COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

RECORDS:

1966/187

SUMMARY OF ACTIVITIES, 1966

SEDIMENTARY BASINS SECTION, GEOLOGICAL BRANCH

15928/65

SUMMARY OF ACTIVITIES, 1966

SEDIMENTARY BASINS SECTION,

GEOLOGICAL BRANCH

RECORDS 1966/187

SEDIMENTARY BASINS SECTION

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CONTENTS

Accompanied by 18 Text Figures

Fig 1

AUSTRALIA

100 50 0 100 200 300 Miles

Reference

- Margin of sedimentary basin.
- Area Mapped previously by B.M.R. (all sections)
- Area mapped 1966 Sedimentary Basins Section
- Scout Drilling, 1966 " " "
- Area Programmed, 1967 " " "
- P Photogeology completed, 1966

To accompany Records 1966/187

SUMMARY

Members of the former Amadeus, Bonaparte Gulf, Bowen and Georgina Basin parties spent most of the year in report writing and map compilation, and only five normal field parties operated during 1966. Four of these, including one staffed jointly by the Geological Survey of Queensland and the Bureau, worked in Queensland and the fifth in the Northern Territory. In addition, various officers were engaged in short-term mapping and/or drilling projects in the Amadeus, Bowen, Canning, Daly River and Northern Eromanga Basins.

Nine new 1:250,000 Sheets were completed, and parts of nine others either mapped or re-mapped. The new work included initial mapping in the Drummond Basin, mapping of parts of the Surat and South-west Eromanga Basins, and completion of mapping of the "junction" area of the Daly River, Wiso and Georgina Basins. For the first time, two Bureau rigs were available for ad hoc drilling requirements of field parties, and to date about 13,250 feet of drilling and coring has been done. Drilling is still in progress in the Surat Basin.

The results of the various drilling programmes have yet to be assessed fully, but several important discoveries were made during surface mapping. These include: marine fossils in the Upper Permian MacMillan Formation (Bowen Basin); Leptophloeum australe in probable Lower Carboniferous sandstone of the Canning Basin; Miocene vertebrates in the Camfield Beds (Daly River/Wiso Basin); two phosphatic units in the Upper Devonian Drummond Basin sequence, and high-grade bentonite in the Upper Jurassic Orallo Formation (Surat Basin).

Only one party used helicopter transport during 1966, but the South-west Eromanga party successfully used a chartered light aircraft to plot cultural details not readily identifiable on air photographs, and for geological reconnaissance.

The Palaeontological Groups continued their research programmes and attended to the ad hoc requirements of industry and of Bureau field parties.

The Photogeological Group completed nine 1:250,000 Sheets, and parts of two others; five sheets were in progress on the 31st October, 1966. Both officers of the Group spent several weeks with field parties to check work done for future mapping projects.

During the year three officers completed overseas study tours, and one departed to study under a scholarship awarded by the Public Service Board.

Publications issued in the period consisted of one Bulletin, five Reports and seven Explanatory Notes. The status of publications and Records at 31/10/66 is shown in the Appendix; on that date, the totals were:

Bulletins, in press or completely edited	- 9
Bulletins, in progress	- 8
Reports, in press or completely edited	- 6
Reports, in progress	- 4
Explanatory Notes, in press or completely edited	- 13
Explanatory Notes, in progress	- 14
Outside Publications, published, completed or in progress	- 24
Records issued	- 43

A M A D E U S B A S I N

AMADEUS BASIN

by

A.T. Wells

PERSONNEL: A.T. Wells, P.J. Cook. P.J. Cook began a course of post-graduate studies in the United States in August, 1966.

FIELD WORK was restricted to the supervision of a scout-drilling programme in the vicinity of Gosses Bluff, where a Bureau Mayhew 1000 rig drilled one hole to a depth of 500 feet, and seven shallower holes.

REPORT WRITING occupied most of the year, and resulted in:

Explanatory Notes - nine completed (HALE RIVER, HENBURY, HERMANNSBURG, KULGERA, LAKE AMADEUS, McDILLS, MOUNT LIEBIG, MOUNT RENNIE, RODINGA) by various authors.

Report Series - The draft of Report 113 "Geology of the north-east Amadeus Basin" was revised to incorporate new information from exploration drilling and from detailed petrological studies on cores and cuttings from Alice No.1, Highway No.1, Erldunda No.1, Ooraminna No.1, Waterhouse No.1 and Mount Charlotte No.1 wells.

Bulletins - About 75 per cent of the first draft of a Bulletin on the geology of the Amadeus Basin has been completed. This work includes sections on Proterozoic, Palaeozoic, Permian, Mesozoic and Quaternary rocks, and part of a section on economic geology which includes petrology and electric log characteristics of Proterozoic sediments, the Pertaoorrta Group, Larapinta Group and post-Larapinta Group sediments.

Records Series - P.J. Cook completed detailed petrography of the Ordovician Stairway Sandstone and its phosphorite beds, and issued the results in Records 1966/1.

Ten types of phosphorite were recognised in the Stairway Sandstone, and textural analyses demonstrated that winnowing has been the main process effecting phosphorite concentration.

P.J. Cook completed Records 1966/132, which details the evidence indicating that Gosses Bluff is a crypto explosion structure formed either by crypto-vulcanism or by impact.

P.J. Cook prepared Records 1966/46 on the Illamurta Structure (on HENBURY), which may be a diapir and may lie on a major lineament named the Spencer-Fitzroy Fracture Zone.

B O N A P A R T E G U L F B A S I N

BONAPARTE GULF BASIN

by

J.J. Veevers

PERSONNEL: J.J. Veevers, J. Roberts

FIELD WORK: [illegible] Veevers and Roberts, accompanied by P.E. Playford of the Western Australian Geological Survey, spent two weeks in the Canning Basin to inspect a Devonian reef complex and to collect fossils for comparison with those of the Bonaparte Gulf Basin.

REPORT WRITING: This occupied the whole year, except for the fortnight's field work in the Canning Basin. The Upper Devonian and Carboniferous geology of the Bonaparte Gulf Basin was described in Records 1966/113. Several papers were written for external publication, and these are listed in Appendix 1.

MISCELLANEOUS: During the visit to the Canning Basin, Veevers et al. collected the plant fossil Leptophloeum australe from probable Lower Carboniferous sandstone in the Christmas Creek area (a paper on this sandstone has been offered for publication in the Australian Journal of Science), fish plates from the sandstone at Knobby Hills, and brachiopods and gastropods from Ordovician sandstone north of Billiluna. All of this work has an important bearing on the relationship between the Canning and Bonaparte Gulf Basins.

J.J. Veevers was co-author with K.A. Townley of a BMR publication entitled "Rocks and Fossils around Canberra, and wrote a paper on "An Improved Field Device for recording Stratigraphical Sections" for publication in the November 1966 issue of the AAPG Bulletin.

B O W E N B A S I N

BOWEN BASIN

BOWEN BASIN REGIONAL SURVEY

by

E.J. Malone

PERSONNEL: E.J. Malone, J.M. Dickins

FIELD WORK: E.J. Malone spent four weeks in May/June checking geology in the Cracow and Blackwater areas.

REPORT WRITING:

Explanatory Notes - five were completed (MOUNT COOLON, SPRINGSURE, MACKAY, EDDYSTONE, TAROOM) by various authors.

Report Series - Nos 102, 121 and 123 were completed. These three complete a series of ten Reports covering the Bowen Basin regional survey.

Bulletin - about 10 per cent of the first draft of "Geology of the Bowen Basin" has been written.

Miscellaneous - E.J. Malone wrote "Devonian of the Anakie High area, Central Queensland" as a contribution to the 1967 International Symposium on the Devonian System. He also compiled the 'Geology' map sheet and booklet of the Fitzroy Region, Queensland, for publication by the Resources, Information and Development Branch of the Department of National Development.

BANDANNA PROJECT

by

A.R. Jensen

PERSONNEL: A.R. Jensen and E.N. Milligan (part time)

FIELD WORK: The Bandanna Project, which is a stratigraphical and petrological study of the Upper Permian and Lower Triassic sequence of the Bowen Basin, continued with field work and scout drilling in the Cracow (MUNDUBBERA) and Blackwater (DUARINGA) areas. Petrographic examination of surface samples, cores and cuttings is in progress.

In the Cracow area, field work consisted mainly of measurement of the Upper Permian sequence exposed in Back Creek, and examination of the Barfield and Flat Top Formations near Theodore. The field work indicates that the Barfield Formation is equivalent to the Acacia Formation. Scout drilling in the Cracow area was programmed to obtain cores and cuttings from the Baralaba Coal Measures, and from the top part of the Barfield Formation. This drilling showed that some beds of the Kaloola Member are hard and cherty at depth. Green bentonitic clay was found in the Kaloola Member, but the return of cuttings was so poor that the interval could not be properly tested; a more detailed investigation may be warranted.

In the Blackwater area, marine fossils were discovered in the MacMillan Formation, and this confirmed allocation of this unit and the overlying Carnangarra Sandstone to the Back Creek Group. The contact between the Carnangarra Sandstone and the overlying Fair Hill Formation, the basal unit of the Blackwater Group, was studied in detail. Field observations in the Blackwater area suggested correlation of the Burngrove Formation with the Kaloola Member of the Baralaba Coal Measures. E.N. Milligan examined possible arthropod tracks and trails, or fish, in the Burngrove Formation, and plaster casts were made of some types. Drilling in the Blackwater area produced cores and cuttings of all formations of the Blackwater Group, and of the concealed MacMillan Formation.

Petrographic examination of rock fragments in sandstone from the lower part of the Rewan Formation has revealed that a variety of provenance areas contributed material. In the south-eastern part of the basin the provenance was almost exclusively volcanic; in the south-western part, near Arcadia and Reids Dome, plutonic and metamorphic provenance areas were shedding material but there was some contribution from volcanic and sedimentary areas. In the Blackwater area the sediments are as a whole much finer and it seems probable that their source consisted mainly of metamorphosed volcanic and sedimentary rocks. In the northern part of the basin a volcanic provenance appears dominant, but some material was derived from sedimentary and plutonic terrains.

SUMMARY OF SUCCESSFUL HOLES DRILLED FOR THE BANDANNA PROJECT

Name of hole	General location	Formation penetrated	Total depth	Interval cored	Generalized lithological log
Mundubbera (BMR) No. 1	Back Creek, 5 miles NW of Cracow	Baralaba Coal Measures	86'3"	75'0" - 78'9" 78'9" - 86'3"	0-50' alluvium 50'-75' sandstone, siltstone 75'0"-75'9" Coal 75'9"-78'9" sandstone, carb. laminae 78'9"-79'2" coal 79'2"-86'3" carbonaceous mudstone
Mundubbera (BMR) No. 2	Back Creek, 5 miles NW of Cracow	Top of Barfield Formation	33'2"	32'0" - 33'2"	0-15'0" soil, alluvium 15'-0"-25'0" mudstone 25'0"-30'0" fine lithic sand., siltstone 30'0"-33'2" tuffaceous mudstone
Mundubbera (BMR)	About 7 miles NW of Cracow	Tertiary alluvium	42'6"	33' - 42'6"	0 -5'0" soil 5'0"-42'6" brown clay
Mundubbera (BMR) No. 4	About ½ mile E of Hillview, Cracow	Kaloola Member, Baralaba Coal Measures	58'0"	15'0" - 25'0"	0 -10'0" soil 10'0"-24'3" siltstone, claystone 24'3"-35'0" clayey sandstone 35'0"-45'0" sandy claystone, minor bentonitic clay 45'0"-57'0" no cuttings 57'0"-58'0" crystal tuff
Duaringa (BMR) No. 2	8 miles north of Cooroorah, Blackwater	Basal Baralaba Coal Measures	46'0"	45'0" - 46'0"	0 -3' 0" soil 3'0"-16'0" fine quartzose sandstone 16'0"-37'0" carbonaceous mudstone 37'0"-46'0" lithic sandstone
Duaringa (BMR) No. 3	8 miles north of Cooroorah, Blackwater	Basal Baralaba Coal Measures	68'10"	59'0" - 68'10"	0 -5' 0" soil 5'0"-15'0" sandstone 15'0"-59'0" mudstone, siltstone 59'0"-68'10" fine lithic sandstone

SUMMARY OF SUCCESSFUL HOLES DRILLED FOR THE BANDANNA PROJECT (Cont.)

Name of hole	General location	Formation penetrated	Total depth	Interval cored	Generalized lithological log
Duaringa (BMR) No. 4	8 miles north of Cooroorah, Blackwater	Fairhill Formation	31'5"	15'0"-24'0" 24'0"-31'5"	0 -5'0" soil 5'0"-31'5" labile sandstone
Duaringa (BMR) No. 5	7 miles NNW of Cooroorah, Blackwater	German Creek Coal Measures	102'10"	37'0"-44'9" 55'6"-61'4" 76'6"-85'11" 86'5"-96'9" 96'9"-102'10"	0 - 5'0" soil 5'0"-44'9" mudstone 44'9"-55'6" coal, carb. mudstone 55'6"-82'10" lithic sandstone, siltstone 82'10"-102'10" carbonaceous mudstone
Duaringa (BMR) No. 8	7 miles west of Blackwater	German Creek Coal Measures	25'0"		0 -5'0" carbonaceous siltstone 5'0"-20'0" sandstone, siltstone 20'0"-25'0" sandstone, mudstone
Duaringa (BMR) No. 10	10 miles west of Blackwater	German Creek Coal Measures	190'		0 - 5'0" soil 5'0"-16'0" sandstone 16'0"-30'0" siltstone 30'0"-46'0" sandstone, siltstone 46'0"-65'0" siltstone, minor coal 65'0"-86'0" quartzose sandstone, siltstone 86'0"-94'0" mudstone, siltstone 94'0"-112'0" quartzose sandstone, siltstone 112'-0"-142'0" siltstone, mudstone 142'0"-148'0" sublabile sandstone 148'0"-190'0" siltstone, mudstone

D A L Y R I V E R/W I S O B A S I N

DALY RIVER/WISO BASIN

DALY WATERS/WISO PARTY

by

M.A. Randal

PERSONNEL: M.A. Randal, M.C. Brown, C.G. Gatehouse (27/5/66-7/8/66)
W.J. Perry (17/7/66-15/8/66), K.G. Smith (17/8/66-11/9/66),
S.K. Skwarko (4/8/66-4/9/66), M.D. Plane (1/9/66-11/9/66),
G.J. Squire (Drafting Assistant)

DURATION OF FIELD WORK: 6/6/66-12/10/66

AREA MAPPED: The Daly Waters/Wiso Party mapped NEWCASTLE WATERS, DALY WATERS, and LARRIMAH, and the eastern portions of DELAMERE, VICTORIA RIVER DOWNS, and WAVE HILL. The main purpose of the survey was to map the Middle Cambrian rocks in the northern part of the Wiso Basin and to ascertain their relationships with the rocks of the Daly River Basin to the north, and the north-western part of the Georgina Basin to the east.

HELICOPTER SURVEYS: A G3B1 helicopter, provided by Rotorwork, Sydney, was used from 25th July to 3rd August. The aircraft flew 1400 miles in 9 traverses and was airborne for 29 hours 20 minutes. It was used mainly in areas of difficult vehicle access.

SCOUT DRILLING: The Bureau's Mayhew rig was attached to the party from 4th August to 16th September. A total of 1131 feet of drilling and coring was completed in five holes - one on DALY WATERS area, 3 on LARRIMAH, and one on KATHERINE. The results are incorporated in the section on Geology, and the locations and logs given in Table 2.

GEOLOGY: The area mapped contains rocks of Precambrian, Lower Cambrian, Middle Cambrian, Cambrian/Ordovician, Lower Cretaceous, and Tertiary ages. A great deal of the area is covered by Cainozoic superficial deposits.

Precambrian - Precambrian rocks of the Victoria River Group crop out in the western parts of WAVE HILL, VICTORIA RIVER DOWNS and DELAMERE but were not mapped during this survey. An inlier of the Group consisting of dolomite, sandstone and siltstone crops out between Wave Hill and Camfield Homesteads. It is unconformably overlain by the Lower Cambrain Antrim Plateau Volcanics. Sandstone, siltstone and glauconitic dolomitic limestone of the Adelaidean Roper Group crop out in the north-eastern part of LARRIMAH. The regional dip is north-eastwards, and the rocks are unconformably overlain by the Lower Cambrian Antrim Plateau Volcanics, the Middle Cambrian Tindall Limestone and Lower Cretaceous rocks. The Carpentarian Tomkinson Creek Beds crop out in the eastern part of NEWCASTLE WATERS where they form the northern continuation of the Ashburton Range on HELEN SPRINGS and BEETALOO. The rocks, which dip westwards, consist of sandstone, siltstone, and conglomerate.

Lower Cambrian - The Lower Cambrian Antrim Plateau Volcanics are widespread in the western part of the area between Mathison Creek and Wave Hill Homestead.

The Volcanics consist mainly of basalt, but sedimentary interbeds have been mapped at several localities, and consist of tuff, agglomerate, fine-grained sandstone, chert and laminated limestone. Abundant algal stromatolites of several types occur in a chert horizon near the top of the

basalt at Top Springs and were figured in Bulletin 27 as Collenia in an inlier of Precambrian rocks. However the association of this chert with the Antrim Plateau Volcanics has been established.

