CLASSIFICATION UNRESTRICTED

DEPARTMENT OF MINES
SOUTH AUSTRALIA

BRANCH ADMINISTRATION AB28

PALAEONTOLOGICAL REPORT 5/54.

REPORT No. 38-128

SUBJECT:— WILLOCHRA BASIN SURVEY, TEST BORES 1 TO 3: PALAEONTOLOGY.

D.M. 503 / 54 SECURITY FILE

By

N. H. LUDBROOK

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WILLOCHRA BASIN SURVEY, TEST BORES 1 TO 3:

PALAEONTOLOGY

1. INTRODUCTION

At the request of the Senior Geologist (Hydrology) rotary drill core from Bore No. 1 and sludges from Bores 2 and 3 were examined for microfaunas with a view to establishing the age of the sediments, to determining the sedimentary environment, and to detecting the presence of old land surfaces.

2. LOCATION

Bore No. 1. Hundred Boolcunda, Section 238, in the northern part of the Basin.

Bore No. 2. Hundred Willochra, Section 94, 35 miles south of Bore No. 1.

Bore No. 3. Hundred Gregory, Section 331, 15 miles south of Bore No. 2 and in the southern part of the Basin.

3. ORGANIC REMAINS

With the exception of some obscure pyritized possibly faecal remains in Bore No. 2 at 282-284 ft. and portion of a Recent insect in Bore No. 1 at 95 ft., no animal remains were detected.

Fragments of wood and other plant remains were recovered from several samples. It is hoped that palynological examination of sludges from 475 ft. to 510 ft. in Bore No. 3, which have been sent to Melbourne University for specialist opinion, may reveal microspores from which an age determination can be made.

4. CORRELATION

The attached sketch sections illustrate the strata penetrated and some possible correlations between the bores.

All three bores penetrated a series of mottled clays passing into white sandy clay and clayey sand.

Bore No. 3 passed into brown carbonaceous silt and sand at 475 ft.

Fossil laterites were encountered at 109-117 ft. in Bore No. 1, 222 ft. in Bore No. 2 and 350-354 ft. in Bore No. 3.

Whether these can be correlated is not within the province of the writer. A second laterite occurred at 372-379 feet in Bore No. 1.

A hard band reported by the driller from 20-22 feet in Bore No. 2 was not sampled. It cannot be inferred with certainty whether this is an ironstone band similar to that at 109 ft. in Bore No. 1 or a marly limestone band similar to that from 50-58 ft. in Bore No. 1.

5. AGE AND DEPOSITIONAL ENVIRONMENT OF THE YOUNGER SEDIMENTS.

The uppermost mottled clays approximately 300 ft. thick are considered to be of Recent or at most late Pleistocene age. No evidence of antiquity could be found.

It is possible that the whitish clayey sands and sandy clays from 379-400 feet in Bore No. 1, below 222 feet in Bore No. 2 and from 354-475 feet in Bore No. 3 are of Tertiary age, confirmation of which will depend on the results of palynological examination of underlying carbonaceous sediments.

The absence of fossils and the nature of the sediments indicate deposition in an intermontane piedmont environment. Most of the sediments penetrated by the bores are fine in texture, which is to be expected in the centre of the basin further from the upland source rocks. That local swamps developed early in the cycle is indicated by the carbonaceous sediments in Bore No. 3.

6. UNDERLYING OLDER SEDIMENTS

Below 400 feet in Bore No. 1 the boring entered yellow ochreous laminated mudstones passing into blue grey laminated mudstone and shale. These are considered to be altered "bedrock" (i.e. Adelaide System sediments).

At 402 ft. in Bore 2 the boring abruptly entered blue-grey bedrock slate. Unfortunately, sludges below 525 ft. in Bore No. 3 were not received by the writer, but samples below 524 ft. with chips of pyritic sandstone are believed to be bedrock.

