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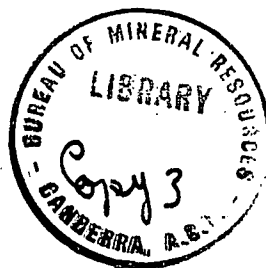
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BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

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LOWER CRETACEOUS FORAMINIFERA FROM PHILLIPS-SUNRAY
BUCKABIE NO. 1 WELL, QUEENSLAND

by

Irene Crespin

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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Phillips-Sunray Buckabie No.1 Well is situated 29 miles north of Quilpie, south-west Queensland and was drilled to the depth of 9,070 feet. Cuttings were available at ten-foot intervals from 80 feet down to 9,035 feet. This report covers the examination of cuttings from 80 feet down to 3,310 feet which was considered to be the base of the marine Lower Cretaceous section. Core 1 at 1,123' 8"-1,136' 6", core 3 at 3,264' - 3,264' 6" and core 8 at 5,518' - 5,537' were also examined.

A considerable number of samples of cuttings have been examined, many being selected at 10 foot intervals to prove the upper and lower limits of the lithological and faunal units recognized. From the study of the lithology and of the first appearance of certain foraminiferal species and of Inoceramus prisms in the downward sequence, a fairly complete section of the Lower Cretaceous sequence in this south-western part of the Great Artesian Basin in Queensland has been determined. Unfossiliferous, carbonaceous sandstones and sandy siltstones, representing the basal Upper Cretaceous Winton Formation overlie the marine sediments of the Lower Cretaceous formations, which are known from the results of the examination of extensive collections of material from the Great Artesian Basin in Queensland to contain characteristic foraminiferal assemblages.

Detailed Description of Samples

Except where stated otherwise, all descriptions are of cuttings.

80-130 feet. Ochreous to cream sandstone and siltstone. Unfossiliferous.

130-1130 feet. Carbonaceous siltstone and silty sandstone. No fossils.

Core 1. 1123'8"-1136'6". Carbonaceous sandy siltstone. No fossils.

1180-1190 feet. Calcareous glauconitic sandstone and a little carbonaceous siltstone. No fossils.

1220-1230 feet. Calcareous sandstone and some carbonaceous sandy siltstone, with megaspores, Pyribolospora reticulata Cookson and Dettmann.

1320-1330 feet. Calcareous sandstone and some brown carbonaceous siltstone. No fossils.

1420-1450 feet. Calcareous sandstone with glauconite, and carbonaceous siltstone. No fossils.

1460-1470 feet. Calcareous sandstone with glauconite, carbonaceous siltstone, megaspores (P.reticulata) and Inoceramus prisms (rare).

1480-1490 feet. Calcareous glauconitic sandstone, and sandy siltstone. No fossils.

1500-1510 feet. Calcareous, glauconitic sandstone and carbonaceous siltstone with megaspores (P.reticulata) and a few Inoceramus prisms.

1520-1530 feet. Calcareous, glauconitic and carbonaceous sandstone. No fossils.

1530-1540 feet. Calcareous, glauconitic, carbonaceous sandstone, and carbonaceous sandstone with megaspores (P.reticulata), a few fragments of indeterminate shells, and Inoceramus prisms (rare).

1550-1560 feet. Calcareous, glauconitic sandstone with some carbonaceous material.

1620-1630 feet. Calcareous, glauconitic sandstone, and carbonaceous siltstone. No fossils.

1720-1730 feet. Calcareous, glauconitic sandstone and carbonaceous silty sandstone, with Inoceramus prisms (rare).

1740-1750 feet. Calcareous glauconitic sandstone and carbonaceous siltstone, with megaspores (P.reticulata) and a few arenaceous foraminifera (Haplophragmoides sp., Trochammina sp.)

1760-1770 feet. Grey siltstone and a little carbonaceous material with a few Inoceramus prisms.

