

RB 507

DEPARTMENT OF MINES
SOUTH AUSTRALIA.

GEOLOGICAL SURVEY BRANCH

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MURRAY BASIN OIL SYNDICATE

PINNAROO BORE

HD. PINNAROO - ADJACENT SECTIONS 59/67.

PROGRESS REPORT NO. 1. SURFACE - 600 FEET.

BY

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MICROFILMED

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PINNAROO BORE.

Hd. Pinnaroo, adjacent Sections 59/67.

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N. H. LUDBROOK.

Abstract.

The succession from surface to 600 feet depth in Pinnaroo bore is: Pleistocene to Recent terrestrial sands and clayey sands thickness 34 + feet; Loxton Sands (Cheltenhamian - Upper Miocene), thickness 107 + feet; ?continental equivalent of Bookpurnong Beds, thickness ? 20 + feet; Gordon Limestone (? Bairnsdalian - Lower Miocene) thickness 40 + feet; Morgan Limestone (Batesfordian - Lower Miocene) 215 + feet; equivalents of Mannum Formation grading downwards to equivalent of Gambier Limestone 140 feet.

1. Introduction. The method of sampling this bore has not been entirely satisfactory. Above 195 feet the samples have not been taken at regular 5ft. intervals and there is no indication on the sample bags of the precise thickness which each sample represents. The Tertiary formations in the interval are thin here and elsewhere and careful sampling and labelling are needed.

2. The Stratigraphic succession.

Recent to Pleistocene sands 20 - 34 feet.

Two samples at 20 feet and 34 feet only were received, suggesting at least 34 feet of Pleistocene and Recent terrestrial sediments.

Loxton Sands 61 feet - 168 feet.

At 61 feet the boring was in the sands, clayey sands and grits of the Loxton Sands formation considered to belong to the Cheltenhamian stage (Upper Miocene).

? Continental facies of Bookpurnong Beds 180 feet.

The one sample available between 168 feet and 195 feet is

of a fine light grey-buff sand. As the marine Bookpurnong Beds appear to be absent it is considered that they are represented by a continental facies.

Gordon Limestone 195 feet - 235 feet.

At 195 feet the Gordon Limestone was entered. It is yellow in colour and of marginal facies in the Pinnaroo Bore, which may be near the southern limit of the formation. This is confirmed by the regressive character of the upper 10 feet 195 feet - 205 feet where Rotalia beccarii is common. The fauna of this formation is characterised by the presence of Cibicides victoriensis and Orbulina universa; the age is post-Patesfordian ? Bairnsdalian, i.e. late Lower Miocene.

Morgan Limestone 240 - 455 feet.

There is a change in fauna and lithology at 240 feet where the boring entered Morgan Limestone which is grey and marly in the deeper parts of the Murray Basin.

The upper member of the Limestone is represented by the interval 240 - 300 feet, with a microfauna dominated by Operculina victoriensis, Amphistegina lessonii and Carpenteria proteiformis. The lower member is represented by the interval 305 - 455 feet with Lepidocyclina present at 370 feet. The typical microfauna of this formation dominated by the species listed for the upper member with Gypsina howchini, Gypsina globulus, Elphidium cf. papillosum, Crespinella sp. and Calcarina verriculata is present.

Transitional sediments 455 - 600 feet.

The faunas in this interval indicate a gradation downwards through equivalents of the Mannum Formation ('Longfordian') to equivalents of the Gambier Limestone ('Janjukian'). Glauconite is generally present. The Mannum Formation is believed to straddle the Oligocene-Miocene boundary and the Gambier Limestone to be of Oligocene age.

3. Description of the Samples.

Depth.