The position of the old land surface is believed to be above 400 ft. in Bore 1 (i.e. 265 ft. above sea level) at 402 ft. in Bore 2 (428 ft. above sea level) and 524 ft. (441 ft. above sea

level) this would indicate no great change in the level of the original floor of the basin from north to south, although younger sediments thicken in this direction.

7. OBSERVATIONS

It must be emphasized that negative results only from palaeontological examination were obtained and that present observations are subject to correction by the Petrologist.

Reports on each bore separately follow.

DEPARTMENT OF MINES

SOUTH AUSTRALIA.

Sample No. F223/54.

Reference .....

PALAEONTOLOGICAL EXAMINATION OF MATERIAL.

Locality: County ..NEWCASTLE... Distance and direction from nearest town

Hundred .BOOLCUNDA... or station .....

Section ..238..... .....

Details: Collected from bore, outcrop etc.

.Rotary drill core Willochra Basin Test Bore No. 1.

Depth 0 - 527 ft.....

Information required .....

Submitted by ...E..P..O'DRISCOLL.....

Address .....

Date .....

PALAEONTOLOGIST'S REPORT.

Rotary drill core was examined macroscopically and representative samples were taken for microscopic examination.

Surface - 50 ft.

Surface soil over yellow-brown mottled clay.

54 ft. - 58 ft. Hard marly limestone.

The rock is composed of clay material with interstices filled with secondary calcite. Washed residue consists mainly of fragments of crystalline calcite which has developed along small cracks and fissures in the clay. There is considerable ironstaining. Fine angular quartz grains are also present.

58 ft. - 101 ft. Red-grey mottled clay.

This washes down to fine angular quartz grains with much ironstaining. Quartz grains are fresh and little worn, considerably etched and pitted.

At 95 ft. the boring passed through a piece of wood. It might be possible to submit the fragments recovered to a specialist in microscopic wood structure for identification. Portion of a Recent insect was also recovered from the core at this depth.

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PALAEONTOLOGIST.

Date .....

101 ft. - 109 ft. Grey-white sandy clay.

Washed residue consists of fine to medium subangular to angular etched and pitted quartz grains.

109 ft. - 117 ft. Hard ferruginous sandstone, a fossil laterite, with embedded fragments of wood.

117 ft. - 350 ft. Parti-coloured mottled clay with sandy bands. The following were washed for microscopic examination: 148-149, russet-grey mottled clay, consisted when washed almost entirely of red ochre and hematite.

210-218, grey white mottled clay leaving little residue which consists mainly of fine quartz grains with some large ironstone and ochreous fragments. There are one or two woody plant remains.

339-343 pinkish sandy clay with carbonaceous nodule. Washed residue of fairly well worn quartz grains of medium fine size, much etched and pitted on the surface with some iron-staining.

350 ft. - 356½ ft. White sandy clay.

356½ ft. - 363 ft. No core.

363 ft. - 372 ft. White sandy clay.

Washed residue of medium fine quartz grains with a few large rounded to subrounded grains, all strongly etched on the surface; an occasional grain of hematitic clay.

372 ft. - 379 ft. No core available.

379 ft. - 383 ft. Red brown and white mottled sandy clay passing into pinkish clay.

At 379 ft. the washed residue consists almost entirely of red ochreous fragments, hematite and subangular to subrounded quartz grains.

Sample at 383 ft. washed down to medium to fine quartz grains all strongly etched on the surface.

383 ft. - 389 ft. 7 in. White clay.

389 Ft. 7 in. - 398 ft. No core.

398 ft. - 400 ft. White clay.

Yields very little residue with medium fine subangular to subrounded quartz grains hematitic clay and a few microscopic plant remains.

400 ft. - 461 ft. Yellowish ochreous laminated mudstones with small fragments of schistose material washing down to ochreous aggregates with very fine quartz grains.

At 445 ft. no core, purplish laminated mudstones.

Sample 458 ft. - 461 ft. shows preservation of schistose character of parent rocks.

461 ft. - 526 ft. Blue-grey soft irregularly banded mudstone.