1770-1780 feet. Grey carbonaceous siltstone with a few calcareous and arenaceous foraminifera, some tests replaced with pyrite, and Inoceramus prisms.

Foraminifera: Trochammina depressa Lozo
cf. Trochamminoides
Marginulinopsis subcretaceus (Crespin)
Robulus gunderbookaensis (Crespin)

1790-1800 feet. Carbonaceous siltstone and sandstone with pyrite, megaspores (P.reticulata), a few foraminifera (Globigerina cf. planispira rare, Robulus spp., Spiroplectammina sp.), Inoceramus prisms, shell fragments and indeterminate ostracods.

1800-1920 feet. Carbonaceous siltstone and sandstone with glauconite, a few foraminifera and Inoceramus prisms.

Foraminifera: Bimonilina sp.
Saccamina sp.nov.
Trochammina minuta Crespin
Valvulineria sp.

1920-2030 feet. Carbonaceous siltstone with foraminifera, chiefly arenaceous, fragments of mollusca (Dentalium sp. and indeterminate gastropod) and Inoceramus prisms.

Foraminifera:

Ammobaculites sp.
Dorothia cf. filiformis (Berthelin)
Flabellamina sp.nov. (vitrea Crespín MS)
Haplophragmoides sp.nov. A (Crespín, MS)
Haplophragmoides spp.
Saccamina sp.
Spiroplectamina sp.nov. (aquabila Crespín MS)
Trochamina sp.nov. (subinflata Crespín MS)
Epistomina australiensis Crespín

2040-2120 feet. Carbonaceous siltstone and sandstone with foraminifera, poorly preserved, and Inoceramus prisms.

2120-2150 feet. Carbonaceous siltstone and sandstone with foraminifera and abundant Inoceramus prisms.

Foraminifera:

Haplophragmoides chapmani Crespín
Reophax deckeri Tappan
Globigerina sp. (rare)
Robulus spp.

2150-2170 feet. Carbonaceous siltstone with abundant carbonaceous fragments, pyrite, a few radiolaria replaced with pyrite (Dictyomitra), a few arenaceous foraminifera (Dorothia sp., Hyperamina sp., Saccamina sp.nov., Trochamina minuta) and numerous Inoceramus prisms.

2170-2180 feet. Carbonaceous siltstone and a little limestone with foraminifera and abundant Inoceramus prisms.

Foraminifera:

Haplophragmoides sp.nov. (wilgunyaensis Crespín MS)
Spiroplectamina sp.
Textularia cf. anacooraensis Crespín
Trochamina sp.nov. (delicatula Crespín MS)
Globigerina planispira Tappan (few)
Globigerina sp. (pyritic)
Epistomina australiensis Crespín

2190-2200 feet. Carbonaceous siltstone with carbonaceous fragments common, a few foraminifera and abundant Inoceramus prisms.

Foraminifera:

Ammobaculites fisheri Crespín
Dorothia sp.
Haplophragmoides sp.
Trochamina sp.nov. (subinflata Crespín MS)
Globigerina sp.

2210-2390 feet. Carbonaceous siltstone and limestone with foraminifera (chiefly Globigerina), abundant Inoceramus prisms and pyritic replacement of radiolaria (Cenosphaera, Dictyomitra).

Foraminifera:

Bimonilina sp.
Flabellamina sp.nov. (vitrea Crespín MS)
Haplophragmoides sp.nov. (wilgunyaensis Crespín MS)
Psammosphaera sp.
Globigerina planispira Tappan (common)
Globigerina sp.

2400-2450 feet. Black carbonaceous siltstone, finely laminated, with pyrite, megaspores (P. reticulata), foraminifera (many tests of Globigerina distorted and crushed) and Inoceramus prisms less common.