- 20 feet Medium gritty quartz sand.
Washings of medium angular quartz grains, some magnetite grains.
- 34 feet Light red brown clayey sand.
Washings fine to medium cream-coloured quartz grains.
- 61 feet Yellow-brown gritty clay, with shell fragments.
Washings of quartz grains with much limonite.
- Fauna
Mollusca
Chismys sp.
Ostrea sp.
- Bryozoa
Cellaria sp. etc.
Echinoidea
Spines of echinoids indet.
Foraminifera
Polymorphina howchini Cushman & Ozawa
Notorotalia sp.
Rotalia beccarii Linne
Operculina sp.
- 65 feet Medium buff quartz sand.
Washings of fine to medium subangular cream quartz grains with occasional shell fragments.
- 72 feet As previous sample - slightly clayey.
- 114 feet)
155 ")
160 ")
168 ")
- 180 feet Fine light grey-buff quartz sand, with some plant remains.
- 195 feet Yellow brown gritty limestone with abundant limonite, mica and shell fragments.
- Foraminifera.
Polymorphina howchini Cushman & Ozawa.
Elphidium parri Cushman
Elphidium advenum Cushman
Elphidium craticulatum (Fichtel & Moll)
Elphidium macellum (Fichtel & Moll)
Cibicides pseudoungerianus (Cushman)
Rotalia beccarii Linne
Notorotalia sp.
cf. Crespinella umbonifera (Howchin & Parr)
- 200 feet Yellow brown limestone.
- Foraminifera
Sigmomorphina subregularis Howchin & Parr
Sigmoidella kagaensis Cushman & Ozawa
Elphidium parri Cushman
Elphidium craticulatum (Fichtel & Moll)
Anomalina sp.
Rotalia beccarii Linne
Amphistegina lessonii d'Orbigny
Operculina victoriensis Chapman & Parr

Depth.

- 205 feet Light cream-yellow limestone, with shell fragments.
 Foraminifera.
 Sigmoidella kagaensis Cushman & Ozawa
 Elphidium parri Cushman
 Cibicides victoriensis Chapman, Parr & Collins
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 210 feet As 205 feet with Cibicides victoriensis
- 215 feet As 210 feet with Crespinella sp.
- 220 feet As 215 feet.
- 225 feet Light cream-yellow limestone.
 Foraminifera
 Textularia sp.
 Sigmoidella elegantissima (Parker & Jones)
 Uvigerina spp.
 Cibicides refulgens Montfort
 Cibicides victoriensis Chapman, Parr & Collins
 Globigerina sp
 Orbulina universa d'Orbigny
- 230 feet Cream limestone, with bryozoa, Ditrupa, echinoid spines
 Foraminifera
 Cibicides pseudoungerianus (Cushman)
 Cibicides victoriensis Chapman Parr & Collins
 Amphistegina lessonii d'Orbigny
 Crespinella umbonifera (Howchin & Parr)
 Operculina victoriensis Chapman & Parr
- 235 feet Cream-yellow limestone with some glauconite and the
 foraminifera
 Cibicides victoriensis Chapman Parr & Collins
 Crespinella sp.
 Operculina victoriensis Chapman & Parr
- 240 feet Grey marly bryozoal limestone
 Foraminifera
 Textularia sp.
 Gaudryina (Pseudogaudryina) crespinae Cushman
 Robulus sp.
 Sigmoidella elegantissima (Parker & Jones)
 Chrenbergina serrata (Reuss)
 Eponides sp.
 Cibicides lobatulus Walker & Jacob
 Cibicides pseudoungerianus Cushman
 Anomalina colligera Chapman & Parr
 Globigerina bulloides d'Orbigny
 Nonion sp.
 Elphidium crespinae Cushman
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 245 feet Grey marly bryozoal limestone
 Foraminifera
 Textularia spp.
 Textularia corrugata (Heron-Allen & Earland)
 Dorothyia sp.
 Nodosaria sp.
 Robulus vortex (Fiddell & Moll)
 Guttulina problema d'Orbigny
 Sigmoidella elegantissima (Parker & Jones)
 Signomorphina subregularis Howchin & Parr
 Eponides sp.
 Carpenteria rotaliformis Chapman & Crespin
 Nonion sp.
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr

Depth.

