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FORAMINIFERA IN U.K.A. CABAWIN 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 It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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SUMMARY

Foraminifera of Lower Cretaceous and Permian ages were found in the cores and cuttings from Cabawin No.1 Well. One assemblage of Lower Cretaceous species shows a close relationship with that present in the Roma (Aptian) beds at Roma. Foraminifera were not abundant in the Permian rocks but a tentative correlation with the Springsure assemblages is suggested.

INTRODUCTION

U.K.A. Cabawin No. 1 Well is situated about 80 miles south-east of Roma. It was drilled to the depth of 12,035 feet. Cores were taken at varying intervals during drilling whilst cuttings were available from every ten feet throughout the sequence. Cores 1 to 6, 9, 11, 15, 16, 29 to 42 were examined for foraminifera; other cores were examined by Dr. P.R. Evans who reported the presence of spores and pollens in them all. Cuttings were examined at varying depths, the upper and lower limits of the foraminiferal zones being determined as far as possible.

Foraminifera of Lower Cretaceous and Permian ages were recorded. The Lower Cretaceous fauna is represented by two assemblages, an upper one, probably equivalent of the Albian and a lower one definitely the equivalent of the Roma (Aptian) beds.

Except where indicated, the description of samples given below is from cuttings.

DETAILED EXAMINATION OF CORES AND CUTTINGS

- 50-60 feet. Sandstone. No fossils.
- 60-70 feet. Limonitic siltstone with gypsum. No fossils.
- 70-100 feet. Ochreous sandy siltstone with siliceous sponge spicules and small crushed indeterminate arenaceous foraminifera.
- 100-140 feet. Siltstone with glauconite, Gypsum, foraminifera (Anomalina mawsoni, Haplophragmoides sp., Verneuilina howchini), radiolaria (Porodiscus, Dictyomitra), and siliceous sponge spicules.
- 140-160 feet. Carbonaceous siltstone with glauconite, megaspores, pyritic replacement of radiolaria, and a few foraminifera (Anomalina mawsoni, Haplophragmoides chapmani, Pelosina sp., Trochammina minuta).
- 170-190 feet. Carbonaceous siltstone and glauconitic siltstone with foraminifera (Gavelinella sp., Globulina cf. lacrima, Haplophragmoides cf. chapmani, Marginulina sp., Verneuilina cf. howchini).
- 200-400 feet. Carbonaceous sandstone with glauconite and sandy siltstone. No fossils.
- 400-550 feet. Carbonaceous siltstone. No foraminifera.
- 550-562 feet. Carbonaceous sandstone with glauconite. No foraminifera.
- CORE 1. 562 feet-563 feet 5 inches. Carbonaceous siltstone and silty sandstone with some glauconite. No foraminifera.
- 570-670 feet. Carbonaceous siltstone and sandstone. No foraminifera.
- 680-690 feet. Carbonaceous siltstone and sandy siltstone with a few arenaceous foraminifera (Ammobaculoides pitmani, Bigennerina loeblichii, Hyperammina sp.) and some echinoid

plates.

690-710 feet. Carbonaceous siltstone and glauconitic sandstone, with arenaceous foraminifera.

Foraminifera: Ammobaculoides romaensis
Ammobaculites cf. subcretaceus
Bathysiphon sp.
Bigenerina loeblichii
Hyperammina sp.
Pelosina lagenoides

760-810 feet. Carbonaceous siltstone and glauconitic sandstone with arenaceous and calcareous foraminifera.

Foraminifera: Ammobaculites cf. subcretaceus
Ammobaculoides pitmani
A. romaensis
Bigenerina loeblichii
Haplophragmoides chapmani
Hyperammina sp.
Trochammina minuta
Lenticulina sp.
Valvulineria infracretacea

850-860 feet. Carbonaceous siltstone and glauconitic sandstone, with arenaceous and calcareous foraminifera.

Foraminifera: Ammobaculoides pitmani
A. romaensis
Bigenerina loeblichii
Haplophragmoides chapmani
Involutina cretacea
Protonina sp. nov.
Anomalina mawsoni
Robulus gunderbookaensis
Valvulineria infracretacea

900-950 feet. Carbonaceous siltstone and glauconitic sandstone, with some pyrite, arenaceous and calcareous foraminifera and fish tooth (at 920-930 feet).

