DEPARTMENT OF
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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1974/76

SHALLOW STRATIGRAPHIC DRILLING, NORTHERN CAPE YORK PENINSULA, 1973

by

D.L. Gibson, B.S. Powell, and J. Smart

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SUMMARY

Nineteen shallow stratigraphic holes were drilled in northern Cape York Peninsula in 1973 with two BMR Mayhew 1000 rigs: ten in the Carpentaria Basin, and nine (maximum depth of 55 m) in the Cainozoic 'Archer-Wenlock Basin'. They:

a) provided fresh cores of Mesozoic and Cainozoic rocks for lithological and palaeontological examination;

b) provided information on the extent, thickness, and lithology of rock units;

c) showed that the sandstone sequence below the Rolling Downs Group in Orford Bay and northern Cape Weymouth 1:250 000 Sheet areas is distinctly different from the equivalent units further south; a new name, Helby Beds, has been applied to this sequence;

d) showed that the mudstone of the Rolling Downs Group is more arenaceous and less calcareous than in the south;

e) showed that the Normanton Formation, although not recognized in surface mapping in the area, is recognizable in the subsurface;

f) showed that water is available from sandstone beds in the Rolling Downs Group and the Gilbert River Formation in Coen 1:250 000 Sheet area.

141°00'
142°30'
144°00'
11°00'
12°00'
13°00'
14°00'
15°00'

JARDINE RIVER
ORFORD BAY
Jardine
River
CORAL
SEA
OB 1
"Heathlands"
CW 1
CAPE WEYMOUTH
"Bramwell"
WEIPA
CARPENTARIA
Wenlock
River
Moreton
Telegraph
Station
Weipa
CW 2
W 1
"Merluna"
AURUKUN
COEN
C 1
"Wolverton"
Aurukun Mission
River
Coen
OF
A 1
A 30
Archer
"Peret"
"Merapah"
C 2
"Rokeby"
River
A 2
Coen
HOLROYD
GULF
Holroyd
River
River
Edward
H1
Edward River
Mission

20 0 20 40 60 80
KILOMETRES

LOWER CRETACEOUS — Rolling Downs Group

JURASSIC AND L CRETACEOUS — Gilbert River Formation, Garraway Beds, Helby Beds

Pre-Mesozoic Basement to the Carpentaria Basin

——————— *Geological boundary, position approximate*

————?——— *Geological boundary, inferred*

⊗H1 *BMR Stratigraphic Hole, 1973 (HOLROYD 1)*

■ *Town*

═══════ *Road*

========= *Vehicle track*

□ *Homestead, Mission*

FIGURE 1 Locality Map, Deeper "Mayhew 1000" Holes

Cainozoic sediments omitted

To accompany Record 1974/76

Q/A/521

INTRODUCTION

General

Nineteen shallow stratigraphic holes were drilled in northern Cape York Peninsula between July and November 1973. Ten holes with an aggregate depth of 2350 m were drilled in the Carpentaria Basin; of this 267 m was cored (102 cores) with an average recovery of 90%. Nine holes were drilled in the 'Archer-Wenlock Basin'* with an aggregate depth of 306 m; 2.2 m of this was cored with a recovery of 87%. Core details are given in Appendix 1.

This program followed drilling in the Carpentaria Basin in 1969, 1970, 1971, and 1972 (Grimes & Smart, 1970; Needham et al., 1971; Smart & Grimes, 1971; Gibson et al., 1973), and was carried out in conjunction with a drilling program using a Gemco 110A auger (Smart, in prep.; Smart et al., 1974). A list of all Mayhew and Gemco holes drilled by BMR in Cape York Peninsula during 1973 is given in Table 1, together with their positions, total depths, drill used and BMR Record in which their descriptions appear. This Record deals only with the 19 holes drilled with the Mayhew 1000 rigs.

Holes are named by 1:250 000 Sheet areas, e.g. BMR Aurukun 2 is the second hole drilled by the BMR in Aurukun Sheet. The locations of the holes in Coen and Orford Bay Sheets, and in Cape Weymouth, Aurukun, and Weipa Sheets will be shown on the second preliminary and first editions respectively of these maps.

Approximate positions of the Mayhew 1000 holes in the Carpentaria and 'Archer-Wenlock' Basins are shown in Figures 1 and 10 respectively; latitudes and longitudes are given in Table 1 and with the individual hole descriptions. Elevations given in hole descriptions are either extrapolated from computer-plotted form lines based on barometric levelling from BMR gravity surveys, or were measured by barometer in the field.

A 'Widco 2000' (610 m) cable logger and, for part of the season a 'suitcase' logger with a short (140 m) cable were used for logging the holes. Several breakdowns of these loggers delayed the logging of some of the holes (e.g. Holroyd 1) or the running of certain logs (e.g. Cape Weymouth 1).

Stratigraphy (See Table 2)

Stratigraphic terms used in this record are shown in Table 2. The Garraway Beds are equivalent to the Eulo Queen Group of the southern Carpentaria Basin, and occur beneath the Gilbert River Formation in Cape Weymouth and Weipa Sheet areas. The Helby Beds are a facies equivalent of the Gilbert River Formation and the Eulo Queen Group, and

TABLE 1

DRILL HOLE DATA, 1973 PROGRAM

NAME		TYPE	DEPTH metres	LOCATION Lat.	long	REFERENCE
JARDINE RIVER	1	Gemco	8.2	11°18'S	142°19'E	Smart et al. 1974
	2	"	9.1	11°19½'S	142°24½'E	"
	3	"	15.9	11°9'S	142°21½'E	"
	4	"	15.9	11°12'S	142°22½'E	"
	5	"	15.9	11°18'S	142°24'E	"
	6	"	15.9	11°21'S	142°24'E	"
	7	"	15.9	11°24'S	142°24'E	"
	8	"	15.9	11°31'S	142°26'E	"
	9	"	15.9	11°32½'S	142°26½'E	"
	10	"	10.4	11°39'S	142°27½'E	"
ORFORD BAY	1	Mayhew	329.50	11°45½'S	142°41'E	This Record
	2	Gemco	3.7	11°53'S	142°31'E	Smart et al., 1974
	3	"	10.4	11°36'S	142°34'E	"
	4	"	12.2	11°41½'S	142°42'E	"
	5	"	15.9	11°37'S	142°51½'E	"
	6	"	7.3	11°36'S	142°50'E	"
	7	"	8.5	11°35'S	142°47'E	"
	8	"	15.9	11°36½'S	142°48'E	"
	9	"	6.7	11°45½'S	142°41'E	"
	10	"	15.9	11°43'S	142°31'E	"
	11	"	12.2	11°50'S	142°30'E	"
	12	"	9.1	11°51'S	142°30½'E	"
WEIPA	1	Mayhew	331.00	12°44'S	142°15'E	This Record
	2	Gemco	8.8	12°57'S	142°25'E	Smart et al., 1974
	3	"	11.6	12°44'S	142°16'E	"
	4	"	5.5	12°33'S	141°49'E	"
	5	"	4.9	12°33'S	141°49½'E	"
	6	"	6.1	12°11'S	142°29'E	"
	7	"	7.3	12°13'S	142°24'E	"
	8	"	9.1	12°11'S	142°21'E	"
CAPE WEYMOUTH	1	Mayhew	334.98	12°02'S	142°45½'E	This Record
	2	"	173.37	12°39'S	142°45½'E	"
	3	Gemco	10.4	12°02'S	142°32½'E	Smart et al., 1974
	4	"	6.7	12°07'S	142°35'E	"
	5	"	10.1	12°04½'S	142°42'E	"
	6	"	6.7	12°04'S	142°44'E	"
	7	"	17.7	12°06'S	142°39'E	"
	8	"	1.8	12°09'S	142°39'E	"

	9	"	4.6	12°09'S	142°38'E	"
	10	"	7.3	12°09'S	142°34'E	"
	11	"	6.7	12°10'S	142°34'E	"
	12	"	3.7	12°22½'S	142°37'E	"
	13	"	8.5	12°24'S	142°37'E	"
	14	"	5.5	12°22'S	142°38'E	"
	15	"	12.2	12°22'S	142°37½'E	"
	16	"	12.2	12°28'S	142°39'E	"
	17	"	7.3	12°31'S	142°40½'E	"
	18	"	8.5	12°32'S	142°39'E	"
	19	"	5.5	12°40'S	142°41'E	"
	20	"	5.5	12°39'S	142°47½'E	"
	21	"	7.3	12°39'S	142°45'E	"
	22	"	6.7	12°39'S	142°45½'E	"
	23	"	6.7	12°39'S	142°46'E	"
	24	"	4.9	12°39'S	142°48'E	"
AURUKUN	1	Mayhew	132.59	13°37½'S	141°33½'E	This Record
	2	"	303.28	13°51'S	142°16'E	"
	3	Gemco	9.4	13°39'S	141°36'E	Smart et al., 1974
	4	"	13.7	13°37½'S	141°33½'E	Smart, 1974
	5	"	8.2	13°37½'S	141°31½'E	"
	6	"	17.7	13°37'S	141°30½'E	"
	7	"	6.4	13°37½'S	141°33½'E	"
	8	"	6.4	14°00'S	141°41'E	Smart et al., 1974
	9	"	6.7	13°59'S	141°28'E	Smart, 1974
	10	"	8.5	14°00'S	141°38'E	"
	11	"	10.4	13°55'S	141°38'E	Smart et al., 1974
	12	"	7.1	13°50'S	141°35'E	"
	13	"	11.3	13°45½'S	141°29'E	Smart, 1974
	14	"	8.5	13°45½'S	141°30'E	"
	15	"	8.5	13°45½'S	141°31½'E	"
	16	"	8.5	13°45'S	141°32'E	"
	17	"	8.5	13°43'S	141°33'E	Smart et al., 1974
	18	"	8.5	13°42'S	141°33'E	"
	19	"	4.5	13°41'S	141°35'E	"
	20	"	4.5	13°37½'S	141°38'E	"
	21	"	3.7	13°37'S	141°39'E	"
	22	"	4.5	13°38½'S	141°41½'E	"
	23	"	4.5	13°43'S	141°50'E	"
	24	"	8.5	13°44'S	141°53'E	"
	25	"	8.5	13°43'S	141°58'E	"
	26	"	8.5	13°45'S	142°13'E	"
	27	"	6.4	13°46'S	142°19'E	"
	28	"	2.7	13°47'S	142°20'E	"
	29	"	11.9	13°50'S	142°20'E	"
	30	"	27.5	13°37'S	141°39'E	Gibson et al.

COEN	1	Mayhew	134.32	13°19'S	142°52'E	This Record
	2	"	275.08	13°40'S	142°36'E	"
	3	Gemco	11.0	13°41'S	142°32'E	Smart et al., 1974
	4	"	17.7	13°54'S	143°31'E	"
	5	"	3.0	13°51'S	143°28'E	"
	6	"	9.8	13°50'S	143°28'E	"
	7	Gemco	10.4	13°52'S	143°28'E	"
	8	"	17.7	13°53'S	143°30'E	"
	9	Mayhew	22.3	13°52'S	143°10'E	This Record
	10	Gemco	3.0	13°54'S	143°05'E	Smart et al., 1974
	11	"	14.0	13°52'S	143°01'E	"
	12	"	8.5	13°49'S	142°54'E	"
	13	"	6.7	13°49'S	142°51'E	"
	14	"	3.0	13°49'S	142°51'E	"
	15	"	6.7	13°49'S	142°50'E	"
	16	"	4.9	13°47'S	142°50'E	"
	17	"	6.7	13°44'S	142°47'E	"
	18	"	6.7	13°39'S	142°48'E	"
	19	"	4.9	13°42'S	142°54'E	"
	20	"	3.0	13°45'S	143°01'E	"
	21	"	5.8	13°45'S	143°06'E	"
	22	Mayhew	40.2	13°35'S	143°02'E	This Record
	23	"	28.7	13°38'S	143°04'E	"
	24	"	54.6	13°41'S	143°05'E	"
	25	"	48.8	13°43'S	143°06'E	"
	26	"	24.4	13°47'S	143°07'E	"
	27	"	18.9	13°50'S	143°09'E	"
	28	"	32.6	13°41'S	143°08'E	"
	29	"	35.7	13°45'S	143°08'E	"
HOLROYD	1	Mayhew	308.45	14°41'S	142°10'E	This Record
	2	Gemco	7.3	14°0½'S	141°36'E	Smart, 1974
	3	"	10.4	14°01'S	141°35½'E	"
	4	"	17.7	14°01'S	141°35'E	"
	5	"	17.7	14°04'S	141°34½'E	"
	6	"	12.2	14°03½'S	141°35'E	"
	7	"	8.5	14°04½'S	141°35'E	"
	8	"	17.7	14°03'S	141°35½'E	"
	9	"	12.2	14°02'S	141°36'E	"
	10	"	8.5	14°02'S	141°36'E	"
	11	"	8.5	14°00'S	141°37½'E	"
EBAGOOLA	1	Gemco	6.1	14°03'S	143°29'E	Smart et al., 1974
	2	"	3.7	14°03'S	143°29'E	"
	3	"	6.7	14°05'S	143°29'E	"
	4	"	8.5	14°01'S	143°16'E	"

TABLE 2.
STRATIGRAPHIC NOMENCLATURE USED IN THIS RECORD

AGE			ROCK UNIT			LITHOLOGY		PRINCIPAL REFERENCES
CAINOZOIC	PLIOCENE to HOLOCENE		Failoch Beds (Czh).			Clayey sand, sandy clay, quartzose granule gravel, some conglomerate. Continental		Powell et al. (in prep.)
			Wyaaba Beds (Czy).			As above, little conglomerate. Continental and Marine.		Smart et al. (1972)
UNCONFORMITY. (period of deep weathering).								
MESOZOIC or CAINOZOIC	CRETACEOUS? or TERTIARY		Bulimba Formation (KTi)			Soft sandy claystone, clayey sandstone and granule conglomerate. Continental		Smart et al. (1972)
MAJOR UNCONFORMITY								
MESOZOIC	LOWER CRETACEOUS	Upper Albian to ?Cenomanian	Rolling Downs Group (Klr)	Normanton Formation (Kln)		Labile sandstone and mudstone. Estuarine.		Klr: Whitehouse (1954) Wilgunya Subgroup: Vine et al. (1967) Kln: Smart et al. (1971)
				Wilgunya Subgroup	Allaru Mudstone (Kla)	Mudstone and glauconitic sandstone. Marine		Kla: Vine et al. (1967)
		? Neocomian to L. Albian			Toolebuc Formation (Klo)	Calcareous shale and limestone. Marine		Klo: Exon & Senior (pers. comm.), replacing Toolebuc Limestone of Vine et al. (1967), and Smart (1972).
					Wallumbilla Formation (Klu)	mudstone, glauconitic quartzose sandstone. Marine.		Klu: Vine et al., 1967.
	UPPER JURASSIC to LOWER CRETACEOUS			Gilbert River Formation (JKg)	Helby Beds (JKb)	Poorly sorted medium to coarse grained clayey quartz sandstone conglomerate and silty mudstone. Continental and marine.	Bioturbated flaser bedded fine to very coarse grained quartz sandstone, granule conglomerate and carbonaceous siltstone, Estuarine.	Jkg: Smart et al., 1971 Jkb: Powell et al., in prep. Jw : Powell et al., in prep. Jue: Smart et al., 1971
	UPPER JURASSIC			Garraway Beds (Jw), & Eulo Queen Group (Jue)		Poorly sorted medium to coarse grained clayey sandstone, conglomerate. Carbonaceous in part. Continental		

are known to be present in Orford Bay Sheet and the northern part of Cape Weymouth (north of 12 05'S). The Garraway Beds and the part of the Helby Beds equivalent to the Eulo Queen Group occur only within the Weipa Depression of Doutch, 1973. The Falloch Beds consist of fluvial sand and clay deposited in the Archer-Wenlock Basin (see Gibson in: Doutch et al., 1973) in Coen Sheet, and are equivalent in age to the Wyaaba Beds.