- 250 feet Grey marly bryozoal limestone
 Bryozoa abundant.
 Foraminifera
 Textularia corrugata (Heron-Allen & Earland)
 Robulus sp.
 Guttulina problema d'Orbigny
 Globulina gibba d'Orbigny
 Sigmoidella elegantissima (Parker & Jones)
 Cassidulina subglobosa Brady
 Eponides sp.
 Nonion sp.
 Elphidium crespinae Cushman
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 255 feet As 250 feet.
- 260 feet Grey marly bryozoal limestone.
 Foraminifera
 Gaudryina (Pseudogaudryina) crespinae Cushman
 Clavulinoides victoriensis Cushman
 Robulus sp.
 Guttulina problema d'Orbigny
 Sigmoidella elegantissima (Parker & Jones)
 Eponides sp.
 Carpenteria rotaliformis Chapman & Crespin
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 265 feet Grey marly bryozoal limestone
 Foraminifera
 Textularia sp.
 Textularia corrugata (Heron-Allen & Earland)
 Textularia sagittula DeFrance
 Gaudryina (Pseudogaudryina) crespinae Cushman
 Purgo sp.
 Nodosaria sp.
 Guttulina irregularis d'Orbigny
 Guttulina problema d'Orbigny
 Globulina gibba d'Orbigny
 Eponides sp.
 Gypsina globulus Reuss
 Carpenteria proteiformis Goes
 Elphidium crespinae Cushman
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 270 feet Grey marly bryozoal limestone, as 265 feet with
 Eponides sp.
 Carpenteria rotaliformis Chapman & Crespin
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 275 feet Grey marly bryozoal limestone
 Foraminifera
 Textularia corrugata (Heron-Allen & Earland)
 Clavulinoides victoriensis Cushman
 Dorothia parri Cushman
 Robulus vortex (Fichtel & Moll)
 Guttulina problema d'Orbigny
 Guttulina irregularis d'Orbigny
 Sigmoidella elegantissima Parker & Jones
 Sigmoidella kagaensis Cushman & Ozawa
 Signomorphina subregularis Howchin & Parr
 Pyrulina fusiformis (Roemer)
 Fronicularia lorifera Chapman
 Pullenia sphaeroides d'Orbigny

Depth.

- 275 feet Eponides sp.
 Conorbella patelliformis (Brady)
 Stomatorbina torrei Cushman & Bermudez
 Globigerinoides bisphaerica Todd
 Gypsina globulus Reuss
 Carpenteria proteiformis Goes
 Nonion sp. nov.
 Elphidium cf. papillosum Cushman
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
 Crespinella sp.
- 280 feet Grey marly bryozoal limestone.
 Foraminifera
 Textularia corrugata (Heron-Allen & Earland)
 Gaudryina (Pseudogaudryina) crespinae Cushman
 Dorothia parri Cushman
 Robulus sp.
 Fronicularia lorifera Chapman.
 Guttulina problema d'Orbigny
 Guttulina irregularis d'Orbigny
 Sigmoidella elegantissima (Parker & Jones)
 Sigmoidella kagaensis Cushman & Ozawa
 Reussella spinulosa (Reuss)
 Reussella sp.
 Cassidulina laevigata d'Orbigny
 Cassidulina subglobosa Brady
 Ehrenbergina serrata Reuss
 Fullenia sphaeroides d'Orbigny.
 Eponides sp.
 Stomatorbina torrei Cushman & Bermudez.
 Globigerina bulloides d'Orbigny
 Globigerinoides bisphaerica Todd
 Globorotalia tumida Brady
 Gypsina globulus Reuss
 Carpenteria proteiformis Goes
 Nonion sp. nov.
 Elphidium crespinae Cushman
 Amphistegina lessonii d'Orbigny
 Operculina victoriensis Chapman & Parr
- 285 feet As 280 feet.
- 290 feet As 280 feet with
 Sigmomorphina subregularis Howchin & Parr
 Carpenteria proteiformis Goes (good specimens)
 Amphistegina lessonii d'Orbigny
- 295 feet Grey marly bryozoal limestone with
 Globigerinoides spp.
 Globoquadrina dehiscens (Chapman, Parr & Collins)
 Gypsina globulus Reuss
 Nonion sp. nov.
 Crespinella sp.
- 300 feet Grey marly bryozoal limestone
 Foraminifera
 Textularia sp.
 Dorothia parri Cushman
 Robulus vortex d'Orbigny
 Guttulina regina (Brady, Parker & Jones)
 Sigmoidella elegantissima (Parker & Jones)
 Sigmomorphina subregularis Howchin
 Eponides sp.
 Cibicides pseudoungerianus Cushman
 Conorbella patelliformis (Brady)
 Globigerinoides trilocularis d'Orbigny

Depth.

