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MESOZOIC STRATA OF THE CALVERT HILLS 1:250,000 SHEET.

by

S.K. Skwarko.

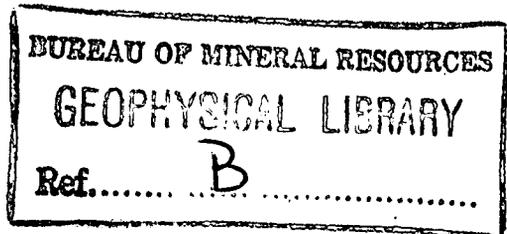
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SUMMARY

Fossil content and field observations suggest that Mesozoic sediments on the Calvert Hills 1:250,000 Sheet area were deposited in distinct environments at three different times in the Lower Cretaceous.

Possibly in mid-Aptian to mid-Albian times quartz sandstone was laid down, apparently in a non-marine environment, over most of the area. In the eastern part, however, this sandstone is not found and Upper Albian marginal marine rocks crop out which are regarded as a continuation of the sediments of the Great Artesian Basin. Both the sandstone and the Upper Albian marginal rocks are overlain by claystone which in the Calvert Hills area is barren of fossils. Farther to the north-west it contains marine microfossils which point to a possible uppermost Albian age. The claystone is possibly a deep water sediment. The sandstone can be traced at least 500 miles to the north-west of the Calvert Hills area, while the claystone possibly extended as far as Darwin.

INTRODUCTION AND ACKNOWLEDGEMENTS

Lower Cretaceous strata of the Calvert Hills 1:250,000 Sheet area were examined during the 1961 field season. Field observations of lithologies and their sequences together with the collection of fossils and their identification provided material for this Record.

Assistance and co-operation of the members of the Borroloola Field Party is acknowledged here with sincere thanks.

FOSSIL LISTS

Lower Cretaceous fossils were collected at three localities on the Calvert Hills 1:250,000 Sheet. Their faunal content and suggested age are as follows:

- T.T.59: Seigals Creek 1-mile Sheet; about  $\frac{1}{2}$  mile south-west from Seigals Creek Homestead, in cliffs on the west bank of Agnes Creek. Run 10 Photo W5013 Point 1  
Plants: Microphyllopteris gleichenioides (Oldham & Morris)  
Otozamites bechei Brongniart  
Conifer foliage and twigs.
- T.T.60: Seigals Creek 1-mile Sheet; about 12 miles south of east from Seigals Creek Homestead. Run 11 Photo 5093 Point 2.

- Pelecypoda : Aucellina hughendenensis (Etheridge Jnr,  
1872)  
 Brachiopoda : Argiope sp. cf. A. punctata Moore, 1870  
Rhynchonella sp. cf. R. solitaria  
 Moore, 1870  
 Cephalopoda : Dimitobelus canhami (Tate), 1879  
 Plants : Cladophlebis australis (Morris)  
Brachyphyllum stems

T.T.61 : Wollogorang 1-mile Sheet: north side of Calvert Hills -  
 Wollogorang Road, about 30 miles east from Calvert Hills  
 Homestead. Run 3 Photo 5113 Point 3.

Plants : Conifer fragments indet.

The floras have been identified by M.E. White. Although  
 the claystone which overlies sandstone in the Calvert Hills  
 1:250,000 Sheet is apparently unfossiliferous, Dr Terpstra  
 identified the following micro-organisms from stratigraphically  
 equivalent claystone from areas to the north-west of  
 Calvert Hills 1:250,000 Sheet.

Walhallow 1:250,000 Sheet: Run 4 Photo 5369 Point 1(A)

Amodiscus cretaceous (Reuss), 1854

Haplophragmoides dickinsoni Crespin, 1953

Haplophragmoides cf. gigas Cushman, 1927

Haplophragmoides cf. wilgunyanensis sp.nov. Crespin

Trochammina sp. MS., 1962

Radiolaria

Tanumbirini 1:250,000 Sheet: Run 3 Photo 5185 Point 3

Amodiscus cretaceous (Reuss), 1854

Haplophragmoides dickinsoni Crespin, 1953

Haplophragmoides cf. gigas Cushman, 1927

Haplophragmoides wilgunyanensis sp.nov. Crespin MS.,

Miliamina sp. 1962

Haplophragmoides sp.

Radiolaria

DISCUSSION

Extensive sheets of Lower Cretaceous strata crop out in the north-western, southern, and south-eastern portions of the Calvert Hills 1:250,000 Sheet area.

