DEPARTMENT OF
MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1973/77

SHALLOW STRATIGRAPHIC DRILLING IN THE CARPENTARIA AND LAURA BASINS, 1972

by

D.L. Gibson, B.S. Powell, H.F. Doutch,
J. Smart and K.G. Grimes*

*Geological Survey of Queensland

Record 1973/77

SHALLOW STRATIGRAPHIC DRILLING IN THE CARPENTARIA AND LAURA BASINS, 1972

by

D.L. Gibson, B.S. Powell, H.F. Doutch,
J. Smart and K.G. Grimes*

*Geological Survey of Queensland

CONTENTS

SUMMARY

Six shallow stratigraphic holes were drilled in northern Queensland using a BMR Mayhew 1000 rig in 1972: three in the west and one in the east of the Carpentaria Basin, one in the Laura Basin, and one in the area between the two basins. 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 in both basins;

c) showed that locally, the basal Mesozoic unit, the Gilbert River Formation, is overlapped by the Wallumbilla Formation along the western margin of the Carpentaria Basin in LAWN HILL and WESTMORELAND;

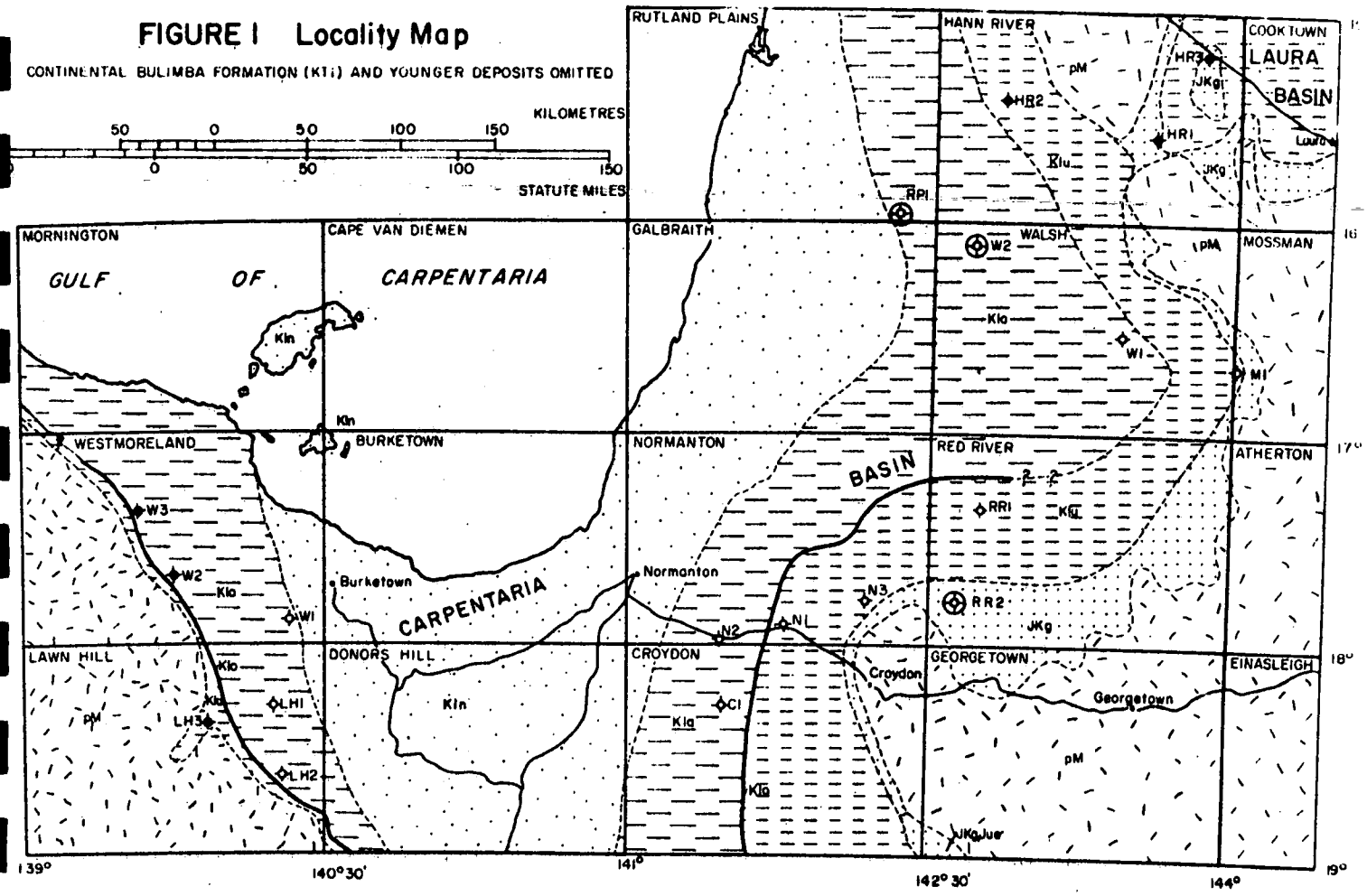
d) showed that the Toolebuc Limestone subcrops closer to the western margin of the Carpentaria Basin than expected;

e) showed that the Gilbert River Formation continues into the Laura Basin, where it is part of the Battle Camp Formation as it was originally defined.

f) showed that artesian water is available from the Mesozoic sandstone of the southwestern Laura Basin.

FIGURE 1 Locality Map

CONTINENTAL BULIMBA FORMATION (KTi) AND YOUNGER DEPOSITS OMITTED



LOWER CRETACEOUS

- Kln — Normanton Formation
- Klo — Allaru Mudstone
- Klo — Toolebuc Limestone
- Klu — Wallumbilla Formation, kle Wolena Claystone (Laura basin only)

JURASSIC AND LOWER CRETACEOUS

- JKg — Gilbert River Formation, Jue Eluo Queen Group (Carpentaria Basin only), Jd Dalrymple Sandstone (Laura Basin only)

- pM — Pre-Mesozoic Basement to the Carpentaria and Laura Basins

- ♦HR3 — BMR Stratigraphic Hole, 1972 (the third hole in Hann River sheet)
- ◇N2 — BMR Stratigraphic Hole, pre 1972 (the second hole in Normanton sheet)
- ⊕ — BMR Stratigraphic Hole, pre 1972, completed in Bulimba Formation
- ---------- Geological boundary, approximate
- -?-?- Geological boundary, inferred
- • Town
- ——— Road

ABBREVIATIONS USED IN DRILL LOGS

a/a	as above
c/s	change of scale, wireline logs
∿∿	unconformity
f	fine
m	medium
c	coarse
vc	very coarse

grain size of sand fraction

To accompany Record 1973

O/A 465

INTRODUCTION

General

Shallow stratigraphic drilling was carried out in the western part of the Carpentaria Basin during May and June 1972 and in the eastern part of the Carpentaria and western part of the Laura Basins during September, October, and November 1972 with a BMR Mayhew 1000 rig. Six holes were drilled to an aggregate depth of 938.2m; 96.97m was cored with an average recovery of 69%. Core details are shown in Appendix 1.

This program followed from earlier drilling in the Carpentaria Basin in 1969, 1970, and 1971 (Grimes & Smart, 1970; Needham et al., 1971; Smart & Grimes, 1971). The general objective of the program was to provide stratigraphic information on parts of the Carpentaria and Laura Basins mapped in 1971 and 1972. Specific objectives were:

1) to obtain fresh samples of unexposed or poorly exposed rock units,

2) to check thicknesses and possible lateral variations of units, in particular where they are close to basement outcrops and buried ridges,

3) to find the limits of the Toolebuc Limestone in the western Carpentaria Basin,

4) to compare the stratigraphy of the western Laura and eastern Carpentaria Basins, and

5) to investigate water supplies from Mesozoic and Cainozoic aquifers.

