Rept. Bk. No. 55/33
G.S. No. 2506
Pal. Rep. 9/62
D.M. 1360/59

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

PALAEONTOLOGICAL SECTION

MATERIAL FROM THE SOUTHERN MARGIN OF THE GREAT ARTESIAN BASIN AND THE FROME EMBAYMENT

by

N.H. Ludbrook
Senior Palaeontologist

55/33

24th July, 1962.

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BY
N. H. LUDBROOK

ABSTRACT: One hundred and six samples collected mainly from spoil heaps of bores were examined. Their ages range from Proterozoic to Recent. A section through deep bores in the Frome Embayment is appended.

1. INTRODUCTION

The material forming the basis of this report was collected by D. Ker in the Frome Embayment and on the southern margin of the Great Artesian Basin between longitudes 136° and 141° and latitudes 29° and 32°. Most of the samples were sludge collected from bore drains or spoil heaps, but some outcrop material is included. The samples have been assayed in groups according to their considered age, so far as it could be determined.

2. PROTEROZOIC - WILLOURAN

F 5/62. Wooltana M.S.

New bore Wooltana H/S. at 220 feet.

This is red igneous rock, essentially of coarse to fine fragments of angular reddish brown quartz with some angular milky quartz. It is considered, with the confirmation of A.R. Crawford, to belong to the Wooltana Volcanic Group, of Proterozoic Age (Willouran).

PROTEROZOIC - UNDETERMINED

F 20/62. Sandyoota M.S.

Government Bore No. 4, 1892, Frome Downs; at 691 feet.

Red siltstone and grey calcareous siltstone with medium to coarse angular to subangular clear and red stained quartz grains and grey and red ferruginized sandstone. The washed sample is a mixture of quartz sand and bedrock fragments. The bedrock is probably Precambrian (Marinoan) but it may be Cambrian of the

Lake Frome Group.

F 31/62. Eurinilla M.S.

Quinyambie Dud Bore 110 feet.

(see Pal. Rep. F 61/59 for this bore).

The present sample consists of sand and felspar porphyry bedrock and is mostly of Precambrian age.

F 63/61. Benagerie M.S.

Canegrass Swamp Bore, Benagerie Station 606 feet.

Metamorphic rock, consisting of dark grey and red rock chips, irregular medium to coarse fragments of grey and pink metamorphic rock; some quartz grains. Most of the material is of Precambrian age.

F 84/62 Reaphook M.S.

Wirrealpa Station, dry abandoned well in 7-mile paddock.

Calcareous sandstone, consisting of angular medium to coarse quartz in a calcareous age.

This material is possibly decomposed bedrock.

F 93/62. Lyndhurst M.S.

Mt. Lyndhurst Station, bore in Magpie Paddock 320 feet.

Grey siltstone with fine angular quartz grains, very abundant pyrite, some vein calcite.

Possibly bedrock ? Proterozoic.

F 117/62. Bopeechee M.S.

Stuarts Creek Station, 7 miles west south west of New Year Bore.

Purple siltstone and sandstone of Proterozoic age.

F 126/62. Teaweara M.S.

Stuart Creek Station, abandoned bore 5 miles north of Pimba Dam.

Grey sludge consisting when washed of chocolate and grey siltstone with brown mineral as in F 116/62.

Proterozoic.

3. MATERIAL OF PROBABLE CAMBRIAN AGE

F 11/62. Siccus M.S.

No. 3 Bore 4.5 miles east of Frome Downs H.S 1412 feet.

The sample is very mixed, consisting of medium to coarse quartz grains and abundant bedrock chips. Bedrock is chocolate sandy shale or fine sandstone and grey limestone with medium subrounded clear and iron-stained quartz.

The bedrock is possibly Cambrian of the Lake Frome Group.

F 60/61. Mulyungarie M.S.

Catch and Trial Bore, Mulyungarie Station 1909 feet deep. ("highest level").

Sample consists of medium to coarse fragments of grey crystalline limestone. It is considered to be of Cambrian age.

F 65/61 Mulyungarie M.S.

Catch and Trial Bore, Mulyungarie Station 1909 feet.

Grey crystalline limestone - Cambrian.

