low rounded hills	Batten Creek area only on east side of Tawallah-Abner line.	Probably equivalent to the Amos Formation and the Emmerugga Limestone.
		Smythe Sandstone	600	Quartz and feldspathic sandstone. Pebble to cobble conglomerate.	Resistant ridge to 200 feet high.	Restricted to east of Tawallah-Abner line in Bitter Creek area.	
G R O U P	B A T T E N S U B G R O U P	Looking Glass Formation	260-750	Chert, chert breccia	Less resistant than Smythe Conglomerate and Stretton Sandstone.	Restricted to east of Tawallah Abner line. Not present east of Abner Range.	
		Stretton Sandstone	100-800	Fine to medium-grained occasionally cross-bedded sandstone	Resistant ridge to 200 feet high	Universal distribution east of Tawallah - Abner line.	Thickens north-eastwards.
		Yalco Formation	450. Thickens in north-east	Thinly laminated white siltstone shale and chert.	Resistant ridge to 200 feet high.	Universal distribution east of Tawallah-Abner line	
		Lynott Formation	2200	Dolomitic siltstone, silty dolomite, dolomitic sandstone, dolomite quartz sandstone, dolomite breccia, chert breccia.	Low hills, higher in south-east, to 200 feet.	Universal distribution east of Tawallah - Abner line.	Dolomite more abundant in south-east. Grain size decreases north-east.

TABLE 1 (Cont.)

ERA	PERIOD		NAME	THICKNESS IN FEET	ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
U P P E R P R O T E R O Z O I C	M A R T H U R	BATTEN SUBGROUP	Donnegan Member	about 350	Fine to medium-grained quartz sandstone dolomitic sandstone.	Low hills to 30 feet high	Restricted to east of the Tawallah-Abner line in the Batten Creek area.	
			Hammer Creek Member	about 1700	Flaggy white chert and cherty siltstone; massive chert breccia.	Poor outcrops, low rubble covered rises.	Restricted to eastern side of Tawallah Range.	
			Top Crossing Dolomite		Massive dolomite; some flaggy dolomite.	Rough ridges to 200 feet high.	Restricted distribution along north-striking Tawallah-Abner hinge line.	Some algae. Probably a reef dolomite.
		BAUHINIA SUB GROUP	Tooganinie Formation	About 2700	Dolomitic siltstone and shale, dolomitic sandstone, algal dolomite, oolitic limestone.	Dolomite as low ridges. Siltstone shale, sandstone mainly as rubble.	Restricted to west of Tawallah line. Also south part of Sheet area.	Rhythmically alternating. Numerous halite pseudomorphs
			Leila Sandstone Member	Generally about 60. Thickens to 500 south west.	Medium-coarse grained cross-bedded dolomitic sandstone. Minor algal dolomite.	Low rough ridge to 30 feet high.	Restricted to west of Tawallah line. Also south part of Sheet area. Not present in extreme north.	
			Tatoola Sandstone	460	Fine to medium-grained - commonly feldspathic. Minor dolomite and siltstone.	Dip and scarp ridge up to 200 feet high. Modified double ridge where dolomite or siltstone present.	Restricted to west of Tawallah line.	Ferruginous matter fills gypsum and calcite pseudomorphs. Subsidiary dolomite mainly in the north, siltstone in south.
			Amelia Dolomite	about 6000 max. 770 north of Leila First Crossing.	Dolomite, often algal. Sandstone chert, siltstone, chert breccia dolomite breccia. Some siderite bands.	Rough hills to 100 feet high. Chert breccia resistant ridge to 200 feet high.	Wide distribution.	Thickest in the east of the area, under 1000 feet west of Tawallah-Abner line. Chert breccia mainly in the east.
			Barney Creek Member	1200	Ferruginous shale, dolomite breccia, flaggy-massive dolomite, tuff.	Poor outcrop. Low hills. Crops out best in creeks.		Ore bearing. Ore restricted to ferruginous (pyritic) shale at depth. Maximum thickness of Member in N.W.C. area.

TABLE 1. (Cont.)