Naming of the holes is by 1:250 000 Sheet areas, e.g. BMR Hann River 2 is the second shallow stratigraphic hole drilled by the BMR in the Hann River 1:250 000 Sheet area. The localities of the Hann River holes will be shown on the second preliminary map to the first edition of HANN RIVER. Holes in WESTMORELAND will be shown on the second edition of this map. Lawn Hill 3 is shown on the preliminary to the second edition.

Approximate positions of the holes are shown in Figure 1 together with holes previously drilled by the BMR in the Carpentaria Basin. Latitudes and longitudes are given in the descriptions of the individual holes. Elevations given in the text are interpolated from computer-plotted form lines based on barometric levelling from BMR gravity surveys.

Results

Cores of the Gilbert River, Wallumbilla, Bulimba, and Floraville Formations, the Toolebuc Limestone, and possible equivalents of the Eulo Queen group in the Laura Basin, were obtained. The cores and cuttings have yet to be re-examined petrologically and palaeontologically in the laboratory.

The holes Westmoreland 2 and 3 show that the Toolebuc Limestone extends farther west than expected (it occurs at a depth of more than 30m below the top of the Mesozoic sequence in both these holes).

Lawn Hill 3 showed that a long narrow coastal embayment present in the western Carpentaria Basin at the time of deposition of the Wallumbilla Formation was probably a river valley being eroded in Gilbert River Formation time.

Hann River 1 showed that there is about 60m of Mesozoic sediment in the area where the Carpentaria and Laura Basins are connected. Most of this is regarded as Gilbert River Formation rather than Battle Camp Formation. Only a few metres of the overlying Wallumbilla Formation are present.

Artesian water was found in several aquifers penetrated by Hann River 3, in what is thought to be the Jurassic Dalrymple Sandstone (de Keyser & Lucas, 1968) of the Laura Basin. This unit has no equivalent in nearby parts of the Carpentaria Basin and is not present in Hann River 1 in the area where the two basins are connected. It is thought to be equivalent to the Jurassic Eulo Queen Group of the southern Carpentaria Basin.

Stratigraphy (see Table 1)

Stratigraphic terms used here are:

1) Mesozoic: those of Smart et al. (1971) for the Carpentaria Basin.

2) Cainozoic: the Lynd Formation of Laing & Power (1959) has been shown to consist of the late Cretaceous(?) or Tertiary Bulimba Formation and the late Cainozoic Wyaaba Beds (Smart et al., 1971); the Floraville Formation has been defined by Smart et al. (1971) and is equivalent to the Bulimba Formation; The Brixton Formation (see log of Hann River 1, Figure 5) of Lucas (1962, 1964) and Lucas & de Keyser (1965a, b) is in part if not wholly equivalent to the Lilyvale Beds of Whitaker & Willmott (1968). The relations of both to the Bulimba Formation and Wyaaba Beds in time and genesis, are for the moment obscure, but the Wyaaba Beds are the more likely time equivalent.

TABLE 1

STRATIGRAPHIC NOMENCLATURE - USED IN THIS RECORD

AGE		PREVIOUS TERMS (VARIOUS AUTHORS)		TERMINOLOGY IN THIS RECORD	GENERALISED LITHOLOGIES
CAINOZOIC	CRETACEOUS? OR TERTIARY PLIOCENE TO PLEISTOCENE	Lynd Formation, Brixton Formation		Wyaaba Beds (Czy)	Sandy clay, clayey sand, quartzose granule gravel. Continental (and marine?)
				UNCONFORMITY	
				Bulimba Formation (KTi)	'Laterite' at top. Sandy claystone, clayey sandstone and granule conglomerate. Continental
				Floraville Formation (KTf)	a/a, continental
				MAJOR UNCONFORMITY	
MESOZOIC	LOWER CRETACEOUS	Normanton Form.	Rolling Downs Gp. (Klr)	Normanton Formation (Kln)	Labile sandstone and mudstone. Marine (and continental?)
				Allaru Mudstone (Kla)	Mudstone. Marine.
		Kamileroi Lm.		Toolebuc Limestone (Klo)	Calcareous shale and limestone. Marine.
		Wolena Claystone			
		Trimble Formation & Blackdown Form.		Wallumbilla Formation (Klu)	Mudstone, minor labile sandstone and limestone. Marine.
	JURASSIC TO LOWER CRETACEOUS	Wrotham Park Sandstone	Gilbert River Formation (JKg)	Coffin Hill Member (Klf)	Medium-grained clayey quartzose sandstone. Marine
		Battle Camp Formation		Yappar Member (JKy)	Coarse to medium-grained clayey quartzose sandsto Continental.
		Gilbert River Formation			
	UPPER JURASSIC	Dalrymple Sandstone	Eulo Queen Group (Jue)	Loth Formation (Jul)	medium to coarse-grained clayey quartzose sandsto micaceous fine-grained sandstone and siltstone. Continental
				Hampstead Sandstone (Jh)	medium to very coarse-grained sandstone, conglomerate. Continenta

BMR WESTMORELAND 2
(Fig. 2)

POSITION: Lat 17°44'S, Long 138°46'E; 4 km west of Chookies Yard, 25 km NNW of Doomadgee Mission. Elevation 52 m.

OBJECTIVES:
(a) To find whether the Toolebuc Limestone is present at this locality, and if so, to determine its depth, thickness, and nature.

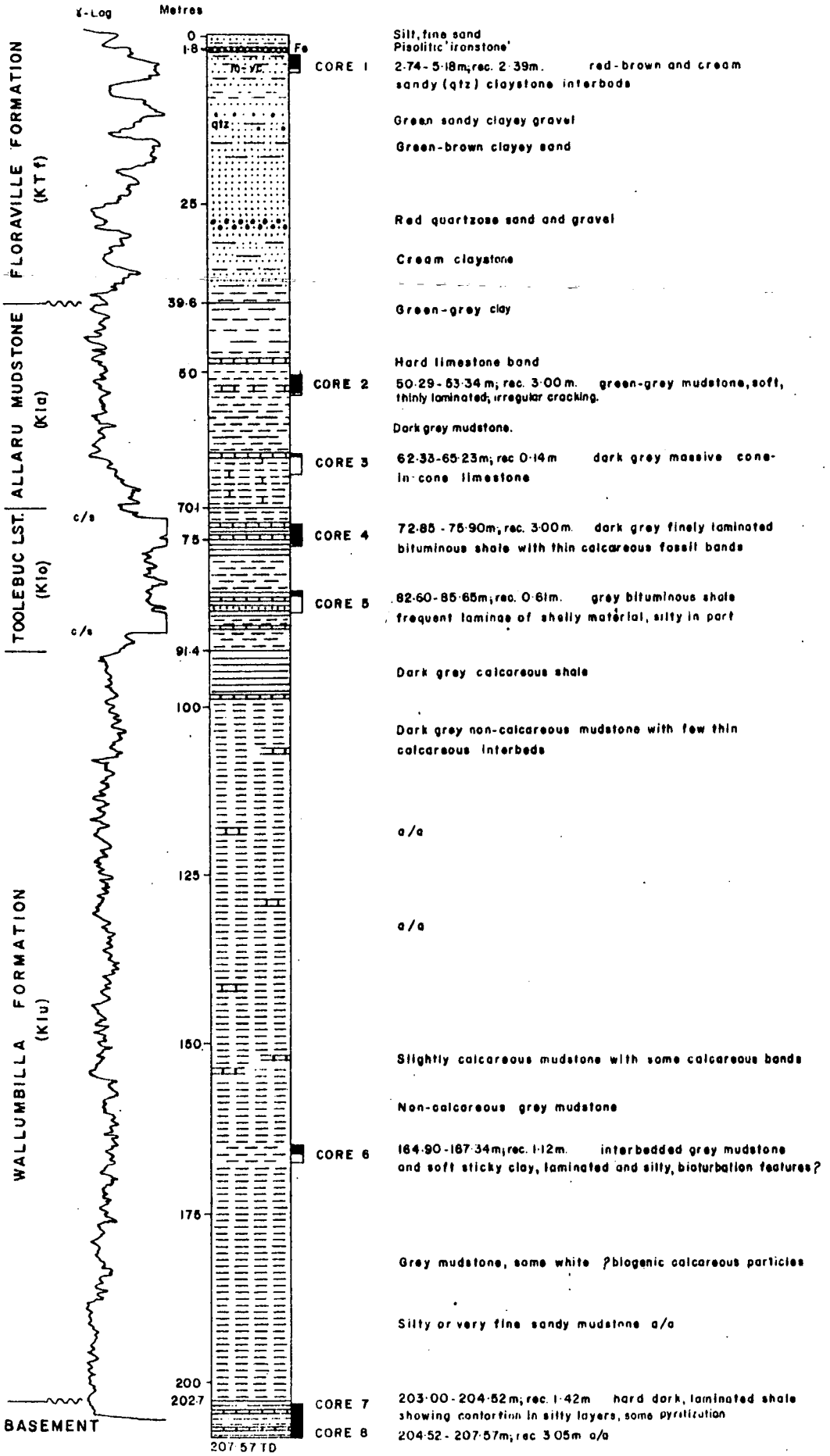
(b) To find whether an equivalent of the Gilbert River Formation is present, and if so, to determine its depth, thickness, and nature.