The major portion of sediments consists of plant-bearing quartz sandstone overlain by the apparently barren claystone. The sandstone layer is impersistent and up to 100 feet thick. It occurs partly as a stream-dissected plateau and partly as low-level infillings in the relief of the pre-Cretaceous surface. The lithological characteristics of this sandstone have already been discussed (Skwarko, 1961a,b).

Both in lithology and in floral content, the saccharoidal sandstone is not obviously distinguishable from sandstone cropping out sporadically in a belt over 500 miles long stretching in a north-western direction. The depositional environment is thought to have been one of non-marine, possibly brackish water sedimentation as suggested by the presence of plant fossils, apparently brought in from elsewhere, to the exclusion of indigenous fossils. The rather long time ranges of these plants do not allow close dating, but do indicate Lower Cretaceous rather than Upper Jurassic as a likely time of deposition of the saccharoidal sandstone. Independent evidence from the overlying claystone, discussed below, suggests mid-Aptian to mid-Albian as the most probable age of the sandstone.

Marine fossils at locality T.T.60 together with lithological evidence discussed previously (Skwarko, 1961b, 1962) suggest a marginal marine environment. The age of strata exposed at T.T.60 and to the east of it, is Upper Albian and it has been postulated that these beds form the western extension and limit, of the Great Artesian Basin at that time (Skwarko, 1962). As far as could be ascertained, the topographical position of these marine sediments is about the same as that of the quartz-sandstone of non-marine origin in their immediate vicinity to the west. Now the Upper Albian sediments are not overlain by younger strata, but are thought to have been originally covered, probably conformably, by the uppermost Albian claystone found capping the saccharoidal sandstone.

The saccharoidal sandstone is overlain by claystone which in the Calvert Hills area is up to 35 feet thick. Lithological characteristics of these strata have already been discussed (Skwarko, 1961a,b) and it has been suggested

that it extends throughout the "inland area of non-marine sedimentation" and probably farther to the north. Unlike the underlying sandstone, the claystone has accumulated in a marine environment. This is shown by the presence of arenaceous foraminifera in samples from Pine Creek, Mt Evelyn, Walhallow and Tanumbirini 1:250,000 Sheet areas; by the presence of radiolaria in samples from Fergusson River and Katherine 1:250,000 Sheets, and finally by the occurrence of Scaphopoda, cephalopoda and brachyura in the Fergusson River 1:250,000 Sheet area.

Arenaceous foraminifera are long-ranging fossils and although they have been found in south-western Queensland associated with Upper Albian macrofossils (pers. comm. Dr Crespin) this cannot be used as definite evidence of Upper Albian age for clays in the Northern Territory without an independent control. In the Mt Evelyn Sheet area such foraminifera have been found in claystone which overlies, apparently conformably, beds with Neocomian marine fossils suggesting post-Neocomian age. Radiolaria hitherto found in the Northern Territory are not reliable for dating, and past correlations based on their determinations must be treated cautiously.

A collection made some time ago by Vacuum Oil Company from west of Katherine consists of belemnites, crayfish remains, and a scaphopod. These have been identified as follows:

Dimitobelus cf. eremos (Tate), 1889

Teredo cf. vastitas Etheridge Jnr, 1902

Glyphaea cf. arborinsularis Etheridge Jnr, 1917

All these forms are known from the Lower Cretaceous strata of the Great Artesian Basin. T. vastitas occurs in both the Roma and Tamo strata which are regarded as of Aptian and Upper Albian age respectively. D. eremos is confined to Upper Albian beds, but preservation of these belemnites is poor and their comparison with the Upper Albian species may not be justified. The same is true of G. arborinsularis which is limited to Aptian strata of the Great Artesian Basin but which is so badly crushed at locality T.T.53 that it is not specifically determinable and it may in fact be a closely related form, G. oculata Woods, 1957 which is confined to Upper Albian age (pers. comm. J.T. Woods).

Without further collecting it is difficult to date the claystone more definitely than of possibly uppermost Albian age.

At some stage in the Upper Albian the Great Artesian Basin apparently extended into the Northern Territory up to the site of T.T.60. Somewhat later, but still in Albian times, the sea transgressed across the northern part of the Territory. Claystone was deposited over the non-marine sandstone as far as Darwin and beyond. On the Mt Evelyn 1:250,000 Sheet there is evidence that they were also deposited over the Neocomian sandstone, and it is very likely that all the Neocomian Aptian marine sediments along the Gulf of Carpentaria were also submerged at that time.

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