ERA	PERIOD		NAME	THICKNESS IN FEET	ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
PROTEROZOIC	UPPER	McARTHUR GROUP	Mallapunyah Formation	2500	Ferruginous sandstone siltstone, dolomite. Some siderite bands.	Sandstone forms resistant hills. Elsewhere low rounded hills.	Wide distribution	Usually pink to purple. Thins eastwards. More sandy to west of Tawallah line.
			Warramana Sandstone	about 200	Blocky, white to pink medium quartz-sandstone.	Resistant ridges.	Restricted to eastern side of Tawallah Range.	Torrentially cross-bedded on Bauhinia Downs Sheet.
			Nesting Creek Formation	about 500	Pink dolomite, chert, siltstone.	Poor outcrops, low rubble covered rises.	Ristricted to eastern side of Tawallah Range.	
			Karns Dolomite	about 300	Dolarenite, dolomite, algal dolomite, laminated colitic and algal chert, dolomitic siltstone and sandstone, silty and sandy dolomite.	Low-lying areas between exposures of Nathan Formation, dissected plateaus.	Extreme east of Sheet area. Widely Robinson River to Calvert Hills Sheet areas.	Represents McArthur Group in shelf area.
			Mulholland Sandstone.	about 900	Flaggy fine to medium-grained quartz sandstone.	Low resistant ridges	Only on west side of Tawallah Group.	
	TAWALLAH GROUP		Masterton Formation	about 3000. Variable	Medium-grained quartz sandstone, siltstone, ferruginous sandstone, conglomerate. Minor intermediate-basic lavas and lapili tuff.	Usually resistant ridges to 400 feet high.	Wide distribution	Microgabbro associated with volcanics.
			Wollogorang Formation	about 700	Flaggy, dolomite, dolomitic siltstone, dolomitic sandstone.	Low rounded hills and strike ridges.	In Tawallah Range, also Mallapunyah Homestead and west of McArthur River Homestead.	
			Rosie Creek Sandstone.	about 1500	Flaggy ferruginous sandstone quartz sandstone, glauconitic sandstone. Some boulder conglomerate.	Variable, usually Poorly outcropping	Tawallah Range and north of Leila First Crossing, not present at Mallapunyah Homestead not exposed elsewhere.	
			Settlement Creek Volcanics	about 450	Intermediate-acid volcanics including tuff	Poor outcrop, very low rounded hills.	Only occur around Mallapunyah Homestead	

TABLE 1. (Cont.)

ERA	PERIOD	NAME	THICKNESS IN FEET	ROCK TYPES	TOPOGRAPHY	DISTRIBUTION	REMARKS
UPPER PROTEROZOIC	TAWALLAH GROUP	Sly Creek Sandstone	about 2000	Flaggy-massive quartz sandstone - sometimes pebbly. Subsidiary ferruginous siltstone.	Resistant ridges	Tawallah Range, north of Leila First Crossing Millapunyah Homestead, not exposed elsewhere.	
		Peters Creek Volcanics	about 1200	Iron-rich trachytes augite-trachyte	Poor outcrop, low rounded hills.	Tawallah Range, and north of Leila First Crossing.	
		Yiyintyi Formation	about 8500	Flaggy to massive quartz sandstone.	Resistant ridges to 560 feet high.	Tawallah Range, and extreme top of unit north of Leila First Crossing	
		UNCONFORMITY					
LOWER PROTEROZOIC		Scrutton Volcanics	not known	Acid to basic lavas. Minor intrusives. Sandstone siltstone, arkose lenses.	Low rough hills to 50 feet high. Sandstone and arkose lenses more resistant.	Only crops out in Tawallah pocket, east of old Tawallah Homestead.	Coarse-grained quartz gabbro also present - possibly minor intrusives
				Microsyenite and syenite dykes.		Along the Emu Fault line. Also small dykes in east Tawallah Range.	Always adjacent to major faults.