The Toolebuc Formation has not been found north of FBH Wyaaba 1, about 200 km south of the area covered by this Record, where it is made up of about 25 m of calcareous shale (see Needham & Doutch, 1973, for a copy of the log of this well). However, in some bores (e.g. ZCL Weipa No. 1 (see Gibson in: Doutch et al., 1973) there is a small sharp gamma anomaly at a depth where the Toolebuc Formation would be expected to occur. Absence of this unit makes it difficult to separate the Wallumbilla Formation from the Allaru Mudstone on lithostratigraphic grounds: hence the general term Wilgunya Subgroup is used on logs. It is difficult to map the lower boundary of the Normanton Formation in the field; it can be more readily delineated in drill holes (e.g. Weipa 1).

The Bulimba Formation and Wyaaba Beds are lithologically similar, but are separated by a period of deep weathering which formed laterite on the Bulimba Formation in many places. However, it is difficult to distinguish between the two formations where this laterite profile, or deeply weathered sediment is absent (e.g. Aurukun 1).

Objectives

The general purpose of the program was to provide stratigraphic information in some of the areas mapped in 1972 and 1973 by BMR in Cape York Peninsula. Specific objectives were:

1) To obtain cores of poorly exposed rock units for examination of lithology and age dating.

2) To measure thicknesses and check for possible lateral variations of units, especially of the Mesozoic sandstone sequence in Orford Bay and Cape Weymouth Sheets, and of the Cainozoic Falloch Beds in the Archer-Wenlock Basin.

3) To core and determine the age of what is thought to be the youngest onshore part of the Rolling Downs Group in the Carpentaria Basin (Aurukun 1).

4) To drill through the Upper/Lower Albian boundary in the Rolling Downs Group, and if the Toolebuc Formation is shown to be present by cuttings or wireline logs, to re-drill and core it.

5) To determine the nature of the basal part of the Rolling Downs Group, and the depth to the Gilbert River Formation. This information helps with mapping the boundary between these units at the surface.

6) To check depth to basement in areas near the margin of the Carpentaria Basin.

7) To investigate water supplies from Mesozoic and Cainozoic aquifers.

8) To check for any indications of sedimentary uranium or placer minerals in the 'Archer-Wenlock Basin'.

Results

Cores and cuttings were obtained of the Falloch, Wyaaba, and Helby Beds, Bulimba, Normanton, and Gilbert River Formations, and the Wilgunya Subgroup.

Orford Bay 1 and Cape Weymouth 1 showed that the sandstone sequence below the Rolling Downs Group in Orford Bay and northern Cape Weymouth Sheet consists of bioturbated flaser-bedded clayey quartzose sandstone and carbonaceous micaceous siltstone which, mainly on the results of these two holes, has been named the Helby Beds (Powell et al., 1974). Weipa 1 showed that in southern Weipa the Normanton Formation can be easily differentiated from the Wilgunya Subgroup on lithology of cuttings. Cape Weymouth 2 showed that the uppermost 65 m of the Gilbert River Formation in central Cape Weymouth is lithologically similar to the Helby Beds farther north but that the lower part of the formation is made up of quartzose sandstone which is not flaser bedded or bioturbated, and is less clayey than the Helby Beds.

Aurukun 1 showed that the Bulimba Formation may not be present in some areas in western Aurukun Sheet. Coen 1 showed that the basal part of the Rolling Downs Group is arenaceous, that the Gilbert River Formation is made up of two distinct units (marine above continental) and that fresh water is available from the continental unit. Coen 2 showed that artesian water is available from sandstone beds in the Rolling Downs Group.

Generally, all holes showed that the Wilgunya Subgroup is more arenaceous and less calcareous in the northern part of Cape York Peninsula than the rest of the Carpentaria Basin, and that in northern Cape Weymouth Sheet there is a facies change from the Gilbert River Formation and Garraway Beds in the south to the Helby Beds in the north.

The shallow Mayhew 1000 holes in the 'Archer-Wenlock Basin' (Coen 9, and 22-29) showed that the Falloch Beds are at least 55 m thick. No indications of placer minerals or sedimentary uranium were found.

BMR ORFORD BAY 1

(Fig. 2)

POSITION: Lat. 11°45½', long. 142°41'E; about 19 km west of Messum Hill and 13 km east of Heathlands homestead on a station track.

Elevation is about 122 m above sea level.

OBJECTIVES:

(a) To determine the nature and thickness of the Mesozoic rocks in the area.

(b) To provide cores of fresh material for micropalaeontological examination.

DRILLING: Casing cemented to 7 m. Drilled with air to 6.4 m, then with mud. Accumulation of wall cavings in the bottom of the hole resulted in a poor recovery of the bottom core. The siltstone content of the Helby Beds as shown in Figure 2 may be influenced in part by poor recovery of siltstone cuttings when drill bits became worn. The hole was plugged and abandoned at a total depth of 329.5 m.

LOGS: Lithological log by K. Grimes and B.S. Powell; wireline log run by B.S. Powell. Only a resistivity log of the hole was run as there were faults in the gamma and self-potential channels of the Widco 2000 logger at the time of logging.

LITHOSTRATIGRAPHY:

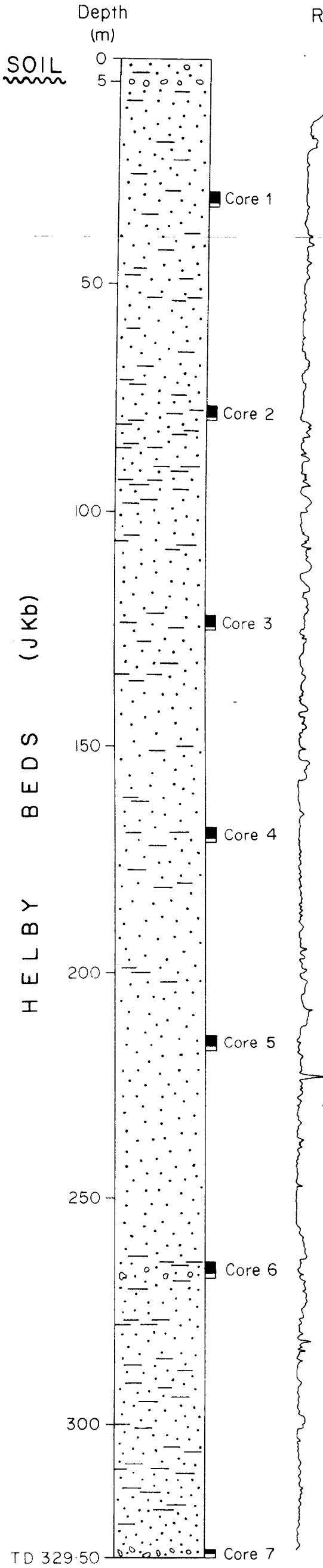
0-5 m: Soil and sandy colluvium

5-T.D.329.50 m: Helby Beds.

Grey quartzose sandstone and micaceous carbonaceous siltstone; bioturbated and weathered from: 5 to 18 m.

Figure 2

BMR ORFORD BAY 1



0 – 5 m	*red-brown clayey medium grained quartzose sand and ferruginous gravel*
5 – 18 m	*mottled clayey medium to coarse-grained sand*
18 – 329·50 m	*grey to green clayey medium to fine-grained sandstone and darker carbonaceous mudstone*
Core 1 29·56 – 32·61 m	*recovered 2·28 m (75%) grey fissile slightly micaceous muddy medium to very coarse-grained glauconitic quartzose sandstone with minor shelly fossils and carbonaceous flecks. Bioturbated*
Core 2 76·81 – 79·85 m	*recovered 2·39 m (79%) flaser-bedded bioturbated fine to medium-grained quartzose sandstone, and dark grey slightly micaceous and carbonaceous mudstone. Some pyrite*
Core 3 122·53 – 125·58 m	*recovered 2·58 m (85%) light grey to brown medium to very coarse-grained clayey quartzose sandstone; slightly micaceous with well defined Planolites burrows*
Core 4 168·25 – 170·99 m	*recovered 2·62 m (96%) dark greenish grey clayey medium to very coarse-grained quartzose sandstone; rhizocorallium ? burrows, laminated dark grey ripple structured mudstone. Minor glauconite and pyrite*
Core 5 214·07 – 217·12 m	*recovered 2·60 m (85%) dark greenish grey coarse to very coarse-grained quartzose sandstone; very poorly sorted and highly bioturbated*
Core 6 264·27 – 267·32 m	*recovered 2·48 m (81%) interlaminated greenish coarse to very coarse-grained poorly sorted quartzose sandstone, and dark grey siltstone Highly bioturbated, occasional quartz pebbles*
Core 7 327·98 – 329·50 m	*recovered 0·66 m (43%) light grey massive clayey micaceous coarse-grained quartzose sandstone and granule conglomerate. Pebbly towards the base*

ABBREVIATIONS USED IN DRILL LOGS

TD Total depth

Wireline log:
- S-P Self-potential
- R Resistivity
- ɣ Gamma ray

~~~ Unconformity

Grain size of sand fraction:
- f Fine
- m Medium
- c Coarse
- vc Very coarse
~~~

REMARKS

The thickness of the Mesozoic sandstone succession in the area is still uncertain as the hole failed to reach basement. However, the rocks are markedly different from those of comparable age to the south, namely, the Gilbert River Formation and Garraway Beds. Outcrop is poor in this region of Cape York Peninsula and drill hole data from Orford Bay 1 and Cape Weymouth 1 provide the most detailed information on the new unit, named the Helby Beds (Powell et al., 1974). Comparison of drilling data with outcrop on northern Cape Weymouth 1:250 000 Sheet indicates a change in facies northwards from predominantly continental to paralic and marine sediments.

Spores and pollen contained in the core material date the succession as ranging from Middle Jurassic (Cores 6 and 7) to Lower Cretaceous (Neocomian) (Cores 2 and 3) (Burger, pers. comm.).

BMR WEIPA 1

(Fig. 3)

POSITION: Lat. 12°44'S, long. 142°15'E; 7 km west of York Downs homestead (abandoned) on the southern side of the road to Weipa. Elevation is about 40 m above sea level.

OBJECTIVES:

(a) To determine the nature and thickness of the Rolling Downs Group in the area.

(b) To determine whether the Toolebuc Formation is present, and if so, to determine its nature and age.

(c) To provide cores of the Gilbert River Formation for micropalaeontological and lithological examination.

The hole was planned to intersect the Toolebuc Formation (if present) at a depth of about 100 m.

DRILLING: Casing cemented to 10 m. Drilled with air to 10 m then with mud. Cavings were few. Water loss was a problem in the top 25 m and there were problems with rig stability when the gilgai type soil became saturated with water escaping from the mudpit. The hole was plugged and abandoned at a total depth of 331.00 m.

LOGS: Lithological log by B.S. Powell and J. Smart; wireline logs run by G. Jennings, Geophysical Branch.

LITHOSTRATIGRAPHY:

0-2 m: Gilgai soil.

2-162 m: Normanton Formation

Grey to green labile and glauconitic quartzose sandstone interbedded with silty mudstone. Weathered to 18 m. (Normanton Formation?).

162-T.D. 331.00 m: Wilgunya Subgroup

Grey silty mudstone and fine quartzose sandstone, with macrofossils.

REMARKS

The lithological and electric logs show a sharp change at 167 m which indicates the Normanton Formation-Wilgunya Subgroup boundary about 40 km to the west (compare with the log of ZCL Weipa 1, shown in Doutch et al., 1973). This depth is consistent with extrapolations from ZCL Weipa No. 1.

Work done after the completion of the drilling program indicated that the hole was drilled higher in the Mesozoic section than originally thought and that if the Toolebuc Formation is present in the area, it should be at a depth of 300-400 m.

BMR CAPE WEYMOUTH 1

(Fig. 4)

POSITION: Lat. 12°02'S, long. 142°45½'E; about 20 km northeast of Bramwell homestead on Bramwell/Shelburne road, on southern bank of creek.

Elevation is about 47 m above sea level.

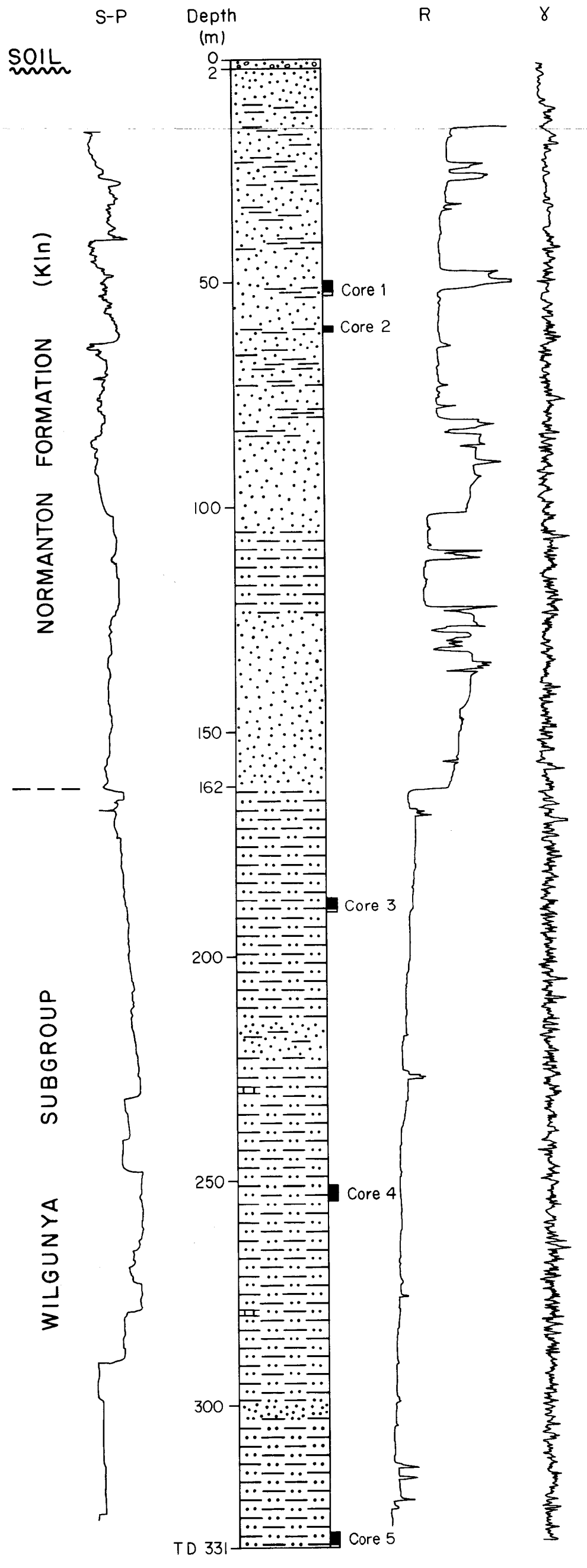
OBJECTIVES: (a) To determine the nature and thickness of Mesozoic sediments in the area.