Water-bore logs and barometric levelling on adjacent hills indicates the Volcanics are at least 800 feet thick. They are disconformably overlain by the Middle Cambrian Montejinni Limestone and Tindall Limestone, and unconformably overlain by Lower Cretaceous rocks and the Tertiary Camfield Beds.

Basalt outcrops in the north-eastern part of LARRIMAH are continuous with others on KATHERINE which have been referred to as Antrim Plateau Volcanics.

B.M.R. Scout-hole L2, 39 miles west of Larrimah Township, intersected basalt at 163 feet and indicates that the Antrim Plateau Volcanics underlie the Mesozoic and Cambrian section in the central northern part of the area and supports the tentative correlation by previous workers of the Nutwood Downs Volcanics to the east with the Antrim Plateau Volcanics.

Middle Cambrian - The Middle Cambrian Montejinni Limestone crops out in a linear belt in the western part of the region from the headwaters of the Camfield River in the south to near Delamere Homestead in the north. A three-fold division of the formation has been recognized at several localities and in scout-hole and water-bore cuttings - an upper and a lower limestone units separated by a middle mudstone unit. The following sequence has been established north of Top Springs:

	Top	
Unit 3	10-15 feet	Grey to brownish limestone with algae, Girvanella and Biconulites. Contains small patches of dolomite and is partly silicified
Unit 2	40 feet	Calcareous mudstone, red-brown and yellow-buff. Silty carbonates. Produces red-brown soil with rubble of red travertine. The unit is poorly exposed
Unit 1	50-60 feet	Mottled limestone with chert nodules and patches of dolomite. Top consists of laminated coarsely crystalline pale dolomitic limestone producing flat slabs in black and grey soils

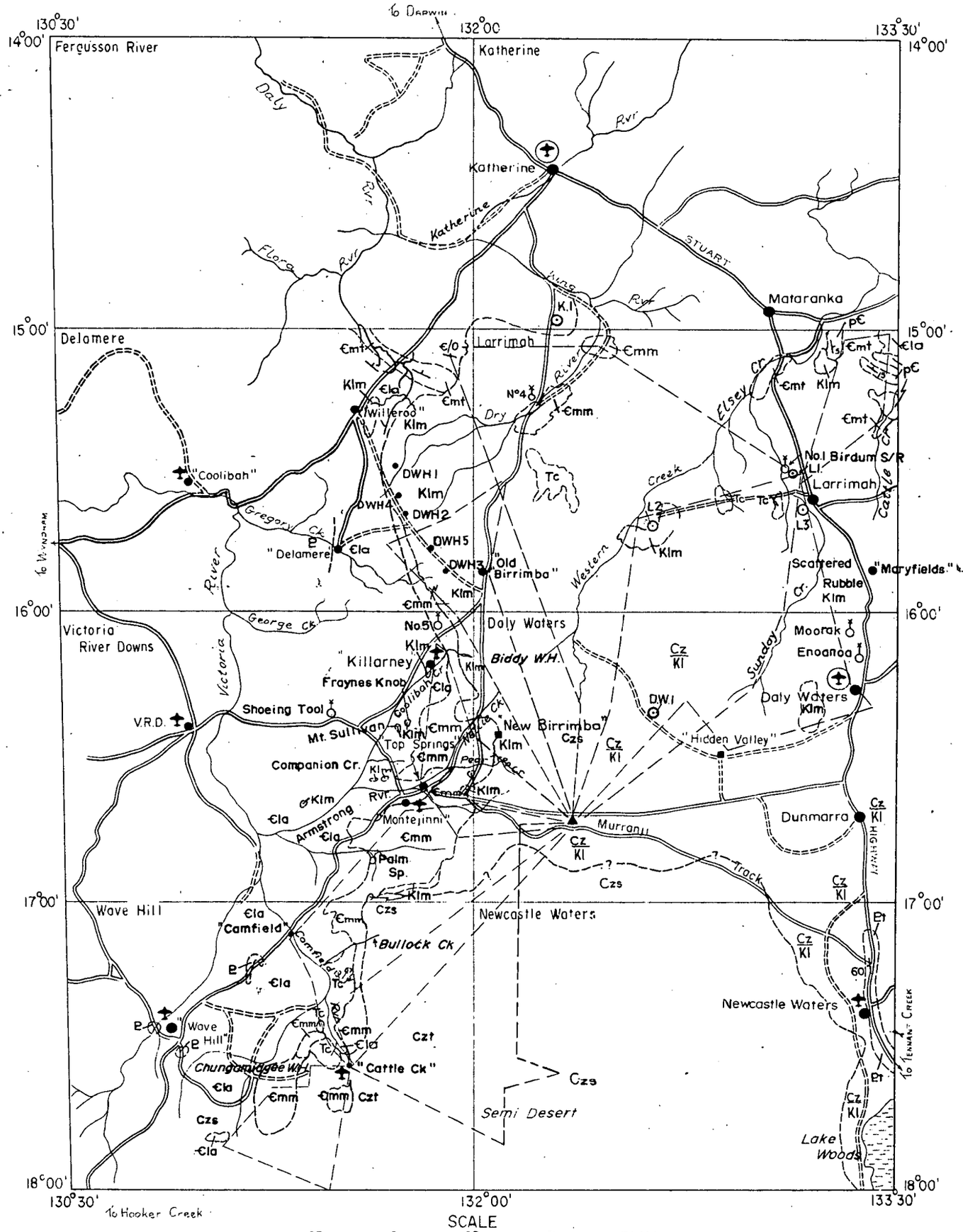
South of Nelly Creek on the Katherine road, the top unit contains Redlichia fragments, Biconulites, and Girvanella. The unit contains the same fauna and phosphatic brachiopods in the valley of the Dry River near No. 4 bore.

To the north of Fraynes Knob the lower unit disappears and the mudstone rests directly on the Antrim Plateau Volcanics.

The results of scout-holes L1 and L2 suggest that the limestone/mudstone/limestone sequence in the Montejinni limestone persists eastwards beneath the Mesozoic cover and that the upper part of the Montejinni continues northwards, becoming thicker, and is equivalent to part of the Tindall Limestone. The similarity of the outcrops of the two elsewhere in the region supports this belief e.g. the fossiliferous limestone outcrops in the valleys of Mathison Creek and the Dry River.

The composite thickness of the Montejinni Limestone is variable: near Palm Springs it is about 170 feet but to the north in Scout-hole L2 it is only 126 feet.

DALY WATERS – WISO BASIN AREA - N.T.



September, 1966.

To accompany Record No 1966/187

The 'Tindall Limestone' occurs in the valley of Mathison Creek, in the valley of the Dry River (where it may be equally as well regarded as Montejinni Limestone), in the valley of Elsey Creek, and between Elsey and Cattle Creeks in the north-east of LARRIMAH. The outcrops are continuous with those of the formation on the Fergusson River and Katherine 1:250,000 Sheet areas. The unit consists of fossiliferous limestone and dolomitic limestone. It has been recognized in the intervals 83'-94' in Scout-hole L1, 140-150' in Scout-hole L2, and 355-430' in Scout-hole K1. It has also been recognized in cuttings from the following water-bores: Maryfield homestead (60'-175'), Encanoa (75'-187') and Moorak (192'-220'), all in the eastern part of the area near the Stuart Highway.

Cambrian/Ordovician - Outcrops of sandstone, siltstone, dolomite and dolomitic limestone in the north-eastern part of DELAMERE are continuous with outcrops of the Jinduckin Formation in the Fergusson River Sheet area.

No fossils, other than a single riberioid have been found in these rocks in this area. The formation is conformable in strike with the lower Middle Cambrian Tindall Limestone i.e. east-south-east with shallow dips to the north-east, but no contacts have been seen. The thickness is unknown but Scout-hole K1 which spudded into the unit penetrated 355 feet before passing into the underlying Tindall Limestone.

Lower Cretaceous - Lower Cretaceous rocks are widespread in the area, but are poorly exposed except in the mesas and plateau edges in the west. Most of the outcrops on LARRIMAH, DALY WATERS, and NEWCASTLE WATERS are heavily lateritized. The rocks are mainly claystone, siltstone and sandstone.

The apparent thickness of the Lower Cretaceous rocks is variable: water-bore data indicates it is less than 200 feet in the eastern part of NEWCASTLE WATERS, but BMR Scout-hole DW1 near the centre of DALY WATERS indicates a minimum of 281 feet, and the drillers logs of several of the Murranji Stock Route bores suggests it is over 300 feet. At Moorak bore it is 191 feet, at Scout-hole L1 45 feet, and L2 24 feet. The variations in thickness are probably a result of erosion.

The Lower Cretaceous rocks were examined by S.K. Skwarko and his results are reported independently.

Tertiary

The Tertiary Camfield Beds (new name) occur in the valley of Bullock Creek near Camfield homestead and extend in discontinuous outcrops to near Cattle Creek homestead. The rocks are mainly limestone and contain abundant bone, teeth, and gastropod remains. Preliminary results on the bones and teeth are reported independently by M.D. Plane.

The following composite section was measured in the headwaters of Bullock Creek:

Top

2 feet	Dark-grey hard limestone, thick-bedded
8 "	Hard and soft limestone with vertical burrows, buff-coloured, medium-bedded.
[illegible]	[illegible]
10 feet	Very cherty limestone, poor bedding
3 "	Cherty limestone, medium-bedded, with gastropods
7 "	Red-grey gypsiferous siltstone (leached silty limestone), bones
4 "	White-buff limestone, opaline silica, gastropods and bone material.
15 "	Mottled red and grey calcareous sandy siltstone.
21 "	Red calcareous siltstone.
10 "	BASALT (Antrim Plateau Volcanics)

Three miles west of Larrimah township, and between Western Creek and the Dry River, outcrops of fossiliferous white siliceous limestone occur as low hills and rubble in black soil plains. The rocks are identical to those found near Bullock Creek and Cattle Creek homestead. Scout-hole L3 spudded into Tertiary limestone near Larrimah township and penetrated 50 feet of limestone before passing into Lower Cretaceous claystone and sandstone.

MISCELLANEOUS

Regional groundwater studies were undertaken concurrently with the geological mapping. Logs from about 340 bores in the area were obtained, and 86 samples for chemical analyses were collected and forwarded to AMDL. Several proposed bore-sites were examined and reported on for the Senior Resident Geologist, Northern Territory Administration.

Both K.G. Smith and M.A. Randal independently revisited parts of the DALY RIVER BASIN on FERGUSSON RIVER, PINE CREEK and KATHERINE following on the 1964 discovery of Lower Ordovician fossils by geologists of Australian Aquitaine Petroleum Ltd. The fossils were found in the Jinduckin Formation near Claravale Homestead. Additional fossils were collected at the localities near Claravale but an extensive search for fossils in other outcrops of the Jinduckin Formation, the Manbulloo Limestone Member and the overlying Oolloo Limestone was fruitless. These three units had previously been regarded as Middle Cambrian and in conformable sequence over the lower Middle Cambrian Tindall Limestone, but all three may be Lower Ordovician and re-mapping of the Daly River Basin is warranted.

TABLE 1 : SCOUT DRILLING DALY WATERS/WISO AREA

Daly Waters (BMR) Scout No. 1

Location: 18 miles north-west of Hidden Valley Homestead

Section:		
0' - 10'	Soil	
10' - 94'	Claystone: pale grey	
94' - 263'	Siltstone and friable sandstone greenish to buff with some glauconite; some claystone	Lower Cretaceous
263' - 281'	Siltstone and friable sandstone purplish to brown	

Larrimah (BMR) Scout No. 1

Location: 6.2 miles WNW of Old Gerry Homestead

Section:		
0' - 44'6"	Sand, with some gravel	Lower Cretaceous?
44'6"-83'	Siltstone, claystone, silty sandstone with chert	Cambrian? Jinduckin Formation?
83' - 94'	Limestone; yellow to brown with trilobites and Biconulites sp.	Middle Cambrian Tindall Limestone or Montejinni Limestone

Larrimah (BMR) Scout No. 2

Location: 38.5 miles west of Larrimah Township

Section:			
0' - 24'	Sand and silty sand	)	Lower Cretaceous
24' - 37'	Siltstone: buff	)	Cambrian?
37' - 73'	Limestone: yellow to brown with Biconulites sp.	)	Middle Cambrian, Montejinni Limestone
73' -123'6"	Mudstone: buff and chocolate brown calcareous, some chert with limestone	)	
123'6"-163'	Dolomitic Limestone	)	
163' -176'3"	Basalt: weathered amygdaloidal	)	Lower Cambrian, Antrim Plateau Volcanics

Larrimah (BMR) Scout No. 3

Location: 3.5 miles west of Larrimah Township

Section:			
0' - 50'	Limestone: white, with pale chert nodules below 35', soft and chalky near top	)	Tertiary
50' -140'	Clay and clayey sandstone, passing down into loose sand and gravel	)	Lower Cretaceous
140' -150'	Limestone: light brown to grey-brown calcilutite	)	Cambrian, Tindall or Montejinni Limestone

Katherine (BMR) Scout No. 1

Location: 33 miles south of Katherine

Section:			
0' - 45'	Interbeds of sandstone and chocolate to red-brown calcareous shale	)	Cambrian/Ordovician Jinduckin Formation
45' -355'	Chocolate-brown and grey calcareous shale, with interbeds up to 15' of dolomite and dolomitic limestone, some chert	)	
355' -430'	Dolomite passing down into grey-brown limestone with Biconulites sp.	)	Cambrian Tindall Limestone

