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MESOZOIC AND PERMIAN FOSSILS FROM THE CANNING BASIN, WESTERN AUSTRALIA

by

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INTRODUCTION

The Permian fossils collected by field parties of the Bureau of Mineral Resources in the Canning Basin in 1955 and 1956 have been considered in a previous report (Dickins, 1958). The fossils now considered were collected by field parties of West Australian Petroleum Pty Ltd. (Wapet) in 1954 and 1955 and are indicated by Wapet field numbers; the specimens have been lodged in the collections of the Bureau of Mineral Resources, Geology and Geophysics, Canberra, A.C.T. The localities have been marked by Wapet on copies of their unpublished maps (Sheet "E", C-1805- ; Sheet "F", C-1806 ; and C-1072-G-1 sheets 1, 2 and 3) held in the Bureau, Canberra and the latitudes and longitudes recorded have been taken from these maps. They must be regarded as approximate, except where otherwise indicated, as they are based on an uncorrected grid.

The fossils are considered under the sub-headings Mesozoic, Mesozoic or Permian, and Permian. Under these sub-headings the localities are listed according to alphabetical and numerical order as it has not been practicable to group them according to their stratigraphical position.

In most samples the fossils identified are pelecypods and gastropods, but in some cases brachiopods and other forms have been listed.

STRATIGRAPHICAL SUB-DIVISIONS OF THE LIVERINGA FORMATION

Guppy, Lindner, Rattigan and Casey (1958, p.51) consider that three lithological units can be recognized in the Liveringa Formation of the Fitzroy Basin; the lowermost unit they named the Lightjack Member and the uppermost the

Hardman Member. They did not name the middle member. The Lightjack and the Hardman Members possess different marine faunas which are readily recognizable, and, according to Thomas and Dickins (1954), are of a different age; the fauna of the Lightjack Member is Lower Permian (Artinskian to Kurgurian), and that of the Hardman Upper Permian (probably Tatarian).

Although McWhae, Playford, Lindner, Glenister and Balme (1958, p.57) apparently include only the marine beds in the Lightjack Member, Guppy et al. include in addition, at the top, plant-bearing sandstones.

In the north-east part of the Canning Basin Casey and Wells (in manuscript) also recognize three subdivisions in the Liveringa Formation: the Balgo, Condren and Hardman Members; the Balgo Member is the equivalent of the Lightjack Member in the restricted sense of McWhae et al. and contains the same marine fauna. The Condren Sandstone Member has a maximum measured thickness of 150 feet of sandstone with minor amounts of claystone; it overlies the Balgo Member and contains plant fossils. The Hardman Member is represented by a single fossiliferous locality.

Doubt might be expressed about the identification of the Lightjack and Hardman Members long distances from their type localities and over considerable areas of non-outcrop on lithological grounds alone. Indeed this doubt is implied in the proposal by Casey and Wells to recognize what I regard as the equivalent of the Lightjack Member in the north-east part of the Canning Basin, as the Balgo Member.

In this report it is proposed to use "Lower Liveringa beds" (or "Lower Liveringa") in the sense of Thomas and Dickins (1954, p.220; 221) and Dickins (1956, p.25) to indicate the lower marine fossiliferous beds of the formation identified by stratigraphical relationship fauna and lithology, and comprising the Lightjack Member in the

restricted sense and the Balgo Member. "Upper Liveringa beds" ("Upper Liveringa") is used for the beds with the Hardman fauna.

The Lower Liveringa beds can be distinguished from the Upper Liveringa especially by the presence of the following molluscs:-

Pelecypods

Astartila fletcheri Dickins 1956

Stutchbuŕia muderongensis Dickins 1956

Atomodesma exarata Beyrich 1864

Oriocrassatella stokesi Etheridge Jnr. 1907

Gastropods

Mourlonia? sp.nov.

The Upper Liveringa beds are characterized by the following:-

Pelecypods

Sanguinolitidae gen. et sp. nov.

Atomodesma cf. semiplicata Reed 1944

Schizodus cf. obscurus (Sowerby) 1821

Oriocrassatella sp.nov. ("Procrassatella" type)

Astartella sp.nov.

Aviculopecten sp.nov.

Pseudomonotis sp.nov. (affins. P.deplanata Waagen, 1881)

Gastropods

Mogulia sp.

Pleurotomariidae gen., sp.nov..

In addition to the molluscs the two sub-divisions have distinctive brachiopod faunas.

The Lower and Upper Liveringa are recognizable over long distances in the Canning Basin (including the Fitzroy Basin) and in the sense used represent "stages". The middle part of the Liveringa is characterized by an absence of marine fossils and the presence of plant beds. It thus appears that a sub-division of the Liveringa based

both on lithological and biological data could be more useful than units defined only by lithology. In this connection it is of considerable interest that the "upper stage" and probably the "middle" and "lower stages" of the Liveringa are recognizable by their fauna and flora in the Bonaparte Gulf Basin.

IDENTIFICATIONS

(a) Mesozoic

C.2a (Godfrey Beds). Lat.20°15'S, Long.126°35'E.
(Corrected grid).