F 66/61. Mulyungarie M.S.

Catch and Trial Bore, Mulyungarie Station 1909 feet. "Middle level" estimated 705 feet.

Red and pink limestone of Cambrian age.

4. PROBABLE BEDROCK OF EITHER PROTEROZOIC OR CAMBRIAN AGE.

F 12/62. Benagerie M.S.

Lucky Hit Bore, Billeroo West, 360 feet.

This sample is a mixture of medium to coarse subrounded to angular quartz and fragments of red micaceous shale and other metamorphic rocks. It is mostly bedrock very likely of Proterozoic age, but possibly Cambrian.

F 17/62. Wirrealpa M.S.

Bore 8.5 miles west of Wyambana H.S., Wirrealpa Station 430 feet.

Reddish gravelly sludge with ferruginized sandstone pebbles, ranging from gravel to a medium grained quartz,

angular fragments of sandstone, grey limestone.

This is either bedrock or gravel composed of Cambrian rocks of the Lake Frome Group.

F 18/62. Wirrealpa M.S.

2 Miles north of Emu Dam, Billeroo West 290 feet.

Grey silty sand and slate sludge, with fine to coarse stained and clear quartz grains and abundant fragments of grey rock ? slate.

Probably bedrock mixed with sand.

F 43/62. Montecollina M.S.

Murnpeowie. New Bore 3.1 miles north west of Box Tank; depth ?.

Light brown iron-stained medium to coarse angular to rounded clear and stained quartz, felspar.

There is no direct evidence of the age of this material, but it appears to be mostly bedrock.

F 69/61. Willippa M.S.

Curnamona Station, Bore No. 2, 4½ miles west south west of House, 655 feet.

Light buff-grey silt and sand, with fine to medium angular etched and pitted angular to subrounded clear quartz grains with nodular aggregates of pyrite, and ferruginized sandstone.

There is no direct information of the age of this material, but it is probably crushed bedrock.

F 75/62. Wilpoorinna M.S.

Well by H/S, Wilpoorinna Station 47 feet.

Red micaceous siltstone mixed with angular to rounded quartz grains.

Most of the material is of probable Proterozoic age, mixed with Quaternary sand.

F 86/62. Wirrealpa M.S.

Wirrealpa Station, Boundary Bore, 207 feet.

Light red brown calcareous sandstone with medium to coarse angular to subangular quartz, abundant iron oxide,

calcite.

There is no direct evidence of the age of this material which may be bedrock.

F 87/62. Reaphook M.S.

Wirrealpa Station, Gravity Bore, 210 feet.

Red calcareous sandstone with grains of quartz, siltstone etc. to grit size in calcareous matrix.

This is presumed to be bedrock of either Proterozoic or Cambrian age.

F 88/62. Reaphook M.S.

Wirrealpa Station, abandoned bore in 7-mile paddock, 601 feet.

Red calcareous sandstone, similar to F 87/62.

Precambrian or Cambrian bedrock.

F 97/62. Murnpeowie Station.

Wilpoorina Station, Hogan's Well, 187 feet.

Pinkish kaolinized clay; washings consist mostly of kaolin with some carbonaceous streaks and subangular quartz grains.

There is no direct evidence of the age of the material which may be Tertiary or weathered bedrock.

F 116/62. Yarra Wurta M.S.

Stuart's Creek Station, abandoned bore 30 miles South of H.S.

Grey sandy siltstone sludge with abundant aggregates of brown unidentified mineral.

The material is probable Proterozoic bedrock mixed with Recent sand.

5. PERMIAN OR MESOZOIC

F 121/62. Teepena M.S.

Mudla Station. Billa Kalina Old H/S.

Light brown gypsum and coal fragments consisting mostly of gypsum and coalified plant remains.

The material needs palynological study. It is either Permian or Mesozoic.

6. PROBABLE BLYTHESDALE GROUP. (Jurassic to Lower Cretaceous).

F 10/62 Quinyambie M.S.

Wally's Bore, Quinyambie, 338 feet, in progress.

Grey silt and quartz grit with subangular to rounded medium to very coarse clear, grey, and milky quartz grains, pyrite.

The age of the material is doubtful, but it may belong to the Blythesdale Group.