Foraminifera: Ammobaculoides pitmani
A. romaensis
Ammobaculites cf. goodlandensis
Haplophragmoides chapmani
Hyperammina sp.
Spiroplectammina edgelli
Anomalina mawsoni (common at 920-930 feet)
Lenticulina sp.
Marginulinopsis cf. subcretaceus
M. sp.
Neobulimina sp.
Robulus gunderbookaensis
Robulus spp.

960-990 feet. Carbonaceous siltstone with pyrite and fine glauconitic sandstone, with arenaceous and calcareous foraminifera fairly numerous.

Foraminifera: Ammobaculoides pitmani
A. romaensis
Ammobaculites sp.
Arenobulimina sp.
Bimonilina sp.
Haplophragmoides chapmani
H. sp.
Hyperammina sp.
Involutina cretacea
Spiroplectammina cushmani
S. edgelli
Trochammina minuta
T. raggatti
Anomalina mawsoni (c)
Marginulina sp.
Robulus gunderbookaensis
R. sp.

1000-1010 feet. Siltstone with small foraminifera

Foraminifera: Bathysiphon sp.
Bimonilina sp.
? Dorothia filiformis
Haplophragmoides sp.
Anomalina mawsoni
Valvulineria infracretacea
Indeterminate forms.

1010-1020 feet. Siltstone and glauconitic sandstone with pyrite and foraminifera, chiefly arenaceous forms.

Foraminifera: Ammobaculoides romaensis
Ammobaculites cf. subcretaceus
Bimonilina sp.
Bathysiphon sp.
Hyperammina sp.
Spiroplectammina edgelli
Valvulineria infracretacea
Indeterminate forms

1060-1099 feet. Siltstone and glauconitic sandstone with numerous arenaceous foraminifera, calcareous forms few; some arenaceous tests partially replaced with glauconite, others having a black mineral (cf. ilmenite) included in their tests.

Foraminifera: Ammobaculoides romaensis
A. pitmani
Ammobaculites fisheri (r)
A. aff. irregulariformis
A. sp. nov.
A. sp.
cf. Ammomarginulina
Bathysiphon sp.
Bigenerina loeblichii
Bimonilina cf. varians
Dorothia sp. nov.
Hyperammina sp.
Spiroplectammina cushmani (c)
S. sp. nov.
S. edgelli
Trochammina sp. nov.
Trochamminoides sp.
Textularia sp.
Verneuilina sp.
? Marginulina
Robulus gunderbookaensis

CORE 2. 1099 feet - 1108 feet 4 inches

- a. 1099-1099' 4". Glauconitic sandstone and sandy siltstone. No recognizable foraminifera.
- b. 1104-1104' 4". Grey glauconitic siltstone and brownish siltstone with few identifiable arenaceous foraminifera (Dorothia sp. nov., ? Textularia).
- c. 1108'-1108' 4". Glauconitic sandstone and brown siltstone with coarse grained arenaceous foraminifera, some tests broken and many almost completely replaced with glauconite.

Foraminifera: Ammobaculoides pitmani
 ? Amodiscus milletianus
Dorothia sp.
Spiroplectammina sp. nov.
Proteonina sp. nov.
 Fragments of large coarse-grained tests
 (cf. Ammobaculites.)

1105-1120 feet. Glauconitic siltstone and sandstone with numerous arenaceous foraminifera and some calcareous tests.

Foraminifera: Ammobaculoides pitmani
A. romaensis (c)
Ammobaculites cf. subcretaceus
Bigennerina loeblichii
Bimonilina aff. varians
Hyperammina sp.
Haplophragmoides sp.
Spiroplectammina cushmani (c)
S. sp. nov.
Trochammina minuta
T. sp. nov.
Anomalina mawsoni
Conorbina cf. conica
Marginulina marreensis

1120-1150 feet. Glauconitic sandstone with pyrite, numerous arenaceous foraminifera, many tests coarse-grained and a few calcareous forms.