(c) To determine the thickness and nature of the Cainozoic rocks in the area.

(d) To determine the depth to and nature of basement.

The hole was sited near the western margin of the Carpentaria Basin. Extrapolation from previous work and nearby water bore data suggested that the Toolebuc Limestone would be absent or at a very shallow depth. About 30m of Allaru Mudstone was proved to overlie the Toolebuc Limestone in this hole. No equivalents of the Gilbert River Formation are present.

BMR WESTMORELAND 2 Fig: 2



To accompany Record 1973/77

Legend as on Fig.1

MIS1228

DRILLING: Drilled with air to 26 m, then with mud. The first 1. 8 m (mainly ferricrete) was very hard and drilling was slow; drilling rates in the mudstones were fast, but a water-truck breakdown slowed progress.

LOG: (lithological log B.S. Powell, gamma log J. Smart)

0-1.8 m	Soil
1.8-39.6 m	Floraville Formation. Cream-coloured sandy claystone and quartzose gravel, with pisolitic ironstone at the top; overlies red and green mottled poorly consolidated sand and clay.
39.6-70.1 m	Allaru Mudstone. Dark grey mudstone with a few thin bands of cone-in-cone limestone. Weathered to green clay in the top 8 m.
70.1-91.4 m	Toolebuc Limestone. Dark grey calcareous shale with a strong bituminous odour, thin bands of fossiliferous limestone and mudstone.
91.4-202.7 m	Wallumbilla Formation. Dark grey silty mudstone with hard calcareous bands.
202.7-T.D.207.57	Basement. Hard dark grey shale and siltstone.

BMR WESTMORELAND 3
(Fig. 3)

POSITION: Lat 17°25'S, Long 138°35'E; at Jam Tin Yards 36 km ESE of Westmoreland homestead on track north of Westmoreland-Doomadgee Mission road. Elevation 44m.

OBJECTIVES: a) To find whether the Toolebuc Limestone is present, and if so, to determine its depth, thickness, and nature.

b) To find whether an equivalent of the Gilbert River Formation is present, and if so, to determine its depth, thickness, and nature.

c) To determine the thickness and nature of the Cainozoic rocks in the area.

d) To determine depth to and nature of the basement.

It was thought that there would only be a thin sequence of Mesozoic rocks present, as basement rocks crop out 3 km from the drillsite. However, the thicknesses encountered are similar to those in Westmoreland 2. It is considered that the two holes are located along strike from each other.

DRILLING: Spudded into Quaternary alluvium. Drilled with air to 11 m, then mud. Drilling was rapid, especially through the mudstones. The hole was completed at a total depth of 196.3m, plugged and abandoned.

LOG: (Lithological log B.S. Powell; gamma log J. Smart)

0-1.5 m	Soil and alluvium
1.5-18.3 m	Floraville Formation. Friable red and white mottled sandy claystone capped by hard ferruginous gravel.
18.3-52.4 m	Allaru Mudstone. Dark grey mudstone weathering to khaki clay at the top and becoming progressively more shaly towards the base.
52.4-71.6 m	Toolebuc Limestone. Dark grey-brown fossiliferous bituminous shale and mudstone interbedded with grey fossiliferous limestone.
71.6-182.9 m	Wallumbilla Formation. Grey mudstone and shale with soft quartzose sandstone towards the base.
182.9-T.D.196.37m	Basement. Highly weathered greenish volcanics.

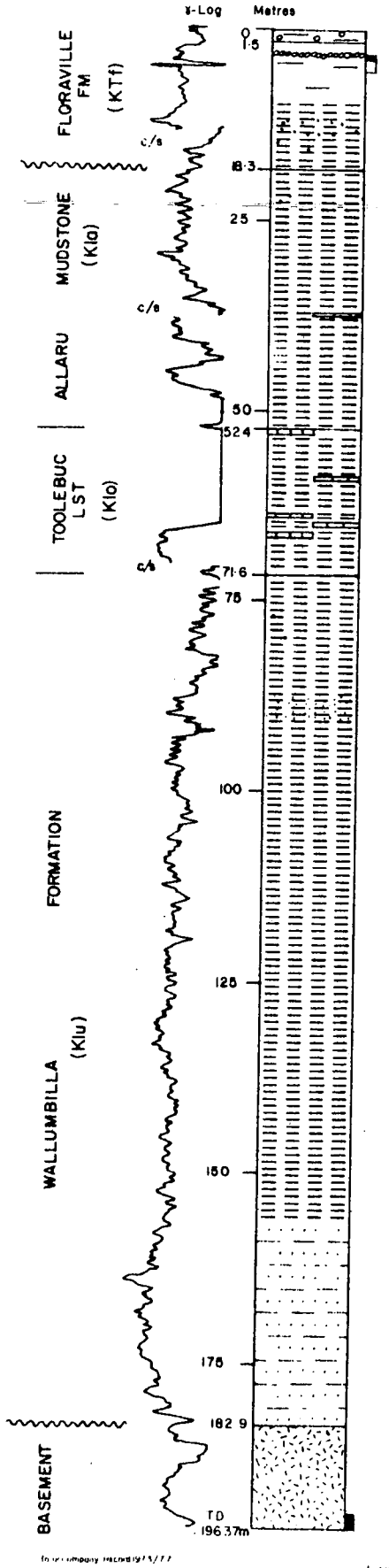
BMR LAWN HILL 3
(Fig. 4)

POSITION: Lat. 18°25'S, Long 138°58'W; Kittys Plain, Archie Creek. The hole was sited in a valley within low hills of Precambrian rocks. 16km west of the hole a mesa outlier of Mesozoic sandstone overlies Precambrian rocks. The hole was spudded into flood plain alluvium. Elevation is approx. 60m.

OBJECTIVES: a) To determine whether the Toolebuc Limestone is present, and is so, its thickness.

b) To determine whether the Gilbert River Formation is present, and if so, its thickness.