Foraminifera:

Bimonilina sp.
Haplophragmoides cf. chapmani Crespín
Haplophragmoides sp.
Verneuillina howchini Crespín
Globigerina planispira Tappan
Globigerina sp.
Gyroidina sp.
Lenticulina sp.
Marginulinopsis australis Crespín

2450-2460 feet. Carbonaceous siltstone but with less carbonaceous material, and glauconitic sandstone, pyrite, a few foraminifera (Ammobaculites sp.nov. (erectus Crespín MS) Trochammina sp. but no Globigerina) and Inoceramus prisms rare.

2470-2490 feet. Siltstone and sandstone with foraminifera chiefly arenaceous tests.

Foraminifera:

Ammobaculites fisheri Crespín
Ammobaculites sp.nov. (exertus Crespín MS)
Haplophragmoides chapmani (large and distorted)
Hyperammina sp.
Pelosina lagenoides Crespín
Saccammina sp.nov. (globosa Crespín MS)
Trochammina cf. raggatti Crespín
Trochammina spp.
Verneuillinoides kansanensis Loeblich and Tappan
Globigerina planispira (rare, ? derived)
Gyroidina sp.

2520-2540 feet. Silty sandstone, fragments of calcareous rock, with megaspores (P. reticulata) radiolaria, foraminifera not common and a few Inoceramus prisms (? derived).

Foraminifera:

Ammodiscus sp.
Haplophragmoides sp.nov.
Trochammina minuta Crespín
Globigerina sp. (? derived)
Gyroidina sp.

2570-2610 feet. Sandy siltstone, with some glauconite, foraminifera chiefly arenaceous tests and ostracoda.

Foraminifera:

Ammobaculites minimus Crespin
Amodiscus glabratus Cushman
Haplophragmoides chapmani Crespin
Haplophragmoides sp.nov. (Wilgunyaensis Crespin MS)
Reophax deckeri Tappan
Saccamina sp.
Verneuilina howchini Crespin
Verneulinoides kansanensis Loeblich and Tappan
Anomalina mawsoni Crespin
Gavellinella sp.
Globigerina sp. (? derived)
Lenticulina sp.
Marginulinopsis australis Crespin
Ramulina sp.

2630-2640 feet. Carbonaceous siltstone, glauconitic sandy siltstone and limestone fragments with pyrite, pyritic replacement of radiolaria, and foraminifera, and Inoceramus prisms (? derived).

Foraminifera:

Ammobaculites minimus Crespin
Ammobaculites sp.
Haplophragmoides cf. chapmani Crespin.
(large and distorted)
Reophax deckeri Tappan
Verneulinoides kansanensis Loeblich and Tappan
Anomalina mawsoni Crespin
Gyroidina sp.
Marginulinopsis subcretaceus (Crespin)
cf. Nodosaria ithystoecha Loeblich and Tappan
Ramulina sp.

2660-2670 feet. Carbonaceous siltstone, sandy siltstone and calcareous rock, with radiolaria common and replaced with pyrite, and foraminifera including large but distorted tests of Haplophragmoides.

Foraminifera:

Haplophragmoides cf. gigas Cushman
Haplophragmoides spp.
Anomalina mawsoni Crespin
Epistomina australiensis Crespin
Globigerina sp. (? derived)
Marginulina sp.
Ramulina sp.
Robulus sp.

2740-2780 feet. Glauconitic sandy siltstone, with pyrite, megaspores (P.reticulata), pyritic replacement of radiolaria (Cenosphaera), arenaceous and calcareous foraminifera and pyritic replacement of pelecypoda.

2740-2780 feet (Contd.)

Foraminifera:

Ammobaculites sp.
Bigenerina loeblichae Crespín
Bimonilina variana Eicher
Haplophragmoides sp. (pyritic, large)
Reophax deckeri Tappan
Trochammina depressa Lozo
Darbyella subcretaceus Tappan
Epistomina australiensis Crespín
Gavellinella cf. minima (Vieux)
Globigerina planispira (rare, ? derived)
Marginulinopsis australis Crespín
Patellina jonesi Howchin
Pseudoglandulina regularis Crespín
Valvulinaria infracretacea Crespín

2790-2820 feet. Glauconitic siltstone with pyrite, numerous foraminifera, calcareous tests well preserved, and a few crinoid ossicles.