D R U M M O N D B A S I N

FIG.1

DRUMMOND BASIN

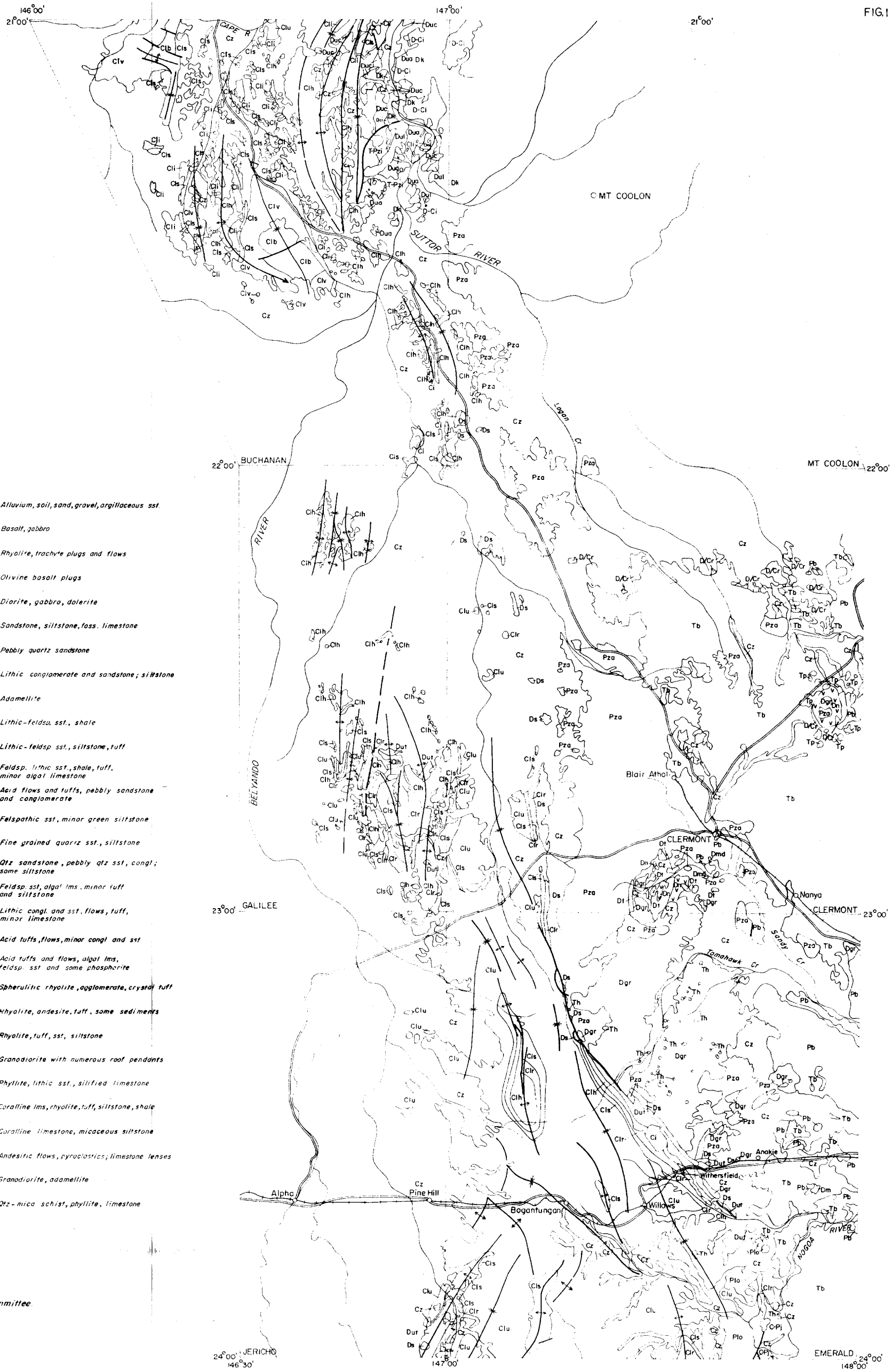
QUEENSLAND

Scale 1:1000,000

REFERENCE

CAINOZOIC	UNDIFFERENTIATED		Cz	*Alluvium, soil, sand, gravel, argillaceous sst.*
	TERTIARY		Tb	*Basalt, gabbro*
		Peak Range Volcanics	Tp	*Rhyolite, trachyte plugs and flows*
		Hoy Basalt	Th	*Olivine basalt plugs*
	UPPER DEV.-TERT		T-Pzi	*Diorite, gabbro, dolerite*
PALAEOZOIC	PERMIAN	Back Creek Group	Pb	*Sandstone, siltstone, foss. limestone*
		Colinlea Sandstone	Plo	*Pebbly quartz sandstone*
	CARB.- PERMIAN	Joe Joe Formation	C-Pj	*Lithic conglomerate and sandstone; siltstone*
	CARBONIFEROUS		Ci	*Adamellite*
	LOWER CARBONIFEROUS	Drummond Group — Bogantungen Sub-group — * Bulliwallah Formation	Clb	*Lithic-feldsp. sst., shale*
		Drummond Group — Bogantungen Sub-group — Dawson Vale Formation *	Clv	*Lithic-feldsp. sst., siltstone, tuff*
		Drummond Group — Bogantungen Sub-group — Ducabrook Formation	Clu	*Feldsp. lithic sst., shale, tuff, minor algal limestone*
		Drummond Group — Withersfield Sub-group — Star of Hope Formation *	Cls	*Acid flows and tuffs, pebbly sandstone and conglomerate*
		Drummond Group — Withersfield Sub-group — * Bingeringo Sandstone *	Cli	*Felspathic sst, minor green siltstone*
		Drummond Group — Withersfield Sub-group — Raymond Sandstone	Clr	*Fine grained quartz sst., siltstone*
		Drummond Group — Withersfield Sub-group — Mt Hall Formation	Clh	*Qtz sandstone, pebbly qtz sst, congl; some siltstone*
		Drummond Group — Scartwater Formation *	Duc	*Feldsp. sst, algal lms, minor tuff and siltstone*
		Drummond Group — Telemon Formation	Dut	*Lithic congl. and sst, flows, tuff, minor limestone*
	UPPER DEVONIAN	Llanarth Volcanics *	Dul	*Acid tuffs, flows, minor congl and sst*
		St Annes Formation *	Dua	*Acid tuffs and flows, algal lms, feldsp. sst and some phosphorite*
		Silver Hills Volcanics	Ds	*Spherulitic rhyolite, agglomerate, crystal tuff*
		Theresa Creek Volcanics	Dt	*Rhyolite, andesite, tuff, some sediments*
	DEVONIAN-CARBONIFEROUS	Mt Rankin Beds	D/Cr	*Rhyolite, tuff, sst, siltstone*
			D-Ci	*Granodiorite with numerous roof pendants*
	MIDDLE DEVONIAN	Ukalunda Beds	Dk	*Phyllite, lithic sst., silified limestone*
			Dm	*Coralline lms, rhyolite, tuff, siltstone, shale*
		Douglas Creek Limestone	Dmd	*Coralline limestone, micaceous siltstone*
			v v v	*Andesitic flows, pyroclastics; limestone lenses*
	DEVONIAN	Retreat Granite	Dgr	*Granodiorite, adamellite*
	PRE-DEVONIAN	Anakie Metamorphics	Pza	*Qtz-mica schist, phyllite, limestone*

* *Proposed name not yet approved by the Stratigraphic Nomenclature Committee.*



DRUMMOND BASIN

DRUMMOND BASIN PARTY

by

F. Olgers

PERSONNEL: F. Olgers, H.F. Doutch, J. Eftekharnejad (G.S. of Iran)

DURATION OF FIELD WORK: 25th April to 29th September

AREA MAPPED: Eastern parts of BUCHANAN, GALILEE, and JERICHO sheets. Revision of the Devonian-Carboniferous sequence in EMERALD and CLERMONT.

The mapping of BUCHANAN, GALILEE and JERICHO completed the regional coverage of the Devonian-Carboniferous Drummond Basin in central Queensland. The units mapped on BUCHANAN in the north of the basin could be correlated with the sequence in the south because of the presence of two good marker units, the Mt Hall and Star of Hope Formation. All units and their main lithological characteristics have been set out in the accompanying figures.

GEOLOGY: The main points arising from this year's field work are outlined below:

1. The greatest thickness of sediment, close to 50,000 feet, was deposited in the north-east of the BUCHANAN. No marine fossils have been found anywhere in the sequence. The only evidence for possible marine conditions is a thin phosphorite bed in the St Annes Formation at the base of the sequence. The St Annes Formation can possibly be correlated with the Upper Devonian Mt Wyatt Beds which crop out in the south-west of the Bowen Sheet area. The Mt Wyatt Beds contain abundant marine fossils, mainly the species Cyrtospirifer c.f. reidi.

2. The basal part of the Ducabrook Formation on EMERALD has been mapped as a separate unit named the Star of Hope Formation. The unit contains acid flows and tuffs, purple lithic conglomerate and sandstone, quartz pebble conglomerate and minor purple siltstone. The proportion of volcanic and sediment content of the unit varies considerably from place to place. The Star of Hope Formation, first mapped in the Narien Dome area (S.E. GALILEE) by French petroleum geologists, has also been recognized in BUCHANAN. The unit is one of two useful marker units in the Drummond Basin.

3. The Douglas/Theresa Creeks area south-west of Clermont was remapped. The volcanics in the area, previously all mapped as Theresa Creek Volcanics, have been subdivided into two units: one, probably closely allied to the Middle Devonian Douglas Creek Limestone and consisting of andesitic volcanics can be correlated with the Dunstable Formation of the Springsure area; the other, the Theresa Creek Volcanics, consisting of spherulitic rhyolite and agglomerate, can be correlated with the Silver Hills Volcanics (see Fig. 3). The preservation of these rocks in the central region of the Anakie Inlier is attributed to the area being a small graben.

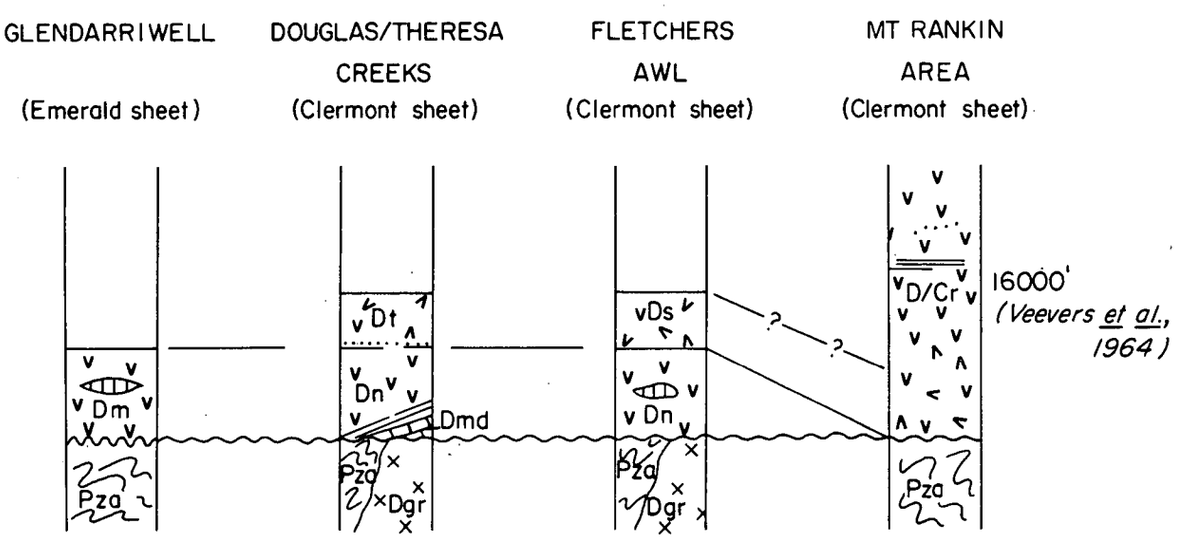
4. The area around Fletcher's Awl, 30 miles north-east of Clermont, was re-examined. Here too both volcanic units described from the Douglas/Theresa Creeks area were recognized. The older basic volcanics contain lenses of partly recrystallized limestone. No fossils were found.

5. The volcanic inliers in the north of CLERMONT, from Mt Rolfe in the west to Mt Rankin in the east, were re-examined to establish the relationship between the Silver Hills Volcanics (Mt Rolfe) and the Mt Rankin Beds (all inliers to the east of Mt Rolfe). The volcanics were found to be similar, mainly flow and spherulitic rhyolite, dacite and acid and intermediate pyroclastics. The bulk of the Mt Rankin Beds are equivalent to the Silver Hills Volcanics. The upper part of the unit, exposed east of Mt Rankin, consists of plant-bearing sediments of probable Lower Carboniferous age. These sediments are equivalent to the Drummond Group west of the Anakie Inlier.

6. The phosphorite occurrence in the St Annes Formation was investigated in detail. Two phosphatic units were discovered near the middle of the Formation, representing transitional conditions between lower tuffaceous sandstone and upper algal limestone and acid volcanics. The highest P_2O_5 value, using the Shapiro test, was 15% in a floater probably shed from the lower unit. The best result from outcropping beds was 4% P_2O_5. Detailed work was done in only one small area, and the persistence of the two units throughout the whole of the formation remains to be proved. A draft of a Record on the occurrences has been completed.

FIG. 3

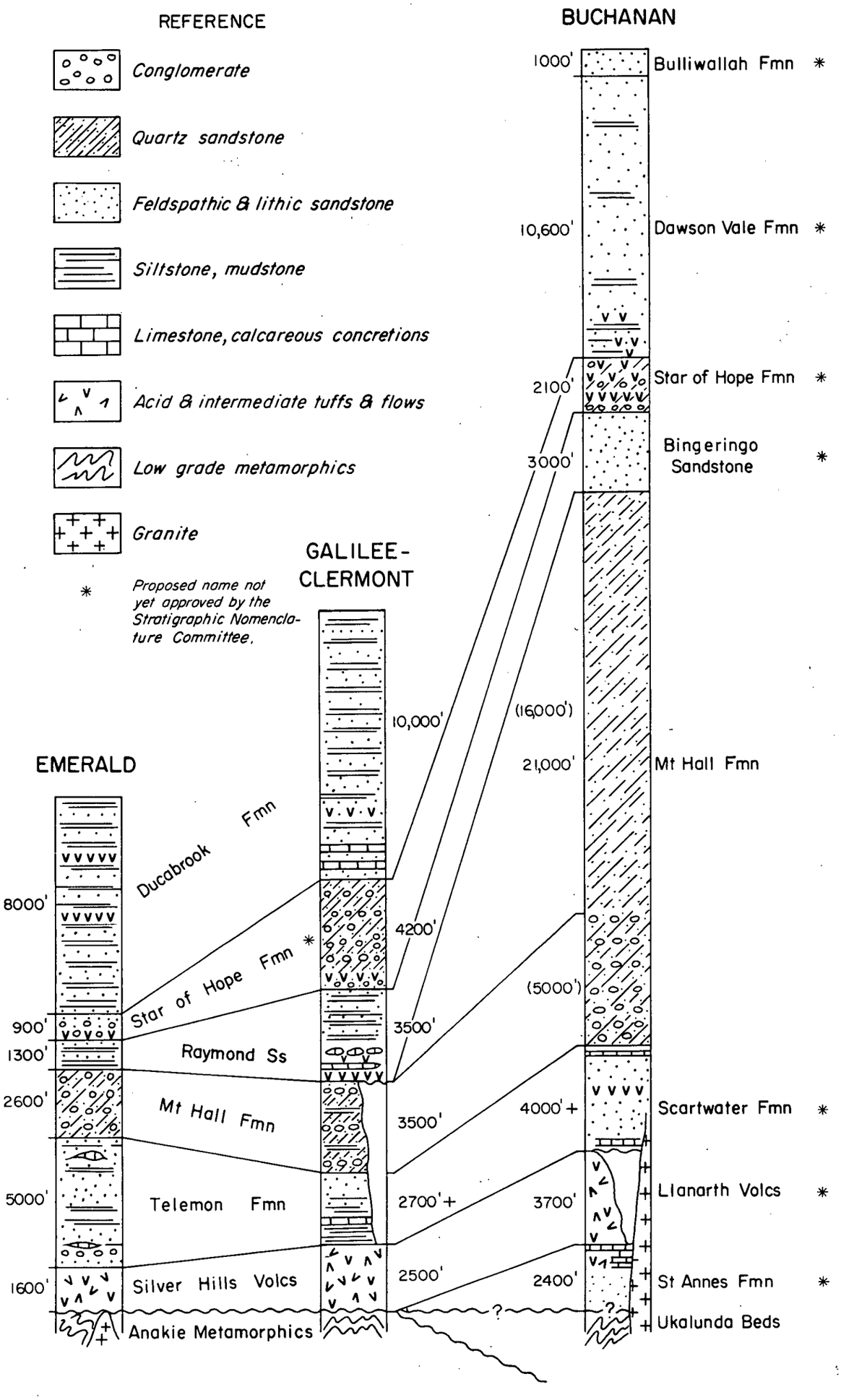
CORRELATION CHART OF DEVONIAN AND CARBONIFEROUS ROCKS ON THE ANAKIE INLIER



For symbols, see figs. 1 & 2. Thickness unknown unless indicated.

FIG. 2

COMPOSITE STRATIGRAPHIC COLUMNS
DRUMMOND BASIN
showing maximum thickness



EROMANGA BASIN

EROMANGA BASIN

(a) SOUTH-WEST EROMANGA BASIN PARTY

by

C.M. Gregory

PERSONNEL: C.M.Gregory, B.R. Senior, M.C. Galloway (August to mid-September.

DURATION OF FIELD WORK: May 15th - September 30th, 1966

AREA MAPPED: CONNEMARA, CANTERBURY, JUNDAH, WINDORAH, and most of ADAVALE.

SCOUT DRILLING: Eleven shallow holes were drilled by a Bureau rig.

AIRCRAFT CHARTER: A light aircraft was chartered for about 70 hours to plot features not identifiable on air photographs and to conduct geological reconnaissance.

GEOLOGY:

Stratigraphy - The rocks exposed within the area mapped represent a history of sedimentation and subsequent near-surface alteration from Lower Cretaceous times to the present. Details of the rock units represented are summarized in Table 1.

Structure - A number of large structures have been mapped in the area. The main ones are:

(1) Warbreccan Dome
(2) Canterbury Dome
(3) Curalle Anticline
(4) Mianga Anticline
(5) Thompson River Syncline
(6) Farrars Syncline
(7) Canaway Fault
(8) Stormhill Fault
(9) Westland Structure

There is evidence that most of these structures were active in the late Tertiary, but it is thought that many reflect deeper, older structures.

The majority of anticlinal structures are recognizable on the ground because of a resistant nature of the silcrete horizon that caps the Glendower Sandstone. This rock forms a persistent bench around breached anticlines and forms hills with a distinct and characteristic radial drainage pattern over unbreached structures. Dips as high as 30° have been measured on one of these structures but generally dips are of the order of 2° to 6°.

The only major synclines so far mapped are along the Thompson River and Farrars Creek; however similar structures are suspected in other areas where significant thicknesses of Quaternary sediments have accumulated.

The main area of faulting is in the eastern part of JUNDAH and WINDORAH. Here four large faults trend between NNE and NNW. On WINDORAH NNW of Canaway No. 1, faulting has produced a horst block that has subsequently been eroded to form the present day valley. Depths to

the main artesian aquifer across the Canaway Fault suggest it has a throw of the order of 1500 feet.

Economic Geology

1. Localized opal mineralization has been mined at a number of places within the zone of chemically altered WINTON FORMATION. The opal occurs in the following settings: as radial and concentric veins in ferruginous concretionary bodies; as veins in ferruginous zones at the base of sandstone beds where they overlie a fine grained bed; and as veins and replacing the matrix (matrix opal) in beds of sandstone. It seems probable that more opal remains to be discovered in the area than has so far been located since all previous prospecting has relied on surface exposures of opal-bearing rock or chance finds in water wells.

2. Prospecting for oil is continuing in the area. Company activity at present includes seismic surveys and a number of drilling operations, mainly confined to ADAVALE and WINDORAH. Numerous structures on the other Sheet areas deserve close examination.