F 24/62. Paralana M.S.

Pepegoona Bore, Wooltana Station, 245 feet.

Greyish coarse angular sandstone and calcareous tufa.

The material is probably a mixture of Blythesdale Group (Neocomian) sandstones and spring deposits of Recent age. Blythesdale Group quartzitic sandstones with marine fossils outcrop at Pepegoona Well.

F52/62. Moolawatana M.S.

Outcrop, Moolawatana Woolshed.

For description of this section, see papers by Wcodard, Glaessner and Rao in Trans. Roy. Soc. S. Aust. and Palaeo. Rep. 3/60.

Blythesdale Group - Neocomian.

7. LOWER CRETACEOUS SHALES OF ALBIAN AND APTIAN AGE.

F 2/62. Tooncatchyin M.S.

Murnpeowie Station, Abandoned bore 2 miles north of homestead.

Green-grey dolomitic shale with fine to medium clear and stained rounded quartz grains with brown nodules of dolomite, abundant glauconite, pyrite, gypsum, a little cone-in-cone calcite, biotite. Foraminifera common, dominated by Bulimina sp.2, Anomalina sp. 2, Verneuilinoides sp. 1, and Haplophragmoides sp. 2. There are fish fragments and one specimen of Pyrobolospora reticulata.

The material is of Lower Cretaceous age, either Upper Aptian or Lower Albian.

F 6/62. Moolawatana M.S.

Woolatchi, new bore, 100'.

Green-grey calcareous siltstone with very fine quartz grains, cemented with calcite, abundant mica flakes, glauconite, chlorite, carbonized plant fragments. Abundant foraminifera dominated by Bigenerina Loeblichae , abundant megaspores, mainly Pyrobolospora reticulata.

The age is Lower Cretaceous - Aptian.

F 8/62. Moolawatana M.S.

Woolatchi, new bore, 260 feet.

Green-grey calcareous siltstone with abundant glauconite and pyrite. Foraminifera abundant, with many species, dominated by calcareous forms of which Anomalina sp. 1 is the most numerous. Pyrobolospora reticulata and mollusca present.

The sample is a mixed one, consisting of siltstone mixed with the sandstone of F 7/62.

Age - Lower Cretaceous, Aptian.

F 9/62. Moolawatana M.S.

Woolatchi, new bore, 380 feet.

Green grey silty mudstone with abundant dolomite. Abundant foraminifera of many species, dominated by Haplophragmoides dickinsoni. Radiolaria and Pyrobolospora present.

Age - Lower Cretaceous, Aptian.

F 41/62. Tooncatchyin M.S.

Murnpeowie, abandoned bore on Emu Creek.

Green-grey siltstone with medium rounded clear quartz grains, red-brown dolomite, pyrite common, mica flakes, some glauconite. Foraminifera rare, flora consists of megaspores of Pyrobolospora reticulata and carbonized plant fragments.

Age - Lower Cretaceous, Albian or possibly Aptian.

F 45/62 Toopawarrina M.S.

Murnpeowie, abandoned bore 5 miles S.E. of Toopawarrina Bore.

Green-grey shale mixed with medium subrounded clear and stained quartz sand. Abundant quartz, glauconite, pyrite, gypsum, dolomite. Foraminifera common, consisting of a few individuals of several species, mainly calcareous forms. Radiolarian and Pyrobolospora, pyrite filled worm burrows. This material is identical with or close to F 2/62.

Age - Lower Cretaceous, Upper Aptian or Lower Albian.

F 48/62. Tooncatchyin M.S.

Murnpeowie Station, Tooncatchem Bore.

Green-grey calcareous siltstone mixed with subrounded quartz sand. Siltstone glauconitic, with pyrite, gypsum, limonite, mica.

Age - Lower Cretaceous, ?Aptian.

F 50/62. Tooncatchyin M.S.

Murnpeowie, abandoned bore (2) on Emu Creek.

Green-grey siltstone with glauconite, pyrite, limonite, calcite, dolomite. Abundant Inoceramus prisms and foraminifera dominated by Haplophragmoides spp. and Anomalina sp. Pyrobolospora reticulata common.

Age - Lower Cretaceous probably Albian but may be Upper Aptian.