(b) To provide cores of these sediments for micropalaeontological examination.

DRILLING: Casing cemented to 5 m. Drilled with air to 4.3 m, then with mud. The hole was plugged and abandoned at a total depth of 334.98 m.

Figure 3

BMR WEIPA 1



0–2 m	*fawn-red silt, fine sand and pebbles of ferruginized sand*
2–15 m	*soft khaki fine-grained clayey sandstone and mudstone*
15–87 m	*light grey fissile silty mudstone and tan clayey fine-grained labile sandstone, with some quartz and glauconite at 27·4 m and green to grey fine-grained clayey slightly micaceous (labile ?) sandstone from 69–87 m*
Core 1 49·91–52·58 m	*recovered 2·15 m (81%) hard grey fissile calcareous silty mudstone and green-grey fine-grained clayey glauconitic sst.*
Core 2 60·05–60·96 m	*recovered 0·90 m (99%) very hard brittle calcareous slightly micaceous silty mudstone*
87–105 m	*predominantly light-grey very poorly sorted clayey medium to fine-grained quartzose sandstone*
105–123 m	*hard grey silty mudstone*
123–162 m	*hard light-grey poorly sorted clayey glauconitic quartzose sandstone*
162–331	*grey silty mudstone with a little light-grey very poorly sorted angular silty fine-grained quartzose ? sandstone. Glauconitic from 214–220 m*
Core 3 186·54–189·59 m	*recovered 2·64 m (87%) hard brittle fissile grey fossiliferous silty mudstone. Mainly molluscs (Ammonites) and small calcareous foraminifera present*
228 m	*hard noisy drilling (concretionary band)*
Core 4 250·55–253·60 m	*recovered 3·05 m (100%) grey brittle highly fissile fossiliferous silty mudstone (pelecypods, belemnites)*
277 m	*hard noisy drilling (concretionary band)*
Core 5 328·00–331·00 m	*recovered 2·94 m (96%) grey fissile to massive micaceous fossiliferous silty mudstone (pelecypods, gastropods)*

To accompany Record 1974/76

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LOGS: Lithological log by B.S. Powell and wireline log (resistivity) run by B.S. Powell. Faults in the gamma and self-potential channels of the Widco 2000 logger at the time of logging prevented the running of these logs.

LITHOSTRATIGRAPHY:

0-4 m — Soil and colluvium

4-T.D.354.98 m — Helby Beds.

Bioturbated grey quartzose sandstone and micaceous carbonaceous siltstone.

REMARKS

The succession is flaser-bedded and bioturbate, differing markedly from that of Mesozoic sandstones to the south (except for the uppermost part of the Gilbert River Formation in Cape Weymouth 2), and is comparable to that found in BMR Orford Bay 1. The sandstones at the top of BMR Cape Weymouth 1, dated as Neocomian (Burger, pers. comm.), are not far below the base of the Rolling Downs Group which lies a few kilometres to the southwest. As there are no indications of structural discontinuity in the area, a change in facies is necessary to explain the lithological differences in the Mesozoic sandstones between this extreme northwest and the southern part of Cape Weymouth 1:250 000 Sheet area.

BMR CAPE WEYMOUTH 2

(Fig. 5)

POSITION: Lat. 12°39½'S, long. 142°46'E; about 9 km east of Batavia Downs homestead (abandoned) on track to Wenlock River. Elevation is about 80 m above sea level.

OBJECTIVES:

(a) To determine the nature of the base of the Rolling Downs Group and of the underlying Gilbert River Formation in the area.

(b) To determine the depth to the Gilbert River Formation.

(c) To provide fresh cores of the Wilgunya Subgroup and the Gilbert River Formation for palaeontological study.

DRILLING: Casing cemented to 13 m. Drilled with air to 13 m, then mud. Drilling mud loss was a continual problem, particularly in the more porous intervals at the top of the Gilbert River Formation. The hole was continuously cored from 13 m, and was plugged and abandoned at a total depth of 173.37 m.

LOGS: Lithological and wireline logs (gamma-ray, resistivity, spontaneous potential) by B.S. Powell and J. Smart.

LITHOSTRATIGRAPHY:

0-3 m — Soil: tan silt, pebbles of iron-cemented sand.

3-90 m — Wilgunya Sub-group

Dark grey micaceous silty mudstone and green to grey fine-grained labile (or quartzose) glauconitic sandstone. Bioturbated and flaser-bedded.

90-T.D.173.37 m — Gilbert River Formation

90-155 m — grey to greenish, medium to coarse-grained micaceous quartzose sandstone, granule conglomerate and carbonaceous siltstone. Bioturbated, with minor glauconite and pebble conglomerate.

155-173.37 m — grey, very poorly sorted, partly silty, medium to very coarse-grained quartzose sandstone, granule and pebble conglomerate. Minor carbonaceous material.

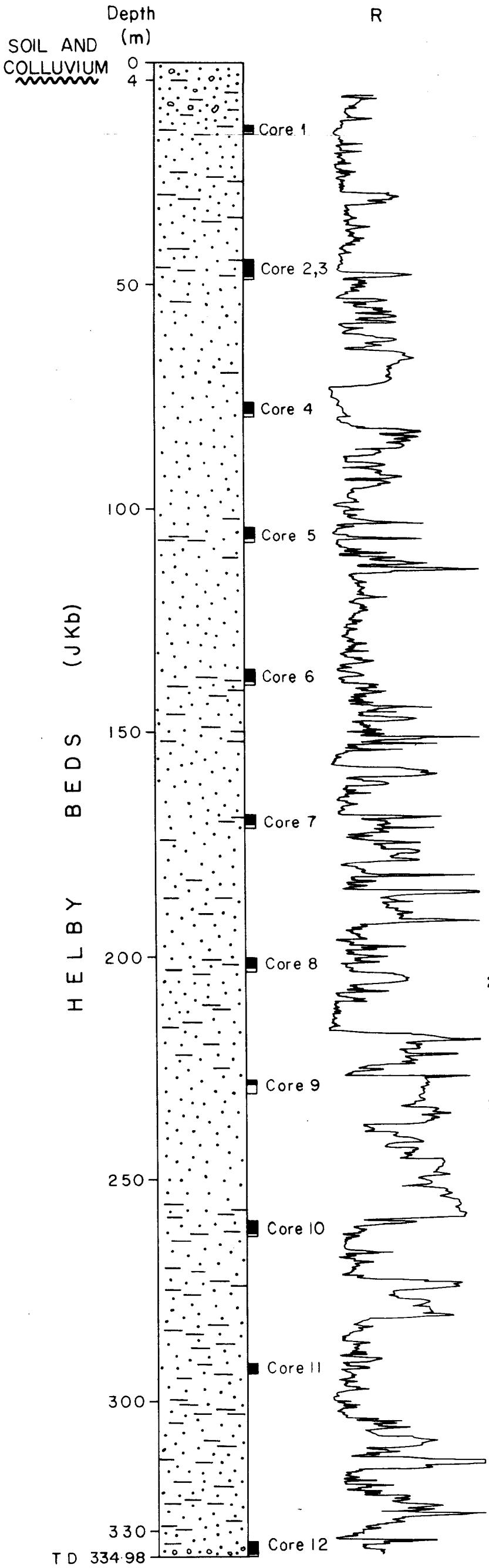
REMARKS

Separation of the Wilgunya Subgroup and Gilbert River Formation is based upon lithological changes. The boundary is deeper than was expected.

The character of the top 65 m of Gilbert River Formation is typical of a paralic or shallow marine environment and is similar to that of the Helby Beds encountered in BMR Orford Bay 1 and BMR Cape Weymouth 1; below this the formation appears to be continental.

BMR CAPE WEYMOUTH 1

Figure 4



0 – 4 m	*tan coloured medium-grained quartzose sand and pebbles of iron-cemented sand.*
Core 1 14·03 – 15·48 m	*recovered 1·34 m (92%) highly bioturbated grey coarse-grained quartzose sandstone and dark grey siltstone. Flaser bedded glauconitic solitary shelly fossil (pelecypod ?)*
4 – 334·98 m	*grey very poorly sorted clayey medium-grained quartzose sandstone, granule conglomerate and laminated silty mudstone*
Core 2 44·53 – 45·85 m	*recovered 1·32 m (100%) laminated grey carbonaceous granule conglomerate and dark micaceous mudstone*
Core 3 45·85 – 48·90 m	*recovered 2·45m (80%) fissile ripple laminated light grey fine-grained sandstone and dark micaceous siltstone*
Core 4 76·66 – 79·71m	*recovered 2·34m (77%) light grey medium to fine-grained quartzose sandstone with thin micaceous and carbonaceous lamina. Massive and cross-laminated.*
Core 5 104·16 – 107·21m	*recovered 2·65m (87%) grey clayey medium to fine-grained sandstone and thinly interlaminated dark micaceous carbonaceous siltstone. Rippled, with slide and slump structures.*
Core 6 136·18 – 139·23m	*recovered 2·47m (81%) bioturbated convoluted green to grey medium to coarse-grained quartzose sandstone and thin micaceous carbonaceous siltstone.*
Core 7 168·21 – 171·26m	*recovered 2·60m (85%) light grey medium to coarse-grained slightly cross-laminated carbonaceous sandstone with minor micaceous siltstone.*
Core 8 200·23 – 203·28m	*recovered 2·11m (69%) highly bioturbated slightly clayey medium to very coarse-grained sandstone, and minor siltstone.*
Core 9 227·68 – 230·73m	*recovered 0·56m (18%) light grey poorly laminated slightly clayey, medium to very coarse-grained quartzose sandstone.*
Core 10 259·71 – 262·76m	*recovered 2·54m (83%) highly bioturbated thinly laminated grey fine to medium-grained sandstone and carbonaceous micaceous siltstone. Minor pyrite.*
Core 11 291·73 – 293·25m	*recovered 1·50m (99%) dark grey, coarse to very coarse-grained sandstone and siltstone. Highly bioturbated with pelletal glauconite (pyritized in places). Cream-coloured in parts.*
	carbonaceous band at 330m.
Core 12 331·93 – 334·98m	*recovered 2·14m (70%) grey flaggy clayey coarse to very coarse-grained carbonaceous sandstone and granule conglomerate.*

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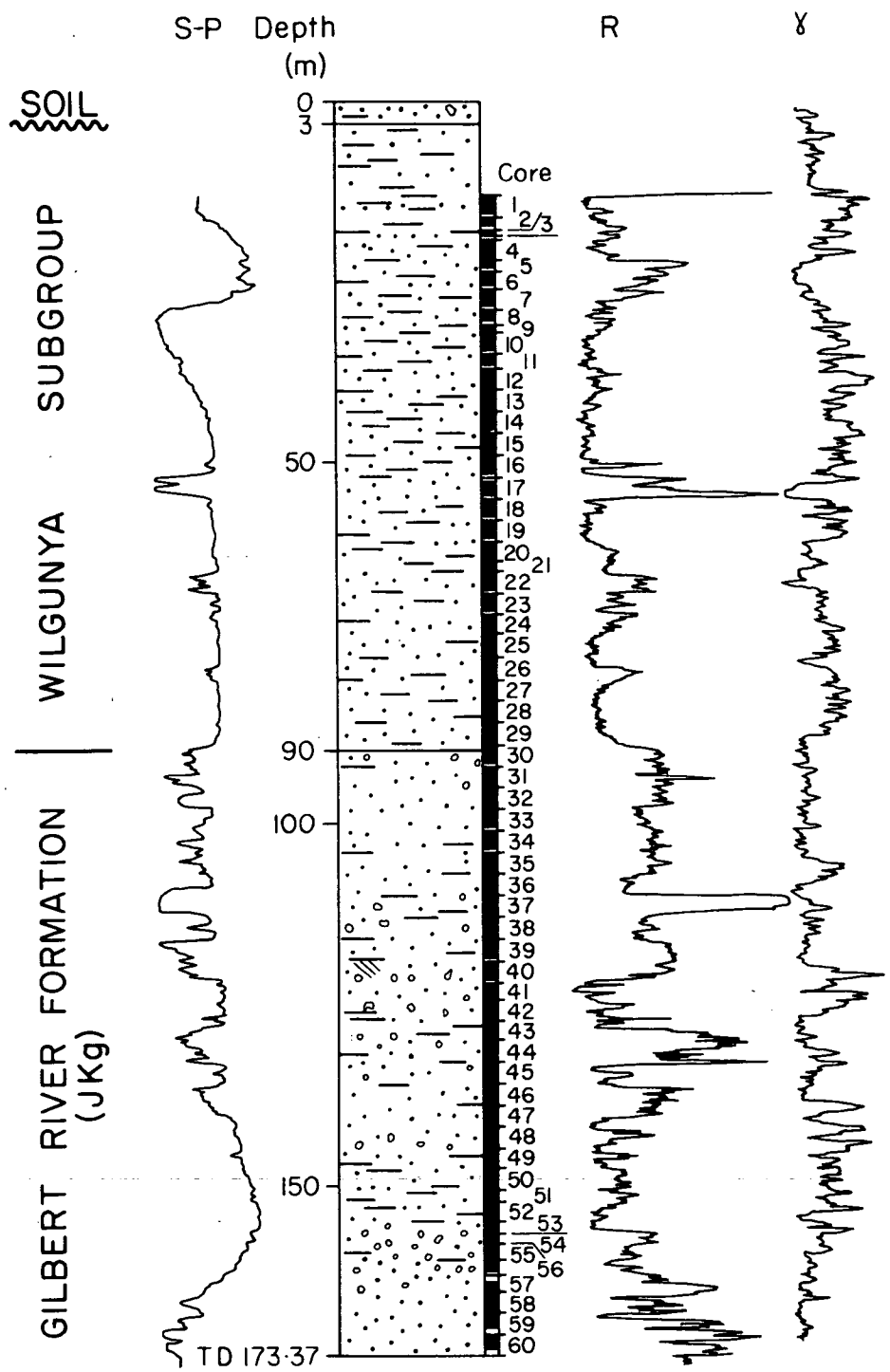
Figure 5



0–3 m	*tan coloured silt, pebbly iron-cemented sand*
3–13 m	*ferruginized cream to green mudstone and medium-grained glauconitic sandstone, grey siltstone*
Core 1–Core 29 13·00–89·00 m	*dark grey micaceous silty mudstone, and green to grey medium to fine-grained labile (or quartzose) glauconitic sandstone; flaser-bedded, bioturbated. Minor calcite and pyrite*
Core 30–Core 52 89·00–155·00 m	*1 m as above, then grey or greenish grey medium to coarse-grained micaceous quartzose sandstone, granule conglomerate and carbonaceous siltstone. Thinly interlaminated, bioturbated and cross-laminated in part, with minor glauconite and pebble conglomerate*
Core 53–Core 60 155·00–173·37 m	*light grey massive partly silty medium to very coarse-grained quartzose sandstone, granule and pebble conglomerate, occasionally cross-laminated. Minor carbonaceous material*

To accompany Record 1974/76

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The high proportion of sandstone towards the base of the Rolling Downs Group makes its lower boundary difficult to determine in outcrop. Spore and pollen analyses of the core material date core 1 as late Neocomian and place the bottom core near the Jurassic/Cretaceous boundary (Burger, pers. comm.).

