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Rept.Bk.No. 693 G.S. 2677 S.R. 11/5/95 Pal. Rep. 7/63



DEPARTMENT OF MINES SOUTH AUSTRALIA

GEOLOGICAL SURVEY PALAEONTOLOGY SECTION

BEACH PETROLEUM N.L.

TROUBRIDGE SHOAL NO.1 STRATIGRAPHIC WEI

SUBSURFACE STRATIGRAPHY

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N. H. Ludbrook Senior Palaeontologist

S.R. 11/5/95

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DEPARTMENT OF MINES SOUTH AUSTRALIA

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ABSTRACT

Beach Petroleum Troubridge Shoal No. 1 Stratigraphic Well, drilled to a depth of 1600 feet intersected Recent, Subrecent and Tertiary sediments to 850 feet below which 750 feet of Lower Permian glacial marine rocks were intersected. The Tertiary sediments from 90 to 850 feet consisted of Pliocene Hallett Cove Sandstone, Miocene Port Willunga Beds, Upper Eocene to Lower Oligocene Blanche Point Marls and Upper Eocene Tortachilla Limestone. The Lower Permian glacigenes correspond closely to those intersected in Stansbury No. 1 Well. Drilling ceased in the Permian.

1. INTRODUCTION

Beach Petroleum Troubridge Shoal No. 1 was drilled on Troubridge Shoal in the south west of St. Vincent Gulf 4 miles ESE of Edithburg on southern Yorke Peninsula. The well was spudded in on 19th May and completed on 7th June 1963.

The present report records data from micropalaeontological examination of cuttings taken every 10 feet and of 2 cores taken at 1490-1500 feet and 1590-1600 feet.

As the samples are considerably contaminated in drilling no attempt was made at a detailed study of the foraminifera and only significant species have been recorded.

A correlation has been made with Stansbury No. 1 Stratigraphic well as shown in the plan (63-646).

2. GENERAL STRATIGRAPHY

The following stratigraphic units were intersected in the well:

Stratigraphic unit	Age	depth (feet)	thickness (feet)
Beach sand	Recent	0-20	20
Calcareous shelly sand	Sub-Recent	20-90	70
Hallett Cove Sandstone	Pliocene	90-190	100
Port Willunga Beds	Lower Miocene	190-610	420
Blanche Point Marls	Lower Oligocene to Upper Eccene	610-750	140
Tortachilla Limestone	Upper Eccene	7 50 - 850	ìoo
Glacial marine rocks	Lower Permian	850-1600	750 +
			1600

3. RECENT BEACH SAND (Thickness 20 feet)

From surface to 20 feet the well passed through grey white calcareous quartz sand with abundant foraminifera, ostracoda, and mollusca.

4. SUBRECENT SHELLY SAND (Thickness 70 feet)

Below 20 feet and continuing to 90 feet there occurred the sequence of calcareous sands, quartzose in part and also kunkarized in part, which was intersected in Port Vincent No. 1 Well. Marginopora vertebralis and abundant mollusca are characteristic of the interval.

5. HALLETT COVE SANDSTONE - PLIOCENE (Thickness 100 feet)

Cream crystalline and recalcified limestone with quartz grains, molluscan moulds and abundant Marginopora vertebralis occurring from 90 to 190 feet is the Hallett Cove Sandstone, which is unusually thick in this well.

6. PORT WILLUNGA BEDS - LOWER MIOCENE (Thickness 610 feet)

Between 190 feet and 380 feet the well intersected cream recrystallized bryozoal limestone which are at present included within the Port Willunga Beds, although they do not occur in the type section of the Port Willunga Beds.

The interval 190 to 280 feet is nowhere exposed and

cannot be correlated with any known outcrops; the interval 280 to 380 feet, containing abundant Lepidocyclina howchini from 280 to 310 feet, is to be correlated with the limestone occurring at Myponga and the Melton Limestone of Batesfordian age. From 380 feet to 610 feet occur Port Willunga Beds with Crespinella sp. nov., Sherbornina atkinsoni, and abundant Fibularia gregata. The bottom 20 feet from 590 to 610 feet is marly. In this interval the Port Willunga Beds are of Longfordian (Lower Miocene) age.

7. BLANCHE POINT MARIS - LOWER OLIGOCENE TO UPPER ECCENE (Thickness 140 feet)

The sequence of dark grey carbonaceous marl, quartz sand and silt with <u>Turritella aldingae</u>, <u>Corbula pixidata</u> are equivalent to the Blanche Point Marls. They occur between 610 and 750 feet.

- 8. TORTACHILLA LIMESTONE UPPER EOCENE (Thickness 100 feet)

 Below 750 feet cream crystalline glauconitic limestone,

 Tortachilla Limestone, extends to 850 feet and contains

 Pseudopolymorphina sp., Gyroidina octocamerata and Lamarckina

 airensis. This formation is unusually thick in this well.
- 9. GLACIAL MARINE ROCKS LOWER PERMIAN (Thickness 750 + feet)

 At 850 feet the well entered grey sandy claystones
 and clayey sandstones, calcareous in part, with grains of granite,
 slate, quartzite, abundant garnet, and some pyrite. These are
 glacigenes. Foraminifera occur sporadically and indicate a
 marine origin for the sediments, which by correlation with
 similar sediments, are of Lower Sakmarian age.

10. COMMENT ON THE SEQUENCE

There are several features of the sequence which are worthy of comment: first, the relative thickness of the later Lower Miocene (Batesfordian - Balcombian) sediments with

Lepidocyclina howchini in the lower part; secondly, the thickness of the Tortachilla Limestone; thirdly, the absence of the Maslin Sands in the section and fourthly the good correlation of the Permian section with that in Stansbury No. 1 Well. The correspondence of foraminiferal zones within the Permian is good for the two wells.