Foraminifera:

Ammodiscus sp.
Ammobaculoides pitmani Crespín
Bathysiphon sp.
Haplophragmoides cf. dickinsoni Crespín
Pelosina lagenoides Crespín
Verneuilinoides kansanensis Loeblich and Tappan
Globigerina sp. (rare, distorted, ?derived)
Lagena sp.
Lenticulina australiensis Crespín
Marginulinopsis subcretaceus (Crespín)
Pyrulina sp.
Nodosaria ithystoecha Tappan
Robulus gunderbookaensis (Crespín)
Valvulinaria infracretacea Crespín

2830-2840 feet. Glauconitic sandstone and siltstone, with calcareous foraminifera (Anomalina mawsoni, large, Pseudoglandulina regularis) and pyritic replacement of radiolaria (Dictyomitra).

2860-2870 feet. Glauconitic siltstone and sandy siltstone, with pyrite, numerous arenaceous and calcareous foraminifera, many tests filled with pyrite, and crinoid plates.

Foraminifera:

Ammobaculoides romaensis Crespín (common)
Ammobaculites minimus Crespín
Bigenerina loeblichae Crespín
Haplophragmoides cf. gigas (large, distorted)
Hyperammina sp.
Trochammina raggatti Crespín
Trochammina minuta Crespín
Anomalina mawsoni Crespín (large, common)
Dentalina sp.
Marginulinopsis australis Crespín
Robulus gunderbookaensis (Crespín)
Robulus sp.
cf. Turrispirillina

2890-2900 feet. Siltstone with some glauconite and foraminifera.

Foraminifera:

Ammobaculoides romaensis Crespin
Haplophragmoides sp.nov. (arenatus Crespin MS)
Haplophragmoides sp.
Hyperammina sp.
Anomalina mawsoni Crespin (common)
Marginulinopsis subcretaceus (Crespin)
Robulus gunderbookaensis (Crespin)
Robulus sp.

2930-2970 feet. Glauconitic siltstone with pyrite, foraminifera and indeterminate ostracoda.

Foraminifera:

Ammobaculoides pitmani Crespin (common at 2930-2940 feet)
Ammobaculoides romaensis Crespin
Ammodiscus sp.
cf. Bimonilina
Haplophragmoides sp.
Spiroplectammina cushmani Crespin
Trochammina cf. minuta Crespin
Anomalina mawsoni Crespin
Globulina cf. exserta (Berthelin)
Lenticulina australiensis Crespin
Marginulinopsis australis Crespin
Patellina jonesi Howchin (at 2960-2970 feet)

3000-3020 feet. Siltstone with glauconite and pyrite, also foraminifera, many tests crushed, and ostracoda.

Foraminifera:

Ammobaculoides romaensis Crespin
Bathysiphon sp.
Bimonilina variana Eicher
Pelosina lagenoides Crespin
Spiroplectammina edgelli Crespin
Spiroplectammina cushmani Crespin
Trochammina cf. minuta Crespin
Lenticulina spp.
Marginulinopsis australis Crespin
Marginulinopsis spp.

3030-3040 feet. Grey siltstone with glauconite, and pyrite, also foraminifera, chiefly calcareous tests, indeterminate shell fragments and several tests of ostracoda.

Foraminifera:

Spiroplectammina cf. edgelli Crespin
Trochammina cf. minuta Crespin
Globulina sp.
Marginulinopsis australis Crespin
Marginulinopsis spp.
Neobulimina minima Tappan (common)

3060-3070 feet. Grey siltstone with pyrite, numerous foraminifera, chiefly calcareous forms with the Lagenidae common, and ostracoda.

