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COMMONWEALTH OF AUSTRALIA.

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DEPARTMENT OF NATIONAL DEVELOPMENT.  
BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS.

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RECORDS:

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1964/44

REPORT ON THE PHOTO-INTERPRETATION OF THE WATERLOO  
1:250,000 SCALE SHEET

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by

R. Richard  
Institut Francais du Petrole

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 It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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# REPORT ON PHOTO-INTERPRETATION OF THE WATERLOO

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## SUMMARY

The photogeological map of Waterloo shows Upper Proterozoic formations overlain unconformably in the western area by the Antrim Plateau Volcanics, and in the eastern area in a few parts by a thin Cretaceous cover.

Two groups of faults are observed; one (the earlier) trending west-north-west and the other trending north and north-east.

## GENERAL STATEMENT

The photogeological study of the Waterloo Sheet has differentiated a number of photogeological units as shown in the legend (page 2).

The only geological reference used for this purpose was "The Geology of the Ord-Victoria Region, Northern Australia" by D.M. Traves (1955).

During the time spent with the Bonaparte Gulf Party brief visits were made to the northern part of the area covered by this map; a general east-west section was examined which helped the geological interpretation of this sheet, but unfortunately not enough time was available to make a north-south section which would have provided more control for correlations.

## STRATIGRAPHY

The stratigraphical names used are taken from Traves (1955). Because the litho-stratigraphical boundaries may not coincide with field-observed geological limits, use is made of symbols which refer only to the general periods rather than to specific formations.

## LEGEND

<u>Photogeological Character</u>	<u>Possible Geological Interpretation</u>
Q Alluvium	QUATERNARY ) C o
	) a z
Cz Cover	Undifferentiated ) i o
	) n i
	) c
Grey thin formation always covered by vegetation, forming a low scarp	K Cretaceous ) M z
	) e o
	) s i
	) o c

UnconformityPhotogeological CharacterPossible Geological Interpretation

In SW corner grey, black and white formations, scarp forming	G 2 Limestone?	}	CAMBRIAN	}	P a l a e o z  o i c
Grey tone, generally scarp forming	G 1 Antrim Plateau				

Unconformity

Grey tone, very well bedded	B 4 Silicified Shale	}	}	P r e c a m b r i a n
Grey tone massive rock, coarse texture, well jointed	B 3 Sandstone			
Alternating hard and soft formation, the first showing a wide plateau the second where exposed is very well bedded	B 2 Sandstone Shale, Limestone			
Grey tone, very well bedded	B 1 Quartzite, Chert			
	u Undetermined			
		UPPER	PROTER-	
		OZOIC		

UPPER PROTEROZOIC Bu 1 - Bu 2 - Bu 3 - Bu 4.

This formation is divided into four subdivisions based on photogeological patterns, and as a result of the rapid field reconnaissance.

Bu 1 was observed only in the north-east corner of the Sheet area. This very well bedded formation shows a prominent ridge of hard rock which was found in the field to consist of quartzite and chert.

Bu 2 Although there was insufficient time in the field to look for the contact between Bu 1 and Bu 2, from photo evidence, Bu 2 is lying conformably on Bu 1. The general lithology is a hard rock (sandstone) overlying soft (shales, limestone). Close to Bullita Homestead, shale and limestone are overlain by hard scarp-forming sandstone.

In the West Baines River valley a section was examined from Bu 2 and Bu 4 (Run 1, Photos 5114). Hard bench-forming sandstone is interbedded with softer shale and limestone, and it seems possible to correlate beds at the foot of the high scarp, along the western side of the valley, with the sequence observed near Bullita Homestead, mainly on the basis of an association of green shale and chocolate limestone. Between the first and second bench-forming sandstones, dark shale is exposed, but above the second sandstone bed the softer lithologies are concealed.

### 3.

Bu 3 is a comparatively thin formation lying conformably on Bu 2. Where it was examined in the field, it is a massive, well jointed, coarse sandstone. It has been entirely eroded from strongly folded areas, but it is present in the axial region of some synclines.

Bu 3 Directly on Bu 3 is a multicoloured silicified shale which is recognized at two localities, Run 1/Photos 5115-5114 and north of the Sheet boundary on Run 1/Photo 5128. Further south it is correlated with a very well bedded formation which is lying on B 3.

#### CAMBRIAN G1 - G2

Lying unconformably on Bu is the "Antrim Plateau Volcanics" (G1) of which the lowest outcrop is a dolerite. The characteristic pattern of this rock is easily followed on the photos.

In the south-west corner there is one formation lying conformably on G 1 but with a different colour and erosion type. This is considered to be a limestone (G2).

A small outcrop of G2 limestone (pers. comm. K. Plumb) (Run 8/Photo 5197) is indicated on the middle of the west side of the Sheet by the symbol G2; it is not wide enough to enable it to be correlated on the photographs with the G2 outcrops seen further south.