F 68/61. Berber M.S.

Berber Bore, Mulyungerie Station, 500 feet.

Sandstone and granite. Coarse grit size pebbles of slate, quartz, subrounded coarse to medium clear quartz grains, muscovite, coal, fragments of micaceous siltstone and sandstone, chlorite. Abundant foraminifera including Haplophragmoides chapmani.

From this mixture of material, it is considered that the bore probably passed through Tertiary or Quaternary sands, then through gritty Lower Cretaceous (Aptian - Neocomian) to bedrock (?granite).

F 81/62. Mundowdna M.S.

Tarkaninna Well, Clayton Station, 32 feet.

Grey siltstone, with abundant fine quartz grains, glauconite, dark brown iron oxide pellets, chlorite, muscovite, molybdenite. A few impoverished foraminifera are present.

Age - Lower Cretaceous, ?Albian.

F 96/62. Murnpeowie M.S.

Wilpoorinna Station, Hankey's Well, 148 feet.

Grey siltstone, washings ferruginized siltstone fragments, fine angular quartz grains. Foraminifera common, dominated by Haplophragmoides dickinsoni.

Age - Lower Cretaceous, probably Aptian.

F 101/62. Callanna M.S.

Welcome Springs, Callanna.

Grey sandy lithic shale with medium irregular angular quartz grains, schist grains. Abundant Haplophragmoides chapmani and "turtle shell" fragments.

Age - Lower Cretaceous, Aptian "turtle shell horizon".

F 103/62. Bopeechee M.S.

Finniss Springs. Outcrop on creek 2 miles south of Venable Bore.

Light grey gypseous siltstone with fine angular quartz grains, ferruginous grains, gypsum. Abundant foraminifera, mainly Haplophragmoides dickinsoni and Trochammina minuta.

Age - Lower Cretaceous, Aptian.

F 104/62. Bopeechee M.S.

Davenport Springs, Finniss Springs Station, upper outcrop.

Grey lithic siltstone with medium angular quartz grains, abundant grains of grey metamorphic rocks, glauconite. Abundant foraminifera, pauperate and rather squashed. The fauna is unusual for the Aptian and has the only occurrence of Tolypammina in the South Australian Cretaceous to my knowledge. Ammodiscus sp.2 also occurs at Hergott No. 2 at 50 feet.

Age - Lower Cretaceous, Aptian (about middle).

F 108/62. Bopeechee M.S.

Finniss Springs Station, outcrop by railway viaduct just east of Bopeechee.

Grey gypseous and sandy mudstone with coarse angular quartz grains, limonite, pyrite, glauconite, abundant gypsum. Three pauperate and crushed foraminifera, including cf. Ammobaculoides sp., cf. Trochammina minuta.

Age - Lower Cretaceous, ? Aptian.

F 109/62. Callanna M.S.

Davenport Springs, Finniss Springs Station.

Grey mudstone, with fine angular quartz grains, abundant pyrite, glauconite. Abundant foraminifera with cola water affinities, e.g. Hippocrepinella sp., dominated by Haplophragnoides chapmani and Textularia sp. 3.

Age - Lower Cretaceous, Aptian.

F 112/62. Bopeechee M.S.

Campoven Dam, Stuart's Creek Station.

Grey mudstone with fine angular quartz, glauconite, abundant pyrite. Abundant foraminifera dominated by Trochammina minuta, with Hippocrepinella and Tolypammina.

Age - Lower Cretaceous, Aptian at the same level as F 109/62.

F 113/62. Bopeechee M.S.

Walgarina Springs, Stuart's Creek Station.

Grey mudstone, with angular quartz grains, glauconite, pyrite, cone-in-cone calcite. Abundant foraminifera of several species, dominated by Siphotextularia sp. 2, specimens deflated and distorted.

Age - Lower Cretaceous, Aptian.

F 114/62. Bopeechee M.S.

Stuart's Creek Station, Bull Paddock Springs and Well, 6 miles north of H/S.

Grey sandy siltstone with medium angular quartz grains, gpsum, limonite, plant fragments, glauconite. Abundant

foraminifera consisting of a few individuals of several species, including Haplophragmoides chapmani, Trochammina minuta, and Textularia anacooraensis.