Drilling Programme

A B.M.R. drilling team joined the field party for six weeks and completed 11 holes in areas of interest. This drilling programme provided valuable information on the following:

(1) the zone of chemically altered Winton Formation sediments;

(2) the relationship and nature of the Moses Sandstone and the underlying Winton Formation;

(3) the nature and extent of the Quaternary sediments;

(4) the depth to silcrete in the areas adjacent to the major water courses;

(5) the nature of the Glendower-Winton contact in the Thompson River Syncline; and

(6) the nature of the opaline rocks at Opalville

Light Aircraft Charter

A light aircraft was chartered for a total of about 70 hours flying from Bush Pilots Airways Ltd, and used mainly to accurately position the numerous water bores in the area which are not identifiable on the aerial photos. This activity was very successful and greatly reduced the amount of time otherwise needed to do this work.

The light aircraft was also used for brief reconnaissance surveys of areas prior to starting systematic mapping.

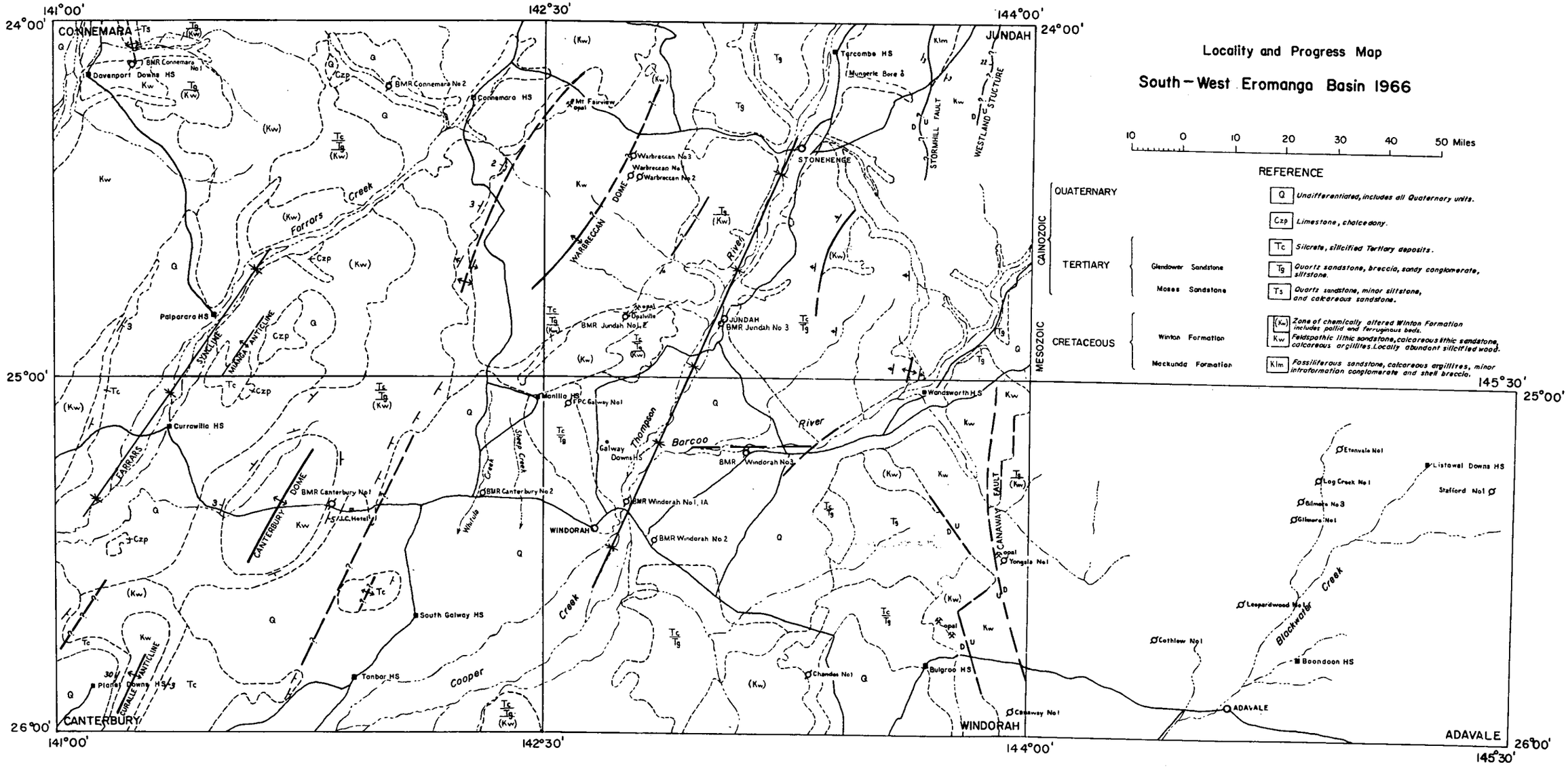
Office Work

Work on the report of this years field work has commenced. Map production at 1:250,000 scale is progressing, and at present the state of the five Sheets is as follows:

CANTERBURY: Geology drawn, topographic base being amended
CONNEMARA: Geology drawn, topographic base yet to be amended
JUNDAH: Geology compiled, topographic base yet to be amended
WINDORAH: Geology compiled, topographic base yet to be amended
ADAVALE: Topographic base drawn, geology yet to be compiled

TABLE 1: SURFACE STRATIGRAPHY OF SOUTH-WEST EROMANGA BASIN

AGE	UNIT	LITHOLOGY	THICKNESS	FOSSILS	RELATIONSHIPS	ENVIRONMENT OF FORMATION	ECONOMIC POTENTIAL
Quaternary	Undifferentiated Q	Silcrete gravel, gravel, sand, silt, clay	Generally a veneer, up to 250 feet along major rivers		Superficial deposit unconformable over most older units. A significan deposit along major water courses	Alluvial, elluvial and colluvial	A source of groundwater in many areas
Cainozoic	Czp	White, very fine grained limestone, sometimes brecciated, often associated with chalcedony especially in the top layers	Up to six feet		Unconformable on older units	An evaporite deposit associated with flood-out areas adjacent to Farrars Ck and its tributaries	
Tertiary	Te	Silcrete, ranges from massive to finely nodular	Generally up to 8 ft, locally may be more		Developed in the upper layers of the Glendower Sandstone, and marks a depositional surface		Useful as a structural marker; locally gravel derived from this unit used as road metal
	Glendower Sandstone Tg	Quartz sandstone, quartz-pebble conglomerate, quartz siltstone, sandy conglomerate, breccia (derived from (Kw))	Up to approx. 200 feet	Some wood material, but this may be derived from Kw	Unconformably overlies the Winton Formation	A large river system with numerous channels and flood-out areas	A source of groundwater in many areas
	Moses Sandstone Ts	Quartz sandstone, minor siltstone and calcareous sandstone. Some very indurated calcareous nodules and also rare ferruginous nodules	About 60 feet		Unconformably overlies the Winton Formation	A lacustrine environment, isolated from the "Glendower River"	
Cretaceous	Chemically Altered Zone Winton Formation (Kw)	Includes a wide range of rocks from kaolinized to ferruginized, sandstone and siltstone, and also some porcellanite	Up to 300 feet	Some rare plant debris	Grades down into fresh Winton Formation sediments	Formed under a peneplain. Otherwise conditions unknown	Locally mineralized with opal
	Winton Formation Kw	Interbedded sequence of lithic-feldspathic sandstone, siltstone, calcareous sandstone and siltstone. Minor carbonaceous shale and coal	Up to 2000 feet	Abundant plant debris and wood	Conformably overlies the Mackunda Formation	Freshwater lacustrine environment	
	Mackunda Formation Klm	Calcareous lithic sandstone, calcareous argillite, minor intraformational conglomerate, cone-in-cone limestone		Inoceramus, Aucellina, Trigonia, ammonites and belemnites. Sharks teeth		Transition Marine	


Locality and Progress Map
South – West Eromanga Basin 1966
10 0 10 20 30 40 50 Miles
REFERENCE
CAINOZOIC
QUATERNARY
Q Undifferentiated, includes all Quaternary units.
Czp Limestone, chalcedony.
TERTIARY
Tc Silcrete, silicified Tertiary deposits.
Glendower Sandstone
Tg Quartz sandstone, breccia, sandy conglomerate, siltstone.
Moses Sandstone
Ts Quartz sandstone, minor siltstone, and calcareous sandstone.
MESOZOIC
CRETACEOUS
(Kw) Zone of chemically altered Winton Formation includes pollid and ferruginous beds.
Winton Formation
Kw Feldspathic lithic sandstone, calcareous lithic sandstone, calcareous argillites. Locally abundant silicified wood.
Mackunda Formation
Klm Fossiliferous sandstone, calcareous argillites, minor intraformation conglomerate and shell breccia.
CONNEMARA
JUNDAH
STONEHENGE
WINDORAH
CANTERBURY
ADAVALE
141°00'
142°30'
144°00'
145°30'
24°00'
25°00'
26°00'
Davenport Downs HS
BMR Connemara No1
BMR Connemara No2
Connemara HS
Mt Fairview Opal
Tarcombe HS
Mungerie Bore 8
Warbreccan No3
Warbreccan No
Warbreccan No2
WARBRECCAN DOME
STORMHILL FAULT
WESTLAND STUCTURE
Palparara HS
SYNCLINE
MANFEA ANTICLINE
FARRARS
Currawilla HS
Manilla HS
PPC Galway No1
Opalville
BMR Jundah No1, 2
JUNDAH
BMR Jundah No 3
Wandsworth HS
Galway Downs HS
Thompson River
Barcoo River
BMR Windorah No3
BMR Canterbury No1
BMR Canterbury No2
CANTERBURY DOME
Sheep Creek
Whirila Creek
BMR Windorah No1, 1A
BMR Windorah No 2
WINDORAH
CANAWAY FAULT
Opal Yongala No1
South Galway HS
Tanbar HS
Cooper Creek
Planet Downs HS
CURRALLE ANTICLINE
Chandos No1
Bulgroo HS
Causeway No1
Etonvale No1
Log Creek No1
Bilmaka No3
Gilmore No1
Listowel Downs HS
Stafford No1
Leepardwood No1
Cathlew No1
Blackwater Creek
Boondoon HS

(b) NORTHERN EROMANGA BASIN PARTY

by

R.R. Vine

PERSONNEL: R.R. Vine

FIELD WORK was restricted to the supervision of a scout drilling programme.

SCOUT DRILLING: Ten shallow holes were drilled with a Bureau Mayhew 1000 rig. The programme began on 28th October, 1966, and was completed on 2nd November, 1966. The specific purposes of this drilling were (a) to investigate a sandstone sequence below the Lower Cretaceous Wilgunya Formation, and (b) to obtain fresh rocks for lithological and palynological study of the Lower(?) Permian to Upper(?) Triassic sequence north-east of Lake Buchanan.

RESULTS:

BMR Hughenden No.1. Abandoned for technical reasons, at 205 feet

BMR Hughenden No. 1A. T.D. 395 feet.

0 - 40 feet,	Sandy clay and argillaceous sandstone;	Cainozoic
40 - 200 feet,	Mudstone	Lower Cretaceous. Doncaster Member of Wilgunya Formation
200 - 211 feet,	Pebbly sandstone, grit and conglomerate;	Lower Cretaceous. Gilbert River Formation
211 - 395 feet,	Very porous quartz sandstone; coal, carbonaceous mudstone and siltstone, 256-267 feet.	Upper(?) Jurassic. Blantyre Sandstone

BMR Tangorin No.1. T.D. 293 feet.

0 - 5 feet,	Clay, soil	Cainozoic
5 - 293 feet,	Dominantly quartz sandstone; some micaceous sandstone, carbonaceous mudstone, and coal.	Jurassic(?) Ranlo Beds

BMR Buchanan No.1. T.D. 210 feet.

0 - 120 feet,	Ferruginous argillaceous sandstone and sandy mudstone;	Cainozoic
120 - 210 feet,	Weathered quartzose to sub-labile sandstone; minor weathered mudstone.	

BMR Buchanan No.2. T.D. 130 feet.

0 - 12 feet,	Loose sand;	Cainozoic
12 - 130 feet,	Very friable, badly-weathered kaolinitic sandstone, with ironstone bands throughout.	Lower(?) Triassic Warang Formation

BMR Buchanan No.3. T.D. 105 feet.

0 - 105 feet,	Very friable, badly-weathered kaolinitic sandstone, with ironstone bands throughout.	Lower(?) Triassic Warang Formation

This hole was drilled to obtain fresh samples of the Upper Permian sequence; the presence of the Warang Formation showed the necessity to revise a geological boundary.

BMR Buchanan No. 4. T.D. 183 feet.

0 - 94 feet,	Sand, gravel and mudstone;	Cainozoic
94 - 183 feet,	Quartzose to labile sandstone, siltstone, mudstone, with some coal and carbonaceous mudstone.	Upper Permian Betts Creek Beds

BMR Buchanan No. 5. T.D. 233 feet.

0 - 126 feet,	Ferruginous sandstone and mudstone;	
126 - 233 feet,	Mudstone, weathered to 215 feet, with varve-like laminations in bottom-hole core.	Lower(?) Permian Boonderoo Beds

BMR Buchanan No.6. T.D. 220 feet.

0 - 110 feet,	Ferruginous sandstone and mudstone;	Cainozoic
110 - 220 feet,	Mudstone and siltstone, weathered to 190 feet. Carbonaceous material and sandstone laminae in bottom-hole core.	Triassic Moolayember Formation

BMR Muttaburra No.1. T.D. 225 feet.

0 - 3 feet,	Soil;	Cainozoic
3 - 15 feet,	Mudstone, partly glauconitic, with basal 6-inch pebble bed.	Lower Cretaceous Doncaster Member of Wilgunya Formation
15 - 225 feet,	Very porous sandstone, sand, minor mudstone and coal.	Jurassic(?) Ranlo Beds

MISCELLANEOUS: R.R. Vine continued a study of Gamma ray logs of Queensland water bores, obtained during a continuing logging programme conducted by the Bureau. He also compiled a Preliminary Edition of a 1:1,000,000 scale map of the Northern Eromanga Basin, and completed Explanatory Notes on MANUKA.

Vine attended the 1966 APEA Conference at Surfers Paradise, Queensland, to deliver a lecture on the Northern Eromanga Basin. In July-September 1966 he spent about ten weeks on an overseas tour, studying the sedimentation of basins comparable with the Great Artesian Basin. Most of these studies were made in France.

G E O R G I N A B A S I N

GEORGINA BASIN

by

K.G. Smith

PERSONNEL: K.G. Smith; M.A. Randal and R.A.H. Nichols (part-time)

FIELD WORK: Nil

REPORT WRITING: This occupied most of the year, and the results are:

Report Series - a Report titled "Stratigraphic Drilling in the Georgina Basin" was completed.

Bulletins - the first draft of "The Geology of the Georgina Basin" was completed.

Records Series - M.A. Randal completed Records 1966/11 "Groundwater in the Barkly Tableland, Northern Territory", and Randal and others completed Records 1966/110, which outlines the geology of the Helen Springs and Beetaloo Sheet areas (mapped in 1965). R.A.H. Nichols gave the results of his extensive study of surface samples and cores and cuttings in Records 1966/145 - "Petrology of some Carbonates in the Georgina Basin" and he also completed Records 1966/155 - "Mulga No. 1 and its Stratigraphic Implications, Georgina Basin, N.T.".

S U R A T B A S I N

SURAT BASIN PARTY

by

N.F. Exon

PERSONNEL: N.F. Exon (party leader), E.N. Milligan, M.C. Galloway, D.R. Williams (draftsman). Part time - D.J. Casey (GSQ), D. Burger.

DURATION OF FIELD WORK: Early June to early November.

AREA MAPPED: ROMA; parts of MITCHELL and BLACKALL. Minor remapping of western TAMBO and south-eastern EDDYSTONE. Galloway worked entirely in the Eromanga Basin, and mapped ADAVALE for the South-west Eromanga Basin Party.

SHALLOW STRATIGRAPHIC DRILLING: Drilling in the Eromanga Basin was supervised by M.C. Galloway. A Carey rig was used from 17th June to 30th July, and a Mayhew rig from 14th September to 12th October. The party supervised Surat Basin drilling with the Mayhew rig, which started on October 17th and is planned to finish on November 11th. This drilling is summarized below:

1:250,000 Sheet	No. of holes	Footage drilled	Footage cored	Stratigraphy
JERICHO	6	1774	245	Carboniferous to Lower Cretaceous
AUGATHELLA	4	802	236	Lower Cretaceous
TAMBO	5	1129	187	Upper Permian to Lower Cretaceous
ADAVALE	1	220	57	Winton Formation
MITCHELL	4	Approx. 1100	Approx. 200	Amby Beds, Roma Formation, Blythesdale Formation
ROMA	?7	Drilling in progress		Jurassic and Cretaceous
Total: Approx.	27	Approx. 6000	Approx. 1300	

GEOLOGY: ROMA and MITCHELL lie on the northern margin of the Surat Basin. The outcropping sediments are of Middle Jurassic and younger age, and are essentially undeformed and conformable. The only igneous rocks are basalt flows, of presumed Tertiary age. The regional dip is less than 1 degree to the south, on which some gentle north-trending structures are superimposed.