Foraminifera:

Ammomarginulina sp.
Hyperammia sp.
Spiroplectammia cushmani Crespin
Pelosina lagenoides Crespin
Trochammia minuta Crespin
Globulina sp.
Gyroïdina sp.
Lagena apiculata (Reuss) var. phialaeformis Crespin
Lenticulina sp.
Marginulina spp.
Neobulimina minima Tappan (common)
Robulus gunderbookaensis (Crespin)
Robulus warrengoensis (Crespin)
Robulus spp.

3100-3110 feet. Siltstone with pyrite and poorly preserved foraminifera and ostracoda.

3110-3140 feet. Dark grey and brown siltstone and some sandstone with a few poorly preserved foraminifera, tests crushed and stained brown Haplophragmoides sp., Robulus sp.) and crushed ostracoda.

3150-3240 feet. Sandstone with a few poorly preserved foraminifera (Ammobaculoides pitmani).

Core 3. 3264' - 3264'6". Micaceous sandstone with crushed arenaceous foraminifera rare (Haplophragmoides sp., Trochammia sp.)

3270-3310 feet. Sandstone, glauconitic siltstone and pyrite, with foraminifera (Ammobaculoides pitmani, Ammobaculites sp.)

Core 8. 5518' - 5537'

1. 5518'3" - 5518'7". Reddish, slightly calcareous sandstone, with rounded to angular quartz grains. No fossils.
2. 5530' - 5530'4". Similar to sample 1.

Core 9. 5537' - 5550'

1. 5538'4" - 5538'9". Similar to above samples from core 8.

Stratigraphical and Microfaunal Notes on the Samples

The following comments on the stratigraphical sequence in the Buckabie No.1 Well, are based, primarily, on the examination of numerous cuttings selected from those taken between the depths of 80 feet and 3,310 feet, the suggested base of the marine Lower Cretaceous. When trying to determine the upper and lower limits of the units suggested below, cuttings were examined at ten feet intervals.

Eight units have been recognized; these have been determined on lithology and microfaunal content. Five of these have distinctive marine microfaunal assemblages; one has a characteristic lithology with marine fossils occurring at widely separated intervals; two others have distinctive lithologies but are unfossiliferous. These units are labelled A to H in upward stratigraphical sequence.

Units	Limiting depths in feet	Lithology	Fossils
H	80 - 130	Ochreous sandstone and siltstone.	-
G	130 - ?1180	Carbonaceous siltstone and sandstone.	-
F	?1180 - 1740	Calcareous glauconitic sandstone and some carbonaceous siltstone.	Megaspores. Occasional <u>Inoceramus</u> prisms.
E	1740 - 2170	Carbonaceous siltstone.	Foraminifera, <u>Inoceramus</u> prisms
D	2170 - 2450	Carbonaceous siltstone with a little limestone.	<u>Globigerina</u> common, <u>Inoceramus</u> abundant in upper part.
C	2450 - 2740	Carbonaceous siltstone with a little glauconitic sandstone towards base.	Foraminifera common, <u>Globigerina</u> and <u>Inoceramus</u> very rare, ?derived.
B	2740 - 3110	Glauconitic sandstone and siltstone.	Foraminifera including type Roma species.
A	3110 - 3310	Sandstone	Foraminifera rare.

These units are discussed in upward stratigraphical sequence.

Unit A. 3310-3110 feet. Few rather poorly preserved foraminifera are present in the sandstone, and these tests are usually stained brown. Two forms, Haplophragmoides sp. and Trochammina sp., were found in the crushings of Core 3 at 3264' - 3264'6". The characteristic Roma species, Ammobaculoides pitmani, was noted in the cuttings. Unit A may correspond to the "Transition Beds" at the base of the marine Lower Cretaceous section in Queensland.