Age - Lower Cretaceous, Aptian.

F 119/62. Kewson M.S.

Mudla Station, 14 miles west of Cowarie Springs.

Grey gypseous siltstone with Bigenerina loeblichae and Haplophragmoides sp.

Age - Lower Cretaceous, Aptian.

F 123/62. Matteaweara M.S.

Stuart's Creek Station, near Blower Water Hole.

Bleached chocolate mudstone; washings consist of ferruginized mudstone and limonite. The material resembles bleached ferruginized shales occurring at Coober Pedy. Two specimens of Trochammina cf. minuta.

Age - Lower Cretaceous, Aptian.

8. CRETACEOUS SHALES OF POSSIBLE CENOMANIAN AGE (Winton Formation).

F 44/62. Blanchewater M.S.

Murnpeowie Station, Reedy Springs.

Green-grey arkosic shale grading to fine sandstone with very fine angular quartz, felspar, grey grains, chlorite, abundant mica and a little pyrite, glauconite, abundant coaly matter. Megaspores of Pyrobolospora reticulata.

Age - Cretaceous, ? Cenomanian.

F 51/62. Waraninna M.S.

Murnpeowie, abandoned bore, 3 miles east of Appendreena Water Hole. Bore sludge.

Green-grey arkosic silty sandstone with grey-green grains, pyrite, abundant plant material and mica. This material is mixed with loose sand.

Pyrobolospora reticulata, P. hexapartita, Minerisporites sp., lycopod megaspores, and iridescent spores present.

Age - Cretaceous, Cenomanian (Winton Formation).

9. MATERIAL OF UNDERTERMINED AGE, POSSIBLY TERTIARY.

F 7/62. Moolawatana M.S.

Woolatchie, Mulligan's Bore, abandoned, 275 feet.

Buff partly silicified sandstone, somewhat silty, with medium to coarse angular to subrounded polished clear quartz grains, with siliceous cement, some calcareous fragments, grey quartz grains.

Age. There is no direct evidence; the material may be Tertiary or Cretaceous.

F 15/62. Paralana M.S.

Wooltana, Yagdlin Bore, sample 2, 596 feet.

Grey silty sand, with fine angular to subangular clear quartz grains, some coarse stained quartz, fragments of volcanic rock, schist.

Age. There is no direct evidence, but the fine quartz is very similar to that of Eocene sands elsewhere.

F 16/62. Siccus M.S.

Wirrealpa, on west of Wilpena Creek, 1½ miles north west of Amphitheatre Dam.

Buff silty sand with fine to medium subangular to rounded clear quartz grains.

Age - No direct evidence but the lithology is similar to that of the Tertiary (Eocene).

F 19/62. Siccus M.S.

Frome Downs, Loveday Bore, 500 feet.

Buff sand.

Age - No direct evidence but probably Tertiary.

F 22/62. Reaphook M.S.

Erudina Station - new flowing bore 700 feet.

Buff silty sand with fine angular to rounded clear pitted quartz, some red shale grains, tourmaline.

Age - No direct evidence, but lithology consistent with Tertiary (Eocene).

F 23/62. Paralana M.S.

Yagdlin Bore, Wooltana, sample 1, 596 feet.

Grey sandy clay with fine angular to subangular clear quartz grains, with coarser fragments of stained quartz and ferruginized sandstone.

Age - No direct evidence but presumed Tertiary (Eocene).

F 26/62. Benagerie M.S.

Billeroo West, Confidence Bore No. 2, 253 feet.

Buff salty sand, similar to previous samples.

Age - No direct evidence but lithologically resembles Tertiary (Eocene).

F 28/62. Sandyoota M.S.

Erudina Station, North Well Paddock, 500 feet.

Buff silty sand as above.

Age - No direct evidence, but lithologically resembles Tertiary (Eocene).

F 37/62. Woolatchie M.S.

Woolatchie Station, New Fossils Bore, 235 feet.

Grey silty fine sand.

Age - No direct evidence but lithology suggests Tertiary.

F 55/62. Siccus M.S.

Frome Downs, McKenzie's Bore, sample 2, 320 feet.

Buff fine sand.

