4.—Crustacea from the Cretaceous and Eocene of Western Australia

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A Cretaceous Cirripede peduncle with heavily calcified integument from the Lower Senonian of Gingin and a new species of Decapod Crustacean *(Protocallianassa australica* n.sp.) from the Eocene strata at 1505 feet in the South Perth Bore are described.

A Cirripede Peduncle from the Gingin Chalk

Some time ago a peculiar fossil from the Senonian (Santonian) chalk of McIntyre Gully, Gingin, was submitted for identification by Dr. C. Teichert (Melbourne University Geology Department Coll. No. 1993). The nature of this fossil became obvious when Withers (1951) described for the first time calcareous Cirripede peduncles which he assigned to the genus *Euscalpellum* Hoek. Though the new fossil differs from all four species described by Withers it will not be given a new name as its relations to another Cirripede whose capitular valves occur in the Gingin Chalk are not at present clearly definable.

The calcareous stalk (plate, 2 a-d) is cylindrical, about 40mm. long, gently curved, narrowing gradually towards it upper end, with two or three slight constrictions in the upper half, and with the upper end slightly dilated to an elliptical shape 15.5 × 18 mm. The lower end, probably a fracture plane, is flat (plate, 2d). Its outline is elliptical, measuring 19.2 × 21.2 mm., with an elliptical opening (5.5 × 7.0 mm.) situated near the inner end of the shorter diameter of the basal eclipse, which is nearer the concave side of the longitudinal curvature of the stalk. The upper end is funnel-shaped with an irregular outline. The maximum width is 17mm., and a larger opening corresponds in position to the smaller one at the lower end. The walls of the stalk are thick and solid. An incomplete division into plates is faintly indicated by about 25 short radial furrows on the outer edge of the upper surface. The outer surface of the stalk shows wavy sub-parallel growth lines. On its lower half there are a few widely scattered outlines of peduncle plates. They become more frequent on the upper half and cover almost completely this portion of the stalk where they form several imbricating rows. The plates are irregularly triangular in external view, with a wide convex base and a rounded narrow upper end. The umbo is produced below the apex into a sharp pointed spine or hook which curves outward and slightly downward, particularly at the concave side of the curvature of the peduncle. The plates are completely fused with each other and with the undivided calcareous matter of the peduncle through which they are scattered in the lower portion of the fossil.

The peduncle from the Gingin Chalk resembles *Euscalpellum zelandicum* Withers in its curvature but differs in the outline of the plates. They are elongated in the New Zealand species, with parallel sides. According to Withers they are regularly developed near the base and occur sporadically near the top. The second of these characters depends on the orientation of the specimen, but in any case the first seems to exclude the possibility of specific identity. The other species described by Withers, *E. antarcticum* Withers from the Upper Senonian of Graham Land, *E. eocenense* (Meyer) from the Eocene of the Gulf Coast of the U.S.A., *E. crassissimum* Withers from the Upper Eocene of Tierra del Fuego, differ in the shape and character of their plates, *E. antarcticum* being closest to *E. zelandicum* and the present species.

The generic identification of the peduncles described by Withers as *Euscalpellum* was based on the occurence of capitular valves belonging to *E. eocenense* together with a "strongly plated" peduncle. This species, however, differs most markedly in the shape of the number of peduncle plates from the present fossil. Scalpellid capitular plates are unknown from the other localities from which "monstrously developed" peduncles have been described. Two Cirripede species occur at Gingin, *Zeugmatolepas australis* Withers and *Scalpellum (Neoscalpellum) glauerti* Withers. The sub-genus *Neoscalpellum* is characterised by reduced calcification of valves which makes it unlikely that the heavily calcified peduncle belongs to this species. On the available evidence a relation between *Zeugmatolepas australis* and the present specimen cannot be excluded. The genus *Zeugmatolepas* possesses "three or more whorls of subtriangular lower latera with V-shaped growth lines" (Withers 1935, p. 79). The lower latera of the type species, *Z. mockleri* Withers, are "sub-triangular, with angularly rounded growth lines".

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They resemble strikingly the uppermost peduncle plates of the new specimen. In *Z. australis* the lower latera are described as "triangular, some acutely triangular and bowed outwards" (Withers 1935, p. 94). This similarity in shape between the lower latera of *Zeugmatolepas* and the peduncle plates of the new specimen does not prove specific or generic identity, particularly when the difference in size and also in shape between the peduncle plates and lower latera in the Jurassic *Z. concinna* (Morris) (Withers 1928, p. 103) is taken into consideration. Moreover, the valves in *Zeugmatolepas* are comparatively thin (Withers 1928, p. 98). Nevertheless, a taxonomic relation between these fossils which occur together is more likely than one between the "monstrously developed" stalks which differ widely in the structure of their peduncle plates. The naming of the specimen will depend on further discoveries of either similar fossil peduncles in their original connection with capitular valves or at least of loose capitular valves at one or more of the other localities at which scalpellid Cirripedes are at present represented only by "monstrous" peduncles.

A Decapod Crustacean from the South Perth Bore

In 1899 the late A. Gibb Maitland sent a number of Crustacean remains from bores in the Perth area to R. Etheridge jun. for identification. Twenty years later, Maitland (1919) referred to *"Tellina, Fusus* or *Triton,* and *Callianassa* or *Thalassina"* from depths of between 1505 and 1831 feet in the South Perth Bore.