Details of core intervals and recovery are given in Appendix 1.

BMR AURUKUN 1

(Fig. 6)

POSITION: Lat, 13°37½'S, long. 141°33½'E; at Don Yard, about 6 km north of Peret (outstation of Aurukun Mission). Elevation is about 10 m.

OBJECTIVES: (a) To provide a fresh core of the Rolling Downs Group for micropalaeontological examination.

(b) To determine the nature and thickness of the Wyaaba Beds and Bulimba Formation in the area.

The hole was sited near what is thought to be the highest stratigraphic level in the Mesozoic succession in the onshore part of the Carpentaria Basin.

DRILLING: Casing cemented to 19.2 m, drilled entirely with mud. The hole was plugged and abandoned at a total depth of 132.59 m.

LOGS: Lithological and wireline logs by D.L. Gibson.

LITHOSTRATIGRAPHY:

0-2 m — fine to coarse-grained yellowish quartz sand - old beach ridge deposit (Qm).

2-87 m — Wyabba Beds

- 2-35 m white very clayey sand, mottled to 15 m.
- 35-39 m bioturbate white and blue-grey sandy clay (marine).
- 39-87 m Very sandy clay and/or very clayey sand, generally white.

87-105 m — Bulimba Formation

Very sandy clay and/or very clayey sand, generally white.

105-T.D. 132.59 m — Normanton Formation

Fine to medium-grained labile sandstone and blue-grey silty mudstone; weathered to yellow-brown above 122 m.

REMARKS

Marine sediments within the Wyaaba Beds have been recognized wlsewhere only offshore at Weipa (Zwigulis, 1971), and in water bores near Edward River Mission (Lat. 14°54'S, long. 141°36'E) and near Rutland Plains Station (Lat. 15°38'S, long. 141°50'E); shelly fossils from the latter area are described by Day (in Doutch et al., 1973). The band of marine sediment at Weipa, about 45 m below mean sea level at its shallowest, is slightly deeper than the bioturbate blue-grey and white sediment (the first indication of marine sediment) in Aurukun 1.

It is difficult to separate the Bulimba Formation from the Wyaaba Beds in this bore. The top of the Bulimba Formation has been placed at a depth below which the coarse quartz grains in the cuttings show slight traces of ferruginization (87 m). The wireline logs show a slight change in character at about 90 m. However, it is possible that the Bulimba Formation is absent. Smart (in Doutch et al., 1973) has shown that the Bulimba Formation is locally absent in the area offshore of Weipa about 110 km to the north.

Core 4 from the Normanton Formation contained no polynomorphs (Burger, pers. comm.).

BMR AURUKUN 2

(Fig. 7)

POSITION: Lat. 13°51'S, long. 142°16'E; situated on a plateau about 23 km southwest of Merapah homestead. Elevation is about 110 m.

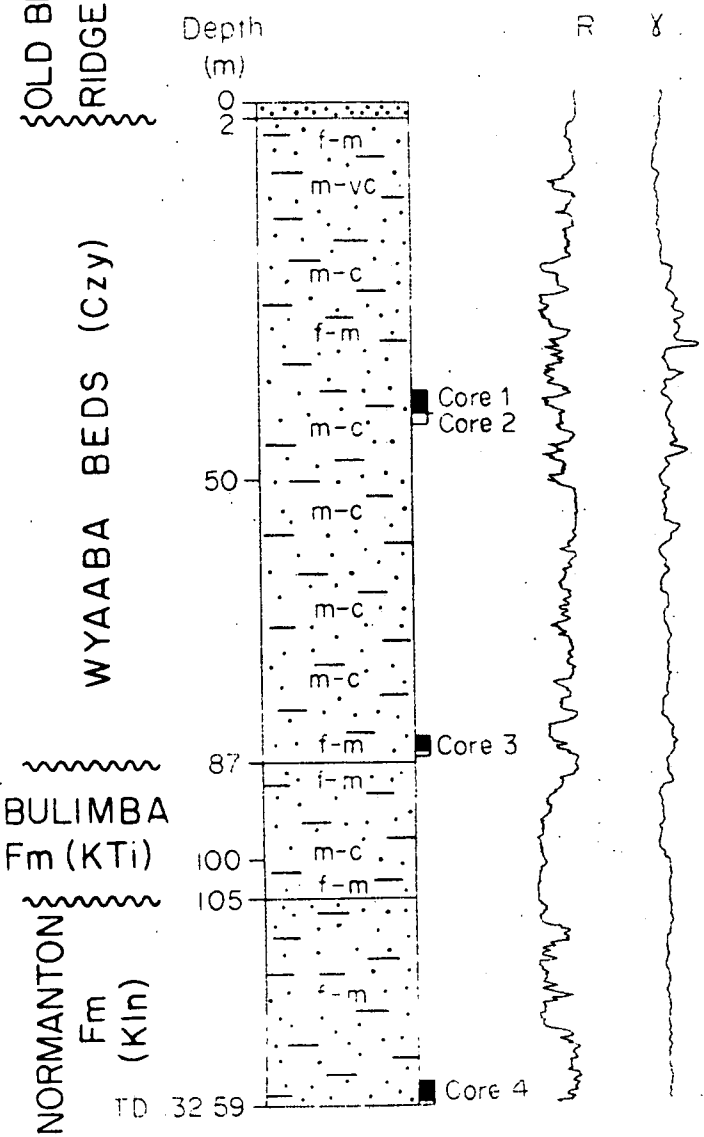
OBJECTIVES:

(a) To determine the nature and thickness of the Bulimba Formation in the area.

(b) To provide cores of the Rolling Downs Group for lithological and micropalaeontological examination.

Figure 6

BMR AURUKUN 1



0-2 m	*beach ridge sand - fine to coarse-grained poorly sorted subangular quartz sand*
2-35 m	*white very clayey sand, mottled to 15 m*
35-39 m	*sand as above, but bioturbated, and white and blue-grey*
Cores 1 and 2 38·10-42·67 m	*recovered 2·97 m (63%) of white and blue-grey bioturbated sandy clay (0·79 m). white sandy clay with thin wavey laminations of blue-grey clay (0·18 m), white slightly sandy to sandy clay (0·91 m), and white very sandy (medium to coarse-grained) clay with shelly fossils*
39-87 m	*white to yellow very clayey sand and/or very sandy clay*
Core 3 83·82-86·26 m	*recovered 1·78 m (73%) of fine to very fine-grained white clayey sand with trace fossils (1·42 m), and white clay with a few thin sandy bands (0·36 m)*
87-105 m	*white to yellow very clayey sand and/or very sandy clay*
105-132·59 m	*fine to medium-grained labile sandstone and blue-grey silty mudstone*
Core 4 129·54-132·59 m	*recovered 2·64 m (87%) of fine to medium-grained green-brown labile sandstone*

To accompany Record 1974/76

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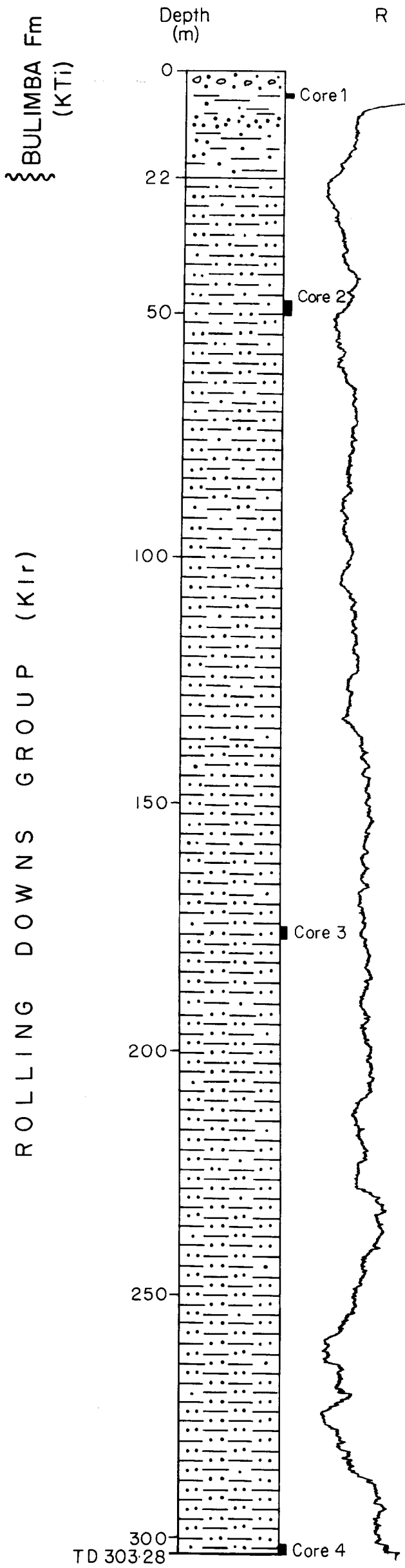
BMR AURUKUN 2

Figure 7



0–4m *red-brown medium to very coarse-grained pisolitic quartzose sand*

Core 1
4·88–5·33m *recovered 0·45m (100%) of white silicified sandy claystone with minor purple mottling.*

4–9m *mottled and partly silicified sandy claystone*

9–12m *medium to very coarse-grained clayey quartzose sand*

12–22m *mottled sandy clay and claystone*

Core 2
47·24–50·29m *recovered 3·02m (99%) of flaser-bedded blue-grey silty mudstone, siltstone, and very fine to fine-grained labile sandstone*

22–98m *lithology as for core 2, but oxidised to a yellow colour above 42m*

Core 3
175·26–177·32m *recovered 2·01m (98%) of blue-grey flaser-bedded silty mudstone, siltstone, and minor very fine to fine-grained labile sandstone*

98 – TD 303·28m *lithology as for core 3*

Core 4
301·75–303·28m *recovered 1·53m (100%) of blue-grey flaser bedded silty mudstone, with siltstone and minor very to fine-grained labile sandstone*

To accompany Record 1974/76

M(S) 321

DRILLING: Drilled with air to 10.7 m, then with mud. Casing set at 25.6 m. The hole was plugged and abandoned at a total depth of 303.28 m.

LOG: Lithological log by D.L. Gibson and J. Smart; wireline log run by D.L. Gibson. No gamma or self-potential logs were taken because of faults in the logger ('Widco 2000').

LITHOSTRATIGRAPHY:

0-22 m — Bulimba Formation

Mottled sandy clay and claystone, some clayey quartzose sand (medium to very coarse-grained). Top 3.7 m is lateritised, and pisolites are common. The interval from 4 to 9 m is partly silicified.

22-T.D. 303.28 m — Rolling Downs Group

Flaser-bedded grey silty mudstone, siltstone and fine labile sandstone to about 98 m. Below this it is less sandy, but generally similar. The top 20 m is slightly oxidised yellow and brown.

REMARKS

The laterization of the Bulimba Formation has produced an aluminous laterite. To the northwest, weathering has been more intense and has formed bauxite.

The bottom of the sandier part of the Rolling Downs Group at 98 m may represent the base of the Normanton Formation. This cannot be verified by observation on the surface because of poor outcrop.

BMR AURUKUN 30

(No Figure)

POSITION: Lat. 13°37'S, long. 141°39'E; on the Peret/Merapah track about 5 km west of the Archer River. Elevation is about 12 m.

OBJECTIVES: To determine the thickness and nature of the Wyaaba Beds. In a previous attempt to drill in this area, the Gemco 110A

Auger could not penetrate the stiff sandy clay of the Wyaaba Beds (Aurukun 20 in Smart et al., 1974).

DRILLING: Drilled with air to 10.7 m, then with water injection. The hole was plugged and abandoned at a total depth of 27.5 m.

LOGS: Lithological log by J. Smart; no wireline logs were run as the "suitcase logger" was out of action.

LITHOSTRATIGRAPHY:

0 - 21.9 m Wyaaba Beds

0 - 3.1 m red-yellow medium to coarse-grained clayey quartzose sand with some pisolites and ferruginous nodules and abundant fragments (coarse to very coarse) of ferruginous (and silicified?) clay and sandy clay.

3.1 - 5.5 m medium to very coarse-grained quartzose sand, sandy clay.

5.5 - 8.5 m yellow, brown and red-stained medium to very coarse-grained clayey quartzose sand. Minor quartzose granules and pebbles.

8.5 - 21.9 m grey-white clayey quartzose sand, medium to very coarse-grained, and sandy clay.

21.9 - T.D. 27.5 m Bulimba Formation

Yellow-brown and pink stained quartzose clayey sand (medium to very coarse-grained) and sandy clay.

REMARKS

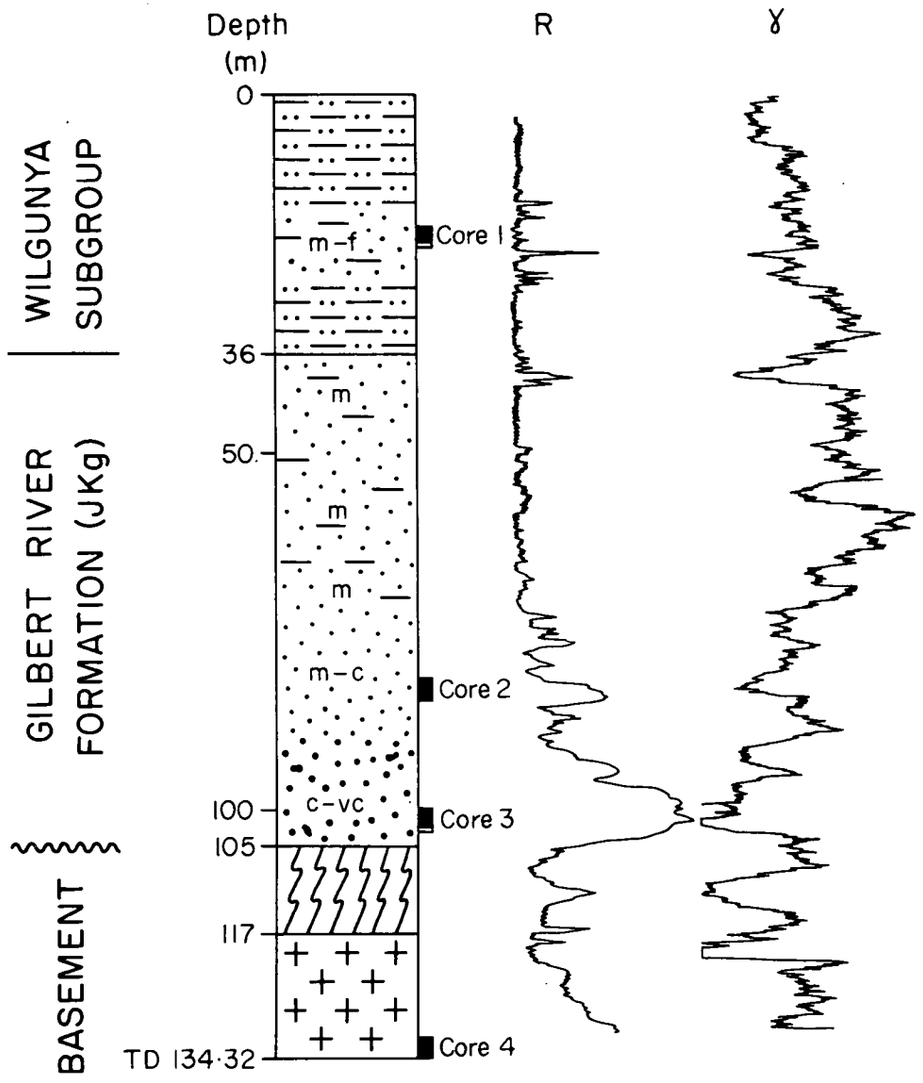
The older laterite surface in the region formed on the Bulimba Formation has been largely eroded off in this area and the boundary between the Bulimba Formation and the Wyaaba Beds is not well marked (compare with Aurukun 1).