Age - No direct evidence but lithology suggests Tertiary (? Eocene).

F 59/61. Berber or Mulyungarie M.S.

Mulyungarie Station, abandoned bore 1¾ miles E.S.E. of Berber Bore, 274 feet.

Buff sand with fine angular quartz grains of even size.

Age - No direct evidence, may be Tertiary (Eocene).

F 70/61. Sandyoota M.S.

Curnamona Station, Billeroo west fence, bore 1, total depth 402 feet.

Dark brownish grey silty sand with fine muscovite flakes, rare carbonized plant fragments.

Age - Little direct evidence, possibly Tertiary (?Eocene).

F 94/62. Murnpeowie M.S.

Mt. Lyndhurst Station. New bore on Murnpeowie Boundary, 220 feet.

White very fine quartz sand, with fine angular quartz, some limonite, siderite, tourmaline.

Age - No direct indication, but from lithology may be Tertiary.

10. MATERIAL OF UNDERTERMINED AGE, PROBABLY EITHER TERTIARY OR QUATERNARY.

F 3/62. Reaphook M.S.

Coffin's Bore, Wirrealpa, 372 feet.

Cream buff somewhat silty soft sandstone, partially consolidated. Rare non-marine shell fragments and spicules.

Age - No direct evidence, possibly Quaternary.

F 4/62. Sandyoota M.S.

Billeroo West, on Curnamone boundary fence, Bore No. 2, 532 feet.

Red brown somewhat clayey sand with fine to medium sub-angular to round red iron-stained quartz grains, gypsum, tourmaline, muscovite, kunkar.

Age - No direct evidence, may be Quaternary.

F 13/62. Sandyoota M.S.

Burlah Bore, Billeroo West, 448 feet.

Silty calcareous sand.

Age - No direct evidence, but possibly Tertiary or Quaternary.

F 14/62. Balcanoona M.S.

Wooltana Station, new bore in spectacle paddock, 490 feet.

Grey calcareous silty sand.

Age - No direct evidence, possibly Tertiary or Quaternary.

F 25/62. Sandyoota M.S.

Billeroo West, Perseverance Bore, 245 feet.

Light brown silty sand, with mostly medium angular to rounded clear quartz grains.

Age - No direct evidence, either Tertiary or Quaternary.

F 33/62. Siccus M.S.

Wirrealpa Station, Stick Hole Bore, 423 feet.

Buff silty sand with fine angular clear and stained quartz grains, iron oxide, occasional pyrite.

Age - No direct evidence; most of the sample is either Tertiary or Quaternary.

F 40/62. Petermorra M.S.

Murnpeowie, White's Well, abandoned, 30 feet.

Gypseous mudstone.

Age - No direct indication, but this may be one of the grey clays of Tertiary - Quaternary age.

F 64/61. Curnamona M.S.

Telechie Station - N. Ashby Bore, 730 feet.

Grey silt and sand, with medium to coarse angular to rounded clear and stained quartz, oolitic calcite, pyrite, 1 vertebrate fragment and one ? Recent shell fragment.

Age - The material is probably a mixture of Tertiary and Quaternary material.

F 77/62. Tankamarrina M.S.

Peachawarinna, abandoned well west side of Lake Tankamarinna, 43 feet.

Grey clay.

Age - No fossil evidence, but material is possibly one of Tertiary or Quaternary clays.

F 78/62. Dulkaninna M.S.

Peachawarinna, abandoned bore west of Lake Tankamarinna, 70 feet.

Greyish silty sand with fine to coarse poorly sorted quartz grains, grey quartz grains.

Age - No direct evidence, but appears to be either Tertiary or Quaternary.

F 80/62. Mundowdna M.S.

Clayton Station, abandoned government well in Creek near H/S.

Dark brown silty sand with subangular mainly polished quartz grains, carbonaceous matter.

Age - This is best determined from field observations; may be Tertiary or Quaternary.

F 105/62. Bopeechee M.S.

Finniss Springs Station, outcrop at Venable Bore.

Dark grey-brown fine sand with abundant carbonaceous matter.

Age - at present indeterminable, may be Tertiary or Quaternary.

F 106/62. Bopeechee M.S.

