

C3
COMMONWEALTH OF AUSTRALIA.



DEPARTMENT OF NATIONAL DEVELOPMENT.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1955/50

FORAMINIFERA IN CORES FROM CAPE RANGE NO. 1 BORE,
CARNARVON BASIN, WESTERN AUSTRALIA

by

I. Crespin and D. Belford.

FORAMINIFERA IN CORES FROM CAPE RANGE NO. I BORE,

CARNARVON BASIN, WESTERN AUSTRALIA.

by

I. Crespin and D. Belford

RECORDS 1955/50

Forty-three cores from Cape Range No. I Bore were submitted by West Australian Petroleum Pty. Ltd. for palaeontological examination; one was from the Mandu Calcarenite, one from the Birdrong Formation and forty-one from below the Birdrong Formation. A feature of the pre-Birdrong cores is the uniformity of lithology and foraminiferal fauna. The sample of Mandu Calcarenite was taken at 500 to 518 feet, that from the Birdrong Formation at 3,553 to 3,579 feet and the pre-Birdrong samples came from the depth of 3,836 feet down to 8,019 feet. No cores were submitted between No. 1 and No. 20. Of these 43 cores, twenty were prepared for micropalaeontological examination. For the sake of completeness Cores No. 45 (Registered No. M.F.988) and Core No. 50 (Registered No. MF.988) which were examined previously, have been included in the present report. The rock of the cores from the pre-Birdrong deposits is very hard and preparation for examination was difficult. However, all the residues yielded a fairly rich foraminiferal fauna, which contained species characteristic of Lower Cretaceous deposits in different parts of Australia. Ostracoda and pyritic casts of radiolaria were present in some cores, pyritic replacements of radiolaria being recognised in the core from 8,000 to 8,019 feet.

A detailed list of foraminifera recognised in each core is given below.

<u>Core No. 1:</u> 500-518 feet - Mandu Calcarenite (Registered No. MF.3217)	
<u>Angulogerina australe</u> (H-A. & E.)	<u>Globigerinoides trilobus</u> (d'Orb.)
<u>Anomalina glabrata</u> Cushman	<u>Globigerina</u> sp.
<u>Anomalinaella rostrata</u> (Brady)	<u>Gyroldina</u> sp.
<u>Bolivina fastigia</u> Cushman	<u>Lenticulina</u> sp.
<u>Bolivinaella australis</u> Cushman	<u>Loxostomum limbata</u> (Brady)
<u>Cibicides pseudoungerianus</u> (Cushman)	<u>Martinotiella communis</u> (d'Orb.)
<u>Cibicides</u> sp.	<u>Osangularia bengalensis</u> (Schw.)
<u>Dentalina consobrina</u> d'Orb.	<u>Pyrgo</u> sp.
<u>Dentalina</u> sp.	<u>Sphaeroidina bulloides</u> d'Orb.
<u>Discorbis tuberculata</u> (B. & W.)	<u>Textularia</u> sp.
<u>australiensis</u> Chap., Parr & Coll.)	<u>Uvigerina peregrina</u> Cushman
<u>Dorothia</u> sp.	<u>Uvigerina soendaensis</u> LeRoy

Small foraminifera are numerous in the sample but are so encrusted that it was not possible to obtain many well preserved specimens for determination. However, the above assemblage is typical of Miocene deposits in the Indo-Pacific region and of that found associated with the larger foraminifera at the type locality for the Mandu Calcarenite.

Core No. 20: 3,552-3,570 feet- Birdrong Formation.

No microfossils were present in the fine-grained, glauconitic sandstone.

Pre-Birdrong Cores

Core No. 21: 3,825-3,840 feet. (Registered No. MF.3218)

Ammobaculites fisheri Crespín
Ammodiscus gaultinus Berthelin
Ammodiscus sp.
Dentalina spp.
cf. Discorbis
Enantiodontalina communis
(d'Orb.)
Globulina exserta (Berthelin)
Globulina minuta (Roemer)
Haplophragmoides chapmani
Crespín

Lenticulina australiensis Crespín
Lenticulina sp. 1
Lenticulina spp.
Pseudoglandulina sp.
Saracenaria sp.
Spiroplectammina sp. 1
Trochammina raggatti Crespín
Trochammina minuta Crespín
Trochammina sp.
Vaginulina sp.