PRELIMINARY EDITION, 1962

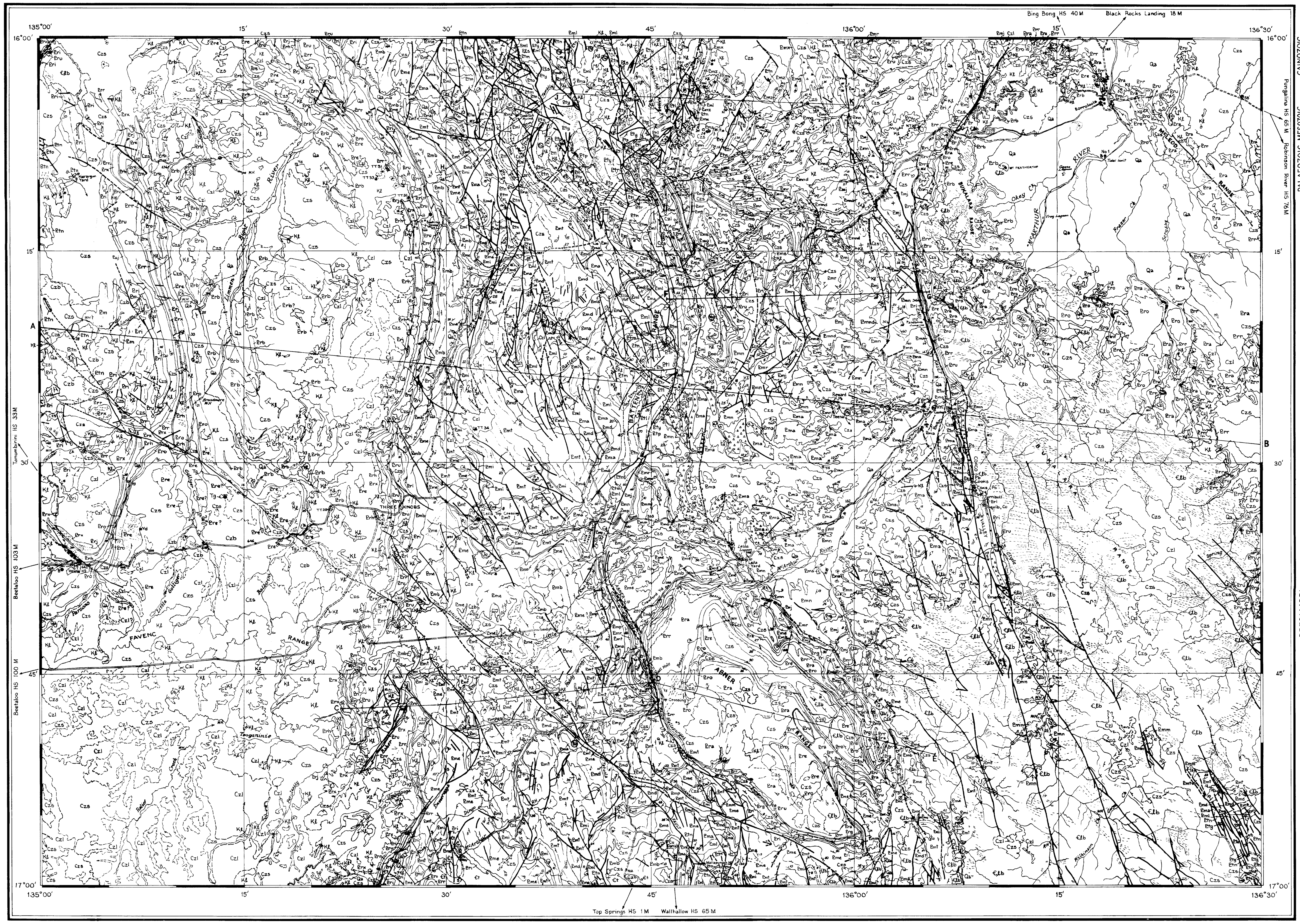
SUBJECT TO AMENDMENT

BAUHINIA DOWNS

NORTHERN TERRITORY

AUSTRALIA 1:250,000

1:250,000 GEOLOGICAL SERIES SHEET SE 53-3



Reference

- Geological boundary
- Synclinal axis
- Fault

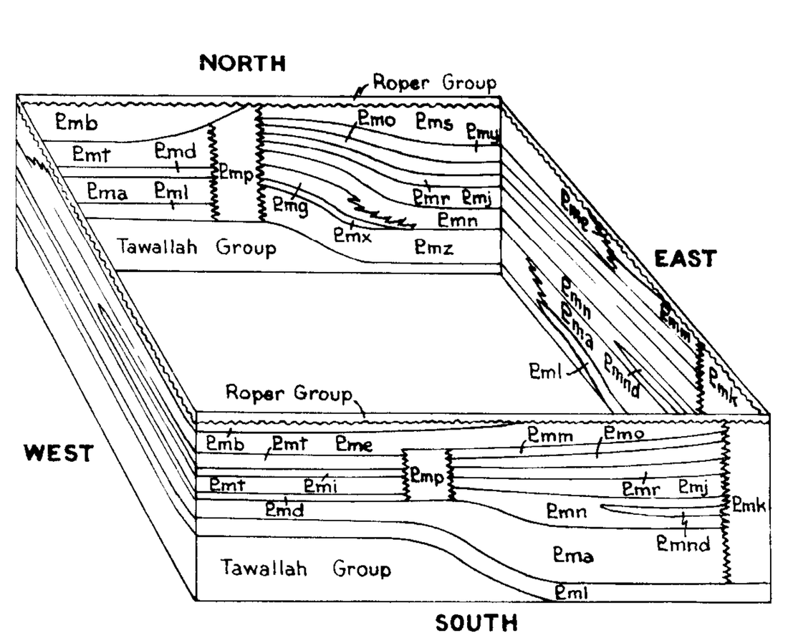
Where location of boundaries, folds and faults is approximate, line is broken; where inferred, queried; where concealed, boundaries and folds are dotted, faults are shown by short dashes

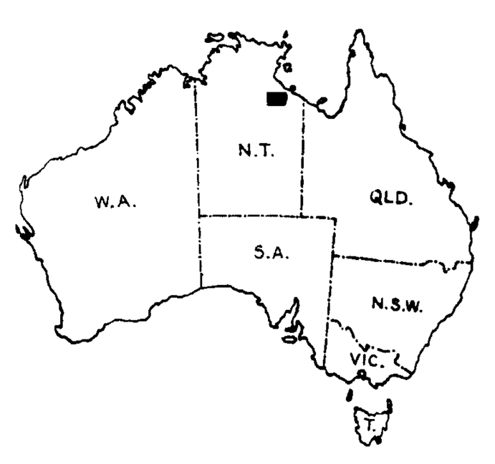
- Strike and dip of strata
- Vertical strata
- Horizontal strata
- Overturned strata
- Trend of bedding, showing direction of dip (Air-photo interpretation)
- Horizontal strata (Air-photo interpretation)
- Joint pattern (Air-photo interpretation)
- Macrofossil locality