526 ft. Blue-grey shale.

4/1/54

(N. H. Ludbrook),
PALAEONTOLOGIST

DEPARTMENT OF MINES

SOUTH AUSTRALIA.

Sample No. F220/54.

Reference .....

PALAEONTOLOGICAL EXAMINATION OF MATERIAL.

Locality: County FROME..... Distance and direction from nearest town

Hundred WILLOCHRA..... or station .....

Section ....94..... .....

Details: Collected from bore, outcrop etc.

Sludge samples, Bore 89/54 Willochra.....
Test Bore 2. E. G. Noll.
Depth ..0 - 425 feet.....

Information required .....

Submitted by E. O'DRISCOLL.....

Address .....

Date .....

PALAEONTOLOGIST'S REPORT.

The sludge samples were examined macroscopically and representative samples selected for microscopic examination. With the possible exception of two obscure pyritized objects, one of which suggested a faecal origin, no organic remains could be found. No precise data on the age of the sediments could be extracted, but from the surface to 402 feet they are believed to be of Tertiary to Recent age. At 402 feet the boring passed into bedrock slate.

0 - 22 ft. Surface soil and brown clay subsoil with a hard band reported by the driller from 20 to 22 feet. No sample was received to determine the nature of this band.

22 - 46 ft. Grey-brown coarse granular sand. Sample from 22 - 33 ft. was examined microscopically. It consisted largely of quartz grains of varying size, the larger grains rounded to subrounded.

46 - 222 ft. Grey and pink mottled clays, taken to test sampling tool.

Sample 86 - 90 ft. examined microscopically. Washed residue consisted of angular to subangular quartz grains of varying size, with much ironstaining, together with grains of hematite, hematitic clay and an occasional woody fragment replaced by iron oxide.

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PALAEONTOLOGIST.

Date .....

222 - 402 ft. Whitish fine pyritic sandy silt and silty sand. Representative samples were examined under the microscope:

226 - 228 ft. silty sandy washing down to quartz grains of varying size, rounded to subangular, frequently stained with limonite and hematite.

228 - 230 ft. Similar to previous sample, with less limonite and hematite staining.

246 - 248 ft. As previous sample, with larger rounded quartz grains much etched on the surface.

252 -254 ft. As previously, but quartz grains yellowish in colour and mostly fine, of fairly uniform size.

282 - 284 ft. White pyritic sandy clay. Washed residue of fine to medium subangular quartz grains with frequent grains of pyrite. Two obscure objects suggest pyritized faecal remains.

316 - 320. Similar to previous sample, but pyrite almost absent, limonitic clay grains common.

380 - 390 ft. calcareous sandy clay. Washings contain many rounded aggregates of fine quartz particles, with calcite and pyrite aggregates.

402 - 425 ft. Blue-grey slate.

4/1/55

(N. H. Ludbrook)
PALAEONTOLOGIST

DEPARTMENT OF MINES

SOUTH AUSTRALIA.

Sample No F221/54

Reference .....

PALAEONTOLOGICAL EXAMINATION OF MATERIAL.

Locality: County FROME Distance and direction from nearest town

Hundred GREGORY or station .....

Section 331 .....

Details: Collected from bore, outcrop etc.

Willochra No. 3 Test Bore. Sludge samples 0 - 525 ft.

Depth .....

Information required .....

Submitted by E. O'DRISCOLL

Address .....

Date .....

PALAEONTOLOGIST'S REPORT.

Eight sampling tool samples between 44 ft. and 320 ft. were received, and sludges from 365 ft. to 525 ft.

Sampling tool samples 44 - 45 ft., 100-101 ft., 139-140 ft., 140-150 ft., 150-158 ft., 158-159 ft., 199-200 ft. consisted of grey and yellow brown clays and sandy clays.

No sample was received between 200 feet and 300 feet, which were logged as creamy very sandy clays.