Core No. 22: 3885-3900 feet. (Registered No. MF.3219)

Ammobaculites fisheri Crespín
Ammobaculites minimus Crespín
Haplophragmoides chapmani Crespín
Haplophragmoides dickinsoni
Crespín
Hyperammina sp.
Lagena laevis (Montagu)
Lenticulina sp. 1
Lenticulina spp.

Marginulina sp.
Pelosina sp.
Reophax sp.
Spiroplectammina cushmani Crespín
Spiroplectammina edgelli Crespín
Trochammina raggatti Crespín
Trochammina sp.

Core No. 24: 3910-3939 feet. (Registered No. MF.3219).

Ammobaculites australe (Howchin)
Ammobaculites fisheri Crespín
Ammobaculites sp.
Ammobaculoides sp. nov.
Ammodiscus cretaceus Reuss.
Anomalina sp.
cf. Arenobulimina
Globigerina spp. (pyritic casts)
Haplophragmoides dickinsoni
Crespín
Haplophragmoides sp.
Hyperammina sp.
Lenticulina cf. scitula
(Berthelin)

Lenticulina sp. 1
Lenticulina spp.
Pelosina sp.
Reophax sp. 1
Reophax sp. 2
Reophax sp. 3
Spiroplectammina cushmani
Crespín
Spiroplectammina sp. nov.
Trochammina raggatti Crespín
Trochammina sp.
Valvulineria infracretacea
Crespín

Core No. 29: 4008-4028 feet. (Registered No. MF.3220)

Ammobaculites minimus Crespín
Ammobaculites sp.
Globigerina planispira Tappan
Globulina minuta (Roemer)
Haplophragmoides chapmani
Crespín
Haplophragmoides dickinsoni
Crespín

Lenticulina sp.
Reophax sp.
Saracenaria triangularis (d'Orb.)
Spiroplectammina edgelli Crespín
Trochammina minuta Crespín
Trochammina raggatti Crespín

Core No. 30: 4131-4135 feet (Registered No. MF.3221)

Ammobaculites fisheri Crespín
cf. Bigenerina sp.
Haplophragmoides chapmani
Crespín

Lenticulina sp.
Marginulina sp.
Nodosaria sp. aff. hispida d'Orb.
Pseudoglandulina sp.

Core No. 31 - 4230-4250 feet. (Registered No. MF.3222)

<u>Ammobaculites fisheri</u> Crespín	<u>Pelosina lagenoides</u> Crespín
<u>Ammobaculites minimus</u> Crespín	<u>Pelosina</u> sp.
<u>Ammobaculites</u> sp.	<u>Reophax</u> sp.
<u>Enantiodontalina</u> sp.	<u>Spiroplectammina cushmani</u>
<u>Haplophragmoides chapmani</u> Crespín	Crespín
<u>Haplophragmoides dickinsoni</u>	<u>Spiroplectammina edgelli</u>
Crespín	Crespín
<u>Hyperammina</u> sp.	<u>Spirillina</u> cf. <u>minima</u> Schacko
	<u>Turrispirillina subconica</u>
	Tappan.