Foraminifera: Ammobaculoides pitmani (c)
A. romaensis (c)
Ammobaculites minimus (r)
A. fisheri (r)
A. cf. subcretaceus
A. sp. nov.
Bimonilina cf. varians
Haplophragmoides chapmani
H. sp.
Hyperammina sp.
Proteonina sp. nov.
Reophax sp.
Spiroplectammina cushmani (c)
S. sp. nov.
Trochammina sp. nov.
T. sp.
Anomalina mawsoni
Lenticulina sp.
Marginulinopsis australis

1160-1170 feet. Glauconitic sandstone and siltstone with a few foraminifera not common (Ammobaculites subcretaceus, Haplophragmoides sp., Spiroplectammina sp. nov.,

S. cushmani).

1190-1200 feet. Sandstone with a little glauconitic sandstone, carbonaceous material, pyrite and one foraminiferal test (Spiroplectammina sp. nov.), probably derived.

1200-1310 feet. Carbonaceous sandstone with glauconite and pyrite. No foraminifera.

1350-1360 feet. Carbonaceous siltstone with coaly particles.

1400-1570 feet. Carbonaceous siltstone and sandstone.

CORE 3. 1581 feet 8 inches - 1588 feet 8 inches.

a. 1581' 8" - 1582'. Brown carbonaceous siltstone and coarse sandstone. No foraminifera.

1600-1610 feet. Carbonaceous sandy siltstone with a little glauconite and ? siderite.

CORE 4. 2095-2105 feet. Carbonaceous sandstone. No foraminifera.

CORE 5. 2429 feet 3 inches - 2433 feet.

a. 2432' 8"-2433 feet. Micaceous sandstone with some carbonaceous material. No foraminifera.

CORE 6. 2780 feet 9 inches - 2790 feet.

a. 2780' 9"-2781 feet. Carbonaceous micaceous sandstone. No foraminifera.

CORE 9. 4202 feet-4212 feet 7 inches.

a. 4202'-4202' 7". Carbonaceous siltstone. No foraminifera.

b. 4212' 3"-4212' 7". Coal and carbonaceous siltstone.

CORE 11. 4899 feet 6 inches - 4906 feet 3 inches.

a. 4903' 5"-4903' 9". Coarse sandstone with carbonaceous material. No foraminifera.

CORE 15. 5895 feet 6 inches - 5897 feet 11 inches.

a. 5897' 7"-5897' 11". Carbonaceous siltstone. No foraminifera.

CORE 16. 6068 feet-6077 feet.

a. 6068'-6068' 4". Black carbonaceous siltstone. No foraminifera.

6077-6280 feet. Carbonaceous sandy siltstone and coarse sandstone. No foraminifera.

9985-9990 feet. Carbonaceous siltstone. No foraminifera.

10040-10100 feet. Carbonaceous siltstone. No foraminifera.

CORE 39. 10113' 5" - 10124' 3".

a. 10113' ~~15~~" - 10124' 3". White sandy siltstone with coaly particles at 10113' 9".

CORE 40. 10129' 6"-10129' 10". Carbonaceous siltstone.
No foraminifera.

10190-10300 feet. Carbonaceous siltstone. No foraminifera.

10340-10360 feet. Whitish carbonaceous siltstone. No foraminifera.

10360-10400 feet. Calcareous rock with foraminifera, productid spines, crinoid ossicles, and bryozoa.

Foraminifera: Calcitornella sp.
? Farlandia
Fronidicularia aulax
Geinitzina caseyi
Hyperammina sp.
Involutina sp.

10490-10550 feet. Calcareous rock with indeterminate bryozoa and ostracoda and productid spines.

10550-10600 feet. Cal.

10650-10750 feet. Carbonaceous siltstone with some productid spines.

10790-10800 feet. Carbonaceous siltstone with foraminifera rare (Involutina cf. multicinctus) and productid spines.

11060-11070 feet. Calcareous rock, with no determinable fossils.

11070-11080 feet. Sandy limestone and numerous coaly particles.

CORE 41. 11086'-11095' 3".

a. 11086'-11086' 4". Fossiliferous limestone with pyrite, foraminifera rare (cf. Geinitzina) and productid spines.

b. 11089' 0"-11089' 4". Carbonaceous siltstone with productid spines and ? conodont.

c. 11091' 5"-1091' 9". Calcareous rock with productid spines.

d. 11094' 11"-11095' 3". Fossiliferous rock. No foraminifera.

11090-11100 feet. Calcareous rock with a few foraminifera, indeterminate bryozoa, crinoid ossicles, productid spines and ostracoda (Bairdia sp.)