BMR WESTMORELAND 3 Fig.3



Brown silty clay
Ferruginous pisolitesand quartz gravel
CORE 1 3·05 - 5·79 m; recovered 0·56m pisolitic ironstone, quartz gravel and mottled sandy claystone

off-white silty clay, minor quartzose sand

yellow-green stiff clay

dark grey mudstone

bituminous mudstone/shale,and grey limestone

dark grey, non-calcareous mudstone

as above with some green sand-sized material (glauconite ?)

dark grey, non-calcareous mudstone

as above

as above

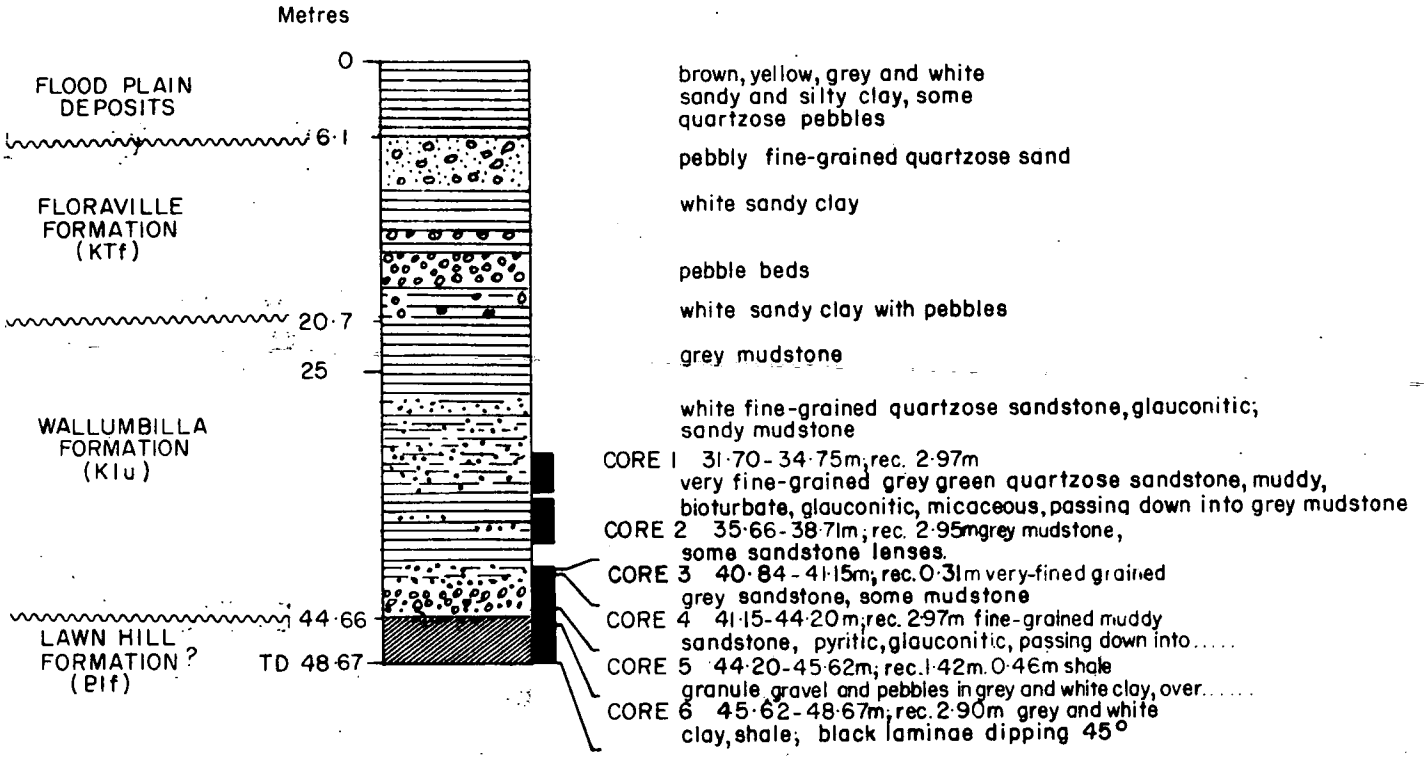
fine dark muddy sandstone (glauconite(?) and quartz)

CORE 2 194·46-196·37m; recovered 1·91m volcanics(?) soft friable, rotten, fawn-green, amygdaloidal, chlorite mineralization

Legend as on Fig 1

BMR LAWN HILL 3

Fig. 4



Legend as in Fig. 1

M(S)230

To accompany Record 1973/77

c) To core Mesozoic rocks for lithological and palaeontological examination.

d) To determine depth to basement, and its nature.

e) To determine the thickness and nature of Cainozoic rocks in the area.

f) To test groundwater.

DRILLING: Drilled with air to 9.1m, then with mud. Casing was cemented to 6.4m. There were no major drilling problems. The hole required cleaning out from time to time before and after coring.

LOG: (Lithological log H.F. Doutch; no gamma log)

0-6.1 m	Quaternary Alluvium
0-3 m	brown to yellow silty and sandy clay. Some detritus possibly derived from nearby 'laterite'.
3-6.1 m	grey, brown and white sandy (quartzose), silty or pebbly (ferruginous, quartzose) clay.
6.1-20.7 m	Floraville Formation
6.1-10.6 m	fine-grained quartzose sand with rounded pebbles of sandstone, siltstone, quartz.
10.6-15.5 m	white clay; pebble band near base.
15.5-18.3 m	pebbles: quartz, quartzose sandstone, some ferruginous.
18.3-20.7 m	white sandy clay, pebbly.
20.7-44.7 m	Wallumbilla Formation
20.7-31.7 m	grey to black claystone, mudstone; minor white glauconitic quartzose sandstone; sandy mudstone at bottom.
31.70-34.75 m	Core 1: 31.70-33.76 m very fine-grained grey-green, clayey, ripple-bedded, bioturbated and glauconitic quartzose sandstone. White quartzose sand in tubes, worm holes; 33.76-34.75 m grey mudstone.
34.75-35.66 m	no cuttings obtained.
35.66-38.71 m	Core 2: grey mudstone, some sandstone bands, little bioturbation.

38.71-40.84 m	grey mudstone.
40.84-41.15 m	Core 3: very fine-grained grey sandstone with mudstone laminae; a few shale and quartz pebbles.
41.15-44.20 m	Core 4: a little mudstone at top over black fine-grained quartzose muddy sandstone and siltstone with some bioturbation, pebbles, glauconite, pyrite, mica to 43.64 m. Below this is a plastic mass of rounded grey mudstone and shale granule gravel and pebbles, coarse quartz grains and blebs of white pyritic, in part silty, clay in grey clay.
44.20-44.66 m	Top of Core 5: as for base of core 4.
44.66-T.D.48.67 m	Lawn Hill Formation ?
44.66-45.62 m	Bottom of Core 5: grey white clay with black laminae dipping approx. 45°.
45.62-48.67 m	Core 6: grey white shale, clay, some of it sandy with black laminae dipping approx 45°. Laminae broken by faults; a few laminae at 90° to the majority.

Remarks

The Floraville Formation may not be present; the strata here assigned to it may be river alluvia. Archie Creek has eroded below local 'laterite' levels, and the ancestral creek could have removed all the underlying Floraville Formation long ago.

The mudstone and muddy sandstone sequence below the Floraville Formation is identified as Wallumbilla Formation because the latter commonly rests directly on basement rocks along the western margin of the Carpentaria Basin and is more likely to do so here than the similar but younger Allaru Mudstone. In addition the glauconite common in this Lawn Hill 3 sequence is elsewhere a feature of the Wallumbilla Formation, but not of the Allaru Mudstone. The glauconite here is associated with bioturbation and white quartzose sandstone infillings; the same association is characteristic of the Wallumbilla Formation in BMR Lawn Hill No. 2 (Needham et al., 1971) in which it is overlain by what appears to be the Toolebuc Limestone, a relationship that helps to identify the Wallumbilla Formation therein.

The Toolebuc Limestone is not present in Lawn Hill 3. Its apparent presence in Lawn Hill 2 suggests that the formation should subcrop further downstream in the Archie Creek area.