The major structural features, from west to east are: the Maranoa Anticline (Nebine Ridge), the Mount Scott Syncline, the Forest Vale Anticline, the Merivale Syncline, the Merivale Fault (and related folds), the Alicker Anticline, the Hutton-Wallumbilla Fault and the Mimosa Syncline. The major faults, although important in the pre-Jurassic sequence, have only limited displacement at the surface. Some of the

small faults of variable trend in the outcropping sequence are probably compaction features.

The sequence is generally thicker in the synclines. The sequence, in ascending order, is described below and illustrated in the accompanying diagrammatic cross-section.

The Injune Creek Group (Ji) is a non-marine Middle and Upper Jurassic sequence ranging from 1000 feet to 2000 feet thick. On MITCHELL sheet it is readily divisible into a lower mudstone sequence (Birkhead Formation), middle sandstone sequence (Springbok Sandstone) and upper silty sequence (Westbourne Formation). On the eastern part of ROMA the group is much more sandy and these units are no longer distinguishable.

The Upper Jurassic (Ju) sequence comprising the Gubberamunda Sandstone and Orallo Formation crops out across ROMA, and is about 600 feet thick. To the west, near the Maranoa Anticline, the Gubberamunda Sandstone lithologies change laterally into those of the "Hooray Sandstone", and the Orallo Formation (included here in Unit A) pinches out.

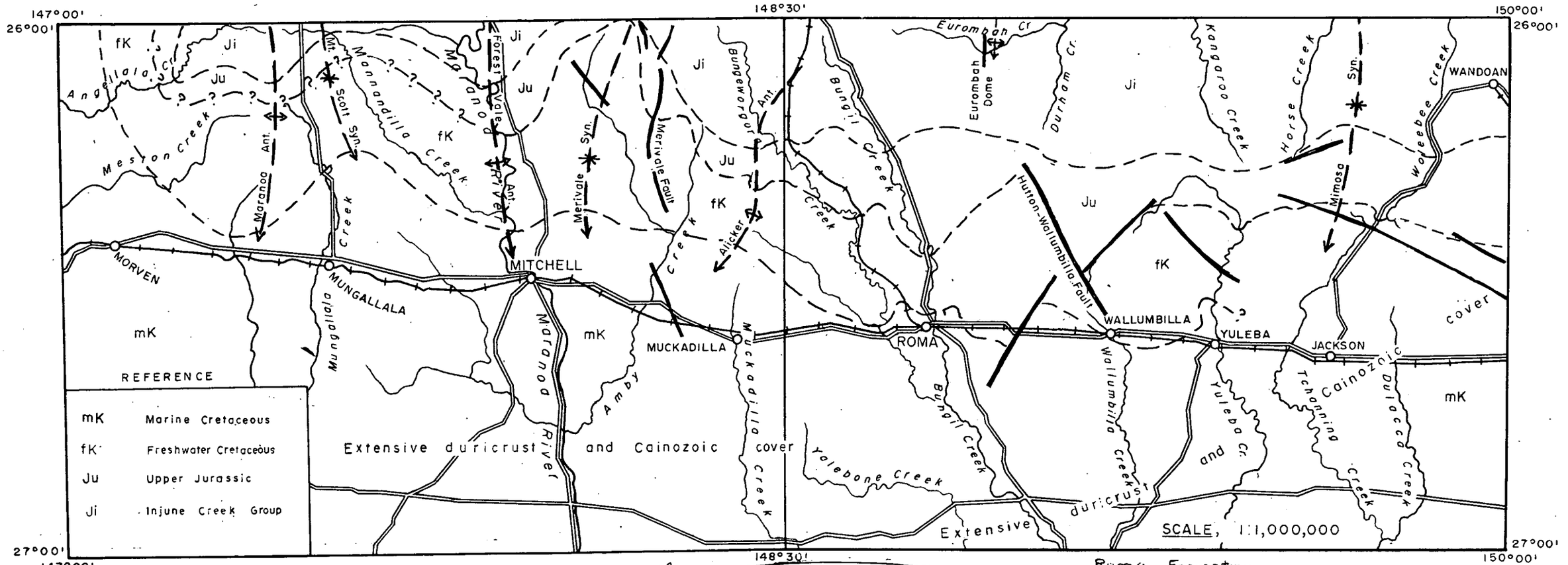
The essentially freshwater Cretaceous sequence (fK) is the 400 feet thick sandy Blythesdale Formation on ROMA, which grades laterally into the upper part of the "Hooray Sandstone" on central MITCHELL. Various members of the Blythesdale Formation can be mapped on ROMA, namely the Mooga Sandstone, Kingull Member, Nullawurt Sandstone, and also the marine Minmi Member. The Minmi Member is lithologically similar to the underlying members, but contains glauconite. Westwards, across MITCHELL the sequence changes gradually. At the Alicker Anticline the distinctive coarse basal sands of the Mooga Member wedge out. West of there the equivalents of the Orallo Formation, Mooga Sandstone and Kingull Member are mapped together (Unit A). Another sand body (Unit B), above Unit A, is confined to the Merivale Syncline. Near the Forest Vale Anticline, the Nullawurt Sandstone and part of the Minmi Member become indistinguishable, and are mapped together as Blythesdale Formation. Farther west again, near the Maranoa Anticline, the upper part of the Minmi Member grades laterally into mudstone lithologies of the Roma Formation.

The marine Cretaceous (mK) sequence consists of the Roma Formation and the overlying silty Amby Beds. The Roma Formation contains fossils of Aptian age, and the Amby Beds of Albian age. The Roma Formation averages 400 feet thick, and the Amby Beds 200 feet.

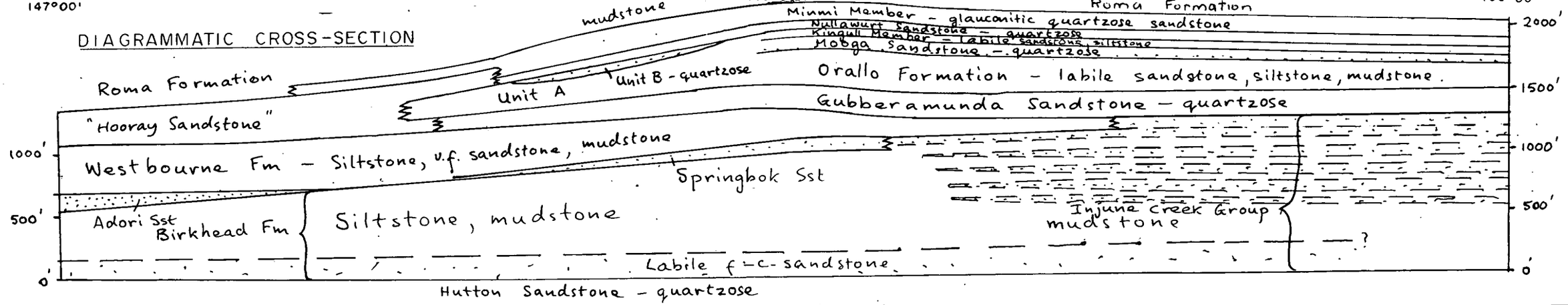
The Cretaceous sequence is unconformably overlain by Tertiary basalt flows and sediments, and duricrust was formed during the Tertiary on the Roma Formation and Amby Beds.

The geology on BLACKALL, in the Eromanga Basin was partly remapped - the main modification being the identification of considerable thicknesses of Tertiary sandstone in the south-western part. Minor alterations to the adjacent part of TAMBO were also made.

ROMA AND MITCHELL SHEETS



DIAGRAMMATIC CROSS-SECTION



Bentonite: High grade bentonite was discovered in the uppermost Orallo Formation north of Yuleba, on ROMA. This deposit is being sampled by drilling.

YARROL BASIN

YARROL BASIN

NORTH YARROL PARTY

by

A.G. Kirkegaard

PERSONNEL: A.G. Kirkegaard, C.G. Murray (GSQ); R.D. Shaw (BMR)

DURATION OF FIELD WORK: June 1st to September 22nd, 1966

AREA MAPPED: Parts of ROCKHAMPTON and PORT CLINTON. No new areas were mapped on the mainland but the party made reconnaissance surveys of the islands in both sheet areas.

GEOLOGY: The 1966 season field work consisted mainly of re-examining areas mapped in 1965. The main results are:

A. The Emu Park Group (previously mapped as the undifferentiated Palaeozoic sequence) comprises:

(1) the Shoalwater Formation(previously Pzb) consisting of interbedded quartz-rich labile to sub-labile arenite and siltstone;

(2) the Wandilla Formation (previously Pzb) consisting of siltstone, labile arenite, chert, greywacke and calcareous oolitic arenite; and

(3) the Doonside Formation (previously Pza) consisting of chert, jasper, vitric tuffs and limestone.

Graded bedding in arenite beds suggest that the sequence is overturned and that the Shoalwater Formation is the oldest and the Doonside Formation is the youngest.

The metamorphic grade of the Shoalwater Formation increases eastward; on Facing Island, the formation includes schist and gneiss which were sampled for radiometric dating of the metamorphism. Most evidence suggests a pre-Devonian age for the Emu Park Group which displays two periods of folding on Collins and Townshend Islands.

B. The suspected unconformity in the Devonian-Carboniferous sequence of the Gracemere Arch occurs between Givetian and Frasnian units. The apparently conformable Upper Silurian to Givetian (upper Middle Devonian) sequence consists of acid to intermediate volcanics, tuffaceous sandstone, siltstone and limestone. The Givetian Capella Creek Beds are unconformably overlain on the western flank of the Gracemere Arch by Frasnian post orogenic andesitic volcanics (previously called the Dee Volcanics). The Mount Morgan Tonalite (360 ± 10 m. years) intrudes the Capella Creek Beds and is unconformably overlain by the Frasnian unit.

The Yarrol Basin is now considered to be an area of differential block subsidence mainly east and to a less extent west of the Gracemere Arch. Block subsidence commenced after the late Givetian folding and intrusion and was repeated at intervals controlling the distribution of the sedimentary pile. Folding in the late Upper Permian completed the depositional history of the Yarrol Basin.

Correlation between the Devonian-Carboniferous sequences of various areas is shown in Table 1.

C. The ultrabasic rocks of the two sheet areas were mapped in detail. Hornblende plagioclase hornfels preserved at the serpentinite margin in places suggests initial intrusion of a harzburgite magma which produced high temperature contact metamorphism. The hornfels was sampled for radiometric age determination. The harzburgite was serpentinized after emplacement. The linear serpentinite bodies in the area are mainly the upturned edges of thin sheets dipping east at 20° to 40° and show slight or no contact metamorphic effects. The sheets and small bodies of serpentinite were probably emplaced as a result of remobilization of serpentinite during later tectonism. South of Mona Vale Homestead, small lenses of sheared and brecciated serpentinite intrude fossiliferous Lower Permian acid volcanics and sediments; thus, the remobilization of the serpentinite is Lower Permian or younger.

The Lower Permian Rookwood Volcanics (spilitic pillow lavas and hornblende-labradorite basalt) are olivine deficient and may represent the residual fraction of a primary magma from which the ultrabasic fraction has differentiated.

D. Two similar piles of acid volcanics, tentatively called the Peninsula Range Volcanics and the Double Mountain Volcanics, were mapped on PORT CLINTON. They consist of gently dipping dacitic crystal tuffs, acid flows and agglomerate and minor tuffaceous siltstone and unconformably overlie the Emu Park Group. The Double Mountain Volcanics are intruded by the Polygon Granites, and contain common arsenopyrite near the contact. The age of the volcanics is not known.

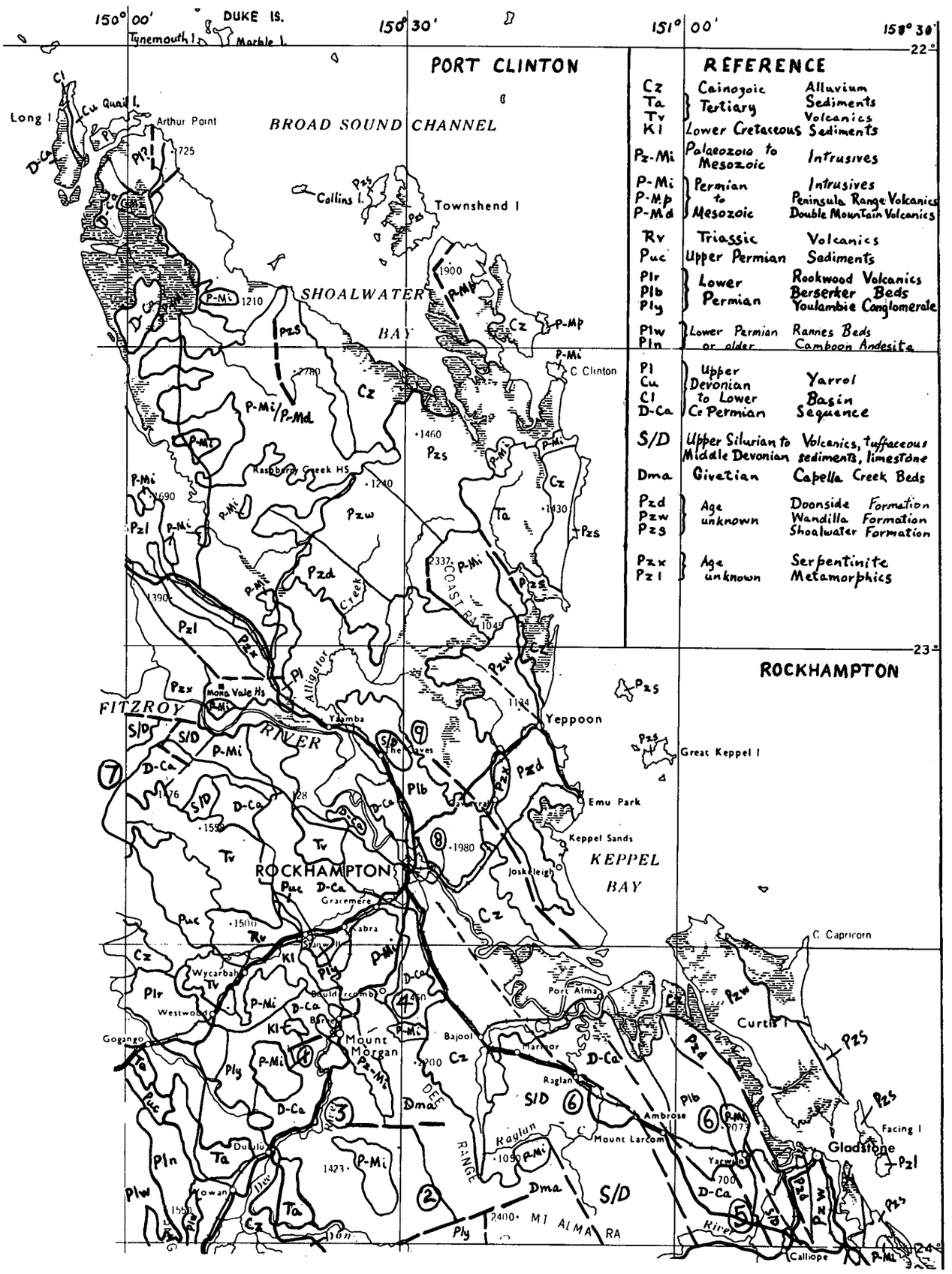
Results from reconnaissance mapping of the islands include:

(1) The Duke Group, Marble Island and part of Hunter Island consist of acid to intermediate volcanics and coralline limestone of Lower Devonian age;

(2) Tynemouth Island, most of Hunter Island and several smaller islands to the west consist of diorite cut by numerous quartz veins containing minor chalcopyrite;

(3) Long Island (in ST LAWRENCE) consists of Devonian to Lower Carboniferous volcanics and tuffaceous sediments in the south-west, overlain by about 1200 feet of Lower Carboniferous sediments including coralline and oolitic limestone, overlain by at least 7000 feet of Upper Carboniferous sandstone, siltstone and conglomerate. Quail Island to the east consists of at least 15,000 feet of Lower Permian siltstone containing ferruginous concretions, feldspathic sandstone and lithic conglomerate.

Geological Sketch Map
Rockhampton and Port Clinton 1:250,000 Sheet Areas, Queensland.



Scale 1:1,000,000

10 0 10 20 30 40 50 Miles

Bureau of Mineral Resources, Geology and Geophysics. October, 1966.

To Accompany Record 1966/187.

RELATIONSHIP BETWEEN ROCK UNITS
ROCKHAMPTON SHEET AREA

Table 1

W.S.W. ① * ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ N.E

		Emu Creek, SW. Mt. Morgan.	Grosstree Ck.	North of Wura.	Tornetski Ck	Calliope R.	Mt. Holly – Mt. Larcom.	Craigilee Anticline.	Glenmore	Mt. Etna.
Lower Permian		Youlambie Cglt.	Youlambie Cglt.				Berserker Beds		Berserker Beds	Berserker Beds
Upper Carboniferous							Undiff. U. Carb	Neerkol Fm.		
Lower Carb.	Visean	Neil's Ck Clastics			Coswell Ck. Group	Coswell Ck. Group	Coswell Ck. Group	Coswell Ck. Group Equiv.	Coswell Ck. Gp. Equiv.	
	Tournaisian	Pond Fm.	Pond Fm.	Pond Fm.	Crana Beds	Crana Beds	Crana Beds	Crana Beds Equiv.		
Upper Devonian	Famennian	Boulder Ck Grit.	Un-named Unit. (s'st, volcs).	Boulder Ck. Grit.						
	Frasnian	Dee Volcanics								
Middle Devonian	Givetian	Capella Ck. Beds	Capella Ck. Beds	Capella Ck. Beds	Capella Ck. Beds	Calliope Beds	Mt. Holly Beds	Un-named Volcanic Unit	Etna Beds	Etna Beds
	Eifelian									
Lower Devonian										
Upper Silurian.										