BMR COEN 1

(Fig. 8)

POSITION: Lat. 13°19'S, long. 142°52'E; about 250 m north of where the track to Wolverton homestead leaves the Kennedy Road, and 30 m west of the telegraph line. Elevation is about 155 m.

Figure 8



1–16 m	*1m of yellow and grey loam soil, followed by red and white, then khaki and yellow, to blue-grey silty mudstone by 12m*
16–27 m	*interbedded medium-grained well sorted rounded glauconitic quartz sandstone and silty mudstone*
Core 1 18·59–21·03 m	*recovered 2·05m (82%) of flaser-bedded silty mudstone and medium to fine-grained glauconitic quartz sandstone*
27–36 m	*mainly blue-grey silty mudstone, some medium-grained sandstone*
36–72 m	*mainly medium-grained glauconitic quartzose sandstone, some blue-grey silty mudstone*
72–90 m	*grey medium to coarse-grained moderately to well sorted subangular glauconitic quartz sandstone*
Core 2 81·39–84·43 m	*recovered 2·80m (92%) of grey medium to coarse-grained moderately well sorted subangular to subrounded glauconitic quartz sandstone, grading into coarse-grained sandstone*
90–105 m	*reddish poorly sorted angular quartzose sandstone, coarse to very coarse-grained, pebbly in places*
Core 3 99·67–102·72 m	*recovered 2·67m (88%) of coarse to very coarse-grained poorly sorted angular quartzose sandstone. Hard, pebbly in places, cross-bedded*
105–117 m	*quartz-mica schist ? Cuttings are grey medium to coarse-grained very very poorly sorted angular quartz, and coarse muscovite*
117–134·32 m	*granodiorite – see description of Core 4*
Core 4 131·68–134·32 m	*recovered 2·64m (100%) of biotite hornblende granodiorite with basic xenoliths. Feldspar is white to greenish*

To accompany Record 1974/76

M(S) 322

OBJECTIVES:

(a) To determine the nature of the base of the Wilgunya Subgroup and of the Gilbert River Formation in this area.

(b) To help determine which of two possible photogeological boundaries is the correct Gilbert River Formation/ Wilgunya Subgroup boundary.

(c) To provide fresh cores of the Wilgunya Subgroup and Gilvert River Formation for micropalaeontological examination.

DRILLING:

Casing cemented to 5.5 m. Drilled with air to 13.7 m, then mud. The hole was plugged and abandoned at a total depth of 134.32 m.

LOGS:

Lithological log by D.L. Gibson; wireline logs run by J. Smart and D.L. Gibson.

LITHOSTRATIGRAPHY:

0-36 m — Wilgunya Subgroup

0-12 m	white, reddish and yellow-brown weathered silty mudstone.
12-16 m	blue-grey silty mudstone.
16-27 m	interbedded blue-grey silty mudstone and grey-green fine to medium-grained moderately to well sorted rounded glauconitic quartzose sandstone.
27-36 m	mainly grey silty mudstone, some medium-grained glauconitic quartzose sandstone.

36-105 m — Gilbert River Formation

36-72 m	mainly medium-grained glauconitic quartzose sandstone, some grey silty mudstone.
72-92 m	Grey-green coarse-grained moderately to well sorted sub-angular glauconitic quartz sandstone (marine).
92-105 m	reddish coarse to very coarse-grained poorly sorted angular quartzose sandstone, pebbly in places (continental). A fresh water aquifer.

105-T.D.134.32 m Basement

105-117 m	quartz-mica schist?; cuttings are medium to coarse-grained angular very poorly sorted grey quartz grains and coarse flakes of muscovite. Very hard drilling.
117-134.32 m	biotite-hornblende granodiorite with basic xenoliths.

REMARKS

The base of the Wilgunya Subgroup was placed at 36 m as the section is generally sandy below this depth. There are no changes in the pattern of the wireline logs at this depth. The boundary could be placed at 72 m, where there is a basic change in the pattern of the resistivity log and a coarsening of grainsize, leaving 33 m of Gilbert River Formation. However, field work in the area east and south of Coen 1 suggests that the Gilbert River Formation is 60 to 90 m thick in the area, so the latter pick is unlikely. Similar problems in picking the base of the Rolling Downs Group in ZCL Weipa 1 (see Gibson in Doutch et al., 1973) were also encountered.

The boundary at 36 m corresponds to the more easterly of the two possible photogeological boundaries between the Gilbert River Formation and the Wilgunya Subgroup.

It is difficult to map the boundary by rock type on the ground as the mudstone of the lower part of the Rolling Downs Group weathers easily, leaving outcrops and floaters of resistant fine-grained sandstone which is similar to that of the upper part of the Gilbert River Formation.

BMR COEN 2

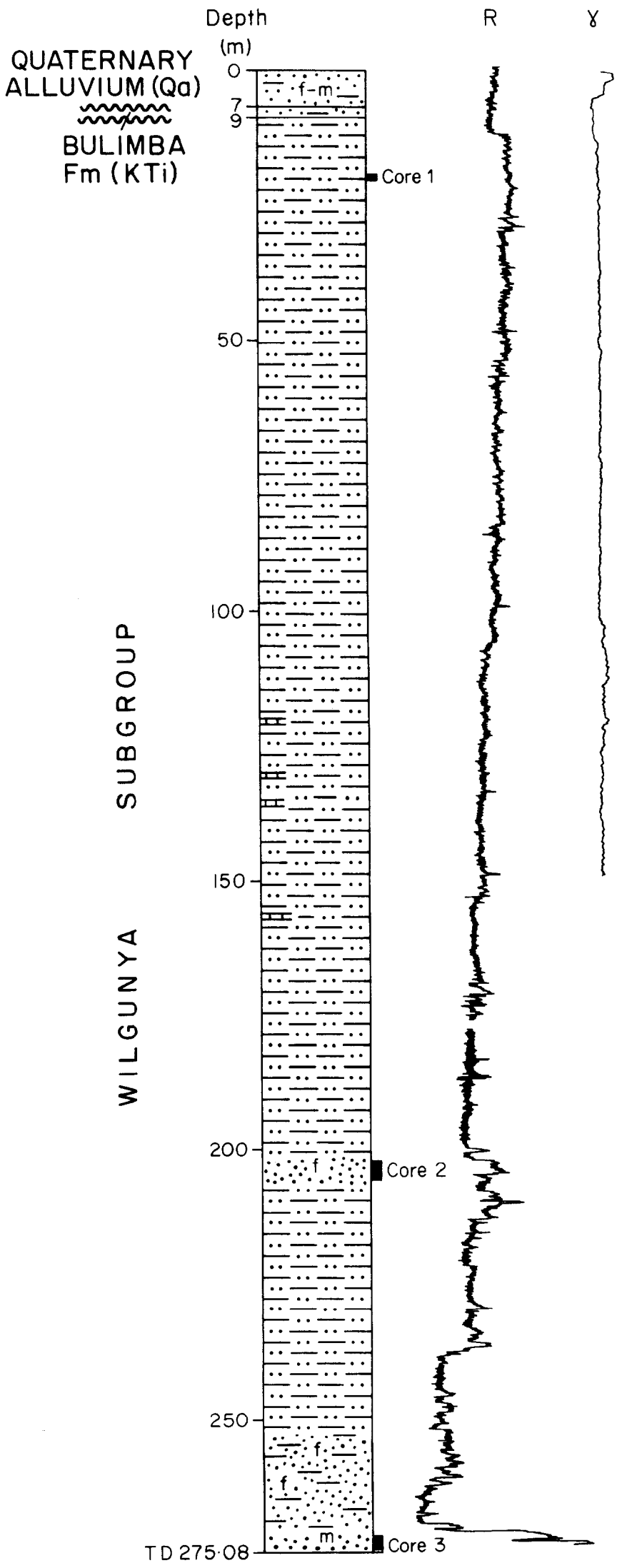
(Fig. 9)

POSITION: Lat. 13°40'S, long. 142°36'E; about 7.5 km west of Rokeby homestead on the Rokeby/Merapah road (0.5 km northeast of the main channel of the Coen River). Elevation is about 70 m.

OBJECTIVES: (a) To determine the nature of the Rolling Downs Group in the area.

Figure 9

BMR COEN 2



0 – 7 m	*medium to fine-grained quartzose slightly clayey sand*
7 – 9 m	*red-brown stained medium to fine-grained clayey sandstone and clay*
Core 1 19·81 – 20·27 m	*recovered 0·43 m (93%) dark grey massive silty mudstone*
9 – 120 m	*blue-grey silty mudstone*
	limestone band or nodule (45 cm)
	limestone band or nodule (70 cm)
120 – 207 m	*blue-grey silty mudstone with some minor (<0·10m) limestone bands to 201 m, then interbedded blue-grey silty mudstone and fine-grained glauconitic quartz sandstone to 207m*
Core 2 202·69-205·74 m	*recovered 2·95 m (97%) of grey mudstone with one 1·5cm nodule of hard brown limestone (0·58m) grading into grey mudstone with specks and small products of fine glauconitic sand (0·40m) grading into green-grey bioturbated fine to very fine-grained glauconitic quartz sandstone with numerous shards and partings of grey mudstone (1·97m). Sandstone contains a little artesian water*
207 – 250 m	*blue-grey silty mudstone*
250 – 275·08 m	*interbedded blue-grey silty mudstone and fine-grained glauconitic quartz sandstone to 271 m, then sandstone as in Core 3*
Core 3 272·03-275·08m	*recovered 2·51 m (82%) of grey-green medium-grained moderately sorted subrounded glauconitic quartz sandstone. Fresh water aquifer (artesian flow)*

To accompany Record 1974/76

M(S)323

(b) To provide fresh cores of the Rolling Downs Group for micropalaeontological examination.

(c) To determine the thickness and nature of the Bulimba Formation in the valley of the Coen River.

DRILLING: Casing cemented to 14.6 m. Drilled with air to 7.6 m, then with mud. The hole could not be plugged immediately on completion of drilling as the amount of cement and barites available was not enough to contain the 5 litres per second (about 4000 g.p.h.) artesian flow from sandstone in the bottom 4 m of the hole.

A blow-out preventer was screwed onto the casing, and the hole was allowed to flow at a reduced rate through a tap for several weeks, as water was forcing its way to the surface outside the casing when the flow was shut off completely.

The hole was finally plugged by completely filling it with cement. Total depth was 275.08 m.

LOGS: Lithological log by D.L. Gibson, J. Smart, K.G. Grimes; wireline logs run by D.L. Gibson. The self potential and gamma channels of the "Widco 2000" logger were defective at the time of logging. The gamma log was run with the "suitcase logger".

LITHOSTRATIGRAPHY:

0-7 m Medium to fine-grained slightly clayey quartzose sand. Quaternary alluvium.

7-9 m Bulimba Formation

Red-brown stained medium to fine-grained clayey sand and clay.

9-T.D. 275.08 m Wilgunya Subgroup

9-271 m Grey silty mudstone with minor limestone bands of concretions between 120 and 200 m, and with interbeds of fine-grained glauconitic quartz sandstone between 201 and 207, and 252 and 271 m.

271-275.08 m Grey-green medium-grained glauconitic quartz sandstone.

REMARKS

The interval from 7 to 9 m has been assigned to the Bulimba Formation as photo-interpretation has shown that this unit is present in the valley of the Coen River in this area.

Age dating of outcrops of the Rolling Downs Group in the Coen Sheet area using palynomorphs (Evans, 1966), foraminifera (Haig, pers. comm.) and macrofossils (Day in Doutch et al., 1973) and regional mapping suggest that the hole should intersect the upper/lower Albian boundary. As the Toolebuc Formation was not intersected, it can be concluded that this unit is not present. The boundary between equivalents of the Allaru Mudstone and Wallumbilla Formation may be at about 105 m as there are slight changes in resistivity and gamma ray intensity at this depth, and limy and sandy intervals are present below 120 m. An analysis of water from this hole is given in Table 3. The high level of fluorine in the water makes it unsuitable for human consumption or stock watering.

TABLE 3

WATER ANALYSIS, BMR COEN 2

Government Chemical Laboratory, Qld.