11. DETAILS OF THE SAMPLES

Depth (feet)

- 0 20 Grey-white calcareous quartzose beach sand with abundant foraminifera; mollusca and ostracodes common.
- 20 30 Grey-white calcified quartz sand, kunkarized in part, with abundant mollusca.
- 30 40 As above, with subrounded quartz coated with calcite.
- 40 90 Grey-white calcareous sand with worn molluscan fragments.
- 90 140 Cream recrystallized and recalcified limestone with quartz grains, bryozoa, molluscan fragments.
- 140 190 As above, with Marginopora, Elphidium, Peneroplis.
- 190 200 Cream recrystallized bryozoal limestone, with Ditrupa and Marginopora.
- 200 220 As above, with Operculina, bryozoa, echinoids.
- 220 230 As above, with abundant bryozoa.
- 230 250 With abundant Fibularia gregata.
- 250 280 As above, with Operculina, Amphistegina, Crespinella sp. nov.
- 280 290 Somewhat chalky bryozoal limestone with Lepidocyclina howchini, Amphistegina, Operculina, Fibularia, brachiopods.
- 290 310 As above, with abundant Lepidocyclina, Mopsea tenisoni.
- 310 360 With Calcarina verriculata; Operculina and echinoids common.
- 360 370 Mopsea common.
- 370 380 With Mopsea and Fibularia, Notorotalia howchini.
- 380 390 Cream-white crystalline limestone, rich in Fibularia
- 390 410 Cream white crystalline limestone, with <u>Fibularia</u>, brachiopods, <u>Crespinella</u> sp. nov.

Depth (feet)

- 410 430 With <u>Crespinella</u> sp. nov., <u>Notorotalia</u> howchini, brachiopods, <u>Fibularia</u>.
- 430 450 As above, with <u>Sherbornina</u>, <u>Cibicides umbonifer</u>; large <u>Cibicides pseudoungerianus</u>.
- 450 510 Bryozoal limestone, somewhat chalky and saccharoidal, with small grains of pale green glauconite.
- 510 520 Hard bryozoal limestone.
- 520 540 Chalky glauconitic bryozoal limestone; saccharoidal.
- 540 550 As above, with Sherbornina atkinsoni.
- 550 610 Greenish-cream marly limestone with bryozoa and Cibicides umbonifer.
- 610 630 Dark grey carbonaceous marl and sand with fine angular quartz, abundant shell fragments, silt material, occasional pyrite.
- 630 640 As above, with <u>Turritella aldingae</u> and other mollusca, bryozoa, corals, sponge spicules.
- 640 660 With <u>Turritella aldingae</u>, <u>Sherbornina atkinsoni</u>, <u>Cibicides umbonifer</u>.
- 660 670 As above, with abundant carbonaceous material.
- 670 690 Carbonacecus silt and marl with pale green glauconite, large <u>Lenticulina</u>.
- 690 700 With Globigerina linaperta.
- 700 720 With sponge spicules, Corbula pixidata.
- 720 730 Glauconitic marl, with Nuculana (Saccella) sp.
- 730 740 With Turritella, Cibicides pseudoconvexus.
- 740 750 Grey glauconitic marl with abundant green glauconite pellets.
 - 763 Bit sample. Glauconitic crystalline limestone.
- 750 790 Cream crystalline limestone, with pale green glauconite in pellets and infilling foraminifera etc.
- 790 810 As above, with occasional pink garnet grain.
- 810 830 As above, with Pseudopolymorphina sp.
- 830 840 Pinkish bryozoal limestone.
- 840 850 Ferruginized limestone with limonite pellets, dark green glauconite, quartz grains, brachiopods, Pseudopolymorphina sp.
- 850 860 Grey sandy claystone and clayey sandstone, with angular to subrounded quartz, pyrite, carbonaceous clay material, pink garnet.
- 860 990 Claystones and sandstones as above, with grains of granite, slate, garnet, pyrite, chlorite, sub-rounded to angular quartz.

Depth (feet)

- 990 1010 Chips of quartz grains in calcareous matrix.
- 1010 1020 First foraminifer; garnet crystals
- 1020 1130 Grey sandy claystone with patches of white calcareous fine sand.
- 1130 1140 As above, with Ammodiscus.
- 1140 1180 Claystone and sandstone as above, with small pebbles of various kinds.
- 1180 1250 Grey clayey sandstone, pyritic, with small pebbles of granite, felspar, etc.
- 1250 1380 Light grey claystone with scattered quartz grains.
- 1380 1440 As above, with abundant garnet at 1380 - 1390'.
- As above, with abundant pyrite clay aggregates. 1440 - 1490
- 1490 1500 Core 1 Recovered 14"
 - 11" Light grey loosely consolidated sandstone with medium coarse fairly well sorted subangular to subrounded quartz, loosely cemented with very little white clay; abundant pink garnet. 3" Grey quartzite boulder.
- 1500 1590 Sandstone as Core 1 with small pebbles of various origins; Hyperammina.
- 1590 1600 Core 2 Recovered 5 feet

12% Grey quartzite boulder.

12" Grey clayey sandstone.

52" Grey quartzite boulder.
50" Grey clayey sandstone consisting mostly of subrounded quartz, grey metamorphic rocks, garnet, light grey clay.

Breaks down readily in water.

A Huabrook

N. H. Ludbrook Senior Palaeontologist

NHL: AGK 30/7/63

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BEACH PETROLEUM

TROUBRIDGE SHOAL NºI STRATIGRAPHIC WELL

COLUMNAR SECTION

STANSBURY NOI STRATIGRAPHIC WELL

