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Plate 1: Greenhill Bore, Idirriki Range Section. Amadeus Basin.

Plate 2: Mereenie Bluff Section. Amadeus Basin.

Plate 1: Gosses Bluff Area. Amadeus Basin.

OP 43 & OPEL

NORTHERN TERRITORY GEOLOGICAL SURVEY

PR 1231

GREENHILL BORE - IDIRRIKI RANGE SECTION

The Greenhill Bore, Idirriki Range section is located about 20 miles southwest of the Haast Bluff Cattle Project, and it was measured on October 8 and 9, 1962. The section starts in the Arumbera formation and ends at the top of the Goyder formation.

About 1660 feet of the Arumbera formation were measured, but the base of the formation was not exposed. The outcrops consist of reddish-brown fine to coarse-grained feldspathic cross-bedded sandstone with slump structures and with reddish-brown siltstone interbeds.

Above the Arumbera is a covered valley which is calculated to contain 720 feet of stratigraphic section. This may be the Hugh River shale.

The next unit has a total thickness of 3500 feet and is designated as the Goyder formation. The lower 2855 feet consist of brown, reddish-brown or yellowish brown fine to coarse-grained feldspathic sandstone with reddish-brown platy micaceous siltstone interbeds. It somewhat resembles the Arumbera formation, and apparently the BMR geologists designate the sequence as the Cleland Sandstone. The upper 645 feet are yellowish-brown fine to coarse-grained micaceous sandstones and are typical Goyder formation.

The Pacoota formation crops out above the Goyder where it forms a strong high persistent cliff. It was not measured.

MEREENIE BLUFF SECTION (LOWER PART)

The lower part of the Mereenie Bluff section is located about eight miles southwest of the Gaast Bluff Cattle Project, and it was measured on October 10, 1962. It extends from in the Pertatataka formation up to the top of the Goyder formation.

Some 4420 feet of the Petatataka formation were measured, but most of the formation was covered and the base was not exposed. The lowermost outcrop measured consists of reddish-brown medium-grained weak ridge-forming sandstone with ironstone developed on the surface sandwiched between greenish-grey gypsiferous (?) recessive shale. In the middle and upper parts of the Pertatataka light grey fine-grained sandstone is exposed in two low ridges.

The Arumbera formation crops out above the Pertatataka, and it is 3715 feet thick. The lower 1630 feet of the Arumbera consists of massive ridge-forming reddish-brown feldspathic sandstone with a few reddish-brown siltstone interbeds. The next 2085 feet are mostly covered, but in the upper part are two light grey weak ridge-forming quartzitic sandstones.

A covered valley occurs above Arumbera, and it may be developed on the Hugh River shale. The stratigraphic interval is calculated to be 1500 feet.

The upper part of the measured section consists of yellowish-brown fine to coarse-grained feldspathic micaceous sandstone that forms rounded hills and it is assigned to the Goyder formation. Near the middle of the unit a conglomerate about 25 feet thick and comprised of yellowish-grey quartzite matrix and cobbles is exposed. The thickness of the Goyder is shown to be 2665 feet but that figure is not considered to be very reliable because of erratic dips and possible faulting.

The upper part of the Mereenie Bluff section ranges from the base of the Pacoota formation to the top of the Mereenie sandstone. It was measured in July 1961, and was used in Figure 7 of Dr. McNaughton's report.

GOSSE'S BLUFF AREA

The north flank of Gosse's Bluff was traversed and a section beginning in the Stairway formation and ending at the top of the Mereenie sandstone was measured inside of Gosse's Bluff using a tape and Brunton compass in November 1962.

North Flank of Gosse's Bluff

The Pertnjara sandstone crops out on the north flank of Gosse's Bluff. The beds are intensely fractured, slickensided and contorted and in places are overturned. The BMR geologists map an east-trending anticline in the area (Prichard, et al., Map of Gosse's Bluff Area, Resident Geologist's Office, Alice Springs, 1963), but the writer disagrees with this interpretation. The beds depicted by the BMR as having south dip and thus forming the south flank of the anticline are overturned. They dip to the south, but the tops of the beds are to the north.

Gosse's Bluff Section

The Stairway and Stokes formations crop out in the recessive core of Gosse's Bluff and the Mereenie and overlying Pertnjara sandstone form the more or less circular ridge comprising the outer part of the structure. Other geologists have also mapped a small exposure of Horn Valley beds in the core. The Horn Valley was not recognised by the writer, but it could very well be exposed there.

The Stairway formation consists of buff fine-to-medium-grained fractured sandstone that forms low ridges interbedded with recessive greenish-grey shaly siltstone and a few thin beds of sandy limestone. The measured thickness is 619 feet, but because of the intense faulting it is doubtful that the entire formation was measured.

The Stokes formation consists essentially of chocolate-brown, dark-grey or greenish grey, shale with some thin sandstone, marl, limestone and coquimeid limestone interbeds. The measured thickness of the Stokes at Gosse's Bluff is 1,275 feet, and since the thickness of the formation at both Stokes Pass and Areyonga is about 1,750 feet, it appears that there is some thinning of the Stokes formation across the Gosse's Bluff dome.

The Mereenie formation is comprised of strong ridge-forming buff or brown fine-to coarse-grained sandstone with chocolate-brown siltstone interbeds in the upper part. A fairly good scolithid-bearing bed and an intrafermational breccia occur near the middle of the formation. The measured thickness is 1,130 feet, and when compared with thicknesses of about 2,300 feet and 2,600 feet at Stokes Pass and Areyonga respectively, there is considerable thinning in the Mereenie formation across the Gosse's Bluff structure.

CONCLUSIONS:

1) The strata at Gosse's Bluff are intensely fractured and deformed, and the beds away from the dome on the flanks, at least on the north side, are also intensely fractured and deformed.

2) The apparent thinning of the Stokes and Mereenie formations across Gosse's Bluff and the upturned position of the Pertnjara sandstone indicate that the structure was growing as early as Stokes time and continued to grow through Mereenie and into Pertnjara times. The intra-formational breccia within the Mereenie may have resulted from structural growth.

R.M. Hopkins Jr.

PLATE 1

GOSSES BLUFF AREA

AMANEUS BASIN

PLATE 1

GREENHILL BORE, IDIRRIKI RANGE

SECTION, AMADEUS BASIN

PLATE 2

MEREENIE BLUFF SECTION

AMADEUS BASIN