The absence of mudstone-free quartzose arenite beds in Lawn Hill 3 makes the mudstone sequence harder to identify, as to the east in the Carpentaria Basin the Wallumbilla Formation usually conformably overlies the quartzose Gilbert River Formation. It appears that the Gilbert River Formation as such is not present in Lawn Hill 3, though, as everywhere else along the western margin of the Carpentaria Basin, the bottom of what is called the Wallumbilla Formation could be its facies equivalent.

However, as the Gilbert River Formation has been identified in water bores not far to the east (Doutch et al., 1970), it is possible that the Wallumbilla Formation overlaps it westwards and rests directly on basement in Lawn Hill 3 and Westmoreland 2 and 3. It is difficult therefore to decide the stratigraphic positional equivalence of flat-lying Mesozoic sandstone, siltstone, and shale in mesa outliers on the nearby Precambrian rocks of Ploughed Mountain and in other areas to the west and southeast.

Basement rocks are called the Lawn Hill Formation because the 1:250 000 geological map suggests this should be so. However, silicified boulders of the Ploughed Mountain Beds upstream from Lawn Hill 3 are not unlike the basement rocks in the hole.

No macrofossils were noted in the cores or cuttings. Palynomorphs and foraminifera are probably present and will be investigated.

In Lawn Hill and Westmoreland Sheet areas water is produced from a number of wells which bottom in the Wallumbilla Formation. Water did not flow from Lawn Hill 3, but may well be available; the wettest core came from the contact between the Wallumbilla Formation and basement. The manager of Lawn Hill Station reports a mill pumping from 'black shale' in the Archie Creek valley upstream from Lawn Hill 3 on the southern side of the Lawn Hill-Gregory Downs road.

BMR HANN RIVER 1
(Fig. 5)

POSITION: Lat. 15°35'S, Long. 143°38'W; 16 km ENE of Kimba homestead; on track to Laura. The hole was sited in 'The Desert' and was spudded into soil on colluvium. Elevation 212m.

OBJECTIVES: To investigate the stratigraphy of a soil-covered area common to both the Carpentaria and Laura Basins, including coring the rocks for lithological and palaeontological examination.

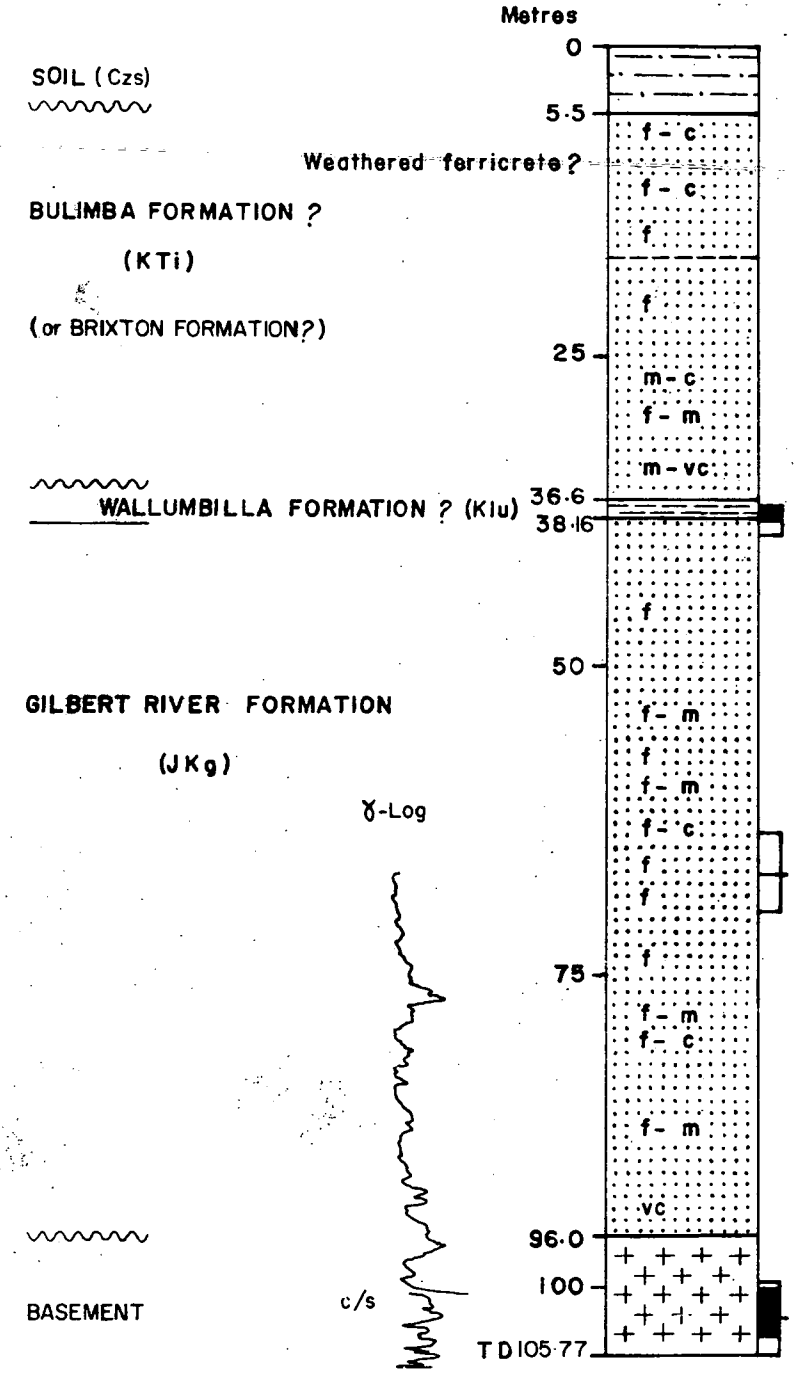
DRILLING: Drilled entirely with mud. Cased to 13.7 m, and casing cemented. No drilling problems. Most of the sand(stone) was too unconsolidated to core with the equipment available, e.g. cores 2 and 3.

LOG: (Lithological log H.F. Doutch; gamma log D.L. Gibson)

0-5.5 m	Quaternary soil and alluvium Red loam: clay and sand, brown at surface.
5.5-36.6 m	Bulimba Formation? (Brixton Formation?)
5.5-13.7 m	red clayey sand, quartzose and ferruginous, very coarse to fine grains, subangular to subrounded; small clasts of yellow and red claystone ('ironstone') below 7.6 m.
13.7-24.4 m	red quartzose sand(stone?), fine grains, subangular to subrounded, clayey. A thin band of white clay at 16.7 m.
24.4-30.5 m	red quartzose sand(stone?), subangular to subrounded, medium to coarse above 27.4 m and medium to fine below 27.4 m. Little clay.
30.5-36.6 m	pale red quartzose sand(stone?), very coarse to medium grains.
36.6-38.1 m	Wallumbilla Formation
36.6-37.2 m	no cuttings, white clay on bit.
37.19-38.10 m	Core 1 (top part): white claystone containing a few sand and clay filled tubes and mauve veins resembling dendrites.
38.10-96.0 m	Gilbert River or Battle Camp Formation
38.10-39.21 m	Core 1 (bottom part): 0.06 m of white clayey quartzose sandstone recovered.
39.21-54.9 m	pinkish white quartzose sand(stone?), medium to fine-grained, subrounded and well sorted above 51.8 m, and angular to subangular and poorly sorted below 51.8 m.