Core No. 35: 4293-4314 feet. (Registered No. M.F.3223)

<u>Globigerina</u> sp.	<u>Reophax</u> sp.
<u>Haplophragmoides chapmani</u> Crespín	<u>Spiroplectammina cushmani</u>
<u>Hyperammina</u> sp.	Crespín
<u>Lenticulina</u> sp.	<u>Trochammina raggatti</u> Crespín

Core No. 36: 4314-4318 feet. (Registered No. M.F.3222)

<u>Ammobaculites fisheri</u> Crespín	<u>Lenticulina</u> spp.
<u>Ammobaculites minimus</u> Crespín	<u>Trochammina raggatti</u> Crespín
<u>Haplophragmoides chapmani</u> Crespín	

Core No. 38: 4500-4518 feet. (Registered No. MF.3224)

<u>Ammobaculites fisheri</u> Crespín	<u>Hyperammina</u> sp.
<u>Ammobaculites minimus</u> Crespín	<u>Reophax</u> sp.
cf. <u>Anomalina</u>	<u>Spiroplectammina cushmani</u>
<u>Globulina exserta</u> (Berthelin)	Crespín
<u>Haplophragmoides chapmani</u>	<u>Spiroplectammina edgelli</u>
Crespín	Crespín
	<u>Trochammina raggatti</u> Crespín

Core No. 39: 4600-4618 feet. (Registered No. MF.3225)

<u>Haplophragmoides chapmani</u> Crespín	<u>Lenticulina</u> spp.
<u>Lenticulina australiensis</u> Crespín	<u>Marginulina</u> sp.
<u>Lenticulina</u> sp. 1	<u>Spiroplectammina cushmani</u>
<u>Lenticulina</u> sp. 3	Crespín
	<u>Trochammina raggatti</u> Crespín

Core No. 45: 5100-5115 feet (Registered No. MF.988).

<u>Globigerina planispira</u> Tappan	<u>Robulus</u> sp. (pyritic cast)
(pyritic cast)	<u>Spiroplectammina cushmani</u>
<u>Globigerina</u> aff. <u>washitensis</u>	Crespín
Carsey (several casts)	<u>Trochammina minuta</u> Crespín
<u>Haplophragmoides</u> sp. (pyritic cast)	<u>Trochammina</u> sp.

Core No. 46: 5200-5215 feet. (Registered No. MF.3226)

Arenaceous foraminifera very abundant.

<u>Ammobaculites</u> sp. 1	<u>Haplophragmoides chapmani</u>
<u>Ammodiscus cretaceus</u> Reuss	Crespín
	<u>Trochammina raggatti</u> Crespín

Core No. 47: 5299-5314 feet. (Registered No. MF. 3227)

<u>Ammobaculites</u> sp. 1	<u>Hyperammina</u> sp.
<u>Haplophragmoides chapmani</u> Crespín	<u>Spirillina minima</u> Schacko

Core No. 50 - 5575-5585 feet. (Registered No. MF.988)

<u>Ammobaculites minimus</u> Crespin	<u>Haplophragmoides</u> sp.
<u>Buccicrenata</u> cf. <u>subgoodlandensis</u> (Vanderpool)	<u>Hyperammina</u> sp.
<u>Haplophragmoides chapmani</u> Crespin	<u>Trochammina</u> cf. <u>raggatti</u> Crespin
	<u>Reophax</u> sp.

Core No. 59: 6365-6383 feet (Registered No. MF.3228)

Foraminifera rare
Hyperammina sp.

Core No. 61: 6518-6536 feet. (Registered No. MF.3229)

Haplophragmoides chapmani Crespin
Hyperammina sp.
Trochammina sp.

Core No. 64: 6956-6966 feet (Registered No. MF.3230)

Dentalina spp.
Globigerina sp.
Gyroldina cf. nitida (Reuss)
Hyperammina sp.

Core No. 66: 8,000-8,019 feet. (Registered No. 3231)

Haplophragmoides sp.
Indeterminate pyritic casts.

Notes on the Pre-Birdrong Foraminiferal Assemblage

The foraminiferal assemblage of the pre-Birdrong deposits from 3,825 feet down to 6,966 feet, is dominated by arenaceous foraminifera which are often accompanied by calcareous genera of the Lagenidae, Polymorphinidae, Globigerinidae and Rotalidae. The deepest core, No. 66 at 8,000-8,019 feet contained only one specimen of the arenaceous genus Hyperammina and a pyritic cast of radiolaria.