No. 815/73 G.S.

	ppm
Total Dissolved Solids	1065
Na^+	407
K^+	2.5
Ca^{++}	9
Mg^{++}	4
Cl^-	207
$SO_4^=$	131
HCO_3^-	617
NO_3^-	<0.5
F^-	5.0
Fe	<0.05
Alkalinity as $CaCO_3$	506
Hardness as $CaCo_3$	39
pH	7.5
K25°C micromhos/cm	1800

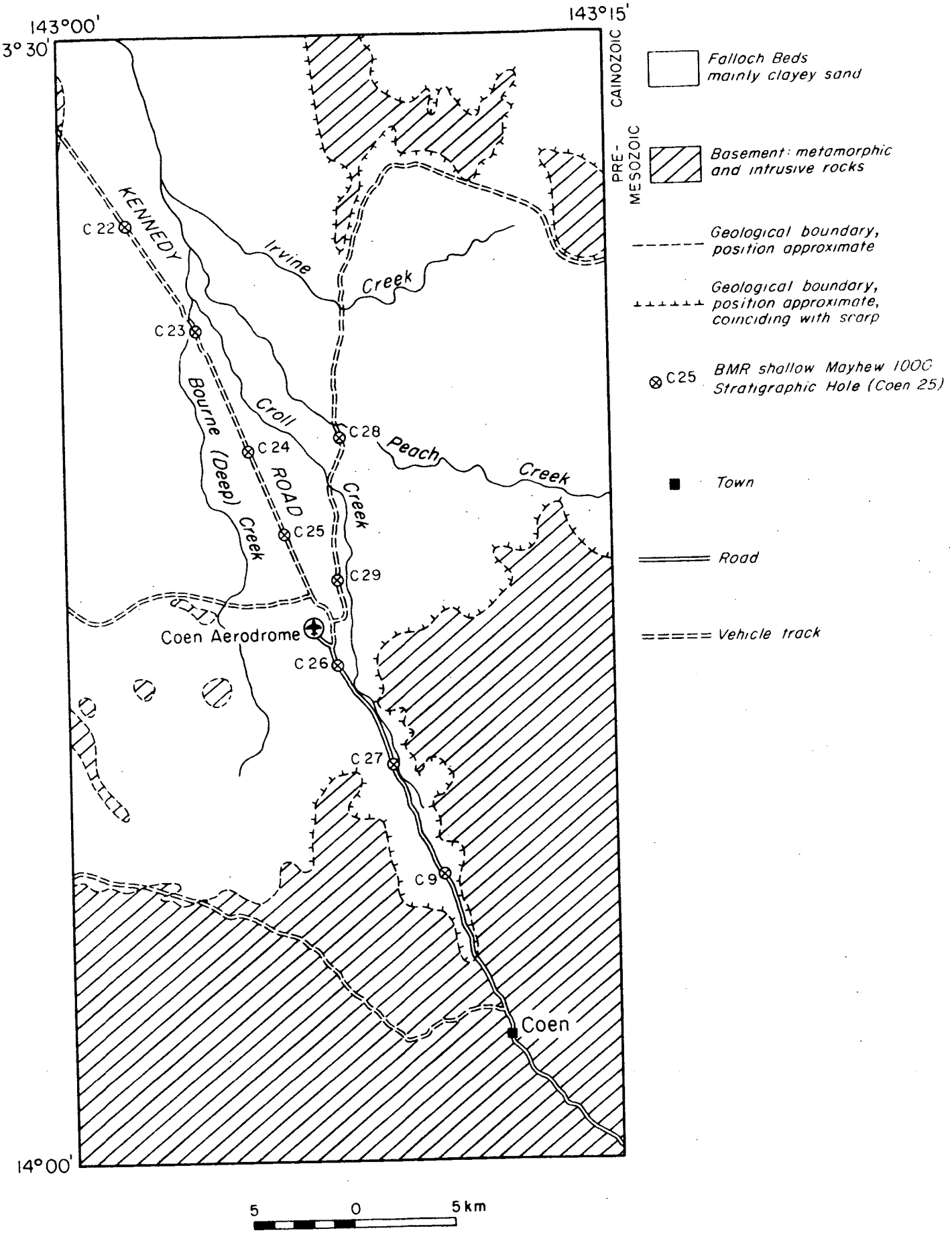


FIGURE 10 Locality Map, Shallow "Mayhew 1000" Holes
(southern part of the Archer-Wenlock Basin)

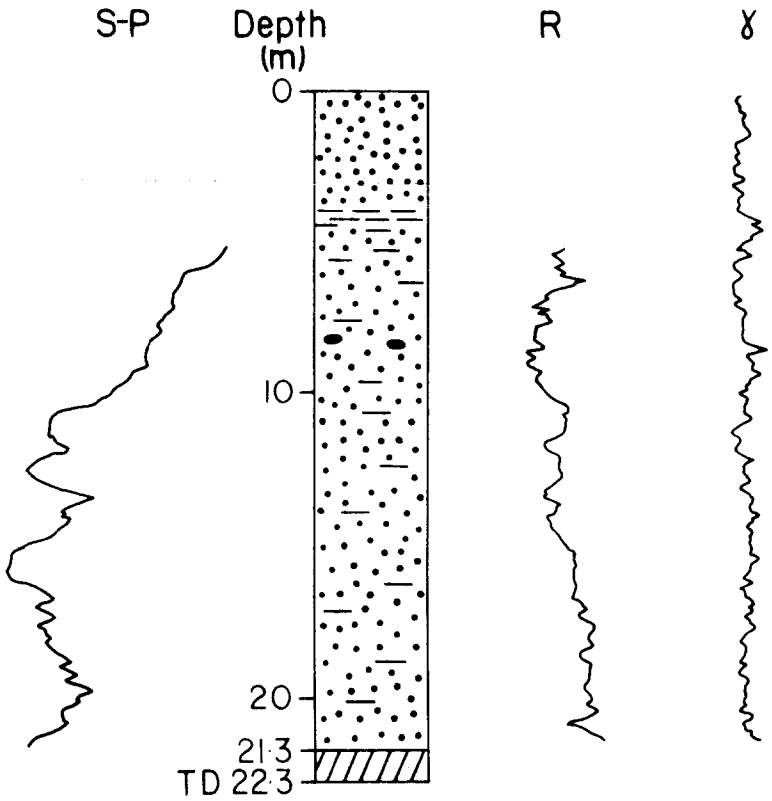
To accompany Record 1974/76

D54/A8/2

Figure II

BMR COEN 9

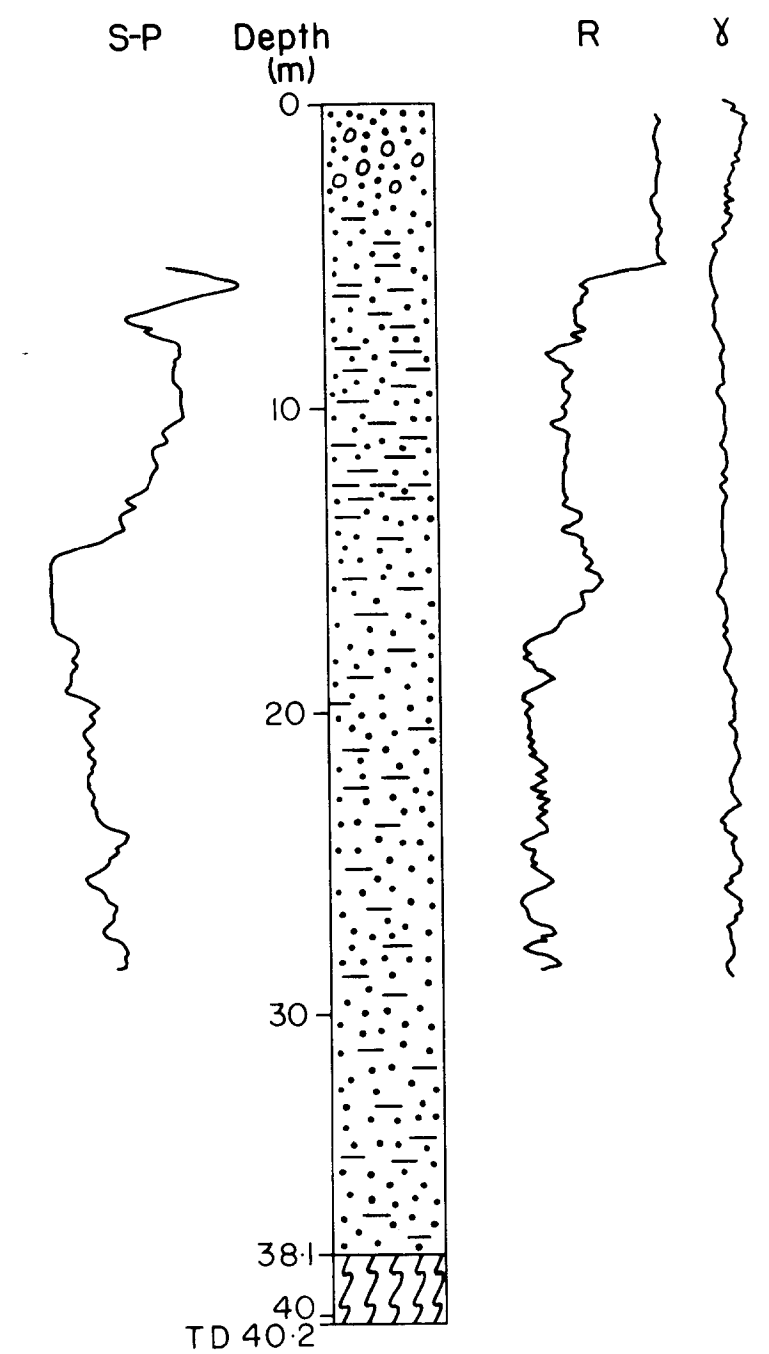
13°52'S, 143°10'E Drilled with air



0-3·7m	*fine to medium-grained sand, hard drilling from 2·4m*
3·7-4·3m	*grey-blue clay. Easy drilling*
4·3-21·3m	*poorly sorted fine to coarse-grained clayey quartzose sand, gravelly between 7·9 and 8·5 m, feldspathic below 13·7 m*
21·3-22·3m	*metamorphic or igneous rock containing biotite. Very hard drilling below 21·9 m*

BMR COEN 22

13°35'S, 143°02'E Drilled with air to 30m, then water



0-0·6m	*poorly sorted fine to coarse-grained quartzose sand*
0·6-3·0m	*reddish sand as above and ferruginous pisolites*
3·0-6·0m	*slightly reddish poorly sorted fine to coarse-grained clayey quartzose sand*
6·0-7·6m	*brownish-yellow very clayey sand as above*
7·6-9·1m	*mottled (red, yellow and white) poorly sorted fine to very coarse-grained very clayey quartzose sand*
9·1-16·8m	*mottled (red and white) silty and sandy clay*
16·8-17·7m	*reddish medium to very coarse-grained clayey quartzose sand*
17·7-30·5m	*yellow-brown (partly reddish above 24·4m) fine to medium-grained clayey sand*
30·5-38·1m	*reddish poorly sorted fine to coarse-grained quartzose sand*
38·1-40·2m	*quartz-muscovite schist*

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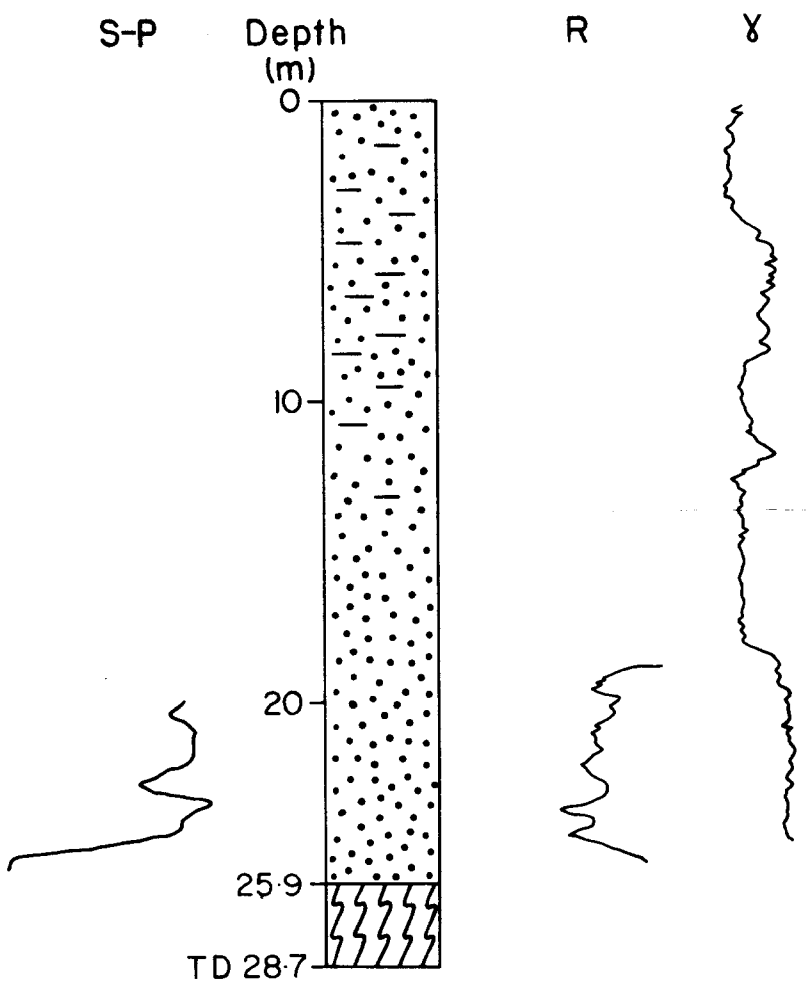
Figure 12

BMR COEN 23

13°38'S, 143°04'E Drilled with air



0–4·3m *poorly sorted fine to very coarse-grained slightly feldspathic quartzose sand and a little white sandy clay. Hard drilling below 3·0m*

4·3–10·7m *yellowish and whitish medium to fine-grained sandy clay and clayey sand*

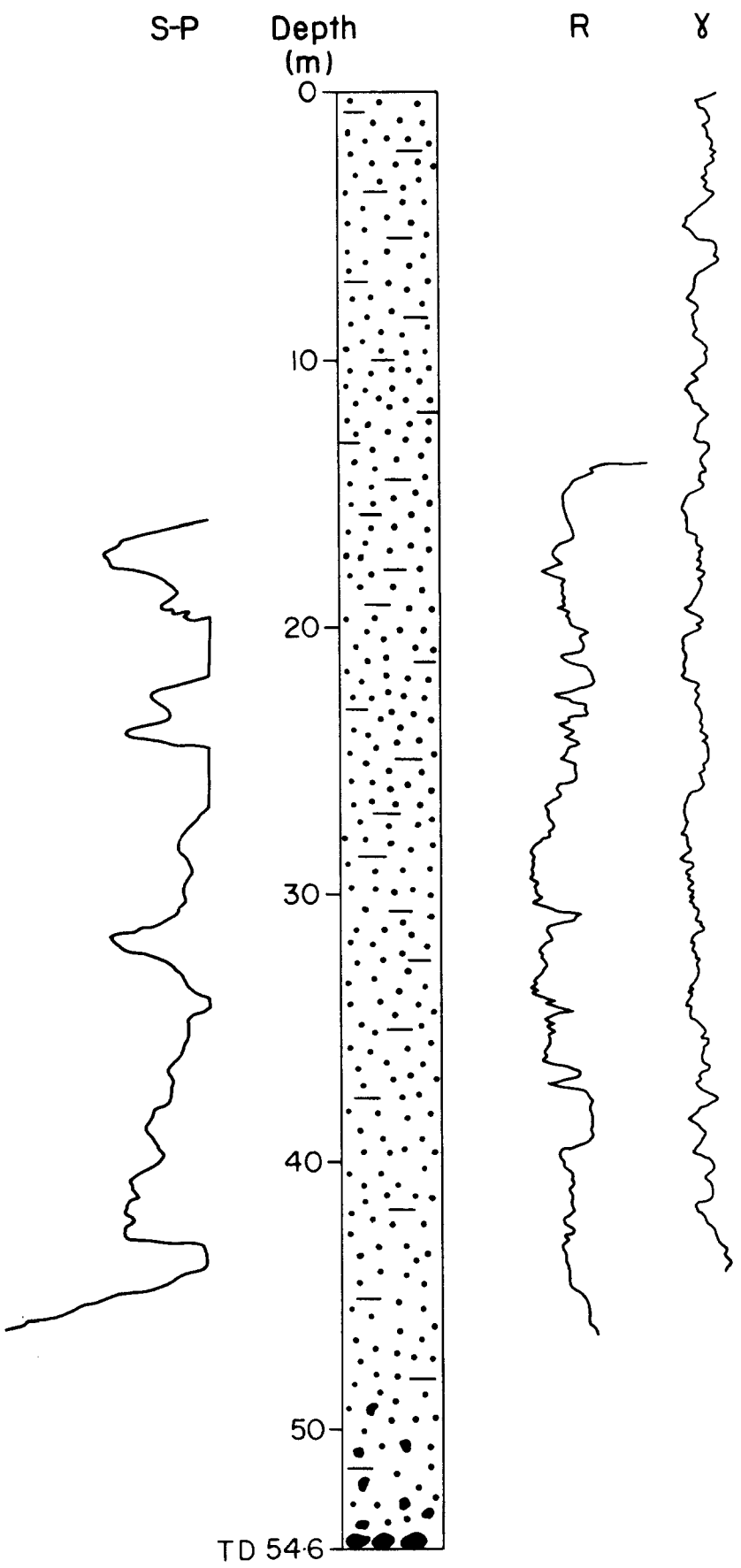
10·7–15·2 m *yellowish poorly sorted fine to coarse-grained slightly clayey quartzose sand. Slightly feldspathic below 12·2 m*