BMR HANN RIVER 1

Fig. 5



Red loam

Clayey sand, quartzose, ferruginous; red

Quartzose sand; clasts of claystone and 'ironstone'; red

Quartzose sand (stone?), clayey; reddish
White clay

Clayey quartzose sandstone; reddish

Quartzose sandstone; red

a/a

Quartzose sandstone; redness fading

Core 1 37·19 - 39·21m; rec 0·97 m white claystone

Quartzose sandstone; pinkish white

a/a

a/a
a/a

a/a

Core 2 no recovery
Core 3 no recovery

Quartzose sandstone; white

a/a
a/a

a/a

Quartzose sandstone; grey-white

Core 4 99·67 - 102·72m; rec 2·59m weathered 'granite'
Core 5 102·72 - 105·77m; rec 0·87m weathered 'granite'

Legend as on Fig. 1

54.9-63.4 m	pinkish white quartzose sand(stone?), fine-grained at the top grading to fine to coarse-grained at the bottom of the interval.
63.40-66.45 m	Core 2: no recovery. Cuttings white quartzose sand(stone?) fine grains.
66.45-69.49 m	Core 3: no recovery. Cuttings as immediately above, subangular to subrounded.
69.49-82.3 m	White quartzose sand(stone?). Subrounded well sorted and fine-grained at the top of the interval grading to subangular poorly sorted and coarse to fine-grained at the bottom.
82.3-91.4 m	White quartzose sand(stone?) medium to fine-grained, subangular to subrounded, poorly sorted.
91.4-96.0 m	White quartzose sand(stone?), very coarse grains, angular to subangular.
96.0-TD 105.77 m	Basement
96.0-97.5 m	no cuttings.
97.5-99.67 m	grey white quartzose sand(stone?), coarse to fine grains, subangular to subrounded. Some clay.
99.67-102.72 m	Core 4: weathered granite, quartz grains, and clay stained orange-brown. Cuttings: greyish white medium-grained quartzose sand, subangular to subrounded, moderate sorting, muscovite flakes.
102.72-105.77 m	Core 5: weathered granite. Cuttings: medium to fine-grained quartzose sand, angular to subangular.

Remarks

The 'Bulimba Formation' contained less clay than expected. What the unit should properly be called depends on further work (Doutch et al., in prep.), and see below.

The Wallumbilla Formation may not be present. The claystone is reminiscent of siltstone at or near the base of the Wallumbilla Formation to the north (Doutch et al., in prep.). However, it may be a bed within the Gilbert River Formation (see below) and some of the overlying 'Bulimba Formation' may be Gilbert River Formation.

The name Gilbert River Formation is preferred until its correlation with the Battle Camp Formation is clarified (Smart et al., in prep.). But even so the final choice will be arbitrary unless stratigraphic names common to both the Laura and Carpentaria Basins are adopted.

Cuttings collected while drilling cores 4 & 5 are similar to those between 91.4 and 99.7 m. Hence weathered granite may be present from 91.4 m downwards.

No macrofossils were noted in cuttings or cores, which will be investigated for palynomorphs and foraminifera.

No groundwater flowed from the hole, but the drilling mud used would have prevented low pressure groundwater from reaching the surface.

A gamma log for the complete hole was attempted, but a fault in the winding mechanism of the logger prevented the recording of an accurate log for the top 67 m of the hole.

BMR HANN RIVER 2
(Fig. 6)

POSITION: Lat 15°25'S, Long 142°53'E; on the west bank of large waterhole 7 km west of Orriners homestead on track to stations farther west. Elevation is approx. 75 m.

OBJECTIVES: a) To recover cores of the Bulimba Formation for a study of its regional variations,

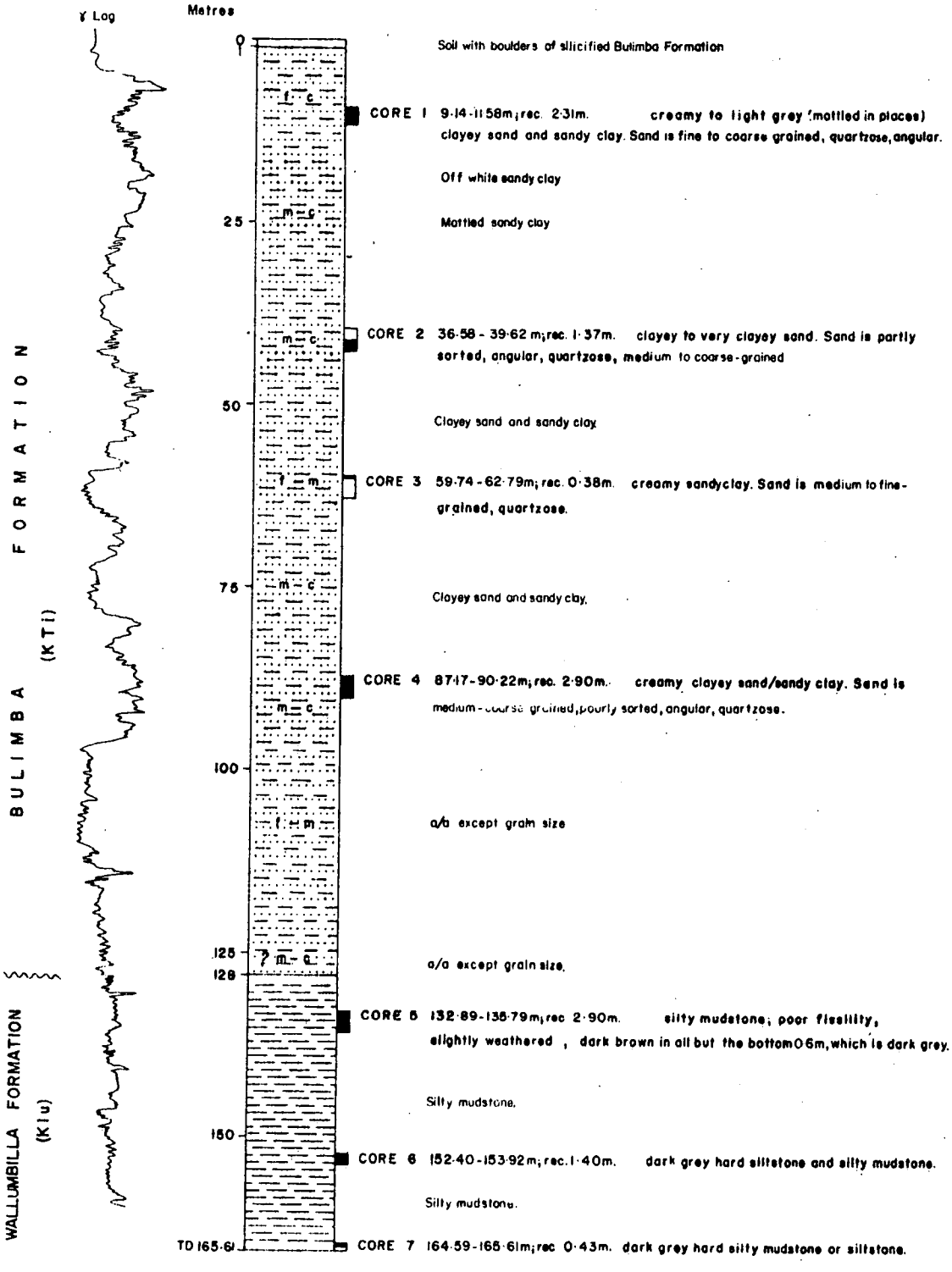
b) To recover fresh cores of the Wallumbilla Formation for micro-palaeontological study.

It was planned to abandon the hole once fresh cores of the Wallumbilla Formation had been recovered.

DRILLING: Silcrete boulders just below the surface caused difficulty in spudding in. Drilled entirely with mud. Casing cemented to 6.7 m. Drilling rates in the Bulimba Formation were fast to very fast, but the Wallumbilla Formation was much harder. The drilling mud rapidly became very viscous while drilling the clayey Bulimba Formation, and had to be replaced several times. The hole was plugged and abandoned at a total depth of 165.6 m.