- Plant fossil locality
- Fossil wood locality
- Mine
- Prospect
- Ba Barite
- Cu Copper
- Fe Iron
- Pb Lead
- Zn Zinc

Circle around mineral symbol denotes unexploited deposit

- Bore
- Spring
- Rockhole
- Waterhole
- Swamp
- Road
- Vehicle track
- Fence
- Homestead
- Yard
- Airfield
- Astro station
- Height in feet, barometric (datum: mean sea level)

DIAGRAMMATIC RELATIONSHIP OF ROCK UNITS
McARTHUR GROUP

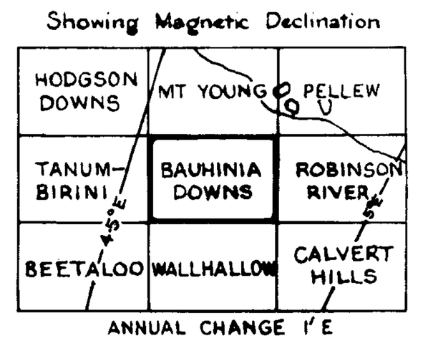




Compiled and published by the Bureau of Mineral Resources, Geology and Geophysics, Department of National Development. Topographic base compiled by the Division of National Mapping, Department of National Development. Aerial photography by the Royal Australian Air Force; complete vertical coverage at 1:50,000 scale. Transverse Mercator Projection.