A single species of pelecypods is present which can be identified as Etea? sp. The genus Etea occurs in the Lower Cretaceous rocks of North America.

L.10. Lat.18°45'S, Long.121°57'E.

Doubtful animal track.

L.24. (Frezier Sandstone) 2½ miles south of La Grange Telegraph Station.

Pseudavicula papyracea Etheridge Jnr. 1907.

This species indicates a Lower Cretaceous (probably Aptian) age.

M.16. Lat.19°30'S, Long.123°11'E.

Meleagrinella maccoyelloides Brunnschweiler ms.
(previously referred to as Maccoyella sp.)

Quenstedtia sp.

Both these species occur in the Alexander Formation.

M.18. Lat.19°28'S, Long.123°28'E.

Mealeagrinella maccoyelloides Brunnschweiler ms.

M.19. Lat.19°28'S, Long.123°28'E.

?Mealeagrinella maccoyelloides Brunnschweiler ms.

M16, M18 and M19 are similar lithologically.

P.2. Lat.20°1'S, Long. 119°53'E.

Plant fragments.

In Creek 11½ miles north of Mt. Clarkson Bore.

Appears to be part of a living chamber of an ammonite but not identifiable.

Foot of Mt. Clarkson.

Pseudavicula? sp.ind.

Unidentifiable pelecypods.

Creek 5 miles North-east of Mt. Clarkson Bore

Unidentifiable shell impressions.

(b) Mesozoic or Permian

M.59 Gl. Lat.19°4'S, Long.125°7'

Oriocrassatella? sp.ind.

These shells cannot be positively identified; they could be poorly preserved Oriocrassatellas and they are not like any of the Mesozoic shells which are found in the area. The presence of Oriocrassatella would indicate that the rocks at this locality were of Permian age but, because of poor preservation, no certainty is possible.

N.1. Lat.18°53'S, Long.125°13'E.

Wood impressions.

N.158. Lat.18°46'S, Long.125°15'

Unidentifiable organic remains.

(c) Permian

B.1. Lat.19°14'S, Long.126°6'E.

Atomodesma sp.ind.

Aviculopectinidae gen.et sp.ind.

Bellerophontidae gen. et sp.ind.

Warthia cf. micromphala (Morris) 1845

These fossils do not allow differentiation within the Permian.

B.51. Lat.19°16'S, Long.125°57'E.

Stutchburia sp.ind.

Astartella sp.

This sample is probably from the Upper Liveringa as Astartella sp. has been recorded only from these beds. Some corroborative evidence, however, would be desirable.

M.2 N1. Lat.19°12'S, Long.125°32'E.

Pelecypoda

Sanguinolitidae gen. et sp.nov. (this species is restricted to the Hardman horizon).

Pseudomonotis sp.nov. (related to P. kazanensis Waagen 1881 and P. deplanata Waagen 1881 from the Middle and Upper Productus Limestone of India. Restricted to the Hardman horizon).

Aviculopecten sp.nov. (type undulating ribbing restricted to the Upper Liveringa).

Gastropoda

Pleurotomariidae gen. et sp.indet.

Brachiopoda

Cleiothyridina sp.

This fauna is from the Upper Liveringa beds.

M.3. Lat.19°12'S, Long.125°32'E.

Pelecypoda

Astartila? sp.nov. (large form with a very prominent beak).

Atomodesma cf. mytiloides Beyrich 1864 (this form is elongated backwards and can perhaps be separated on this basis from A. mytiloides.

Volsellina? sp.nov. (= Modiola sp. in Guppy et al. 1958, p.54).

Pseudomonotis sp.nov. (as in M2 N1).

Aviculopecten sp.nov.?

Gastropoda

Bellerophon sp.

Bellerophontidae gen. et sp.indet.

Pleurotomariidae gen. et sp.indet.

Other Fossils

Bryozoan and brachiopod fragments.

Upper Liveringa.

M.4. Lat.19°12'S, Long.125°33'E.

Pelecypoda

Nuculanidae gen. et sp.ind.

Astartila? sp.nov.

Sanguinolitidae gen. et sp.nov.

Stutchburia sp.nov. (short and squat)

Schizodus sp.nov.

Oriocrassatella sp.nov. ("Procrassatella" type found in Upper Permian)

Astartella sp.nov.

Pseudomonotis sp.nov.

Aviculopecten sp.nov.

Streblochondria? sp. (a small form; more inflated than species in Lower Permian beds)

Pelecypoda gen. et sp.nov. (triangular form with radiating teeth)

Gastropoda

"Bucanopsis" sp.nov.

Pleurotomariidae gen., sp.nov.

Brachiopoda

Streptorhynchus sp.

Strophalosia sp.

Waagenoconcha? sp.ind.

Upper Liveringa beds

M.5. Lat.19°17'S, Long.125°26'E.

Stutchburia sp.ind.

Atomodesma exarata Beyrich 1864

Warthia cf. micromphala (Morris) 1845

Pleurotomariidae gen. et sp.ind.

The occurrence of A. exarata indicates this locality is from the Lower Liveringa beds.