BMR HANN RIVER 2

Fig. 6



To accompany Record 1973/77

Legend as on Fig. 1

M151232

LOG: (Lithological log D.L. Gibson; gamma log J. Smart)

0-1 m	Soil with boulders of silicrete (silicified Bulimba Formation)
1-128 m	Bulimba Formation
1-9.14 m	off white clayey sand and sandy clay.
9.14-11.58 m	Core 1: 9.14-9.25 m - cavings of sandy clay and clayey sand; 9.25-9.60 m creamy-coloured coarse-grained poorly sorted angular clayey quartzose sand; 9.60-10.01 m mottled medium-grained poorly sorted angular clayey quartzose sand; 10.01-10.62 m - as immediately above, but not mottled (creamy); 10.62-11.45 m very light grey sandy clay - sand is med-fine grained; 11.45-11.58 m no recovery.
11.58-36.58 m	Sandy to slightly sandy clay, off-white, with mottling evident in cuttings below 19.8 m.
36.58 - 39.62 m	Core 2: 36.58 - 38.25 m - no recovery; 38.25-39.17 m Coarse-grained poorly sorted angular clayey quartz sand; 39.17-39.62 m harder medium to coarse-grained very clayey angular quartzose sand(stone?).
39.62-59.74 m	Clayey sand and sandy clay, many beds less than 1m thick.
59.74-62.79 m	Core 3: 59.74-60.12 m cream coloured, sandy clay sand is medium-fine grained, quartzose. 60.12-62.79 m no recovery.
62.79-87.17 m	Clayey sand and sandy clay.
87.17-90.22 m	Core 4. 87.17-87.27 m - no recovery. 87.27-90.17 m - cream coloured very clayey sand to very sandy clay. Sand grains are angular, very poorly sorted, med-grained. Not mottled. 90.17-90.22 m - no recovery.
90.22-128.0 m	Clayey sand and sandy clay.
128.0-TD165.61 m	Wallumbilla Formation
128.0-132.89 m	Cavings of Bulimba Formation with traces of grey mudstone.
132.89-135.79 m	Core 5: 132.89-135.18 m dark brown to grey slightly weathered poorly fissile silty mudstone. 135.18-135.79 m - as immediately above but dark grey and not weathered.

135.79-152.40 m	Cavings of Bulimba Formation with traces of grey mudstone.
152.40-153.92 m	Core 6: 152.40-152.70 m very hard dark grey silty mudstone. 152.70-153.62 m very hard dark grey siltstone. 153.62-153.80 m very hard dark grey silty mudstone. 153.80-153.92 m no recovery.
153.92-164.59 m	Cavings of Bulimba Formation with traces of grey mudstone.
164.59-TD165.61 m	Core 7: 164.59-165.02 m dark grey hard silty mudstone or siltstone. 165.02-165.61 m. No recovery.

Remarks

Excessive caving of the Bulimba Formation made it difficult to observe changes in lithology by cuttings; cores were the only lithological control. The top of the Wallumbilla Formation has been placed at 128 m, though this is only an approximate figure as cuttings of the Wallumbilla Formation were diluted many times over by cavings of the Bulimba Formation. Mud pressure was beginning to rise by 132 m, indicating relatively unweathered mudstone at this depth.

The hole became choked with cavings after being left for several hours and had to be reamed out several times. Water rose to the top of the casing, but flow was negligible.

BMR HANN RIVER 3
(Fig. 7)

POSITION: Lat. 15°11'S, Long. 143°52'; on south bank of Hann River 100 m west of Coen/Laura Road. Elevation is approx. 70 m.

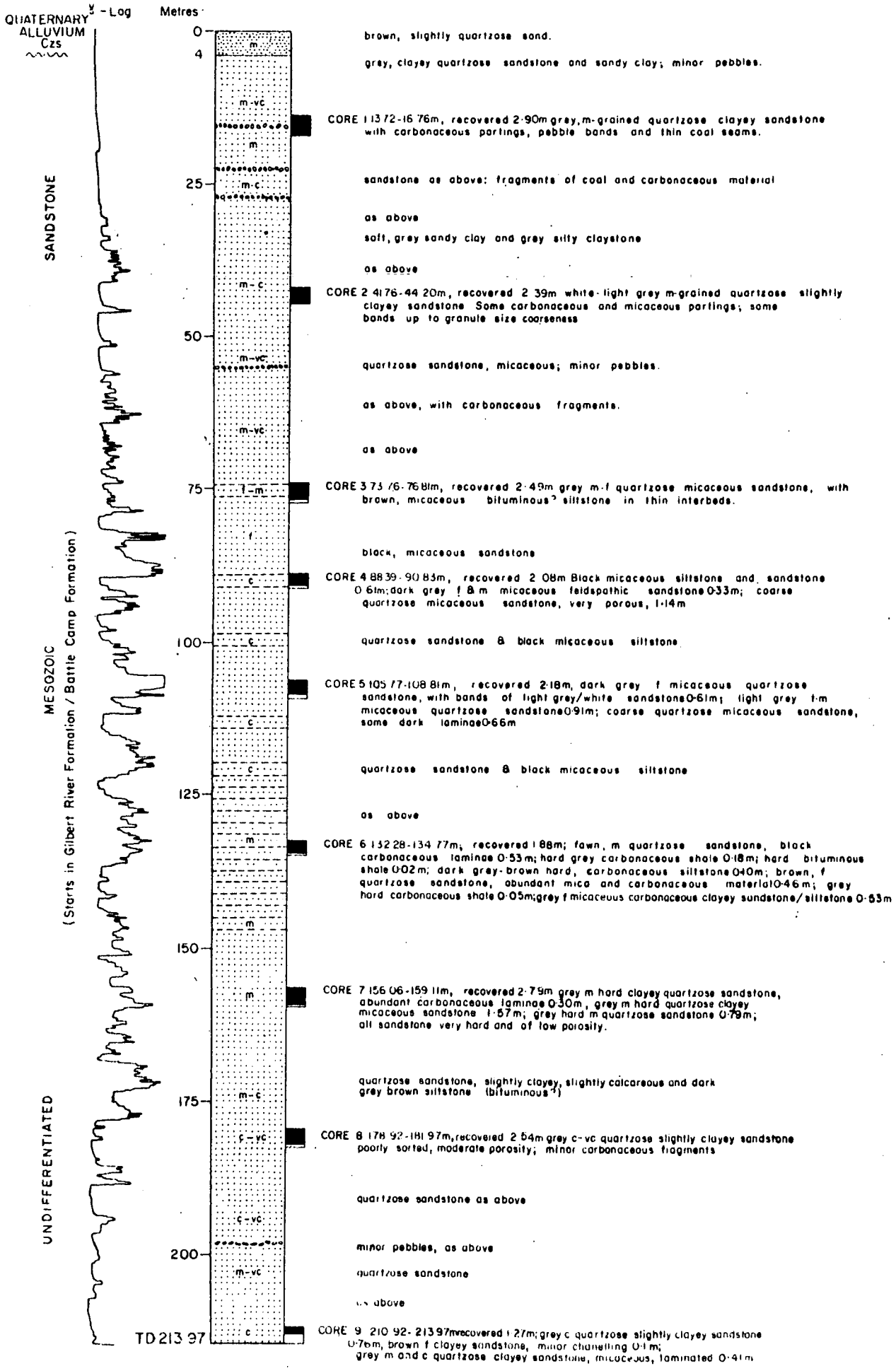
OBJECTIVES: a) To determine depth to basement,

b) To determine thickness and nature of the Mesozoic formations. The hole was sited on supposed Wallumbilla Formation equivalents, but the drilling results suggest that this unit is absent. The sandstone sequence was much thicker than expected.