#### CRETACEOUS (K)

Lying unconformably on the Upper Proterozoic and on G1 (Run 15/Photo 5150) is a thin formation which generally forms a low scarp.

#### REMARKS ON FIELD OBSERVATIONS

1. In the East Baines River valley (Run 2/Photo 5170) and West Baines River valley (Run 1/Photos 5113-4), in the area visited, it is possible to find chert in the form of concretions which is considered as a secondary formation, perhaps deposited in the bottom of a lake.

2. Basalt is exposed in a road cutting near Newry Homestead (Run 1/Photo 5122) and it seems probable that it underlies an extensive area of alluvium (Q) to the north of Newry Homestead. This is of interest because the stratigraphically lowest outcrop of "Antrim Plateau Volcanics" which was observed in a number of places is a dolerite, so that considering its topographical position this basalt may be Proterozoic or Cambrian.

3. On Run 2/Photos 5143-5144 is a small area with low relief (not shown on map) which seems to have been a former alluvial terrace, and in which pebbles of granite, gneiss, chert, quartzite with garnet, quartz, marble, pegmatite etc. are recognised.

#### STRUCTURE

The eastern area is occupied by gently folded Proterozoic rock cut by faults trending generally west-north-west. Near the West Baines River valley this west-north-west trend is broken, and on the western side of the Sheet, in the area

covered by Cambrian volcanics, fault directions have a less well-defined orientation. North and north-east trends appear to prevail in the younger rocks, with an important fault trending north of east situated near the head of the West Baines River. In the north of the Sheet it is suggested that the West Baines River valley is the manifestation of a north-east trending graben, which may explain the reappearance of Bu 2 on the western side of the valley.

In the south-west of the Sheet, the distribution of Cambrian units suggests a regional south dip, which is disturbed strongly in places, apparently by faulting.

The north and north-east trending faults are thought to be later than those trending west-north-west because the younger rocks are cut by the north-east trending faults. It is assumed that faulting on north and north-east trends originated in the Precambrian, but several post-Cambrian movements occurred also, some of which affected the Bonaparte Gulf Basin e.g. Cockatoo Fault.

#### CONCLUSIONS

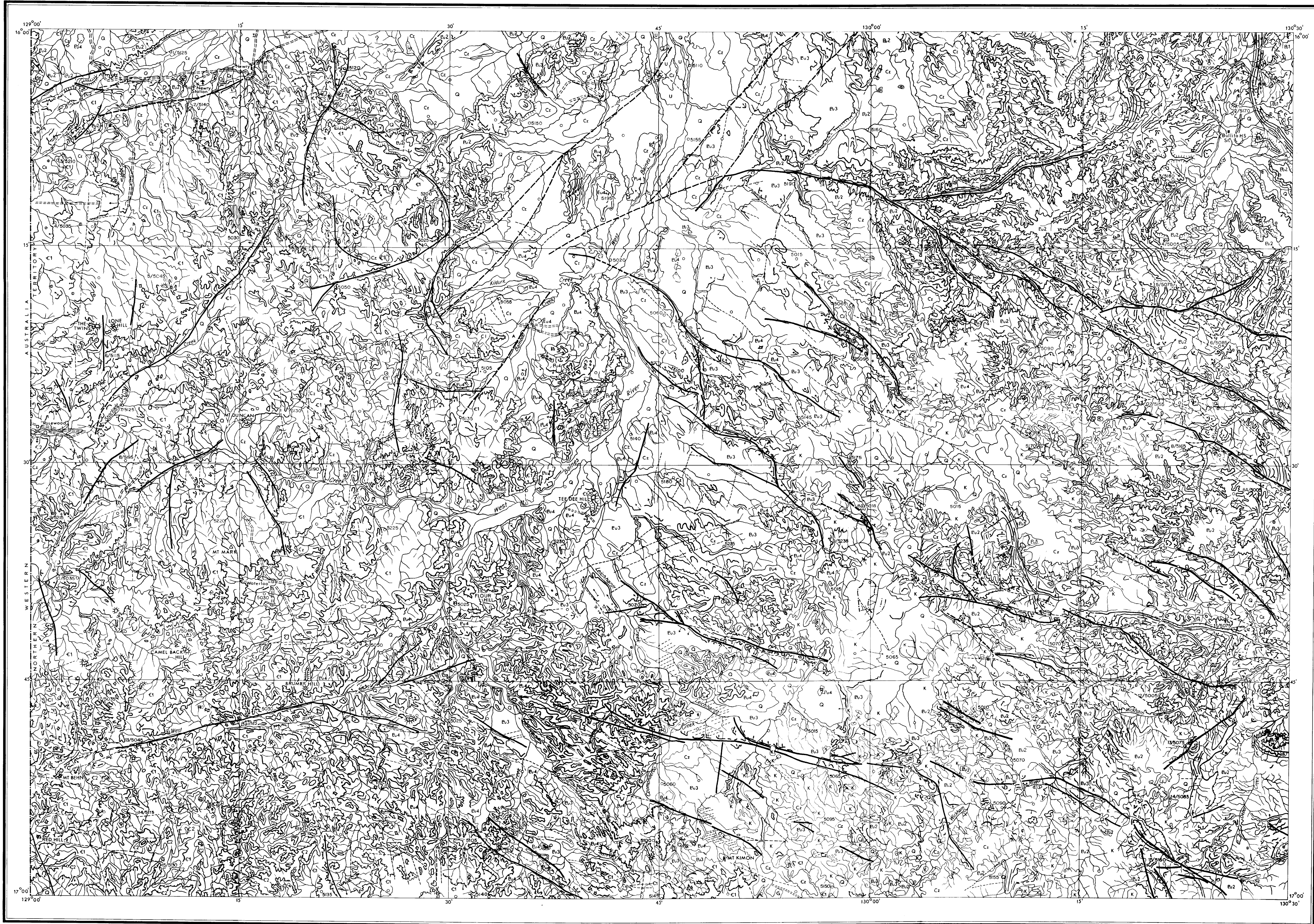
It seems that perhaps the most interesting formation, because of its thickness and lithological variation, is the one called Bu2. A good section could be traversed from Bullita Homestead to the west as far as the wide tableland (Run 1/Photo 5100) which is considered as the top of Bu2.