- 325 feet Grey marly bryozoal limestone
Foraminifera
Textularia sp.
Dorothia parri Cushman
Guttulina regina (Brady, Parker & Jones)
Sigmoidella elegantissima (Parker & Jones)
Sigmomorphina subregularis Howchin & Parr
Sponides sp.
Carpenteria rotaliformis Chapman & Crespin
Elphidium crespinae Cushman
Gypsina globulus Reuss
Amphistegina lessonii d'Orbigny
Operculina victoriensis Chapman & Parr
Hofkerina semiornata (Howchin)
- 330 feet Grey marly bryozoal limestone with
Fibularia gregata Tate and
Calcarina verriculata (Howchin & Parr)
Amphistegina lessonii d'Orbigny
Operculina victoriensis Chapman & Parr
- 335 feet As 330 feet with
Fibularia gregata Tate
- 340 feet Grey marly bryozoal limestone, with Fibularia gregata Tate, abundant Operculina victoriensis, Amphistegina lessonii, Crespinella sp., together with Dorothia parri, Calcarina verriculata and smaller species.
- 345 feet Grey marly bryozoal limestone with Fibularia gregata
Foraminifera
Textularia corrugata (Heron-Allen & Earland)
Dorothia parri Cushman
Sigmoidella elegantissima (Parker & Jones)
Carpenteria rotaliformis Chapman & Crespin
Elphidium parri Cushman
Gypsina globulus Reuss
Amphistegina lessonii d'Orbigny
Calcarina verriculata (Howchin & Parr)
Operculina victoriensis Chapman & Parr
Crespinella sp.
- 350 feet As 345 feet with abundant Operculina victoriensis, Amphistegina lessonii and Calcarina verriculata, together with Frondicularia lorifera Chapman, Sigmomorphina subregularis and Crespinella sp.
- 355 feet As 345 feet with Fibularia gregata, abundant Amphistegina lessonii, together with Operculina victoriensis and Crespinella sp.
- 360 feet As 345 feet, with Operculina victoriensis, Amphistegina lessonii and Calcarina verriculata dominating the foraminiferal assemblage.
- 365 feet As 360 feet.
- 370 feet Grey bryozoal limestone with Lepidocyclina
Foraminifera
Textularia corrugata (Heron-Allen & Earland)
Textularia spp.
Sigmoidella elegantissima (Parker & Jones)
Sigmoidella kagaensis Cushman & Ozawa
Sigmomorphina subregularis Howchin & Parr
Carpenteria rotaliformis Chapman & Crespin
Gypsina globulus Reuss
Gypsina howchini Chapman
Elphidium parri Cushman
Elphidium crespinae Cushman

- 370 feet Amphistegina lessonii d'Orbigny
 Calcarina verriculata (Howchin & Parr)
 Lepidocyclina sp.
 Operculina victoriensis Chapman & Parr
 Crespinella sp.
- 375 feet Grey bryozoal limestone
 Foraminifera
 Textularia corrugata (Heron-Allen & Earland)
 Textularia sp.
 Globulina gibba d'Orbigny
 Guttulina regina (Brady, Parker & Jones)
 Pyrgulina fusiformis (Reuss)
 Sigmomorphina subregularis Chapman & Parr
 Eponides sp.
 Cibicides pseudoungerianus (Cushman)
 Anomalina sp.
 Globigerina bulloides d'Orbigny
 Globigerina sp.
 Globigerinoides trilocularis (d'Orbigny)
 Globigerinoides triloba (Reuss)
 Globigerinoides bisphaerica Todd
 Globoquadrina dehiscens (Chapman, Parr & Collins)
 Gypsina howchini Chapman
 Nonion victoriense Cushman
 Nonion sp. nov.
 Amphistegina lessonii d'Orbigny
 Calcarina verriculata (Howchin & Parr)
 Operculina victoriensis Chapman & Parr
 Crespinella sp.
- 380 feet Grey bryozoal limestone, with abundant Calcarina
 verruculata, and Sigmomorphina subregularis,
 Carpenteria rotaliformis, Gypsina howchini,
 Amphistegina lessonii, and Operculina victoriensis.
- 385 feet Grey bryozoal limestone
 Foraminifera.
 Textularia corrugata (Heron-Allen & Earland)
 Textularia sp.
 Dorothia parri Cushman
 Nodosaria soluta Reuss
 Guttulina regina (Brady, Parker & Jones)
 Sigmomorphina subregularis Howchin & Parr
 Reussella, sp.
 Eponides tethycus Dorreen
 Eponides sp.
 Cibicides pseudoungerianus Cushman
 Cibicides lobatulus (Walker & Jacob)
 Cibicides sp.
 Globigerina bulloides d'Orbigny
 Globigerinoides trilocularis d'Orbigny
 Globigerinoides triloba (Reuss)
 Globigerinoides bisphaerica Todd
 Planorbulina sp.
 Gypsina globulus Reuss
 Gypsina howchini Chapman
 Carpenteria rotaliformis Chapman & Crespin
 Elphidium parri Cushman
 Nonion sp. nov.
 Amphistegina lessonii d'Orbigny
 Calcarina verriculata (Howchin & Parr)
 Operculina victoriensis Cushman
- 390 feet As 385 feet with Gypsina howchini, Carpenteria
 rotaliformis, Carpenteria proteiformis, Amphistegina
 lessonii, Calcarina verriculata, Operculina
 victoriensis.