15·2–25·9m *fine to medium-grained quartzose sand*

25·9–28·7m *fine to medium-grained quartzose sand, but fresher and more angular than above. Quartzite?*

BMR COEN 24

13°41'S, 143°05'E Drilled with air to 27m, then water injection



0–32·0m *poorly sorted fine to medium-grained very clayey sand. Khaki to 29m, then reddish (ferruginized)*

32·0–54·6m *poorly sorted medium to very coarse-grained clayey sand (mainly quartz, some feldspar and chert present) with granules present below 49m. Hole bottomed in conglomerate (hard drilling)*

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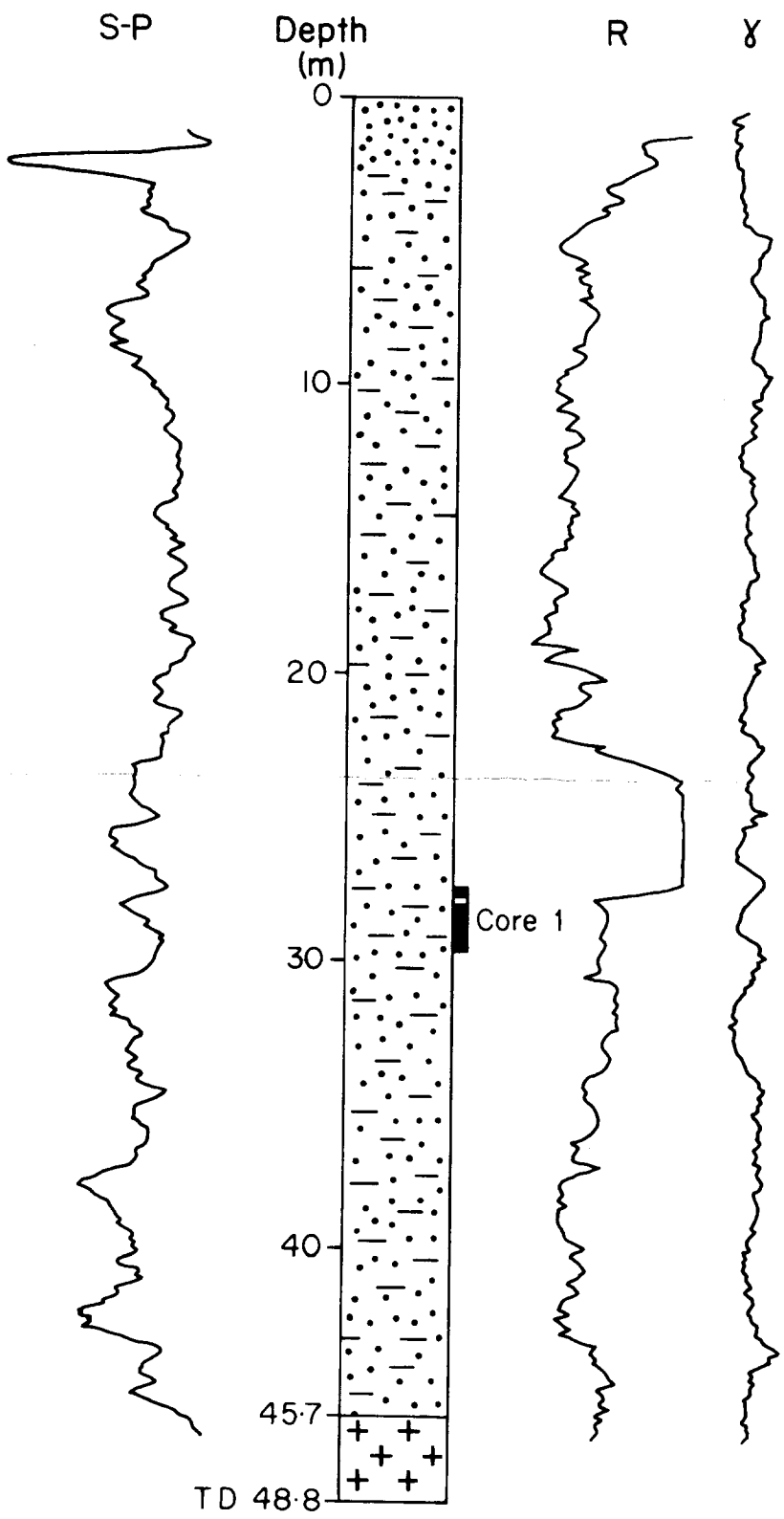
Figure 13

BMR COEN 25

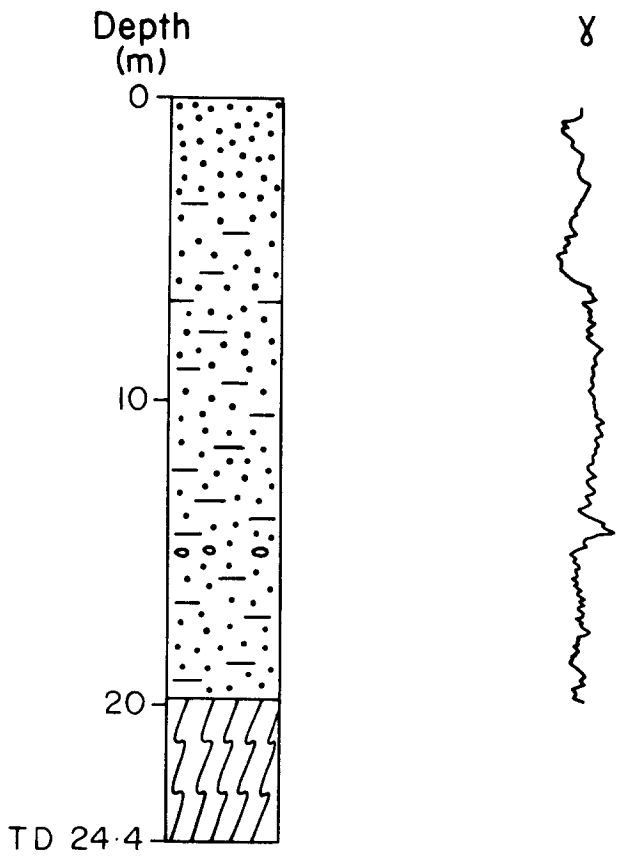
13°43'S, 143°06'E Drilled with water



0–3·0 m	*coarse to very coarse-grained poorly sorted quartzose sand*
3·0–9·1 m	*reddish coarse to very coarse-grained clayey feldspathic quartzose sand*
9·1–15·2 m	*slightly reddish medium-grained clayey quartzose sand*
15·2–25·9 m	*coarse-grained clayey quartzose sand*
25·9–28·4 m	*slightly reddish medium to coarse-grained clayey quartzose sand. Harder drilling than above*
Core 1 27·43–29·64 m	*recovered 1·93m (87%) of medium to coarse-grained clayey to very clayey quartzose sand with red and yellow staining to 28·37m, then soft whitish coarse to very coarse-grained very clayey quartzose sand*
28·4–45·7 m	*soft coarse to very coarse-grained clayey quartzose sand*
45·7–48·8 m	*granitic basement rock*

BMR COEN 26

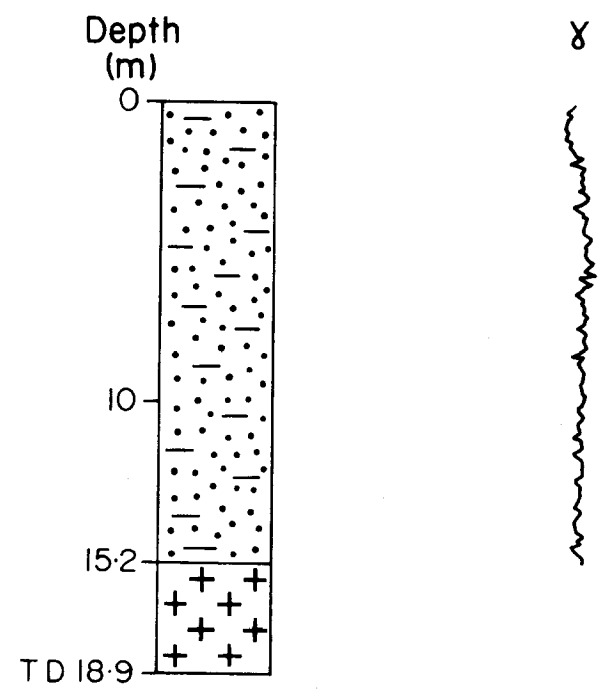
13°47'S, 143°07'E Drilled with air



0–3·0 m	*slightly reddish poorly sorted fine to coarse-grained quartzose sand*
3·0–19·8 m	*fine-grained very clayey sand. Reddish to 6·1m, greyish to 9·1m, then brownish yellow. Pebble band at 15m*
19·8–24·4 m	*quartz-biotite schist*

BMR COEN 27

13°50'S, 143°09'E Drilled with air



0–15·2 m	*poorly sorted fine to coarse-grained clayey feldspathic quartzose sand*
15·2–18·9 m	*granitic basement rock, weathered to 18·0m, then fresh (hard drilling)*

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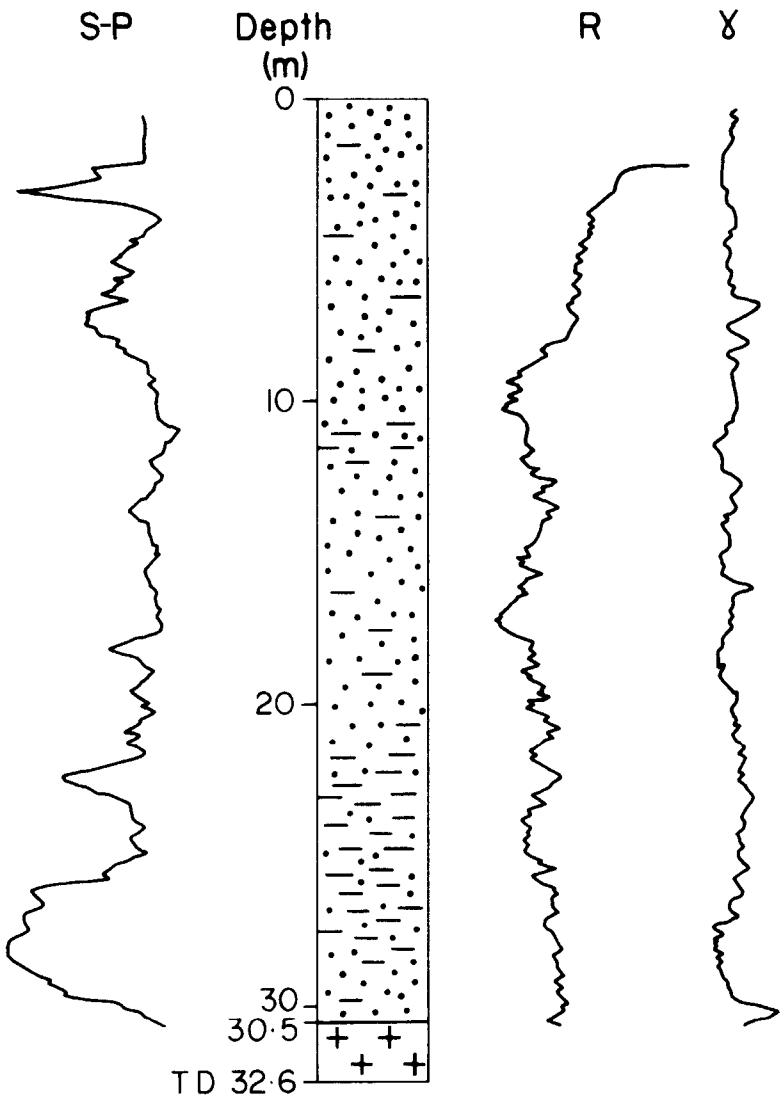
Figure 14

BMR COEN 28

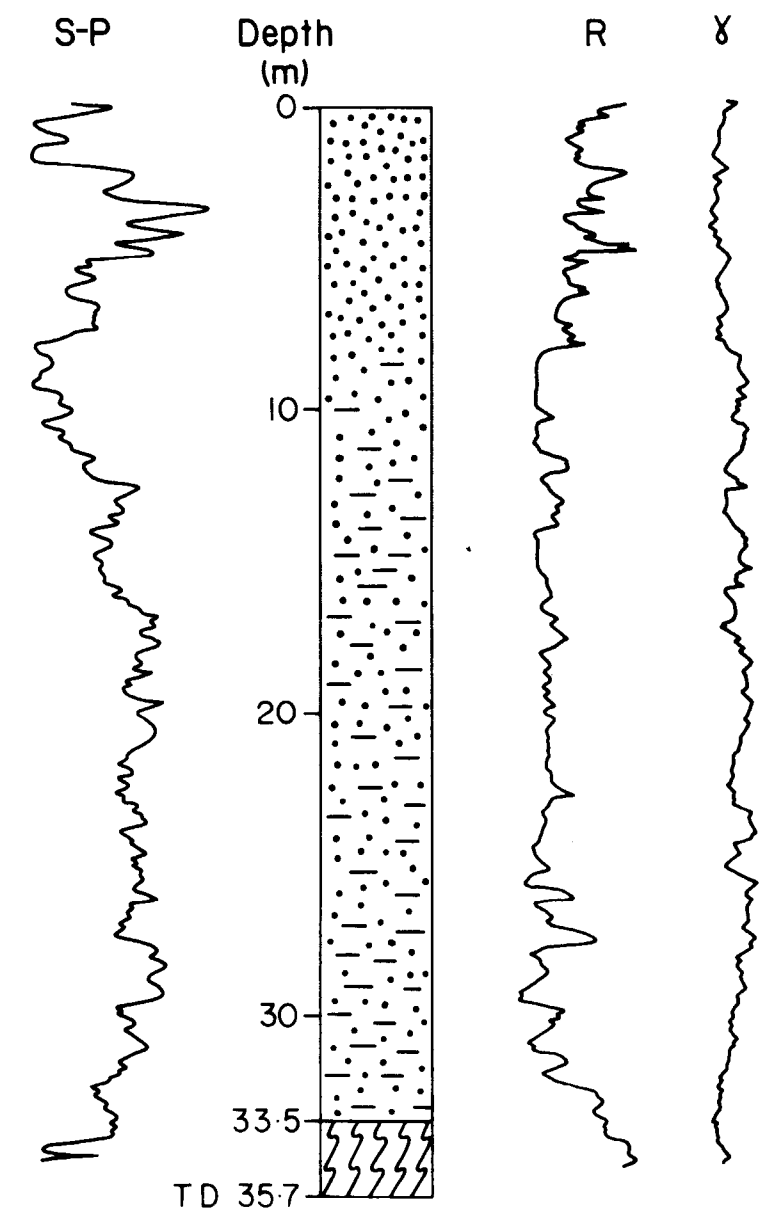
13°41' S, 143°08' E Drilled with mud



0–0·9 m	*medium to fine-grained quartzose sand*
0·9–3·7m	*ferruginized fine to very coarse-grained clayey quartzose sand*
3·7–10·7m	*harder medium to coarse-grained feldspathic clayey quartzose sand*
10·7–12·2m	*white very sandy (fine to coarse-grained) clay*
12·2–21·3m	*mainly medium to coarse-grained feldspathic clayey quartzose sand, some very sandy clay*
21·3–27·4m	*fine sandy clay*
27·4–30·5m	*coarse-grained feldspathic clayey ? quartz sandstone*
30·5–32·6m	*weathered and epidotised? muscovite granite ?*