* ①, ② etc. indicate these localities on Fig. 1.

M A C R O P A L A E O N T O L O G Y

MACROPALAEONTOLOGY

GENERAL by J.M. Dickins

Dr. D.L. Strusz from the Townsville University College, joined the section.

Dr. A.A. Öpik working on a contract basis has completed projects on Middle Cambrian Neipidae, organization and structure of the trilobite Xystridura, the first stage of the description of the Dolichometopidae, the Metadoxididae of Australia and the Archaeostraca of the early Middle Cambrian. Also on a contract basis Dr. Irene Crespim has continued her work on the catalogues of fossil type specimens. Mr. R.W. Day of the Australian National University has continued work on Cretaceous molluscs from the Great Artesian Basin and Mary E. White provided reports on Palaeozoic, Mesozoic and Tertiary macroflora.

Messrs. R.E. Wass of the Sydney University and B.N. Runnegar of the University of Queensland, working in collaboration with the B.M.R., have prepared reports on Permian Polyzoa of the Bowen Basin and Permian pelecypods from Eastern Australia respectively which are to be printed as B.M.R. Bulletins.

The reports of individual palaeontologists follow except that of J. Roberts which is included with the report of the Bonaparte Gulf Basin Party.

ANNUAL REPORT

by

J.M. Dickins

Bowen Basin Regional Survey work is reported in the section on this survey.

GENERAL: Considerable time has been spent organizing the work of the section. This has included reorganization of the collections in the new building and in the Working Museum area at Fyshwick.

Publication - The following palaeontological appendices have been prepared for publication with their respective reports:

BARALABA DUARINGA - ST LAWRENCE EDDYSTONE-TAROOM-MUNDUBBERA SPRINGSURE	Bowen Basin, Queensland

BMR Bore No.8, MT MADELINE, and No.9, DAURIE CREEK, CARNARVON BASIN, WESTERN AUSTRALIA.

Other Reports - Other reports have been prepared on Devonian fossils from Wilcannia-Cobar area, N.S.W. Lower Carboniferous fossils from Continental's St Georges Range No.1 Well, belemnites from the Fitzroy Basin, fossils from Aquitaine's Kulshill No. 2 Well, and Permian fossils from Wapet Mt Adams No.1 Well.

A report of the geology of the Port Keats area, Bonaparte Gulf Basin (jointly with J. Roberts and J.J. Veevers) is being prepared for publication.

ANNUAL REPORT

by

Joyce Gilbert-Tomlinson

SUMMARY: Joyce Gilbert-Tomlinson carried out routine examination of Cambrian, Ordovician, Devonian, and Carboniferous fossils from New South Wales, South Australia, Western Australia, and the Northern Territory, as follows: Middle Cambrian gastropods (HELEN SPRINGS, GEORGINA BASIN, N.T., B.M.R. field party), late Upper Cambrian gastropods, ribeirioids, and trilobites (ALCOOTA, BARROW CREEK, and TOBERMORY, GEORGINA BASIN, N.T., American Overseas Petroleum); Ordovician brachiopods, gastropods, pelecypods, nautiloids, trilobites, and problematica (LANDER RIVER, WISO BASIN, N.T., B.M.R. field party and American Overseas Petroleum), Ordovician nautiloids (BARROW CREEK, American Overseas Petroleum), a possible Ordovician bryozoan (Ngalia Basin, N.T., Resident Geologist, Alice Springs), Ordovician trilobites (West Australian Petroleum Kidson No. 1 Well, Canning Basin, W.A.), Ordovician brachiopods, gastropods, pelecypods, and trilobites (MILPARINKA, N.S.W., B. Warris, Sydney University), nautiloid, probably Ordovician (French Petroleum Mount Crispe No. 1 Well, DALHOUSIE, S.A.); Devonian fishes (WHITE CLIFFS and IVANHOE, N.S.W., BARROW CREEK, N.T., American Overseas Petroleum; Carnarvon Basin, W.A., Dr. G. Seddon, University of Western Australia; BILLILUNA Sheet, Canning Basin, W.A., Drs J.J. Veevers and J. Roberts; Bonaparte Gulf Basin, W.A., B.M.R. field party; HERMANNSBURG, Amadeus Basin, N.T., P.J. Cook); Carboniferous fishes (Bonaparte Basin, W.A., B.M.R. field party and Australian Aquitaine Petroleum). Results of Devonian studies are presented in two papers (1) 'A new record of Bothriolepis in the Northern Territory of Australia', (2) Devonian rocks in the Amadeus and Georgina Basins, N.T., forming part of a paper on the Devonian System in northern and Western Australia for the International Devonian Symposium of 1967.

CAMBRIAN: New collections add to knowledge of distribution of Middle and Upper Cambrian gastropods and details of late Upper Cambrian lithology.

ORDOVICIAN: Collections from the Wiso Basin and western New South Wales are particularly informative. Nautiloids of the Wiso Basin show relationship to those of the Georgina Basin; the trilobites, on the other hand, have affinities with the Amadeus Basin. The trilobites of the Mount Arrowsmith limestone of north-western New South Wales include an indigenous central Australian genus, known only from the Amadeus and Georgina Basins; it is one more link in the growing chain of evidence of the essential unity of western New South Wales with central Australia, western Queensland, and, in Lower Cambrian time, with South Australia.

The Canning Basin continues to yield trilobites of a marked Georgina Basin aspect. Progress in Ordovician studies has been so marked that a correlation of the Ordovician formations of northern Australia has at last become a practical proposition and will be produced early in 1967.

DEVONIAN: The number of new localities for late Devonian fishes illustrates the mounting interest in this group of fossils. The preservation of the material in hand is mostly too fragmentary for firm identification, but the discoveries themselves encourage the expectation that better specimens may be found when the opportunity for a systematic search presents itself. The two papers on Devonian stratigraphy are complementary. The first, on Bothriolepis in the Northern Territory, is to be published in B.M.R. Bulletin 80. It examines in some detail, inter alia, the stratigraphy and ecology of known occurrences of late Devonian fishes in Australia; from this study it is evident that three

main faunas are present. The oldest is marine, is confined to Western Australia, and is Frasnian (mostly early Frasnian) in age. The second and most widespread is found in New South Wales, Victoria, and the southern part of the Northern Territory; its age is late Frasnian or early Famennian, and its ecology is non-marine. The youngest fauna, also non-marine, is Famennian in age and is mainly developed in western New South Wales but may also extend into the area of the Toko and Toomba Ranges on the Northern Territory/Queensland border. Contributions to the paper for the International Devonian Symposium have been written in collaboration with other officers, A.T. Wells (Amadeus Basin), and P.J. Jones (Georgina Basin). It draws attention to the little-known sedimentary sequences intervening between the comparatively well-documented Ordovician and late Devonian rocks in the southern part of the Northern Territory and in the Canning Basin of Western Australia. At present the main geological achievement is to recognize the existence of the problem presented by these rocks. Progress towards solving it is confined to the following observations:

(1) at least part of the sequence was laid down under marine conditions, but these may have been interrupted by periodical regression, and evaporitic sediments are present in Western Australia;

(2) where exposed at the surface the rocks are unconformable on the underlying Ordovician and older sediments but are apparently conformable with the overlying late Devonian;

(3) fossils in the Georgina Basin indicate a late Silurian or early Devonian age, and a Lower Devonian date is suggested by the few fossils from the Canning Basin.

CARBONIFEROUS: The newly discovered early Carboniferous fishes of the Bonaparte Basin are marine and are restricted to representatives of the cartilage fishes (shark-like animals). The spine collected by A.A.P. geologists from the Enga Sandstone is provisionally assigned to Ctenacanthus; the teeth from the overlying Utting Calcarenite (m.s. name by B.M.R. geologists) include Ctenacanthus, cf. Deltodus, and Psammodus. The latter is a new record for Australia; the fauna is cosmopolitan.

ANNUAL REPORT

by

M. Plane

Approximately half of the year was spent on vertebrate palaeontological work. The preparation of the text and illustrations for Bulletin 87, "Stratigraphy and vertebrate fauna of the Otibanda Formation, New Guinea" was completed. Galley and page proofs have been received and checked. Fossil mammals were examined from:

Kelley's Hill Cave, Kangaroo Island, S. Australia	- Pleistocene
Kasievena Shelter, Central Highlands, New Guinea	- Pleistocene
Condamine River, Queensland	- Pliocene - Pleistocene
MacEachern's Cave, Victoria	- Pleistocene
WAVE HILL, Northern Territory	- ?middle Miocene

Field work was confined to the collection of fossil vertebrates and mollusca from the Camfield Beds on WAVE HILL. Preparation work on these animals commenced and it is possible to tentatively place the diprotodontids from this fauna in the phyletic scheme of Stirton, Woodburne and Plane, thus giving them a middle to late Miocene age.

The Australian Museum, Sydney, the National Museum of Victoria, Melbourne and the Queensland Museum, Brisbane were all visited and their fossil mammal collections examined.

ANNUAL REPORT

by

S.K. Skwarko

S.K. Skwarko spent considerable portion of the year on a general description of Australian Mesozoic stratigraphy and palaeontology. This is a long-term project which will eventually result in the presentation of complete bibliographies, synonymy lists, and lists and figures of fossils as well as description and correlation of individual Mesozoic stratigraphical units. His field trip, which took him around the Perth, the Carnarvon, and the Canning Basins, as well as part of the Northern Territory was directly connected with this project.

In addition he examined and described for publication a Middle Jurassic fauna from Enenty Hill, Western Australia, and examined and dated Middle Triassic collection of molluscs from New Guinea.

Skwarko read manuscripts, galley and page proofs for his B.M.R. Bulletins 73 and 75, as well as edited manuscripts for his contributions to Bulletins 80, 82, and 92. He also examined and reported on Barrow Island samples sent in by WAPET.

ANNUAL REPORT

by

C.G. Gatehouse

FIELD WORK:

1. The period 28.5.66 to 6.8.66 was spent with the Wiso/Daly Waters Field Party, mapping on WAVE HILL and VICTORIA RIVER DOWNS. During that time the Montejinni Limestone (early Middle Cambrian or Redlichia-time) and the Camfield Beds (Tertiary bone beds) were mapped and some sections were measured.

2. A week was spent at the University of Queensland, Brisbane, examining the collections of F.W. Whitehouse.

3. The A.C.T. Geology and Palaeontology Field Party made collections of fossils from the Yarralumla Brickworks quarry, Belconnen, Pierces Creek areas. Dr. D.L. Strusz participated in the collecting.

OFFICE WORK:

Papers in press

1. First Record of Lithistid sponges in the Cambrian of Australia (in Bulletin 92)

2. Early Middle Cambrian ptychopariid trilobites from the Litchfield area, Daly River Basin, N.T. (in Bulletin 80).

Papers in manuscript

1. Summary of the palaeontology of the Barkly Tableland Region (a Record).

Papers in progress

1. Eurestina Whitehouse 1939 and associated trilobites from Mt Lamb, on ALROY, N.T.

2. Inarticulate brachiopods from the Litchfield area, Daly River Basin, N.T.

Reports completed

1. Palaeontological report on a sample from Koonenberry, New South Wales. 17.1.66

2. Palaeontological report on samples submitted by American Overseas Petroleum Limited. 17.1.66

3. Report on fossiliferous material submitted by the Wiso Basin Party (1965). 26.1.66

4. Palaeontological report on samples from HELEN SPRINGS, N.T. 26.1.66

5. Palaeontological report on B.M.R. No.11, Cattle Creek, Stratigraphic Hole. 12.4.66

6. Palaeontological report on material submitted by American Overseas Petroleum Limited. 7.10.66

7. Palaeontological examination of samples from the Duchess Sheet area, Queensland. 12.10.66

ANNUAL REPORT

by

D.L. Strusz

D.L. Strusz started work towards the end of May. He has since then been engaged principally in a preliminary examination of the fairly extensive existing collections of fossils, made by officers of the Bureau, from the A.C.T. and surrounding districts. Most of the localities from which these were collected are in sheared sediments, but it would appear that the brachiopods and trilobites are sufficiently numerous to allow useful taxonomic, and thence biostratigraphic work to be carried out. In addition, several localities in the calcareous facies have a coral-trilobite-brachiopod fauna which, on detailed analysis, should provide a useful basis of comparison with the "standard" Australian Silurian sequence developed at Yass.

A number of fresh collections have been made from localities in the A.C.T., including some revealed by engineering works in the Belconnen area.

A collection of possible Devonian fossils, submitted by American Overseas Petroleum Ltd, was examined and reported upon.

A summary of the Devonian succession and correlations along the Molong Geanticline and adjacent trough regions was completed for inclusion in the description of the Eastern Australian Devonian prepared by D. Hill and G.M. Packham for the 1967 Calgary Symposium on the Devonian System.

A paper on species of Rhizophyllum and Calceola from the Emsian? Garra Formation, started prior to arriving in Canberra, was completed. Preliminary descriptive work, based on the original material (loaned by the National Museum of Victoria), was carried out for a revision of Acanthophyllum mansfieldense (DUN), from the Emsian of Loyola, Victoria.

M I C R O P A L A E O N T O L O G Y

ACTIVITIES OF THE MICROPALAEONTOLOGICAL GROUP

by

G.R.J. Terpstra

GENERAL:

Two thousand one hundred and thirty eight samples were washed, picked and prepared for the study of their microfaunal content.

Six hundred and fifty seven thin sections were made and three hundred and fifty nine polished rock surfaces were prepared.

Seven hundred and seventy three samples were treated with acid (in weight about 4500 lbs of rock) in order to extract conodonts.

One hundred and thirty seven samples were treated for technical experiments in order to find new methods of treatment.

Two hundred and twenty nine samples were processed for their spore and microplankton content.

The following scientists visited the laboratory:

Mr. S. Kustanowich, micropalaeontologist of the Continental Oil Company, in November 1965 studied microfaunas from Papua-New Guinea. Mr. E.H. Esperitu, a micropalaeontologist and Colombo Plan Fellow of the Philippines, in December 1965 and January 1966 studied Upper Cretaceous and Tertiary faunas of Papua, New Guinea and Australia. Mr. J.V. Eade, a micropalaeontologist of the New Zealand Oceanographic Institute in Wellington in March 1966 studied the collections of recent foraminifera. Dr. J.M. Spruyt, a micropalaeontologist of the Shell Development Co. Melbourne, in May 1966 studied the collection of Permian foraminifera. Dr. C.G. Adams, a specialist on larger Foraminifera from the British Museum of Natural History London, in June and July studied the collections of larger Foraminifera of Australia and New Guinea.

Foraminifera

G.R.J. Terpstra was engaged in the examination of surface samples collected by field parties from Queensland, Northern Territory, Papua and New Guinea and on the study of cores and cuttings from water-bores and subsidized wells. The examination of Lower Cretaceous sections of B.M.R. Scout Holes (Queensland) was continued. A Lower Cretaceous fauna was found in bores of the Derby area (W.A.) and in shot point samples from the Augathella area (Queensland). In Barrow No.9 (WAPET) a sequence of Upper Paleocene, Campanian and Albian was recognized. Lower Cenomanian faunas were found to occur in Gunn Point Bore (N.T.) 101-143 feet and Campanian in Yaringa No.1 Continental Oil (W.A.) from 130-250 feet.

Limestone samples from Bougainville Island (T.P.N.G.) contained larger foraminifera and a Lower Tertiary "e" stage age was established for some of the rocks.

Foraminiferal marls from outcrops west of Wewak, N.G. revealed rich faunas indicative of Upper Miocene to Lower Pliocene. A contribution was made to the compilation of a Catalogue of an Index of Smaller Foraminifera to be issued by the American Museum of Natural History New York. The application of larger Foraminifera to the Tertiary Stratigraphy was discussed at length with Dr. C.G. Adams, especially relevant to work previously carried out on rock samples from Woodlark Island and Bougainville Island. Time was spent on administrative matters and on the supervision of records of the reports on plant fossils examined by the consulting palaeobotanist, Mrs. M.E. White.

D.J. BELFORD:

The illustration of Carboniferous Foraminifera from the Bonaparte Gulf Basin, Western Australia, is almost complete. Many faunas from outcrop samples and seismic shot holes are poorly preserved, and illustration will be limited in these cases to thin sections only. In conjunction with Professor B.L. Mamet of the University of Brussels (at present at Montreal University), the age significance of the different assemblages has been determined.

Tertiary larger Foraminifera occurring in limestones of Christmas Island (Indian Ocean) were examined together with Dr. C.G. Adams of the British Museum (Natural History). Results of this work will be useful in clarifying the stratigraphical sequence of larger Foraminifera in the Indo-Pacific Tertiary.