Finniss Springs Station, bore in spring at old H/S.

Brownish yellow sand, with medium to coarse subangular to subrounded quartz, some calcite, pyrite, duricrust grains.

Age - No direct evidence ? Quaternary.

F 115/62. Bopeechee M.S.

Stuart's Creek Station, Bull Paddock Spring.

Buff sand with medium to coarse subangular quartz, fragments of duricrust.

Age - No direct evidence ? Quaternary.

11. MATERIAL OF QUATERNARY OR RECENT AGE.

F 27/62. Sandyoota M.S.

Erudina Station. Two Gum Bore, 55 feet.

Grey buff silty sand, with medium subangular to rounded clear and stained quartz grains, sandstone and siltstone fragments, some calcareous tufa.

Two incomplete valves of an ostracode and one gastropod. Oogonia of Chara and stem moulds. Vertebrate bone fragments.

Age - Quaternary or Recent.

These are probably fluviatile sediments of the present river system, but they may be a mixture of Tertiary and younger sediments.

F 35/62. Reaphook M.S.

Wirrealpa Station, Emu Well and Springs outcrop 19 feet.

Grey very fine sand with fragments of vertebrate bones and Chara.

Age - ? Recent.

F 36/62. Wirrealpa M.S.

Wirrealpa, well 6½ miles north of Coffins.

Grey sludge and sand, with small vertebrate fragments.

Age - No direct indication apart from Recent vertebrate remains.

F 56/62. Siccus M.S.

Frome Downs, McKenzie's Bore, Sample 1. Total depth of bore 320 feet.

Light brown gypseous silty sand with foraminifera - Nonion, Streblus and Elphidium, similar to those recorded from Lake Eyre.

These were deposited either in a salt lake or in a wide estuary.

Age - Probably Pleistocene or early Recent.

F 61/61. Mulyungarie M.S.

Mulyungerie Station, Lockhart's Bore, 400 feet.

Grey-buff silty sand, with vertebrate bore fragments.

Age - Quaternary, probably, if the bone fragments are indigenous.

F 62/61. Mulyungarie M.S.

Mulyungarie Station, Furlough Bore No. 4, 358 feet.

Grey-buff silty sand and silt with schist fragments and one small fragment of bone.

Age - As F 61/61.

F 67/61. Berber M.S.

Mulymgarie Station, Watson's Bore, 11, 365 feet.

Grey buff silty sand similar to F 61/61 and F 62/61.

Age - ? Quaternary.

12. RECENT SEDIMENTS.

F 99/62. Callanna M.S.

Wangianna Springs, Callanna Station.

Grey silty sand and calcareous tufa, consisting of fine to medium angular quartz grains, pyrite aggregates, carbonized plant fragments, calcareous spring deposits. Chara, shell fragment.

Age - ? Recent.

F 100/62. Marree M.S.

Grey silty sand with fine to medium angular quartz grains pyrite, grains of miscellaneous rocks, abundant ostracodes and freshwater mollusca.

Age - ? Recent.

F 102/62. Callanna M.S.

Welcome Springs, sample in spring.

Brown sand with medium angular irregular quartz grains, fragments of rocks, few Recent ostracodes, some vertebrate bone fragments.

Age - Recent.

F 107/62. Emeroo M.S.

Gosse's Springs, Finniss Springs Station, sand in spring.

Yellowish buff coarse sand with rounded to angular quartz mostly with etched surfaces, duricrust fragments. One specimen of Haplophragmoides sp. 1 (Cretaceous).

Age - Recent, with material derived from underlying Cretaceous.

F 110/62. Bopeechee M.S.

Fred Springs, Stuart's Creek Station.

Buff calcareous sand with medium to coarse subrounded quartz, shell fragments, Chara, duricrust.

Age - Recent.

F 124/62. Kewson M.S.

Coward Springs, Stuart's Creek Station.

Grey calcareous tufa with freshwater gastropods and and ostracoda.

Age - Recent.

F 125/62. Teepena M.S.

Billakalina Springs, Mudla Station.

Grey calcareous tufa.

Age - Recent.

13. MATERIAL OF UNCERTAIN AGE.

F 21/62. Wirrealpa M.S.