INDEX TO ADJOINING SHEETS

Showing Magnetic Declination



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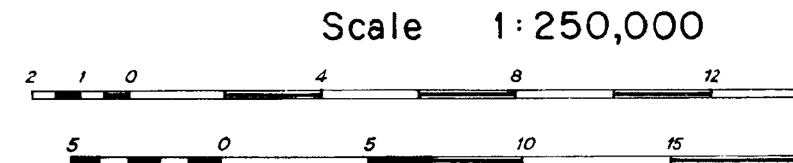
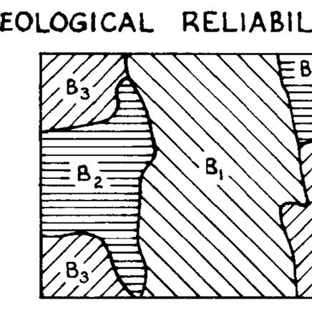


GEOLOGICAL RELIABILITY DIAGRAM



- B1 Detailed reconnaissance - numerous traverses and air-photo interpretation
- B2 Reconnaissance - some traverses and air-photo interpretation
- B3 Helicopter traverses and air-photo interpretation

Geology and compilation, 1960-61, by: J.W.Smith, H.G.Roberts, K.A.Plumb, A.W.Webb, F.J.Roberts.

Drawn, January 1962, by: F.J.Roberts.