One of the main problems on the Sheet will be to verify the correlation, shown on the map, between the formation Bu2 differentiated in the ridge (Run 1/Photo 5115, Run 2/Photo 5149) and Bu2 near Bullita Homestead.

#### REFERENCES

- TRAVES, D.M., 1955 - The Geology of the Ord-Victoria Region Northern Australia, Bur.Min.Resour.Aust. Bull. 27.





REFERENCE

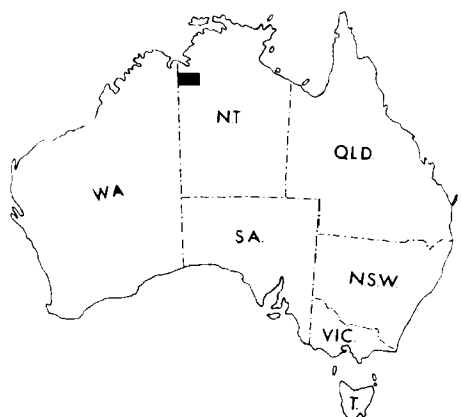
Photogeological Character

Possible Geological Interpretation

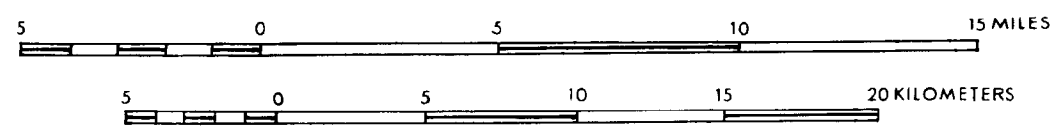
	Alluvium	QUATERNARY	} CENOZOIC
	Cover	Undifferentiated	
	Grey thin formation always covered by vegetation, forming a low scarp	CRETACEOUS	} MESOZOIC
Unconformity			
	Limestone?	} CAMBRIAN	} PALAEOZOIC
	Anfrim Plateau Volcanics		
Unconformity			
	Grey tone, very well bedded	Silicified Shale	} UPPER PROTEROZOIC
	Grey tone massive rock, coarse texture, well jointed	Sandstone	
	Alternating hard and soft formation, the first showing a wide plateau, the second where exposed is very well bedded	Sandstone, Shale, Limestone	
	Grey tone, very well bedded	Quartzite, Chert	
	Undetermined		

	Lithological boundary		Principal road
	Probable lithological boundary		Minor roads and tracks
	Anticlinal axis		Railway line
	Synclinal axis		Telephone line
	Fault		Fence
	Probable fault		State boundary
	Edge of bed		Mine
	Probable edge of bed		Homestead
	Edge of bed expressed as scarp		Yard
			Windpump
			Airport or Airfield, Landing ground
	Estimated dips		Bore
	+ Horizontal		Tank
	+ Very low		Well
	+ Low		Spring
	+ Medium		Waterhole
	+ Steep		Dam
	+ Vertical		Photo-centre points
			Photo-centre points-adjointing sheet
	Trend line		
	Joint pattern		
	Topographic scarp		
	Laterite (L), Terrace (T), Scree (S)		
	Dyke		

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Transverse Mercator Projection.



SCALE 1:250,000



INDEX TO ADJOINING SHEETS

CAMBRIDGE GULF	AUVERGNE	DELAMERE
LISSADELL	WATERLOO	VICTORIA RIVER DOWNS
DIXON RANGE	LIMBUNYA	WAVE HILL

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Drawn by: J. Pasmann