Foraminifera: Calcitornella cf. elongata
Fronidicularia sp.
cf. Trepeilopsis

11100-11110 feet. Sandy limestone with productid spines, but no foraminifera.

11110-11140 feet. Limestone with foraminifera, indeterminate bryozoa, productid spines and indeterminate ostracoda.

Foraminifera: Frondicularia aulax
Nodosaria sp.

11170-11220 feet. Sandy limestone with productid spines.

11240-11250 feet. Fossiliferous rock with foraminifera.
bryozoa, productid spines, and small gasteropoda
(Peruvispira sp.)

Foraminifera: Calcitornella cf. elongata
Frondicularia sp.
Hyperammina sp.

11290-11300 feet. Limestone with productid spines. No
recognisable foraminifera.

11550-11560 feet. Limestone with foraminifera (Geinitzina
cf. triangularis) and productid spines.

CORE 42. 11578' 4" - 11588' 6"

Crushings:

a. 11578' 4"-11578' 8". Fossiliferous rock with pyrite
and numerous productid spines.

b. 11580' 8"-11581' 0". Fossiliferous rock with pyrite
and numerous productid spines.

c. 11585'-11586' 1". Fossiliferous rock with a few
productid spines.

Thin sections of base of core between 11588' 2" and 11588' 6"

d. Upper half - Detrital limestone with small fragments
of volcanic rock, considerable pyrite, foraminifera rare
(?Calcitornella), brachiopod and molluscan shell fragments
and indeterminate ostracoda.

e. Lower half - Detrital limestone with numerous fragments
of volcanic rock, abundant pyrite, also crinoid plates and
molluscan shell fragments.

11600-11670 feet. Calcareous siltstone with productid
spines.

11690-12035 feet. Volcanic rock.

NOTE ON THE FORAMINIFERAL ASSEMBLAGES IN
CABAWIN NO. 1 WELL

A summary of the micropalaeontological examina-
tion of cores and cuttings from Cabawin No. 1 Well is as
follows :

Depth in feet	Lithology	Fossil content	Age
30-60	Sandstone	-	-
60-190	Carbonaceous siltstone, glauconite pyrite	Megaspores Radiolaria Foraminifera Sponge spicules	Lr. Cretaceous (? Albian)
200-670	Carbonaceous siltstone, sandy siltstone, glauconite		Lr. Cretaceous
680-1170	Carbonaceous siltstone and glauconitic sandstone	Numerous foraminifera	Lr. Cretaceous (= Roma beds, Aptian)
1190-?9450	Carbonaceous siltstone and sandstone, conglomerate	Spores, pollens (P.R.E.)	? Lr. Cretaceous Jurassic Triassic
?9450-10290	Carbonaceous siltstone and sandstone	Spores, pollens (P.R.E.)	? Upper Permian
10360-10550	Calcareous, fossiliferous rock	Foraminifera Bryozoa, productid spines, Ostracoda indet.	Permian ? = Mantuan <u>Productus</u> Bed
10550-10600	Coal		Permian
10600-11670	Calcareous rock, detrital limestone pyrite	Foraminifera Bryozoa, crinoid ossicles, productid spines, Mollusca	Permian (= Ingelara Fm or Cattle Creek Fm.
11690-12035	Volcanics	-	-

Lower Cretaceous

Foraminifera were found in two intervals within the Lower Cretaceous. The limiting depths of these intervals are :

- a. Between 60 feet and 190 feet.
- b. Between 680 feet and 1170 feet.

a. Between 60 feet and 190 feet. Foraminifera were not common in this interval and were found associated with radiolaria and siliceous sponge spicules. The arenaceous tests were poorly preserved and distorted; the calcareous tests were represented chiefly by the small species Anomalina mawsoni Crespín. There is no definite evidence as to the European stage equivalent these beds may represent but the association of the foraminifera with radiolaria suggests a Lower Albian age. It is also most probable that it comes within the middle zone of Lower Cretaceous foraminifera in the Great Artesian Basin as suggested by Crespín, (1956).

The section between the depths of 190 feet and 680 feet consists of carbonaceous siltstone and sandstone with glauconite but no foraminifera were noted in the sediments.

b. Between 680 feet and 1170 feet. The assemblage of foraminifera within this interval is dominated by arenaceous tests chiefly of Ammobaculoides romaensis Crespin, A. pitmani Crespin, Bigenerina loeblichii Crespin, Haplophragmoides chapmani Crespin and Spiroplectammina cushmani Crespin. Calcareous tests include genera of the Lagenidae and rotalines such as Anomalina mawsoni.