DRILLING: Drilled with air to 4.5 m then mud. Drilling rates were moderately good, and the hole was kept clean by the artesian flow. The hole began to make water at about 43 m, and the supply increased to a final figure of about 8.8 litres per second (7000 gph) measured by

BMR HANN RIVER 3

Fig. 7



LEGEND AS IN FIG 1

a v-notch weir. An analysis of a water sample taken after the completion of the hole is shown on table 2. The aquifers correspond to the sandy intervals shown on the gamma-ray log.

LOG: (Lithological and gamma logs J. Smart)

0-4 m	Quaternary alluvium. Slightly clayey brown quartzose sand.
4-214 m	Mesozoic sandstone - Gilbert River Formation and/or Eulo Queen Group Equivalents
4-41 m	grey medium and coarse-grained quartzose clayey sandstone, with pebble bands. Minor coal seams and carbonaceous partings. Some silt mudstone and sandy clay.
41-TD213.97 m	grey, medium to very coarse-grained quartzose slightly clayey sandstone, micaceous and pebbly; grey brown medium-grained quartzose clayey sandstone with carbonaceous partings; minor dark grey-brown carbonaceous and bituminous shale.

Basement was not reached and the Mesozoic sandstone may be quite thick. Structural studies suggest it may have been deposited in a graben, which has subsequently been upfaulted.

TABLE 2

WATER ANALYSIS, HANN RIVER 3

Government Chemical Laboratory, Qld

No. 2239/72-G.S.

	ppm
Total Dissolved Solids	144
Na^{+}	40
Ca^{++}	13
Mg^{++}	3
Cl^{-}	31
$SO_4^{=}$	7
HCO_3^{-}	101
F^{-}	0.5
Hardness as $CaCo_3$	46
Alkalinity as $CaCo_3$	83
pH	7.0
K25°C micromhos/cm	275

REFERENCES

DOUTCH, H.F., INGRAM, J.A., SMART, J., and GRIMES, K.G., 1970 - Progress report on the geology of the Southern Carpentaria Basin. Bur. Miner. Resour. Aust. Rec. 1970/39 (unpubl.).

DOUTCH, H.F., SMART, J., GRIMES, K.G., GIBSON, D.L., and POWELL, B.S., in prep. - Progress report on the geology of the Carpentaria Basin in Cape York Peninsula, 1972. Bur. Miner. Resour. Aust. Rec. (unpubl.).

GRIMES, K.G., and SMART, J., 1970 - Shallow stratigraphic drilling, Southern Carpentaria Basin, 1969. Bur. Miner. Resour. Aust. Rec. 1970/38 (unpubl.).

de KEYSER, F., and LUCAS, K.G., 1968 - Geology of the Hodgkinson and Laura Basins, North Queensland. Bur. Miner. Resour. Aust. Bull. 84.

LAING, A.C.M., and POWER, P.E., 1959 - New names in Queensland stratigraphy, Carpentaria Basin. Aust. Oil Gas J., 5(8), 35-6; 5(9), 28.

LUCAS, K.G., 1962 - The geology of the Cooktown 1:250 000 Sheet area, SD55/13 North Queensland. Bur. Miner. Resour. Aust. Rec. 1962/149 (unpubl.).

LUCAS, K.G., 1964 - The geology of the Cape Melville 1:250 000 Sheet area, SD55/9, North Queensland. Bur. Miner. Resour. Aust. Rec. 1964/93 (unpubl.).

LUCAS, K.G., and de KEYSER, F., 1965a - Cooktown, Qld - 1:250 000 Geological Series. Bur. Miner. Resour. Aust. explan. Notes SD/55-13.

LUCAS, K.G., and de KEYSER, F., 1965b - Cape Melville, Qld - 1:250 000 Geological Series. Bur. Miner. Resour. Aust. explan. Notes SD/55-13.

NEEDHAM, R.S., SMART, J., GRIMES, K.G., and DOUTCH, H.F., 1971 - Shallow stratigraphic drilling in the southern Carpentaria Basin, 1970. Bur. Miner. Resour. Aust. Rec. 1971/142 (unpubl.).

SMART, J., INGRAM, J.A., DOUTCH, H.F., and GRIMES, K.G., 1971 - Recent geological mapping in the Carpentaria Basin. New stratigraphic names. Qld Govt Min. J., 72, 227-33.

SMART, J., and GRIMES, K.G., 1971 - Shallow stratigraphic drilling in the eastern Carpentaria Basin, 1971. Bur. Miner. Resour. Aust. Rec. 1971/143 (unpubl.).

SMART, J., GRIMES, K.G., and DOUTCH, H.F., 1972 - New and revised stratigraphic names, Carpentaria Basin. Qld Govt Min. J., 73, 190-201.

SMART, J., GRIMES, K.G., POWELL, B.S., GIBSON, D.L., and DOUTCH, H.F., in prep. - New and revised Mesozoic and Cainozoic stratigraphic names, Cape York Peninsula. Bur. Miner. Resour. Aust. Rec.

WHITAKER, W.G., and WILLMOTT, W.F., 1968 - The nomenclature of the igneous and metamorphic rocks of Cape York Peninsula, Queensland. Part I - the southern Area. Qld Govt Min. J., 69, 345-55.

APPENDIX 1

DETAILS OF CORING
(in metres)

Core No.	Interval cored	Distance cored	Recovered	% recovery
Westmoreland 2				
1	2.74 - 5.18	2.44	2.39	98%
2	50.29 - 53.34	3.05	3.00	98%
3	62.33 - 65.23	2.90	0.14	5%
4	72.85 - 75.90	3.05	3.00	98%
5	82.60 - 85.65	3.05	0.61	20%
6	164.90 -167.34	2.44	1.12	46%
7	203.00 -204.52	1.52	1.42	93%
8	204.52 -207.57	3.05	3.05	100%
		21.50	14.73	69%
Westmoreland 3				
1	3.05 - 5.79	2.74	0.56	20%
2	194.46 -196.37	1.91	1.91	100%
		4.65	2.47	53%
Lawn Hill 3				
1	31.70 - 34.75	3.05	2.97	97%
2	35.66 - 38.71	3.05	2.95	97%
3	40.84 - 41.15	0.31	0.31	100%
4	41.15 - 44.20	3.05	2.97	97%
5	44.20 - 45.62	1.42	1.42	100%
6	45.62 - 48.67	3.05	2.90	95%
		13.93	13.52	97%
Hann River 1				
1	37.19 - 39.21	2.02	.97	48%
2	63.40 - 66.45	3.05	0.00	0%
3	66.45 - 69.49	3.04	0.00	0%
4	99.67 -102.72	3.05	2.59	85%
5	102.72 -105.77	3.05	0.87	29%
		14.21	4.43	31%

Core No.	Interval cored	Distance cored	Recovered	% recovery
Hann River 2				
1	9.14 - 11.58	2.44	2.31	95%
2	36.58 - 39.62	3.04	1.37	45%
3	59.74 - 62.79	3.05	0.38	12%
4	87.17 - 90.22	3.05	2.90	95%
5	132.89 -135.79	2.90	2.90	100%
6	152.40 -153.92	1.52	1.40	92%
7	164.59 -165.61	1.02	0.43	42%
		17.02	11.69	69%
Hann River 3				
1	13.72 - 16.76	3.04	2.90	95%
2	41.76 - 44.20	2.44	2.39	98%
3	73.76 - 76.81	3.05	2.49	82%
4	88.39 - 90.83	2.44	2.08	85%
5	105.77 -108.81	3.04	2.18	72%
6	132.28 -134.77	2.49	1.88	76%
7	156.06 -159.11	3.05	2.79	91%
8	178.92 -181.97	3.05	2.54	83%
9	210.92 -213.97	3.05	1.27	42%
		25.65	20.52	80%
Total		96.96	67.36	69%