M.5-E. Same locality as M.5.

Stutchburia sp.ind.

Warthia cf. micromphala (Morris) 1845

Fossils not very useful for age determination; could be Lower Liveringa.

M.7 El. Lat.19°14'S, Long.125°55'.

Pelecypoda

Nuculana? sp.

Astartila sp.nov.

Stutchburia sp.ind.

Allorisma? sp.

Atomodesma sp.ind.

Schizodus sp.

Oriocrassatella sp.nov.

Astartella sp.nov.

Gastropoda

Warthia cf. micromphala (Morris) 1845

Pleurotomariidae gen, sp.nov. (this genus and species is restricted to the Hardman horizon).

Other Fossils

Aulosteges? sp.

Straight nautiloid

Astartella sp.nov., Oriocrassatella sp.nov and Pleurotomariidae gen, sp.nov indicate this fauna is from the Upper Liveringa beds.

M.8. Lat.19°8'S, Long.126°1'E. (35 feet from top of Saddle Back Hill).

Bellerophontidae gen. et sp.

Fossils not of value for identifying the stratigraphical sub-division. Lithology like that of Lower Liveringa beds.

M.50. Lat.18°59'S, Long.125°49'.

This sample contains no molluscs but the occurrence of Strophalosia kimberleyensis Prendergast 1943 indicates this sample is from the Noonkanbah Formation.

In the Canning Basin (including the Fitzroy Basin) S. kimberleyensis occurs only in the top part of the Noonkanbah Formation and in the Carnarvon Basin only in the Wandagee and Norton Formations.

M.51. Lat.19°8'S, Long.125°57'E.

Indeterminate shell fragments.

M.55 A1. Section at Lat.18°59'S, Long.125°0'E.

Pelecypoda

Heteropecten? sp.ind.

Indeterminate fragments.

Brachiopoda

Strophalosia kimberleyensis Prendergast 1943

Noonkanbah Formation.

M.55 A2. Same latitude and Longitude as M55 A1.

Brachiopoda

Taeniothaerus sp. (similar to species described by Coleman 1957 from Wandagee Formation of Carnarvon Basin).

Permorthotetes guppyi Thomas 1958

"Martiniopsis" sp.

Neospirifer sp.

Upper Noonkanbah or Lower Liveringa.

G.A. Thomas (pers. comm.) suggests this fauna may be the same as that found at the base of the Liveringa Formation at the Shore Range Trig.

M.55 A3. Location as for M65A1.

Brachiopoda

Neospirifer cf. *byroensis* Glauert 1912

N.byroensis appears to be a long ranging species and at present is of little value for correlation within the Permian.

M.55 B1. Section at Lat.18°59'S, Long.125°0'E.

Pelecypoda

Astartila sp.ind.

Leiopteria? sp.ind.

Oriocrassatella stokesi Etheridge Jnr. 1907

Gastropoda

Mourlonia? sp.nov.

Bellerophon sp.ind.

Mourlonia? sp.nov. and *Oriocrassatella stokesi* would suggest this sample is from the Lower Liveringa.

M.56. Lat.19°0'S, Long.125°1'.

Gastropoda

Mourlonia? sp.nov.

Bellerophontidae gen. et sp.ind.

As for the previous sample this is probably Lower Liveringa. This is especially so if the lithology is taken into account.

M.58. Lat.19°5'S, Long.125°6'E.

Brachiopoda

Strophalosia sp.

Streptorhynchus sp.

Cleiothyridina sp.

G.A. Thomas (pers. comm.) considers these brachiopods indicate this is Upper Liveringa.

M.62. Lat.19°14'S, Long.125°20'E.

Gastropoda

Pleurotomariidae gen. et sp.ind.

Warthia cf. *micromphala* (Morris) 1845

Scaphopoda

Gen. et sp.

Fossils not def nitive but from lithology could be Lower Liveringa.

M.66. Lat.19°2'S, Long.125°13'.

Pelecypoda

Astartila sp.ind.

Atomodesma exarata Beyrich 1864

Gastropods

Warthia cf. micromphala (Morris) 1845

A. exarata indicates this sample is from the Lower Liveringa.

M.67. Lat.19°4'S, Long.125°22'E.

Pelecypoda

Megadesmus? sp.nov.

Stutchburia sp.ind.

Gastropoda

Warthia cf. micromphala (Morris) 1845

Fossils not definitive, but from lithology could be Lower Liveringa.

M.68 A. Lat.19°5'S, Long.125°27'E.

Indeterminate shell fragments.

M.68 B. Castle Rock, Lat. and Long. as for M.68 A.

Pelecypoda

Astartila fletcheri Dickins 1956

Stutchburia muderongensis Dickins 1956

Atomodesma exarata Beyrich

Indeterminate gastropods.

The three pelecypods are characteristic of the Lower Liveringa.

M.69. Lat.19°3'S, Long.125°31'E.

Pelecypoda

Megadesmus? sp.nov.

Stutchburia muderongensis Dickins 1956

Atomodesma exarata Beyrich 1864.

Gastropoda

Warthia cf. *micromphala* (Morris) 1845.

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