The assemblage of arenaceous species closely resembles that found in the sections at Bungeworgorai and Clerk Creeks, 5 miles west of Roma which is the type area for the Roma Formation, (Whitehouse, 1955) and from many other localities in the Roma area from which the writer made collections in 1948 and 1950. Many of the species have been described by her (Crespin, 1944, 1953). All the arenaceous species listed above from the Cabawin Bore, have the brown colouring of the test characteristic of the Roma specimens. A. romaensis and A. pitmani are almost entirely restricted to beds equivalent of the Roma Formation, which on evidence of the macrofossils is regarded as the equivalent of the Aptian. Some of the other species recorded are referable to new forms found recently in the Upper Longsight Sandstone in western Queensland, which on evidence of macrofossils is also considered to be Aptian.

Bigenerina loeblichii, which is characteristic of the Roma Beds has been found outside the Roma Formation but it is not common. Haplophragmoides chapmani, though common in the Roma Beds is widespread throughout the Lower Cretaceous of the Great Artesian Basin. Spiroplectammina cushmani is also recorded outside the Roma Beds but it is characteristic of that horizon, where it occurs in abundance in a bed at Minmi Crossing over Bungil Creek just north of Roma. It occurred commonly in some samples in the Cabawin Bore in association with other Roma species.

Robulus gunderbookensis (Crespin), Valvulineria infracretacea (Crespin) and Anomalina mawsoni Crespin are amongst the commoner calcareous species recognised in the bore samples.

The above assemblage of foraminifera may represent zone 3, suggested by Crespin (1956) in which Haplophragmoides chapmani and Spiroplectammina cushmani are the predominant forms. The discovery of Valvulineria infracretacea and Anomalina mawsoni in beds referable to the Aptian shows the importance of detailed work in recognized stratigraphical sequences.

Permian

It is most probable that the bore first encountered the Upper Permian freshwater beds at approximately 9450 feet, this information being confirmed by the work of Dr. P.R. Evans. However, the first evidence of marine Permian in the downward sequence of the bore was in cuttings at 10360-10400 feet when foraminifera and other fossils were recorded. The deepest record of foraminifera was in cuttings at * with indeterminate tests in Core 41 taken from 11086 feet down to 11095 feet 3 inches and Core 42 taken from 11578 feet 4 inches down to 11588 feet 6 inches. (*cuttings at 11550-11560 feet).

Suggested correlations of the Cabawin Permian foraminiferal assemblage can be made only with that from the Springsure area (Crespin, 1958), as the foraminiferal sequences in beds in the Bowen Basin are as yet very incompletely known.

a. The cuttings from 10360 feet down to 10550 feet overlie a bed of coal approximately 50 feet thick. The cuttings at 10360-10440 feet contained two interesting species, Fronicularia aulax Crespin and Geinitzina caseyi Crespin, the latter species being especially well preserved. F. aulax ranges from the Cattle Creek Formation up to the Mantuan Productus Bed in the Springsure area. Up to the present, G. caseyi has been restricted to the latter formation in that area. Because of this and the occurrence of a thick bed of coal immediately underlying the marine beds, it is here suggested that the marine beds from 10360 to 10550 feet may possibly be equivalent of the Mantuan Productus Bed. J.M. Dickins has informed the writer that this conclusion would in no way conflict with the evidence given by the macrofossils.

b. In Core 41 at 11086 feet down to 11095 feet 3 inches and Core 42 at 11578 feet 4 inches down to 11588 feet 6 inches, the commonest foraminifer was Calcitornella cf. elongata Cushman and Waters; fragments of Geinitzina cf. triangularis (Chapman and Howchin) were also noted. The genus Calcitornella is common in the Cattle Creek Formation but has not been found in the stratigraphically higher Ingelara Formation; G. triangularis has been recorded from both formations. Evidence from the macrofossils in the above cores from Cabawin, suggests a probable correlation with the Ingelara Formation. Except for the common occurrence of Calcitornella and the record of cf. Trepeilopsis which tend to suggest a Cattle Creek equivalent for these beds, no evidence is at present available for a satisfactory correlation with the Springsure area.

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