- 395 feet As 385 feet, with Gypsina howchini, Carpenteria rotaliformis, Amphistegina lessonii, Operculina victoriensis.
- 400 feet Grey bryozoal limestone with a relatively poor fauna, including Fibularia gregata, Sigmomorphina subregularis, Gypsina globulus, Calcarina verriculata, Operculina victoriensis.
- 405 feet As 400 feet, with Gypsina globulus, Gypsina howchini, Amphistegina lessonii, Calcarina verriculata, Operculina victoriensis, Crespinella sp.
- 410 feet As 400 feet, with the same microfauna.
- 415 feet As 400 feet, with the same microfauna, Operculina victoriensis in abundance.
- 420 feet Grey partially recrystallized bryozoal limestone carrying a relatively poor fauna.
Sigmomorphina subregularis Howchin & Parr
Sigmoidella sp.
Gypsina howchini Chapman
Carpenteria rotaliformis Chapman & Crespin
Elphidium sp.
Calcarina verriculata (Howchin & Parr)
- 425 feet Grey, partially recrystallized bryozoal limestone
Foraminifera.
Textularia pseudogramen Chapman & Parr
Textularia spp.
Guttulina problema d'Orbigny
Guttulina regina (Brady, Parker & Jones)
Sigmoidella elegantissima (Parker & Jones)
Sigmomorphina subregularis Howchin & Parr
Globigerina sp.
Gypsina globulus Reuss
Gypsina howchini Chapman
Nonion sp. nov.
Elphidium crespinae Cushman
Amphistegina lessonii d'Orbigny
Calcarina verriculata (Howchin & Parr)
Operculina victoriensis Chapman & Parr
- 430 feet As 425 feet, with Dorothia parri, Sigmoidella elegantissima, Gypsina globulus, Carpenteria rotaliformis, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 435 feet As 425 feet, with Dorothia parri, Sigmoidella elegantissima, Frondicularia lorifera, Gypsina howchini, Carpenteria rotaliformis, Amphistegina lessonii, Calcarina verriculata, Operculina victoriensis.
- 440 feet As 425 feet, with Frondicularia lorifera, Sigmomorphina subregularis, Elphidium cf. papillosum, Calcarina verriculata, Operculina victoriensis, Crespinella sp.
- 445 feet Grey bryozoal limestone, partially recrystallized
Foraminifera.
Sigmomorphina subregularis Howchin & Parr
Gypsina globulus Reuss
Carpenteria rotaliformis Chapman & Crespin
Carpenteria sp.
Elphidium crespinae Cushman
Elphidium parri Cushman
Calcarina verriculata (Howchin & Parr)
Operculina victoriensis Chapman & Parr
Crespinella sp.