Routine work was continued as necessary, and the results reported. The following papers were submitted for publication:

"Paleocene planktonic Foraminifera from Papua and New Guinea"
"Additional Miocene-Pliocene planktonic Foraminifera from Papua and New Guinea"
"Occurrence of the genus Draffania Cummings in Western Australia"

The papers listed as in press in the previous annual report are still in press.

A.R. LLOYD:

Completed Part 1 of a series of papers on the taxonomy, distribution and stratigraphic significance of the Miocene and younger foraminifera from Wreck Island and Heron Island bores, Queensland; it is to be published in Bulletin 92. Part 2 of the series is nearing completion and it is estimated that there will be 4 or 5 parts in the series.

Miscellaneous samples were examined and reported on as submitted.

P.J. JONES:

Overseas Study Tour 1965-1966

Selected micropalaeontological laboratories in West Germany, Sweden, France, Great Britain and the United States of America were visited during the period 15th November, 1965 - 15th January, 1966 under the Commonwealth Government's scheme for officers to study overseas techniques related to oil exploration. Governmental, commercial and academic centres were visited and notes were taken on current research on ostracods and conodonts, its application to stratigraphy, and laboratory techniques. In some cases, notes were taken on the aims and principles of these organizations. Where appropriate, specific collections were examined and the inter-continental significance of the Australian Upper Devonian and Lower Carboniferous ostracod faunas was discussed. The joint symposium meeting of the Geological Society of London and the Palaeontological Association - "Review of the fossil record" held in Swansea, between 20th-21st December, 1965, was attended.

Upper Devonian Ostracoda of the Bonaparte Gulf Basin

A MS on the Upper Devonian Ostracoda from the Bonaparte Gulf Basin has been prepared for publication as a bulletin. The ostracods have been found in the Westwood Member of the Cockatoo Formation (Frasnian), the Buttons Beds, and the Ningbing Limestone (both lower Famennian), the ages

of which have been established by means of conodonts (Jones & Druce, 1966). Nineteen ostracod species have been described (9 new, 7 with open nomenclature, but probably new, and 3 probably previously described), which represent 18 genera (1 new and 2 probably new). Also, two species belonging to the suborder Eridostraca are described, but are excluded from the Ostracoda. A provisional zonal scheme is suggested. Within the Westwood Member of the Cockatoo Formation two species are definitely related to those of the Frasnian or late Givetian of Europe. Within the Buttons Beds four concurrent-range zones are proposed which are the basis for correlation of the Buttons Beds in the Burt Range area, where conodonts are absent, with the type section in the bed of the Ord River, and with the Ningbing Limestone. Six species from the early Famennian zonal sequence also occur in the Fitzroy Basin, but in the late Famennian.

Upper Devonian and Lower Carboniferous Conodonts of the Bonaparte Gulf Basin

A paper was prepared in collaboration with E.C. Druce entitled "Intercontinental conodont correlation of the Palaeozoic sediments of the Bonaparte Gulf Basin, Northwestern Australia". This recorded the preliminary results of our conodont studies, in order to provide a basic stratigraphic framework for the Devonian and Carboniferous formations. The results were first presented as a record (1965/232), and later published (Nature - 211, (5047), 357-9, July 23, 1966).

Devonian Palaeontology and Correlation of the Bonaparte Gulf Basin

A paper was prepared in collaboration with J. Roberts and E.C. Druce entitled "Devonian Palaeontology and Correlation of the Bonaparte Gulf Basin, Northwestern Australia". This provides a concise, but comprehensive explanation of our Devonian correlations both within the Bonaparte Gulf Basin, and with the Fitzroy Basin. This paper will be presented at the International Symposium on the Devonian System, at Calgary, Canada, in September 1967.

Miscellaneous

(a) Routine examinations

St Georges Range No.1 Well - ostracods, possibly Lower Carboniferous, recovered over the interval 9,490-10,740 feet.

Kidson No. 1 Well - Ordovician (post-Tremadocian) conodonts recovered from core 21 (14,318-14,334 feet).

Yaringa No.1 Well - late Ordovician (?) conodonts from core 14 (3,422-3 feet).

Baylam No. 1 Well - serpulids, and fragmentary sponge spicules and phosphate shell material from the pre-Triassic sequence, below 2,547 feet.

(b) Acid Laboratory

Some time was spent in discussions and planning with E.C. Druce and others on the design of a proposed acid laboratory.

E.C. DRUCE:

Work continued on Devonian and Carboniferous conodonts from the Bonaparte Gulf Basin. 173 species were identified. A preliminary examination of faunas from the Lower Ordovician of the Amadeus Basin was begun. Four months were spent in the field testing a new field

laboratory. Devonian and Carboniferous conodonts were recovered from over 130 samples collected in the Yarrol Basin, and over 1,500 lbs of rock was processed in three months. Designs for a new acid laboratory were submitted and all samples submitted by Oil Companies were analysed and reports submitted.

P.R. EVANS & D. BURGER:

Palynology

Although palynological studies were undertaken during the year in the new Parkes building, the Childers Street laboratory was maintained for sample processing while awaiting modifications to the Parkes laboratory. The Childers Street laboratory was put out of action at the beginning of June by water flooding from a burst pipe and emergency alterations to the Parkes laboratory permitted the latter's limited use. The main modifications to the Parkes laboratory have still to be completed. Additional curtailment of activities resulted from the absence of Miss McKenzie, Technical Assistant, on sick leave from early in June to early September.

Dr. D. Burger joined the group on 18th February.

Introduction of a feature punch card system of cataloguing palynological data was introduced on receipt of the necessary equipment in February.

P.R. Evans attended an introductory Schlumberger logging course in Sydney in May-June and both Evans and Burger attended the Geological Society of Australia Scientific Meeting, Palynology Symposium in Adelaide during August. Evans contributed papers on the Permian and Jurassic and led a seminar on the facies significance of microplankton.

D. Burger joined the Surat Basin field party during September and October.

Curtailment of activities for reasons given above were compensated to some extent by the reduced demand by the oil industry for information about subsidized drilling. However, few problems encountered could be answered by simple well analysis and studies of groups of wells were required. Synthesis of data into stratigraphic schemes thus formed the main task of the group; much of the effort concerned the Mesozoic. Thus:

1. Study of the Mesozoic palynology of the Otway Basin, in conjunction with the work of the Basins Study Group of the Petroleum Exploration Branch was virtually completed; small supplementary contributions merely await description. Tracing the Cretaceous spore and microplankton zones across the basin indicated several variations in associated lithofacies.

2. Study of Mesozoic sediments in the Archer River area of Cape York Peninsula, northern Queensland, for the Australian Aquitaine Petroleum Pty Ltd confirmed the zonal sequence of the Otway Basin and provided a link between the Upper Mesozoic of the Papuan and Great Artesian Basins. Variations in microplankton content were used to indicate the extent of the southerly marine transgression during Upper Mesozoic times.

3. Study of B.M.R. drill holes in the Augathella and Mitchell areas of central Queensland gave further evidence of the nature of the change from non-marine to marine conditions in the Great Artesian Basin at the end of the Jurassic. Examination in detail of the Upper Jurassic in

the deep wells Cabawin No.1, Pickanjinnie No.1, and A.A.O. No.1 (Roma) in the Surat Basin has provided basic data for future comparison with the outcrop around the Surat Basin.

4. Detailed study of Amerada Newlands No.1, central Queensland provided yet another link in the problem of correlating the Jurassic and basal Cretaceous of the Great Artesian Basin and a means of revising the stratigraphy of other wells in the area.

5. Examination of Alliance Chandos No.1 in central Queensland indicated its intermediate position between the Upper Palaeozoic-Lower Mesozoic depositional areas of the Galilee and "Coopers Creek" Basins and led to a review of available evidence from the "Coopers Creek" region, and its correlation with the Galilee Basin.

6. F.P.C. (A) Mokari No.1, in northern South Australia, provided a means of correlating the late Carboniferous and earliest Permian of the Simpson Desert region and a means of comparing it to similar deposits in the "Coopers Creek" and Galilee Basins.

7. The reliability of this Permo-Carboniferous palynological sequence was checked by examination of the A.A.P. Point Moody No.1 well, southern Fitzroy Basin, Western Australia, and A.A.P. Kulshill No.1, [illegible] Bonaparte Gulf Basin, Northern Territory.

Other projects included:

1. Study of samples from the Permian-Triassic Blackwater Group and Rewan Formation of the Bowen Basin for A.R. Jensen. Transitional beds between the Permian and Triassic are present in the Blackwater area.

2. Determination of the late Lower Cretaceous age of coaly deposits below the bauxite deposits on Gove Peninsula, Northern Territory.

3. Re-examination of material from Emu No.1, Officer Basin, South Australia, under carefully controlled, sterile conditions, which indicated that previously reported Mesozoic grains from the well could have been contaminants.

4. Examination of selected samples from Balfour No.1, Bury No.1, Dural South No.1, Galway No.1, Mt Crispe No.1, Mt Howitt No.1, St George No.1, and a seismic survey near Ivanhoe, N.S.W.

P H O T O G E O L O G Y

PHOTOGEOLOGY

by

W.J. Perry

PERSONNEL: W.J. Perry, and J.C. Rivereau (I.F.P.). M. Rivereau completed his tour of duty on 30th October, 1966, and returned to France.

COMPILATION METHODS: In October 1965 it was decided to change the method of compilation of photogeological maps from one involving direct reduction of photo detail to 1:250,000 scale to a method whereby detail is compiled on overlays of photo-scale planimetric sheets, and subsequently reduced.

MAPS COMPLETED AT 1:250,000 SCALE:

Queensland - BUCHANAN (eastern part); MILLUNGERA; MITCHELL (southern half); ROMA; CHINCHILLA.

Northern Territory - NEWCASTLE WATERS; DALY WATERS; LARRIMAH; WAVE HILL; VICTORIA RIVER DOWNS; DELAMERE.

MAPS IN PROGRESS (1:250,000 scale) ON 31st OCTOBER, 1966:

Queensland - DONORS HILL; CROYDON; BURKETOWN; SURAT; DALBY.

FIELD WORK: W.J. Perry visited the Daly Waters/Wiso Party from 17/7/66 to 16/8/66; during this period he assisted with the work of the party, and also checked his interpretation of parts of WAVE HILL, VICTORIA RIVER DOWNS, and DELAMERE.

J.C. Rivereau visited the Surat Basin Party from 9/9/66 to 1/10/66, to observe the stratigraphic sequence on MITCHELL and ROMA, and to check his interpretation of parts of SURAT and DALBY.

MISCELLANEOUS: Six Records were issued, accompanied by photogeological maps. At the request of the Department of Geology, University of New England, W.J. Perry gave a course of laboratory work in photogeology to third-year students at Armidale from 4/10/66 to 8/10/66.

M I S C E L L A N E O U S

MISCELLANEOUS

P.J. Cook documented his knowledge of stratigraphy of the Ngalia Basin in Records 1966/73 and completed part of Records 1966/9 dealing with geological work in Antarctica during the 1965 season. This Record was subsequently modified for publication as Report 118, and Cook was mainly responsible for the oceanographic section of this Report. He was awarded a Commonwealth Public Service Scholarship and began post-graduate studies at the University of Colorado, in September 1966.

D.J. Forman continued post-graduate studies at Harvard University, Massachusetts U.S.A., during the whole year. These studies are being made during the tenure of a Commonwealth Public Service Scholarship awarded in 1965.

B.K. Graham was engaged on the following:

A. Data Filing and Indexing

(1) Subsidy applications and completion reports on wells and geophysical surveys were circulated and filed as received. Summary cards were prepared for all well applications and reports.

(2) Sedimentary Basin index cards were kept up to date as applications, reports and other references were received.

(3) Material received from exploration companies, and data from other sources such as scout reports and press releases, were added to well progress files.

(4) Punch cards summarizing applications and reports, prepared by other officers of the section, were punched and filed.

(5) As a result of a reduction in the number of copies of well progress material supplied to the B.M.R., discussions were held with relevant Petroleum Exploration Branch officers to decide the best method of sharing and circulating the material.

B. Map Compilation

(1) Geological Map of the World: Australia and Oceania 1:5,000,000 scale:

The fair drawings of Sheets 3, 4 and 5 (covering an area enclosed by 156°E and 132°W, 0° and 24°N) were checked and the sheets forwarded to the printer.

The compilations of Sheets 2 (132°E to 156°E, 0° to 24°N), Sheet 10 (132°W to 156°W, 0° to 24°S) and Sheet 15 (24°S to 30°S, as an extension of Sheet 10) were completed and the sheets forwarded for fair drawing.

A preliminary compilation of Sheet 8 (156°E to 180° , 0° to 24°S) was completed and forwarded for drafting and editing.

A preliminary compilation of part of Sheet 9 (180° to 156°W, 0° to 24°S) showing data supplied to the B.M.R. by other authorities specifically for use in this project, was prepared and forwarded to the New Zealand authorities. They will prepare the final map as part of their contribution to the project.

(2) Index Map to B.M.R. Records 1:1,000,000 scale:

Compilation continued of a series of maps covering Australia and Papua-New Guinea, showing areas covered by individual B.M.R. Records and the type of work reported.

The following sheets were completed ready for drafting (excluding 1966 Records) - SD55 (COOKTOWN), SE55 (TOWNSVILLE), SG55 (CHARLEVILLE), SI55 (CANBERRA) and SJ55 (MELBOURNE). Sheet SF55 (CLERMONT) was drafted and checked.

C. Miscellaneous

(1) A series of weekly lectures to be given by officers of the Geological and Geophysical Branches during the inter field season was arranged and supervised.

(2) Meetings to discuss the setting up of a data storage and retrieval system for the B.M.R. were attended.

T. Quinlan completed Explanatory Notes on HERMANNSBURG, wrote a section on groundwater for the Bulletin on the Amadeus Basin, and completed Bulletin 89 - "Geology and Hydrology of the Alice Springs Town and Inner Farm Basins". He spent half of the year in investigating the use of computers in geology; three months at the Public Service Board's Systems Analysis Course were followed by three months in North America, visiting geological organisations which use computers and obtaining practical experience on specific projects.

At present, computers are used in two distinct types of activities - (a) data processing systems for the storage and retrieval of geological data; (b) the analysis and interpretation of the data. The first use is justified when the volume of data is such that it cannot be handled efficiently by files of punched cards; the second use, at present, is in those fields where geologists assemble substantial volumes of numeric data for which the methods of numerical taxonomy and statistics are applicable.

G. Schmerber (I.F.P.) spent the year studying the petrology of cores and cuttings from several wells drilled in the Amadeus Basin. Three Records were issued, and two others have been completed but not yet issued. A study of the petrology of surface samples from many parts of the Amadeus Basin is in progress.

APPENDIX

(i)

STATUS OF RECORDS AND PUBLICATIONS ON 31st OCTOBER, 1966

PROJECT	AUTHOR	TITLE		FORM OF PUBLICATION	STATUS
				Bulletin B. Report R. Explanatory Notes E.N. Outside Publication O.P. Records C.	
AMADEUS BASIN	WELLS, A.T., and others	Geology of the Amadeus Basin		B	First draft 75 per cent complete
	COOK, P.J.	The Stairway Sandstone		B95	Received by Editor
	WELLS, A.T., and others	Geology of the south-east Amadeus Basin		R88	Sent to press 19/11/65; now printing
	" " " "	Geology of the north-east Amadeus Basin		R113	Text complete, drafting in progress
	FORMAN, D.J., and others	Structure of the north-eastern margin of the Amadeus Basin		R103	Sent to press 14/9/66; proofed
	FORMAN, D.J.	AYERS ROCK	SG-52/8	E.N.	Printed; awaiting maps
	" "	BLOODS RANGE	SG-52/3	E.N.	" " "
	" "	RAWLINSON	SG-52/2	E.N.	" " "
	STEWART, A.J.	KULGERA	SG-53/5	E.N.	Edited
	SHAW, R.D.	HALE RIVER	SG-53/3	E.N.	With Map Editor
	COOK, P.J.	HENBURY	SG-53/1	E.N.	" " "
	QUINLAN, T., and FORMAN, D.J.	HERMANNSBURG	SF-53/13	E.N.	" " "
	COOK, P.J.	LAKE AMADEUS	SG-52/4	E.N.	" " "
	STEWART, A.J.	McDILLS	SG-53/7	E.N.	" " "
	RANFORD, L.C.	MOUNT LIEBIG	SF-52/16	E.N.	" " "
	RANFORD, L.C.	MOUNT RENNIE	SF-52/15	E.N.	" " "
	COOK, P.J.	RODINGA	SG-53/2	E.N.	" " "

SHAW, R.D., and MILLIGAN, E.N.	ILLOGWA CREEK	SF-53/15	E.N.	In progress
CROOK, K.A.W.*, and COOK, P.J.	Gosses Bluff - Diapir, Crypto-Volcanic Structure or Astrolebe		O.P.	Submitted to Jour. geol. Soc. Aust.
COOK, P.J.	Winnowing - an important process in the concentration of the Stairway Sandstone (Ordovician) phosphorites of central Australia		O.P.	Submitted to Journal of Sedimentary Petrology
COOK, P.J.	The Stairway Sandstone, a Sediment-ological Study		C, 1966/1	Issued
COOK, P.J.	The Illamurta Structure of central Australia. Its Development and Relation-ship to a Major Fracture Zone		C, 1966/46	Issued
COOK, P.J.	The Gosses Bluff Crypto-Explosion Structure		C, 1966/132	Issued
QUINLAN, T., and FORMAN, D.J.	Explanatory Notes, Hermannsburg Geological Sheet, N.T.		C, 1966/27	Issued
FEHR, A.**	Petrological Study of Cambrian Sediments in Alice No.1 Well, Amadeus Basin, Northern Territory		C, 1966/5	Issued
SCHMERBER, G.**	A petrological study of the sediments from Ooraminna No.1 Well, Amadeus Basin, Northern Territory		C, 1966/82	Issued
SCHMERBER, G.	A petrological study of the sediments from Highway Anticline No.1 Well, Amadeus Basin, Northern Territory		C, 1966/83	Issued
SCHMERBER, G.	A petrological study of the sediments from Waterhouse Anticline No.1 Well, Amadeus Basin, Northern Territory		C, 1966/137	Issued

* A.N.U.
** I.F.P.