300 - 320 ft. Light grey ironstained sandy clay. Washed residue consists of subrounded to rounded medium to coarse quartz grains, much etched and pitted on the surface and frequently ironstained. Abundant grains of hematite or hematitic clay with some limonite.

320 - 365 ft. No samples received, but a ferruginous hard band reported from 350 - 354 feet.

365 - 475 ft. White sandy clays and clayey sands.

370 - 372 ft. Typical of sandy clay.

Washed residue consists of fine to medium subangular quartz grains, etched and pitted on the surface; larger grains are rounded. In appearance these are similar to residues of sediments from shallow depths (approximately 200-350 feet) in Lake Frome bores.

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Date .....

395-396 ft. Typical of clayey sand. Residues similar to previous sample.

475-510 ft. Brown carbonaceous pyritic sandy clays and clayey sands.

Washed residues of fine subangular quartz grains considerably finely etched and pitted on the surface, pyrite, carbonized wood and carbonaceous matter.

510-523 ft. Brown sandy clay.

Washed residue of fine to medium quartz grains, the larger grains subrounded and much pitted and etched on the surface, together with small fragments of carbonized wood, pyrite and mica.

524-525 ft. Grey sandy clay with chips of pyritic sandstone.

Some carbonaceous fragments, much pyrite, some chlorite, and chips of pyritic sandstone. The boring here is probably passing into basement.

525-560 ft. No samples received - logged as "light grey sandy clay with chips of pyritic grey sandstone and slate".

N H Ludbrook

(N. H. Ludbrook)
PALAEONTOLOGIST

4/1/55

BORE Nº 1

Hº BOOLCUNDA
SEC. 238

R.L. 665 Ft.

0 Yellow mottled clay
50 Marly Limestone
58 Red-grey mottled clay
109 Ironstone band
117 Red-grey mottled clay
350 White sandy clay
372 Laterite
379 Brown and white sandy clay and white clay.
400 Yellow ochreous laminated mudstone
461 Blue-grey laminated mudstone
526 Blue-grey shale

BORE Nº 2

Hº WILLOCHRA
SEC. 94

R.L. 830 Ft.

0 Brown soil
Brown-yellow clay
20 Hard band
22 Grey-brown coarse clayey sand
46 Brown sandy clay
94 Grey, pink and yellow mottled clay
222 ? Laterite
Whitish pyritic sandy silt and silty sand.
402 Blue-grey slate

BORE Nº 3

Hº GREGORY
SEC. 351

R.L. 965 Ft.

0 Brown sandy clay
36 Water-worn gravel
39 Brown sandy clay
Brown and yellow clay with pebbles & boulders
100 Gray-yellow brown sandy clay
225 Grey and cream sandy clay
300 Ironstained sandy clay
320 Mottled cream sandy clay
350 Ferruginous hard band
354 White clayey sand and sandy clay
475 Brown carbonaceous silt and sand
510 Beds with clay
525 Slate

BORES 1-3 ARE FROM North to South.

TO ACCOMPANY PALAEONTOLOGICAL REPORT 5/54 by N.H.LUDBROOK.

S.A. DEPARTMENT OF MINES

No.	Amendment	Exd.	Date

WILLOCHRA BASIN SURVEY
TEST BORES 1-3

Approved	Passed		Scale:
		Drn:	55·2 Fa+h
		Tcd: K	
		Ckd:	
Director		Exd.	Date 5·1·55

BORE Nº 1

Hº BOOLCUNDA
SEC. 238

R.L. 665 Ft.