- 450 feet Grey bryozoal limestone, with Sigmomorphina subregularis, Carpenteria rotaliformis, Amphistegina lessonii, Calcarina verriculata, Operculina victoriensis, Crespinella sp.
- 455 feet Grey partially recrystallized limestone with a poorly preserved fauna, including Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 460 feet As 455 feet, with Sigmomorphina subregularis, Nonion sp. nov., Gypsina globulus, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 465 feet Grey partially recrystallized limestone, with some glauconite infilling microfossils. Sigmomorphina subregularis, Carpenteria rotaliformis, Operculina victoriensis,
- 470 feet Grey somewhat glauconitic limestone.
Foraminifera.
Textularia vertebralis Cushman
Nodosaria sp.
Robulus vortex d'Orbigny
Guttulina problema d'Orbigny
Guttulina irregularis d'Orbigny
Guttulina regina (Brady, Parker, & Jones)
Sigmoidella elegantissima (Parker & Jones)
Sigmoidella kagaensis Cushman & Ozawa
Cibicides pseudoungerianus Cushman
Globigerina bulloides d'Orbigny
Carpenteria rotaliformis Chapman & Crespin
Astrononion sp.
Amphistegina lessonii d'Orbigny
Calcarina verriculata (Howchin & Parr)
Notorotalia howchini (Chapman, Parr, & Collins)
Operculina victoriensis Chapman & Parr
- 475 feet Grey partially recrystallized limestone with poorly preserved microfossils including Robulus vortex, Sigmomorphina subregularis, Guttulina irregularis, Elphidium crespinae, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 480 feet As 475 feet, with Dorothia parri, Robulus vortex, Sigmoidella elegantissima, Sigmoidella kagaensis, Sigmomorphina subregularis, Eponides cf. repandus (Fichtel & Moll), Eponides praecinctus Karrer, Cibicides pseudoungerianus, Cibicides boueanus, Carpenteria rotaliformis, Nonion sp. nov., Elphidium crespinae, Amphistegina lessonii, Notorotalia howchini, Operculina victoriensis, Crespinella sp.
- 485 feet As 475 feet, with Sigmoidella elegantissima, Sigmomorphina subregularis, Eponides praecinctus, Carpenteria rotaliformis, Elphidium crespinae, Amphistegina lessonii, Calcarina verriculata, Operculina victoriensis, Crespinella sp.
- 490 feet Grey partially recrystallized limestone with saccharoidal calcite. Fauna includes Fibularia gregata, Dorothia parri, Guttulina problema, Sigmoidella elegantissima, Sigmomorphina subregularis, Eponides praecinctus, Cibicides pseudoungerianus, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 495 feet As 490 feet, with Sigmomorphina subregularis, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.

- 500 feet As 490 feet, with Sigmomorphina subregularis, Eponides praeinatus, Amphistegina lessonii, Calcarina verriculata, Operculina victoriensis.
- 505 feet Grey partially recrystallized marly limestone.
Foraminifera.
Textularia sp.
Gaudryina (Pseudogaudryina) crespinae Cushman
Robulus sp.
Guttulina regina (Brady, Parker & Jones)
Glandulina laevigata d'Orbigny
Sigmoidella elegantissima (Parker & Jones)
Sigmoidella kagaensis Cushman & Ozawa
Angulogerina australis Heron-Allen & Earland
Cassidulina laevigata d'Orbigny
Cassidulina subglobosa Brady
Pullenia quincloba (Reuss)
Pullenia sphaeroides d'Orbigny
Eponides sp.
Cibicides pseudoungerianus Cushman
Cibicides lobatulus (Walker & Jacob)
Anomalina glabrata Cushman
Globigerina bulloides d'Orbigny
Astrononion sp.
Notorotalia howchini (Chapman, Parr & Collins)
Amphistegina lessonii d'Orbigny
Operculina victoriensis Chapman & Parr.
- 510 feet As 505 feet, with Guttulina problema, Sigmomorphina subregularis, Elphidium crespinae, Operculina victoriensis, Crespinella sp.
- 515 feet As 505 feet, with Sigmomorphina subregularis, Elphidium crespinae, Amphistegina lessonii, Operculina victoriensis.
- 520 feet Grey partially recrystallized limestone, with saccharoidal calcite.
Foraminifera.
Nodosaria sp.
Nodosaria cf. soluta Reuss
Sigmoidella elegantissima (Parker & Jones)
Sigmoidella kagaensis Cushman & Ozawa.
Cibicides pseudoungerianus Cushman
Cibicides boueanus d'Orbigny
Amphistegina lessonii d'Orbigny
Elphidium parri Cushman
Elphidium sp.
Notorotalia howchini Chapman, Parr & Collins
Operculina victoriensis Chapman & Parr
- 525 feet Grey glauconitic limestone with saccharoidal calcite, glauconite as grains and infilling foraminifera.
Cibicides pseudoungerianus, Amphistegina lessonii, Operculina victoriensis, Crespinella sp.
- 530 feet As 525 feet, with Sigmoidella elegantissima, Sigmomorphina subregularis, Cibicides pseudoungerianus, Carpenteria rotaliformis, Elphidium crespinae, Amphistegina lessonii, Operculina victoriensis.
- 535 feet As 525 feet, with Carpenteria rotaliformis, Nonion sp. nov., Elphidium crespinae, Amphistegina lessonii, Calcarina mackayi, Operculina victoriensis.
- 540 feet Grey hard bryozoal limestone with abundant Cellepora.
Foraminifera.
Nodosaria cf. soluta Reuss
Robulus vortex d'Orbigny
Sigmoidella elegantissima (Parker & Jones)