	SCHMERBER, G.	A petrological study of the sediments from Mount Charlotte No.1 Well, Amadeus Basin, Northern Territory	C, 1966/120	In progress; text stencilled
	SCHMERBER, G.	A petrological study of the sediments from Erldunda No.1 Well, Amadeus Basin, Northern Territory	C, 1966/182	Text submitted for stencilling
BONAPARTE GULF BASIN	VEEVERS, J.J., and KAULBACK, J.A.	Lower Palaeozoic Rocks of the Bonaparte Gulf Basin	R109	With Editor
	VEEVERS, J.J., and ROBERTS, J.	Littoral talus breccia and probable beach rock from the Visean of the Bonaparte Gulf Basin	O.P.	Accepted for publication in J. geol. Soc. Aust., 13 (2)
	VEEVERS, J.J., and ROBERTS, J.	Upper Devonian geology of the Bonaparte Gulf Basin	O.P.	Written for International Symposium on the Devonian System; Calgary, 1967
	ROBERTS, J., DRUCE, E.C., and JONES, P.J.	Upper Devonian palaeontology and correlation of the Bonaparte Gulf Basin	O.P.	Ibid
	PLAYFORD, P.E.,* VEEVERS, J.J., and ROBERTS, J.	Upper Devonian and probable Lower Carboniferous reef complexes in the Bonaparte Gulf Basin	O.P.	Published in Aust. J. Sci., 1966, Vol.28
	VEEVERS, J.J., and ROBERTS, J.	Upper Devonian and Carboniferous geology of the Bonaparte Gulf Basin	C, 1966/113	Issued

* W.A.G.S.

BOWEN BASIN	MALONE, E.J., and DICKINS, J.M.	Geology of the Bowen Basin		B	In progress; first draft about 10 per cent completed
	MALONE, E.J., and others	Geology of the Bowen South Area, Queensland		R100	Issued
	OLGERS, F., and others	Geology of the Baralaba 1:250,000 Sheet area, Queensland		R102	Printing
	MALONE, E.J., and others	Geology of the Duaringa and St. Lawrence 1:250,000 Sheet areas, Queensland		R121	With Editor
	MOLLAN, R.G., and others	Geology of the Springsure 1:250,000 Sheet area, Queensland		R123	With Editor
	MOLLAN, R.G., and others	Geology of the Eddystone, Taroom and western third of the Mundubbera 1:250,000 Sheet areas, Queensland		R	Internal editing in progress
	JENSEN, A.R.	MACKAY	SF-55/8	E.N.	Printed
	MALONE, E.J.	MOUNT COOLON	SF-55/7	E.N.	With Editor
	EXON, N.F.	EDDYSTONE	SG-55/7	E.N.	Internal editing in progress
	FORBES, V.R.*	TAROOM	SG-55/8	E.N.	With Editor
	MOLLAN, R.G.	SPRINGSURE	SG-55/3	E.N.	" "
	OLGERS, F.	BARALABA	SG-55/4	E.N.	Printed
	MALONE, E.J.	Devonian of the Anakie High area, Central Queensland		O.P.	Written for International Symposium on the Devonian System, Calgary, 1967
	MALONE, E.J.	'Geology', map sheet and booklet, Fitzroy Region, Queensland		O.P.	In press for R.S.I.D. Branch, NAT. DEV.

* G.S.Q.

THOMPSON, J.E., and DUFF, P.G.	Bentonite in the Permian Black Alley Shale, Queensland	C, 1965/171	Issued
FEHR, A.	Lithological correlations of Middle-Upper Triassic and Lower Jurassic units in seven wells in the southern Bowen-Surat Basin, Queensland	C, 1965/175	Issued
ARMAN, M.	Petrographic Notes on Bowen Basin shallow holes drilled in 1963	C, 1965/215	Issued
ARMAN, M.	Petrography and Lithological correlations of Permian Formations on AFO Inderi No.1 and AFO Cooroorah No.1, Queensland	C, 1965/226	Issued
BASTIAN, L.V. and ARMAN, M.	Petrographic Notes on some Triassic sediments in UKA Wandoan No.1 Well, and in adjoining areas	C, 1965/230	Issued
BASTIAN, L.V.	Petrographic Notes on Permian sandstone of the Springsure 1:250,000 Sheet area, Queensland	C, 1965/230	Issued
BASTIAN, L.V.	Petrographic Notes on the Clematis Sandstone and Moolayember Formation, Bowen Basin, Queensland	C, 1965/240	Issued
MOLLAN, R.G.	Tertiary volcanics in the Peak Range, Central Queensland	C, 1965/241	Issued
BASTIAN, L.V.	Petrographic Notes on the Rewan Formation, Southern Bowen Basin, Queensland	C, 1965/260	Issued
JENSEN, A.R., and ARMAN, M.	Notes on some Upper Permian and Lower Triassic units, Bowen Basin, Queensland	C, 1966/21	Issued

EROMANGA BASIN	VINE, R.R.	Recent Geological Mapping in the Northern Eromanga Basin		O.P.	Submitted to APEA Journal, 1966
	EXON, N.F.	Revised Jurassic to Lower Cretaceous Stratigraphy in the South-east Eromanga Basin, Queensland		O.P.	Published in Qld Govt Min. J., May 1966
	D.J. CASEY	WINTON	SF-54/12	E.N.	In press
	W. JAUNCEY	MANEROO	SF-54/16	E.N.	In press
	D.J. CASEY	MANUKA	SF-54/8	E.N.	In progress
	EXON, N.F., and others	The Geology of the Tambo, Augathella and Blackall 1:250,000 Sheet areas, Queensland		C, 1966/89	Issued
	VINE, R.R.	Recent Geological Mapping in the Northern Eromanga Basin		C, 1966/84	Issued
	VINE, R.R., and GALLOWAY, M.C.	Shallow stratigraphic drilling and coring, Northern Eromanga Basin, 1963/64		C, 1965/244	Issued
GEORGINA BASIN	SMITH, K.G.	Geology of the Georgina Basin		B	First draft completed; interval editing in progress
	SMITH, K.G., and others	Stratigraphic Drilling in the Georgina Basin		R124	Edited
	SMITH, K.G.	TOBERMORY	SF-53/12	E.N.	Issued
	SMITH, K.G.	FREW RIVER	SF-53/3	E.N.	Issued
	SMITH, K.G., and MILLIGAN, E.N.	ELKEDRA	SF-53/7	E.N.	In press
	RANDAL, M.A.	AVON DOWNS	SF-53/4	E.N.	In press
	RANDAL, M.A.	ALROY	SE-53/15	E.N.	In press
	RANDAL, M.A.	RANKEN	SE-53/16	E.N.	In press
	RANDAL, M.A.	BRUNETTE DOWNS	SE-53/11	E.N.	In press

	NICHOLS, R.A.H.	SANDOVER RIVER SF-53/8	E.N.	In press
	RANDAL, M.A.	Groundwater in the Barkly Tableland, Northern Territory	C, 1966/11	Issued; forwarded to Editor for editing as a Bulletin
	RANDAL, M.A., BROWN, M.C. and DOUTCH, H.F.	Geology of the Helen Springs and Beetaloo 1:250,000 Sheet areas, Northern Territory	C, 1966/110	Issued
	NICHOLS, R.A.H.	Petrology of some Carbonates in the Georgina Basin	C, 1966/145	Issued; forwarded to Editor for editing as a Bulletin
	NICHOLS, R.A.H.	Mulga No.1 and its stratigraphic implications, Georgina Basin, N.T.	C, 1966/155	Issued
	NICHOLS, R.A.H.	Report on core-hole Grg 9A, Georgina Basin, and comparison with Grg 14	C, 1966/2	Issued
SURAT BASIN	EXON, N.F., and others	The geology of the northern half of the Mitchell 1:250,000 Sheet area, Queensland	C, 1966/90	Issued
WISO BASIN	MILLIGAN, E.N., and others	Geology of the Wiso Basin, Northern Territory	C, 1966/47	Issued

MACRO-PALAEONTOLOGY				
(Georgina Basin)	OPIK, A.A.	The Mindyallan fauna of North-western Queensland	B74	In press
	OPIK, A.A., DICKINS, J.M., GATEHOUSE, C.E., SKWARKO, S.K., and TOMLINSON, Joyce N.G.	Various papers on macropalaeontology	B80	Ready for press
	PLANE, M.D.	Stratigraphy and vertebrate fauna of the Otibanda Formation Morobe District, New Guinea	B86	In press
	SKWARKO, S.K.	Mesozoic fossils from Central Australia and New Guinea	B75	In press
	SKWARKO, S.K.	Cretaceous stratigraphy and palaeontology of the Northern Territory	B73	In press
	SKWARKO, S.K.	Chapter on Mesozoic of the Katherine-Darwin region	B82	With Editor
	OPIK, A.A., GATEHOUSE, C.G., and SKWARKO, S.K.	Various papers on macropalaeontology	B92	Edited
	PLANE, M.D., STIRTON, R.A., and WOODBURNE, M.O.	Various papers on diprotodonts	B85	In press; proofed
(Bowen Basin)	DICKINS, J.M.	Permian marine macrofossils from the Baralaba Sheet area	R102 (Appendix)	Printing
(Bowen Basin)	DICKINS, J.M.	Permian marine macrofossils from the St. Lawrence and Duaringa Sheet areas	R121 (Appendix)	With Editor

(Bowen Basin)	DICKINS, J.M.	Permian marine macrofossils from the Mundubbera and Monto Sheet areas	R (Appendix)	Internal editing in progress
(Bowen Basin)	DICKINS, J.M.	Permian marine macrofossils from the Springsure Sheet area	R123 (Appendix)	With Editor
(Carnarvon Basin)	DICKINS, J.M.	Palaeontological Appendix	R108	
(Bowen Basin)	[2]WHITE, Mary E.	Plant fossil collections from Springsure, Queensland	R123 (Appendix)	With Editor
(Georgina Basin)	GATEHOUSE, C.G.	Palaeontological Report on BMR 11 Well	R124 (Appendix)	Edited
	ROBERTS, J.	Mantle canal patterns in Schizophoria verulamensis cvancara (Brachiopoda) from the Lower Carboniferous of N.S.W.	O.P. ?	Text completed; place of publication to be decided
(Bonaparte Gulf Basin)	ROBERTS, J., JONES, P.J., and DRUCE, E.C.	[1]Palaeontology and correlates of the Upper Devonian of the Bonaparte Gulf Basin, W.A., and N.T.	O.P.	Written for International Symposium on the Devonian System, Calgary 1967
	STRUSZ, D.L.	Rhizophyllum and Calceola from the Devonian of N.S.W.	O.P.	
(Amadeus, Georgina Basins)	TOMLINSON, Joyce N.G.	Devonian rocks in the Amadeus and Georgina Basins, N.T.	O.P.	Written for International Symposium on the Devonian System, Calgary, 1967
	[2]RUNNEGAR, B.N.	Conodont bivalves from the Permian of eastern Australia	B	With Editor
(Bowen Basin)	[2]WASS, R.E.	Permian Polyzoa of the Bowen Basin, Queensland	B	With Editor
(Georgina Basin)	GATEHOUSE, C.G.	Summary of the palaeontology of the Barkly Tableland Region	C	In progress

1. Includes micropalaeontology

2. BMR material used by non-Bureau workers

MICRO-PALAEONTOLOGY				
	BELFORD, D.J., HODGSON, E.A., LLOYD, A.R.	Various papers on micropalaeontology	B80	Ready for press
	BELFORD, D.J., and LLOYD, A.R.	Various papers on micropalaeontology	B92	Edited
	EVANS, P.R.	Mesozoic stratigraphic palynology in Australia	O.P.	Published 1966, in Aust. Oil & Gas Jour., 12 (6), 58-63
	BELFORD, D.J.	Foraminifera from outcrop samples, Star Mountains, Papua-New Guinea	C, 1965/233	Issued
	EVANS, P.R.	Palynological studies in the Longreach, Jericho, Galilee, Tambo, Eddystone and Taroom 1:250,000 Sheet areas, Queensland	C, 1966/61	Issued
(Otway Basin)	EVANS, P.R.	Mesozoic stratigraphic palynology of the Otway Basin	C, 1966/69	Issued
(Bowen Basin)	EVANS, P.R.	Contributions to the palynology of the Permian and Triassic of the Bowen Basin	C, 1966/134	Issued
(Bonaparte Gulf Basin)	JONES, P.J., and DRUCE, E.C.	International Conodont Correlation of the Palaeozoic sediments of the Bonaparte Gulf Basin, N.W. Australia	C, 1965/232, and O.P.	Issued Nature - 211, (5047),1966
	TERPSTRA, G.R.J.	Micropalaeontological examinations of Outcrop Samples from Bougainville, T.P.N.G.	C, 1966/66	Issued

PHOTO-GEOLOGY				
(Drummond Basin)	PERRY, W.J.	Photo-interpretation of the eastern part of the Buchanan 1:250,000 scale Sheet.	C, 1966/4	Issued
(Victoria River and Wiso/Daly River Basin)	PERRY, W.J.	Photo-interpretation of WAVE HILL, VICTORIA RIVER DOWNS and DELAMERE, Northern Territory	C, 1966/159	Issued
(Ngalia Basin)	RIVEREAU, J.C.*	Report on photo-interpretation of the Ngalia Basin, Northern Territory	C, 1965/255	Issued
(Wiso-Daly River Basins)	RIVEREAU, J.C.	Report on photo-interpretation of NEWCASTLE WATERS, DALY WATERS and LARRIMAH, Northern Territory	C, 1966/63 C, 1966/54	Issued Issued
(Carpentarian Basin)	RIVEREAU, J.C.	Report on photo-interpretation of MILLUNGERA 1:250,000 Scale Sheet, Queensland		
(Surat)	RIVEREAU, J.C.	Report on photo-interpretation of MITCHELL (southern half), ROMA and CHINCHILLA, Queensland	C, 1966/100	Issued
MISCELLANEOUS				
	QUINLAN, T.	Geology and Hydrology of the Alice Springs Town and Inner Farm Basins, Northern Territory	B89	Edited
	VAN ANDEL, Tj H., and VEEVERS, J.J.	Morphology and sediments of the Timor Sea	B83	In press; proofed
	CASEY, J.N., and KONECKI, M.C.	Natural Gas: A review of its Occurrence and Potential in Australia and Papua	O.P.	Written for the Seventh World Petroleum Conference
	COOK, P.J.	The reconstruction of an ancient shallow water marine environment	O.P.	Written for presentation to AAPG., 1967

*I.F.P.

(Ngalia Basin)	COOK, P.J., and SCOTT, I.F.*	Reconnaissance Geology and Petrography, Ngalia Basin, Northern Territory	C, 1966/73	Issued
	GALLOWAY, M.C., and DUFF, P.G.	Oil Traces in Lower Cretaceous sediments near Mitchell, Queensland	O.P.	Published in Aust. Oil and Gas Jour., 1966
	TOWNLEY, K.A. and VEEVERS, J.J.	Rocks and Fossils around Canberra	Booklet	Issued as a BMR publication
	VEEVERS, J.J., and JACKSON, J.W.	An improved field device for recording stratigraphical sections	O.P.	Accepted by AAPG for publication in November, 1966
	VEEVERS, J.J.	Dispersion and deposition of terrigenous sediment on continental terraces	O.P.	Accepted for publication in J. geol Soc. Aust., 1967
(Canning Basin)	VEEVERS, J.J., ROBERTS, J., WHITE, Mary E., and GEMUTS, I.	Sandstone of probable Lower Carboniferous age in the north-eastern Canning Basin, W.A.	O.P.	Accepted for publication in Aust. J. sci.
	VEEVERS, J.J., and VAN ANDEL, Tj H.	Depth of magnetic basement and submarine morphology of the Sabul Shelf	O.P.	Offered (Oct. 1967) for publication in an American journal
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