BMR COEN 29

13°45' S, 143°08' E Drilled with water



0–12·2m	*medium to coarse-grained feldspathic quartz sand. Clayey below 8m*
12·2–33·5m	*fine to medium-grained clayey feldspathic quartzose sand and sandy clay. Some carbonaceous? bands between 21·3 and 27·4m. Hard drilling below 30·4m*
33·5–35·7m	*schist*

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BMR COEN 9 AND COEN 22 TO 29

(Figs 11 to 14)

Nine shallow Mayhew 1000 holes were drilled in the 'Archer-Wenlock Basin' in the Coen Sheet to help elucidate its depositional history, and to determine whether there are any indications of sedimentary uranium or placer minerals in the Falloch Beds. The localities of these holes are shown in Figure 10, and latitudes and longitudes are given in Table 1 and on the graphic logs, Figures 11 to 14.

The Falloch Beds are the major unit in the basin. They generally have a sandy and/or ferruginous capping (e.g. in Coen 22) which supports open eucalypt forest. Topography over much of the basin is rolling with local relief of up to about 20 m; however, in an area of about 75 km^2 just north and east of the Coen airport, the land surface is very flat with no indications of a ferruginous capping and is vegetated with a dense Melaleuca (ti-tree) scrub. It was first thought that the ferruginous layer might pass at depth below this area: this would divide the Falloch Beds into two units separated by a period of weathering.

However, as no ferruginous layers were encountered in holes drilled in the low-lying flat area (Coen 23, 24, 25 and 29), it appears that sedimentation continued in low lying parts of the basin whilst sediments left exposed elsewhere were being weathered. Soil forming processes probably operated on the sediment as it was deposited, giving rise to mottling, now found at depth (e.g. in Coen 22 and 25), and the general microscopic texture of the Falloch Beds, which closely resembles textures found in many soils.

The Falloch Beds have been correlated with the Wyaaba Beds of Smart et al. (1972) and the Lilyvale Beds of Willmott & Whitaker (1968) as none of these lithologically similar Cainozoic deposits have a true lateritic capping, whereas the older Bulimba Formation (Smart et al., 1972) has. The Falloch Beds were originally mapped as Lilyvale Beds (Trail et al., 1969, Whitaker & Willmott, 1969), but recent field work has shown that they are a separate sequence (Smart <u>in</u> Doutch et al., 1973).

All cuttings from the holes were tested with a hand-held scintillometer, but there were no above-background readings. Gamma logs did not show any anomalies; the 'suitcase' logger was inoperative at the time of drilling, and the holes had to be logged after the program had finished, by which time all the holes had partly caved in. No placer minerals were found in the cuttings or core.

BMR HOLROYD 1

(Fig. 15)

POSITION: Lat. 14°41'S, 142°10'E; about 200 m west of the old Strathgordon homestead, and about 10 m south of the edge of the lagoon. Elevation approx. 45 m.

OBJECTIVES: (a) To determine the nature of the Wyaaba Beds, Bulimba Formation and Rolling Downs Group in the area.

(b) To determine the thickness of Cainozoic units in the area.

(c) To provide cores of the Rolling Downs Group for micro-palaeontological examination.

DRILLING: Casing cemented to 2.9 m. Drilled with mud to 2.9 m and from 14.3 m, with air from 2.9 to 14.3 m. The hole tended to cave below about 120 m. It was plugged and abandoned at a total depth of 308.45 m.

LOGS: Lithological log by D.L. Gibson, wireline logs run by G. Jennings, Geophysical Branch.

LITHOSTRATIGRAPHY:

0-119 m — Wyaaba Beds

Clayey sand, sandy clay and clay, 'case hardened' to 12 m; 1 m of hard pebbly sandstone at the base. The "Widco 2000" logger was faulty at the time of drilling, and the hole had caved into 100 m below the surface when an attempt to log it was made several weeks later.

119-151 m — Bulimba Formation

Interbedded coarse clayey sand and sandy clay. Very easy drilling.

151-T.D. 308.45 m — Wilgunya Subgroup

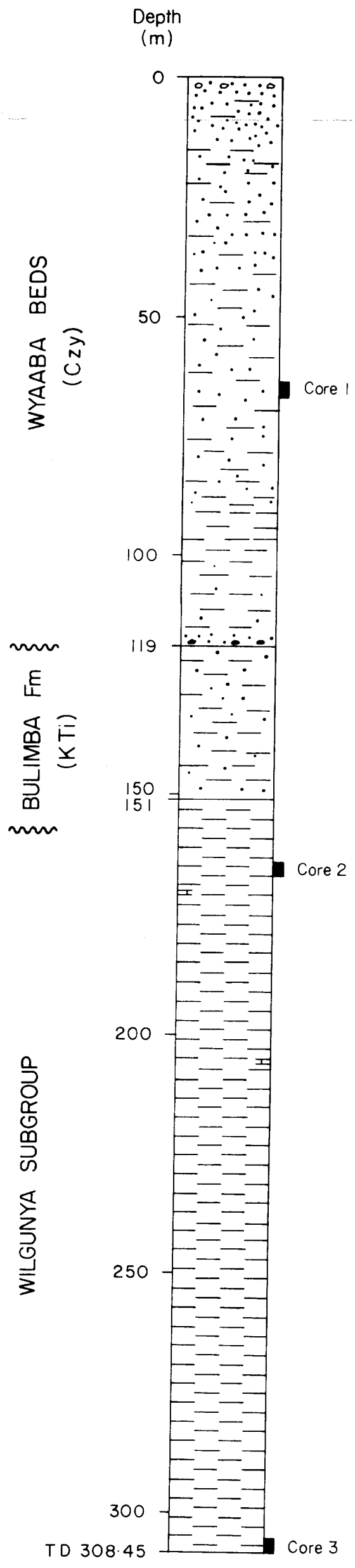
Dark grey silty mudstone, sandy siltstone and mudstone. Weathered to yellow-brown above 160 m.

REMARKS

The Wyaaba Beds/Bulimba Formation boundary may be higher or lower than shown in the logs, as deep weathering effects at the top of the Bulimba Formation are not obvious

BMR HOLROYD 1

Figure 15



0–12m	*1m of sandy soil, then poorly sorted angular quartzose sandstone, coarse-grained and pebbly between 1 and 2m, then medium-grained. Some sandy mudstone below 3m*
12–23m	*poorly sorted angular medium to coarse-grained clayey sand and sandy clay*
23–42m	*poorly sorted angular coarse-grained clayey sand and some sandy clay*
42–77m	*very clayey angular poorly sorted quartzose sand and/or sandy clay*
Core 1 63·40–66·45m	*recovered 3·05m (100%) very sandy clay (coarse-grained angular quartz grains), white slightly mottled (0·79m), very clayey sandstone (grains as above), more mottling (2·26m)*
77–89m	*sandy to slightly sandy (medium to coarse grained) clay. Softer than above.*
89–101m	*white clay*
101–118m	*soft slightly silty and/or sandy clay*
118–119m	*pebbly poorly sorted angular quartzose sandstone*
119–151m	*interbedded coarse-grained poorly sorted angular to subangular quartzose clayey sandstone and medium grained sandy clay. Soft*
Core 2 163·98–166·88m	*recovered 2·90m (100%) dark grey sandy mudstone. Massive*
151–308·45m	*dark grey silty and very fine-grained sandy mudstone and siltstone. Some thin (about 20cm) carbonate bands or concretions. Weathered to khaki colour above 160m*
Core 3 305·71–308·45m	*recovered 2·70m (99%) of dark grey flaser bedded mudstone and very fine-grained sandstone or siltstone*

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and the two formations are similar lithologically. The base of the Wyaaba Beds has been taken at a conglomerate band at 118-119 m below which the hole tended to cave.

A recent regional study of probable dips and formation thicknesses in the area shows that the hole probably penetrated equivalents of the Allaru Mudstone and possibly the Wallumbilla Formation.

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APPENDIX 1

DETAILS OF CORING

Core No.	Interval Cored	Distance Cored	Recovered	% recovery
Orford Bay 1				
1	29.56-32.61	3.05	2.28	75
2	76.81-79.85	3.04	2.39	79
3	122.53-125.58	3.05	2.58	85
4	168.25-170.99	2.74	2.62	96
5	214.07-217.12	3.05	2.60	85
6	264.27-267.32	3.05	2.48	81
7	327.98-329.50	1.52	0.66	43
		19.50	15.61	80
Weipa 1				
1	49.91-52.58	2.67	2.15	81
2	60.05-60.96	0.91	0.90	99
3	186.54-189.59	3.05	2.64	87
4	250.55-253.60	3.05	3.05	100
5	328.00-331.00	3.00	2.94	96
		12.68	11.68	92
Cape Weymouth 1				
1	14.03-15.48	1.45	1.34	92
2	44.53-45.85	1.32	1.32	100
3	45.85-48.90	3.05	2.45	80
4	76.66-79.71	3.05	2.34	77
5	104.16-107.21	3.05	2.65	87
6	136.18-139.23	3.05	2.47	81
7	168.21-171.26	3.05	2.60	85
8	200.23-203.28	3.05	2.11	69
9	227.68-230.73	3.05	0.56	18
10	259.71-262.76	3.05	2.54	83
11	291.73-293.25	1.52	1.50	99
12	331.93-334.98	3.05	2.14	70
		31.74	24.02	76
Cape Weymouth 2				
1	13.00-16.00	3.00	2.57	86
2	16.00-18.00	2.00	1.01	51
3	18.00-18.80	.80	0.42	53
4	19.00-22.00	3.00	3.00	100
5	22.00-23.50	1.50	1.26	84
6	23.50-26.00	2.50	2.13	85
7	26.00-29.00	3.00	2.73	91
8	29.00-31.00	2.00	1.05	53
9	31.00-32.00	1.00	1.00	100
10	32.00-35.00	3.00	2.79	93

Core No.	Interval Cored	Distance Cored	Recovered	% recovery
51	150.85-152.07	1.22	1.22	100
52	152.07-155.00	2.93	2.92	100
53	155.00-156.80	1.80	1.67	93
54	156.80-158.00	1.20	1.07	89
55	158.00-160.10	2.10	1.81	86
56	160.10-162.25	2.15	1.74	81
57	162.25-164.72	2.47	1.38	56
58	164.72-167.72	3.00	2.96	99
59	167.72-170.72	3.00	1.51	50
60	170.72-173.37	2.65	1.60	60
		160.17	149.73	93
Aurukun 1				
1	38.10-41.15	3.05	1.47	48
2	41.15-42.67	1.52	1.50	99
3	83.82-86.26	2.44	1.78	73
4	129.54-132.59	3.05	2.64	87
		10.06	7.39	73
Aurukun 2				
1	4.88-5.33	0.45	0.45	100
2	47.24-50.29	3.05	3.02	99
3	175.26-177.32	2.06	2.01	98
4	301.75-303.28	1.53	1.53	100
		7.09	7.01	99
Coen 1				
1	18.59-21.03	2.44	2.01	82
2	81.39-84.43	3.04	2.80	92
3	99.67-102.72	3.05	2.67	88
4	131.68-134.22	2.64	2.64	100
		11.17	10.12	91
Coen 2				
1	19.81-20.27	0.46	0.43	93
2	202.69-205.74	3.05	2.95	97
3	272.03-275.08	3.05	2.51	82
		6.56	5.89	90
Coen 25				
1	27.43-29.64	2.21	1.93	87
Holroyd 1				
1	63.40-66.45 m	3.05 m	3.05 m	100
2	163.98-166.88	2.90	2.90	100
3	305.71-308.45	2.74	2.70	99
		8.69	8.65	100
	TOTAL CORING	269.87	242.03	90

Core No.	Interval Cored	Distance Cored	Recovered	% recovery
11	35.00-37.00	2.00	1.96	98
12	37.00-40.00	3.00	2.94	98
13	40.00-43.00	3.00	3.00	100
14	43.00-46.00	3.00	3.00	100
15	46.00-49.00	3.00	2.96	99
16	49.00-52.00	3.00	3.00	100
17	52.00-55.00	3.00	2.60	87
18	55.00-58.00	3.00	2.79	93
19	58.00-61.00	3.00	2.61	87
20	61.00-63.70	2.70	3.04	113
21	63.70-65.05	1.35	1.35	100
22	65.05-68.00	2.95	2.80	95
23	68.00-71.00	3.00	2.96	99
24	71.00-73.85	2.85	2.71	95
25	73.85-77.00	3.15	3.15	100
26	77.00-80.10	3.10	3.10	100
27	80.10-83.00	2.90	2.90	100
28	83.00-86.00	3.00	3.00	100
29	86.00-89.00	3.00	2.99	100
30	89.00-92.00	3.00	2.85	95
31	92.00-95.00	3.00	3.00	100
32	95.00-98.00	3.00	3.00	100
33	98.00-101.00	3.00	2.94	98
34	101.00-104.00	3.00	2.97	99
35	104.00-107.00	3.00	3.00	100
36	107.00-110.00	3.00	3.00	100
37	110.00-113.00	3.00	2.99	100
38	113.00-116.00	3.00	2.97	99
39	116.00-119.00	3.00	2.95	98
40	119.00-122.00	3.00	2.85	95
41	122.00-124.20	2.20	2.20	100
42	124.20-127.20	3.00	2.79	93
43	127.20-130.00	2.80	2.80	100
44	130.00-133.00	3.00	2.96	99
45	133.00-136.00	3.00	2.97	99
46	136.00-139.00	3.00	2.98	99
47	139.00-142.00	3.00	3.02	101
48	142.00-145.00	3.00	2.94	98
49	145.00-147.77	2.77	2.77	100
50	147.77-150.85	3.08	3.08	100