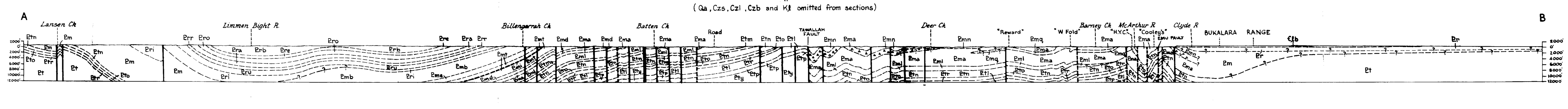
Reference

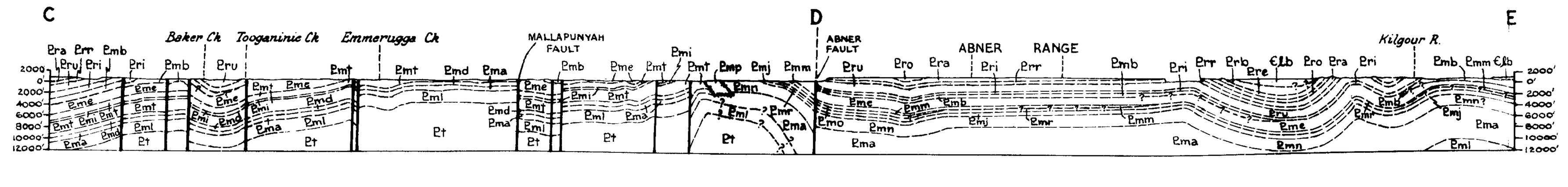
Era	Period	Group	Unit	Symbol	Description
CAINOZOIC				Qa	Alluvium
				Czs	Soil, sand, ferruginous cemented detritus
				Czb	Black soil
				Czl	Laterite, lateritic soil
	TERTIARY		Golliger Beds	Tg	Massive limestone
MESOZOIC	? LOWER CRETACEOUS		Undifferentiated	Kl	Friable yellow clayey sandstone. Massive white quartz sandstone and conglomerate, white leached siltstone
PALAEOZOIC	LOWER TO MIDDLE CAMBRIAN		Top Springs Limestone	€t	Massive limestone, laminated cherty limestone
			Bukalara Sandstone	€lb	Massive medium to coarse-grained quartz sandstone, feldspathic sandstone
PRECAMBRIAN	UPPER PROTEROZOIC	ROPER GROUP	Undifferentiated	Pr	
			Cobanbirini Formation	Prb	Flaggy siltstone, medium-grained quartz sandstone
			Bessie Creek Sandstone	Pre	Jointed, medium-grained quartz sandstone
			Corcoran Formation	Pro	Flaggy brown siltstone, medium-grained quartz sandstone, ferruginous sandstone
			Abner Formation	Pra	Jointed, medium-grained quartz sandstone. Minor siltstone, ferruginous sandstone, fine-grained conglomerate
			Hodgson Sandstone Member	Prh	Strongly jointed, medium-grained quartz sandstone
			Jalboi Member	Prj	Purple ferruginous sandstone. Minor shale bands
			Arnold Sandstone Member	Prx	Strongly jointed, medium-grained quartz sandstone
			Crawford Formation	Prr	Thickly flaggy glauconitic sandstone, quartz greywacke; Flaggy, purple micaceous siltstone
			Mainoru Formation	Pru	Flaggy purple and green micaceous siltstone; fine-grained glauconitic sandstone, quartz greywacke, shale
			Kilgour Sandstone Member	Prg	Fine to medium-grained sandstone, siltstone
			Limmen Sandstone	Pri	Fine to medium-grained quartz sandstone, flaggy micaceous sandstone, conglomerate
		McARTHUR GROUP	Undifferentiated	Pm	
			Karns Dolomite	Pmk	Dolarenite, dolomite, algal dolomite, laminated oolitic and algal chert, dolomitic siltstone and sandstone, silty and sandy dolomite
			Top Crossing Dolomite	Pmp	Massive grey to buff dolomite, chert-breccia
			Emmerugga Dolomite	Pme	Massive dolomite, algal dolomite, chert breccia, dolomite-breccia, dolomitic sandstone, siltstone
			Billengarrah Formation	Pmb	Massive chert breccia; flaggy siltstone, quartz sandstone, chert, dolomite
		Bauhinia Downs Sub-Group	Tooganinie Formation	Pmt	Flaggy dolomite, algal dolomite, dolomitic siltstone, sandstone, quartz sandstone, oolitic limestone
			Leila Sandstone Member	Pmi	Dolomitic sandstone, minor algal dolomite
			Tatoola Sandstone	Pmd	Quartz sandstone, dolomitic sandstone, feldspathic sandstone
			Amelia Dolomite	Pma	Dolomite, algal dolomite, chert, dolomite breccia sandstone, minor siderite bands; Chert breccia
			Barney Creek Member	Pmq	Ferruginous shale, dolomite breccia, dolomite, tuff
			Mallapunyah Formation	Pml	Purple siltstone, ferruginous quartz sandstone, dolomite, chert, minor siderite beds
			Stott Formation	Pms	Oolitic chert, minor dolomite, sandstone
			Amos Formation	Pmm	Dolomitic siltstone, dolomite, dolomitic sandstone, sideritic chert
			Smythe Sandstone	Pmy	Quartz sandstone, feldspathic sandstone, pebble to cobble conglomerate
		Batten Sub-Group	Looking Glass Formation	Pmo	Chert, chert breccia, minor sandstone
			Stretton Sandstone	Pmr	Flaggy quartz sandstone
			Yalco Formation	Pmj	Laminated cherty siltstone, claystone, chert
			Lynott Formation	Pmn	Cherty siltstone, dolomitic siltstone, dolomitic sandstone, silty and sandy dolomite, chert, chert breccia, dolomite breccia
			Donnegan Member	Pmnd	Quartz sandstone, dolomitic sandstone
			Hammer Creek Member	Pmg	Flaggy white chert and cherty siltstone, Massive chert breccia
			Warramana Sandstone	Pmx	Blocky white to pink medium-grained quartz sandstone
			Festing Creek Formation	Pmz	Pink dolomite, chert, dolomitic siltstone, siltstone
		TAWALLAH GROUP	Undifferentiated	Pt	
			Mulholland Sandstone	Ptm	Flaggy white to grey, fine to medium-grained quartz sandstone
			Masterton Formation	Ptn	Blocky, purple and white, medium-grained quartz sandstone, minor feldspathic sandstone
			Gold Creek Volcanic Member	Ptg	Basalt, trachyte
			Wollogorang Formation	Pto	Dolomitic siltstone, flaggy grey and pink finely crystalline dolomite, dolarenite, dolomitic sandstone, chert
			Rosie Creek Sandstone	Ptr	Flaggy, purple and white, very coarse to fine-grained quartz sandstone; ferruginous and feldspathic glauconitic siltstone
			Settlement Creek Volcanics	Pte	Basalt, siltstone, tuff
			Sly Creek Sandstone	Ptl	Blocky white to pink medium-grained quartz sandstone. Some pebbly bands
			Peters Creek Volcanics	Ptp	Amydaloidal basalt
			Yiyintyi Sandstone	Pty	Blocky white medium to coarse-grained quartz sandstone; minor pebble to boulder conglomerate
	LOWER PROTEROZOIC		Scrutton Volcanics	Pls	Porphyritic dacite; feldspathic sandstone, tuff, minor dolerite dykes
				Ps	Microsyenite