BORE Nº 2

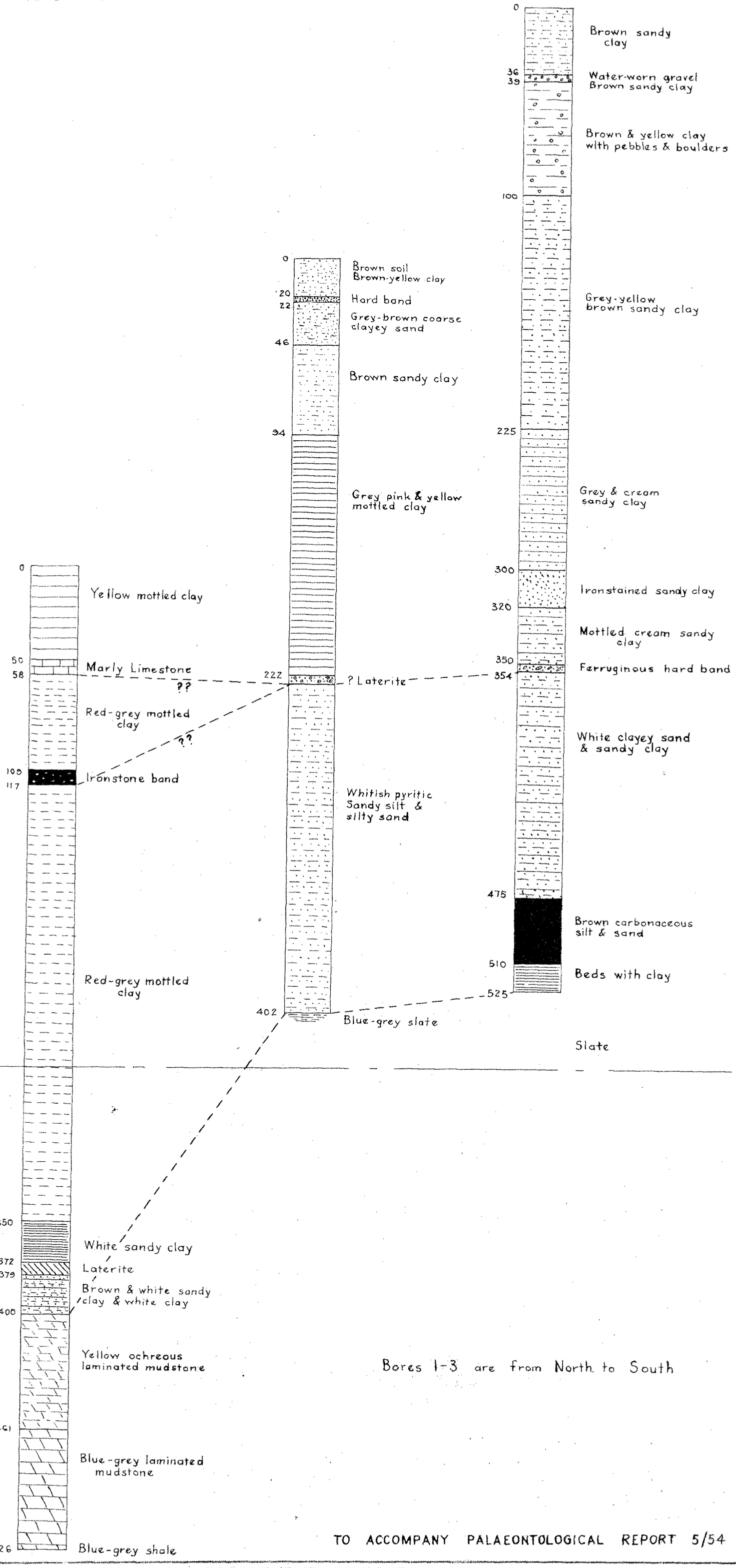
Hº WILLOCHRA
SEC. 94

R.L. 830 Ft.

BORE Nº 3

Hº GREGORY
SEC. 351

R.L. 965 Ft.



Bores 1-3 are from North to South

TO ACCOMPANY PALAEONTOLOGICAL REPORT 5/54 by N.H. LUDBROOK.

S.A. DEPARTMENT OF MINES

WILLOCHRA BASIN SURVEY
TEST BORES 1-3

No.	Amendment	Exec.	Date

Approved	Passed		Scale:
		Drn.	55·2
		Trd R.G.C.	Fe+h
		Ckd.	
Director		Exd.	Date 5-1-55