The arenaceous tests of Haplophragmoides, Ammobaculites and Trochammina which were usually characteristically crushed or deflated, were very common in some samples, for example in Core No. 46 at 5,200-5,215 feet; genera and species were few but individual tests were very common. The calcareous forms were dominated by well preserved tests of Lenticulina; the Globigerinidae and Rotalidae occurred as pyritic casts.

The assemblage of these samples from 3,825 feet down to 6,966 feet is characteristic of that found in deposits of the Great Artesian Basin of Australia (Crespin, 1953) and is regarded as equivalent in age to the Roma beds of Queensland which are referred to the Aptian. A difference between the assemblage in the cores from Cape Range No. 1 Well and the Great Artesian Basin fauna is the absence of the calcareous species Anomalina mawsoni Crespin and the rare occurrence of Valvulineria infracretacea Crespin, in the Cape Range beds.

The arenaceous genera Ammodiscus, Ammobaculites, Haplophragmoides, Hyperammina, Spiroplectammina and Trochammina range from Palaeozoic upwards but the species such as Ammobaculites fisheri, Haplophragmoides chapmani, Spiroplectammina cushmani, Spiroplectammina edgelli and Trochammina raggatti are not known to occur in beds in Australia older than Lower Cretaceous.

The calcareous forms are even more important particularly the Globigerinidae and Rotalitidae. Glaessner (1954,

p.203) states that "Globigerina is first recorded from the Barremian (i.e. the topmost division of the Neocomian). In the Aptian small species of the genus become abundant, marking the first appearance of foraminifera as an important group of planktonic organisms". He further states that "no planktonic foraminifera have been found in Jurassic rocks".

In the present set of samples, Globigerina was represented by several tests in Core No. 45 at 5,100-5,115 feet and in Core No. 64 at 6,956-6,966 feet.

Amongst the genera of Rotalidae recorded were Gyroidina, Valvulineria and Anomalina. According to Glaessner (1945) and Cushman (1950) Gyroidina is not recorded until the Lower Cretaceous and the genus Valvulineria until the Cretaceous. The occurrence of Anomalina in beds older than Lower Cretaceous is considered doubtful.

Some species recorded show affinities with those described from the Lower Cretaceous overseas. Spirillina minima Schacko was described from the Cretaceous of Germany and Turrispirillina subconica Tappan came from the Duck Creek beds (lower Cretaceous) of Texas.

Genera of the Lagenidae recorded are Lagena, Dentalina, Marginulina and Lenticulina, and Globulina represented the Polymorphinidae. Of these the most important is Lenticulina of which several new species are present. None of these, however, have any similarity with known Jurassic species from Western Australia (Chapman, 1904) or elsewhere.

Although the evidence of age as given by the foraminifera in the Cape Range beds does not agree with the doubtful determinations so far made from larger fossils, on present knowledge of ranges of genera and species, the writers feel that the deposits cannot be older than basal Lower Cretaceous. If the evidence based on the larger fossils becomes more firmly established the earliest occurrences of several genera of calcareous foraminifera will be extended. It would also extend the known stratigraphical range of species of arenaceous forms described from well known Lower Cretaceous deposits in Australia into the Jurassic. From knowledge of the Western Australian Jurassic foraminiferal assemblages, arenaceous foraminifera are exceedingly rare in them, the fauna being dominated by the Lagenidae, as is typical in Jurassic deposits throughout the world.

No age has been assigned to Core 66 at 8,000-8,019 feet.

References.

- Chapman, F., 1904 - On Some Foraminifera and Ostracoda from Jurassic (Lower Oolite) Strata, near Geraldton, Western Australia. Proc.roy.Soc.Vict. 16, 185-206.
- Crespin, I., 1953 - Lower Cretaceous Foraminifera from the Great Artesian Basin, Australia. Contr.Cush.Fdn., 4 (1), 26-36.
- Cushman, J.A., 1950 - Foraminifera. Their Classification and Economic Use. 4th ed. Harvard Univ. Press.
- Glaessner, M.F., 1945 - "Principles of Micropalaeontology."