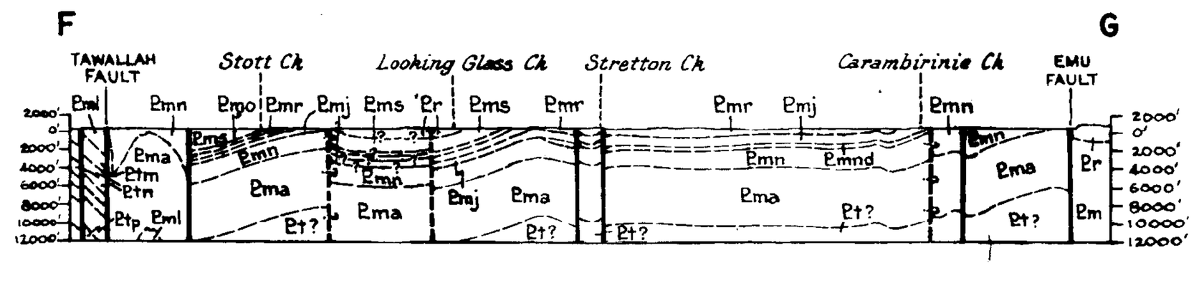
Sections

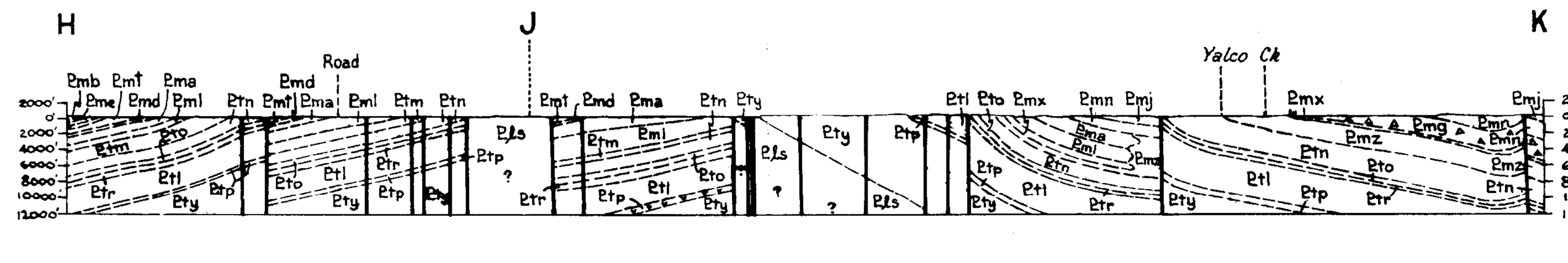
SCALE V/H = 1

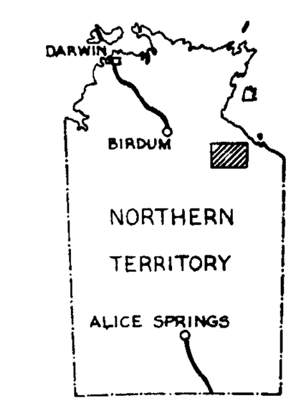
(Qa, Czs, Czl, Czb and Kl omitted from sections)











BAUHINIA DOWNS
SHEET SE 53-3

DIAGRAMMATIC RELATIONSHIP OF ROCK UNITS