Wirrealpa, bore 6.5 miles west of Lennard's Well.

Buff silty sand.

F 29/62 Caldina M.S.

Paralana Bore, Wooltana.

Buff silty sand with mica, gypsum and sandstone fragments.

F 30/62. Curnamona M.S.

Curnamona Station, D.M. bore in Mustering Paddock, 312 feet.

Brown grey clay and sand, fine white sandstone fragments.

F 32/62. Baratta M.S.

Curnamona Station, Toolaby Bore, 245 feet.

Light brown clayey sand; cone-in-cone calcite.

F 34/62. Siccus M.S.

Wirrealpa Station. Bull Corner Bore.

Buff fine sand.

F 38/62. Petermorra M.S.

Murnpeowie, Yerila Bore, ? 400 feet.

Mixed sample of grey mudstone, quartz sand, duricrust, and kaolin.

F 39/62. Petermorra M.S.

Murnpeowie, Lignum Bore, 132 feet.

Grey silty sand.

F 49/62. Montecollina M.S.

Murnpeowie, abandoned bore 5 miles north west of Box Dam.

Brownish buff sand.

F 54/62. Balcanoona M.S.

Werthaloona H/S, bore by the Creek No. 2, 290 feet.

Light yellow - buff sand.

F 76/62. Cooryanna M.S.

Dulkaninna, White Well, abandoned well north of conical hill.

Bleached off white mudstone with fine angular quartz, calcite coating gypsum.

F 83/62. Appollinaris M.S.

Mulga Bore, Mt. Lyndhurst Station, 154 feet.

Reddish clayey sand.

F 85/62. Wirrealpa M.S.

Wirrealpa Station, dry well 2½ miles east of Redbanks Bore, 40 feet.

Brownish grey calcareous clay with abundant iron oxide, calcite, rock fragments.

F 89/62. Reaphook M.S.

Wirrealpa Station, Limestone Bore, 160 feet (lower sample).

Buff sand and sludge with medium to coarse rounded but etched quartz grains, grains of red sandstone quartz - mica schist, pebbles of sandstone.

F 90/62. Reaphook M.S.

Wirrealpa Station, Limestone Bore, 160 feet (upper sample).

Buff silty sand similar to F 89/62 with grains of various rocks.

F 91/62. Reaphook M.S.

Wirrealpa Station, Coffin's Bore, 375 feet, (lower sample).

Buff sand and sludge with fairly well sorted medium angular quartz grains.

F 92/62. Reaphook M.S.

Wirrealpa Station, Coffin's Core, 376 feet (upper sample).

Chocolate sandy clay with abundant angular medium quartz grains with etched and fractured surfaces, much iron-staining.

F 95/62. Wilpoorinna M.S.

Wilpoorinna Station, bore by H/S abandoned, 200 feet.

Pale grey siliceous silt with medium subangular to subrounded pitted quartz grains, gypsum, iron oxide, pyrite.

F 120/62. Mudla M.S.

Mudla Station, Greenfield's Bore.

Buff sandstone with coarse mostly angular quartz grains, some felspar, fragments of duricrust.

14. INDETERMINATE MATERIAL

F 42/62. Blanchewater M.S.

Murnpeowie, Blanchewater along creek.

Grey very light weight silty clay resembling cement. It contains a flask-shaped organism and abundant sponge spicules. The nature of this material and environment of deposition is new to me - it may have been deposited by a spring or in a lake if indeed it is a natural rock.

F 79/62. Wilpoorinna M.S.

Wilpoorinna Station, abandoned well 2½ miles east of East Dam, 200 feet.

Rubble. Mixture of sand, silty material, clay etc., consisting when washed of medium angular quartz, iron oxide, leached kaolinitic matrix.

15. FROME EMBAYMENT BORES (ENTERPRISE EXPLORATION)

A section is included showing the stratigraphic interpretation of Enterprise Exploration bores in the Frome Embayment. From north to south these are Kopperamama, Tilcha, Cootabarlow No 2, Lakeside and Black Oak.

Only Tilcha has been examined in detail by the writer, but except for some details which will be amended as soon as time permits examination of the other bores, the section is believed to be reasonably accurate.

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NHL:MIP
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