Unit B. 3110-2740 feet. Both arenaceous and calcareous tests of foraminifera are common in the glauconitic siltstone and sandy siltstone of this unit. The family Lagenidae is well represented amongst the calcareous forms. The arenaceous assemblage includes species such as Ammobaculoides pitmani, A. romaensis, Bigenerina loeblichae and Spiroplectammina cushmani which are characteristic of the sediments in the type area for the Roma Formation near Roma. Amongst the calcareous species is Anomalina mawsoni which was common at 2890-2900 feet, the tests being unusually large at 2860-2870 feet. The glauconitic siltstone and sandstone is also a lithological feature of the Roma beds.

Unit C. 2740-2450 feet. The lithology is carbonaceous siltstone with some glauconitic sandstone towards the base of the unit. Arenaceous and calcareous foraminifera are present but the typical Roma species listed in Unit B were not noted. Radiolaria are common at 2660-2670 feet, all tests being replaced with pyrite. Globigerina and Inoceramus prisms are very rare and it is most probable that the specimens that are present were derived from the overlying Unit D.

Unit D. 2450-2170 feet. The lithology is mainly carbonaceous siltstone; some fragments of limestone were noted. Foraminifera are present, with Globigerina very common in some cuttings. Inoceramus prisms are abundant in some samples but decrease in number from 2450 to 2400 feet. Between these two depths, the rock is a finely laminated carbonaceous siltstone in which the many tests of Globigerina are distorted or crushed. The abundance of Globigerina and Inoceramus prisms within this unit suggests an equivalent of the Toolebuc Limestone Member of the upper part of the Wilgunya Formation in western Queensland.

Unit E. 2170-1740 feet. The lithology is carbonaceous siltstone. Foraminifera are not common and arenaceous tests are predominant; Globigerina occur rarely. Inoceramus prisms increase in number towards the base of the unit, between 2170 and 2120 feet. This unit shows some resemblance with the upper part of the Wilgunya Formation of western Queensland.

Unit F. 1740 - ?1180 feet. The characteristic rocks in the cuttings are calcareous glauconitic sandstone in which the marine influence is shown by the presence of a few Inoceramus prisms at 1720-1730 feet, 1530-1540 feet, 1500-1510 feet and 1460-1470 feet. The Cretaceous megaspore, Pyribolospora reticulata was recorded at 1530-1540 feet, 1500-1510 feet, 1460-1470 feet and 1220-1230 feet. The upper limit of this unit is given as approximate only, as the fragments of calcareous glauconitic sandstone associated with the carbonaceous siltstone of the overlying unit G are small immediately above the cuttings at 1180 feet.

Unit G. 1180-130 feet. The lithology is carbonaceous siltstone and sandstone. No evidence of marine conditions were recognized.

Unit H. 130-80 feet. The cuttings consist of unfossiliferous ochreous sandstone and siltstone.

The detailed examination of many cuttings within unit F was prompted by the comments of N. de Jersey and R.J. Paten of the Queensland Mines Department in their Record 1961/3 on the Palynology of the Buckabie No.1 Well. They stated "Cuttings showed the presence of shelly fragments as high as 1,520 feet or doubtfully to 1,410 feet and coal seams to a depth of 1,100 feet or possibly to 1,230 feet. This indicates that the transition from marine to freshwater deposition occurred within the strata penetrated between 1,110 feet and 1,520 feet and suggests that the base of the Winton Formation be placed considerably higher than placed by the well-site Geologist", which was at 1747 feet. The writer tentatively suggests that the dominating presence of calcareous glauconitic sandstone in the numerous cuttings examined between the depths of 1740 feet and 1180 feet, and referred to as Unit F., may represent transitional beds between the foraminiferal bearing sediments below 1740 feet and the freshwater beds above 1180 feet or at least above and including Core 1 at 1123'8"-1136'6". This tentative suggestion would, however, require considerable field work for its substantiation.

REFERENCE

de JERSEY, N.J. and PATEN, R.J., 1961 - The Palynology of Samples from Phillips-Sunray Buckabie No.1 Well. Geol.Surv.Qld. Record 1961/3