- 540 feet Eponides sp.
Elphidium parri Cushman
Elphidium crespinae Cushman
Amphistegina lessonii d'Orbigny
Notorotalia sp.
Operculina victoriensis Chapman & Parr.
- 545 feet As 540 feet, with Cellepora and Nodosaria cf. soluta,
Sigmoidella elegantissima, Sigmomorphina subregularis,
Eponides sp., Amphistegina lessonii, Operculina
victoriensis.
- 550 feet Hard bryozoal limestone with Cellepora and Nodosaria
cf. soluta, Sigmomorphina subregularis, Gyroldina sp.,
Cibicides pseudoungerianus, Cibicides boueanus,
Amphisterina lessonii, Operculina victoriensis.
- 555 feet As 550 feet, with Guttulina regina, Nodosaria cf.
soluta, Gyroldina sp., Operculina victoriensis.
- 560 feet As 550 feet, with Fibularia gregata, Sigmomorphina
subregularis, Amphistegina lessonii, Operculina
victoriensis.
- 565 feet No sample.
- 570 feet As 550 feet, with Nodosaria cf. soluta, Sigmoidella
elegantissima, Sigmomorphina subregularis, Robulus
vortex, Carpenteria rotaliformis, Carpenteria sp.,
Amphistegina lessonii, Operculina victoriensis,
Crespinella sp., small shark's tooth.
- 575 feet Grey partially recrystallized limestone, with Sigmoidella
elegantissima, Sigmomorphina subregularis, Cassidulina
subglobosa, Cibicides pseudoungerianus, Gyroldina sp.,
Gypsina globulus, Calcarina sp., Operculina victor-
iensis, Crespinella sp.
- 580 feet As 575 feet, with Cibicides pseudoungerianus, Gyroldina
sp., Calcarina verriculata, Operculina victoriensis.
- 585 feet Grey partially recrystallized limestone
Foraminifera.
Textularia sp.
Nodosaria sp.
Guttulina regina (Brady, Parker & Jones)
Cassidulina subglobosa Brady
Sphaeroidina bulloides d'Orbigny
Cibicides spp.
Cibicides pseudoungerianus Cushman
Anomalina colligera Chapman & Parr
Gyroldina sp.
Nonion sp. nov.
Elphidium crespinae Cushman
Calcarina verriculata (Howchin & Parr)
Operculina victoriensis Chapman & Parr
- 590 feet As 585 feet, with Sigmoidella elegantissima, Sigmo-
morphina subregularis, Cassidulina subglobosa,
Cibicides boueanus, Cibicides pseudoungerianus,
Gyroldina sp., Carpenteria rotaliformis, Operculina
victoriensis.
- 595 feet Grey marly limestone with Fibularia gregata, Gyroldina
sp., Carpenteria rotaliformis, Operculina victorien-
sis in coarse fraction, small species with abundant
Globigerina in fine fraction.

600 feet Grey marly limestone with abundant Globigerina bulloides.
Foraminifera.

Trifarina bradyi Cushman
Angulogerina australis Heron-Allen & Earland
Cassidulina subglobosa
Gibicides pseudoungerianus Cushman
Gyroldina sp.
Anomalina pinguiglaba Finlay
Anomalina glabrata Cushman
Anomalina cf. colligera Chapman & Parr
Globigerina bulloides d'Orbigny
Carpenteria rotaliformis Chapman & Crespin
Elphidium sp.
Calcarina verriculata (Howchin & Parr)
Notorotalia sp.
Operculina victoriensis Chapman & Parr
Crespinella sp.
Victoriella plecte (Chapman) - worn

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