The Palaeontological Collection of the Australian Museum in Sydney contains a Crustacean on the surface of a core taken at a depth of 1505 feet from this bore (No. F5993, "presented by A. G. Maitland 1899"). This is one of the specimens examined by Etheridge and named *"Callianassa* or *Thalassina."* As it is almost complete and identifiable and comes from a formation from which only foraminifera have been described, it is desirable to give a full account of this fossil.

The fossil is preserved as a rather shadowy, dark, flattened pellicular body, probably chitinous and almost completely uncalcified with the exception of the finger tips. The matrix is a dark grey laminated shale, slightly sandy and glauconitic, with interbedded lighter bands and with microfossils including foraminifera, sponge spicules, bryozoa and ostracodes, and organic debris, visible under the low-power microscope on some bedding planes. These planes show a clear dip of 10°. The fossil is flattened, lying on its side on a bedding plane on which few microfossils, probably ostracodes, are indistinctly visible.

Protocallianassa australica nov. sp.
Plate, 1

Description.—The abdomen and thoracopods are clearly visible but not all the legs can be identified and the carapace is not in its normal position in relation to the rest of the body. A sharp semi-elliptical ridge above the merus of the larger cheliped may represent a cast of the cervical groove and obscure remnants of the carapace seem to extend upward from this line, suggesting that the fossil is preserved in moulting position (Glaessner 1929). Neither the rostrum nor the areas on which lineae could be seen are preserved.

The abdomen is almost completely preserved in a strongly flexed position. The pleurae of segments 2 to 5 are well developed, terminating in rounded lobes. Only the pleurae of the right side are visible and it is uncertain whether the visible dorsal outline of the flattened abdomen is in its median line. The outlines of the first segment and the tail fan are not clearly preserved because of overlapping by the pereiopods.

The first pereiopods are heterochelous. The right chela is larger, with an apparently gently convex dorsal edge of the propodus which, however, could be slightly modified by its flattening. The ventral edge of which only the distal part is clearly preserved is straight and probably ridged. The proximal edge is very slightly inclined downward and forward. The immovable finger is straight and narrow and equals in length the dactylus which is wide (dorso-ventrally) at its base, with a straight ventral and a very strongly curved dorsal edge. No teeth are visible and it is probable that none were present. The carpus was much shorter and probably narrower than the propodus. Only its distal and dorsal outlines are clearly visible. The outline of the merus is irregularly lozenge-shaped. The ischium was apparently rectangular and narrow. The left chela is much smaller and its dactylus is slender but not much shorter than that of the right chela. The immovable finger is shorter than the dactylus. The carpus shows clearly a regularly curved edge extending from the proximal joint to the ventral edge of the propodus. The terminal joints of the remaining pereiopods are not visible. The last pereiopods are preserved in a dorsally flexed position as in living specimens of Callianassa.

Measurements (in mm.)

Length of abdomen (measured along dorsal curvature)	37
Larger (right) first cheliped	
Length from base to tip of dactylus	39
Length of propodus	17
Height of propodus	10
Length of dorsal edge of propodus	12
Length of dactylus	9
Length of carpus (dorsal)	5
Length of merus	8
Height of merus	5
Length of ischium	5
Smaller (left) first pereiopod	
Length of propodus	11
Heigth of propodus	5
Length of dorsal edge of propodus	6
Length of dactylus	7.5
Length of carpus (dorsal)	4.5

Comparisons.—The new species is placed in the genus *Protocallianassa* Beurlen 1930, Type species *P. archiaci* (H. Milne Edwards), which is distinguished by a linea thalassinica on the carapace together with well developed pleurae on the third to sixth abdominal segments, uropods without diaeresis, and large heterochelous first chelipeds. It was considered by Beurlen as intermediate between the Axiidae and Callianassidae but was placed in the latter family as the sole representative of a subfamily Protocallianassinae (Beurlen 1930, p. 332). Mertin (1941) described several species from the Upper Cretaceous of Europe and referred to the same genus two species from the Upper Cretaceous of North America. He noted that the Lower Cretaceous *"Callianassa" uncifera* Harbort closely resembles the Upper Cretaceous species of *Protocallianassa* to which genus the only other European Lower Cretaceous species described as *Callianassa (C. neocomiensis* Woodward and *C. urgoniensis* Lorenthey) are also likely to belong. The new species is distinguished from all these species by the outlines of the carpus and propodus of its chelipeds and also by its rounded second, third and fifth abdominal pleurae. It differs from *Callianassa bakeri* Glaessner (Eocene of Victoria) of which only the chelae are known, in their shape and ornamentation.

Mertin (1941, p. 209) has pointed out that the genus *Protocallianassa* may well extend its range into the Cainozoic. Few complete Tertiary specimens of Thalassinids are known and many of the numerous species of *Callianassa* based on chelae of widely varying shapes cannot be definitely assigned to this genus. The present specimen is the first definite record of a Thalassinid with well developed abdominal pleurae from the Eocene.

Age.—The Eocene age of the strata at 1505 feet in the South Perth Bore is proved by the occurrence of a distinctive fauna of smaller foraminifera in the core which contains *Protocallianassa australica.* Its microfauna includes:

Textularia sp.

Quinqueloculina sp.

Lenticulina sp.

Angulogerina cf. *subangularis* Parr

"Discorbis assulatus Cushman" (as figured by Parr)

Eponides sp.

Alabamina westraliensis (Parr)

Anomalina cf. *glabrata* Cushman

Cibicides umbonifer Parr

Cibicides spp.

Globigerina aff. *bulloides* d'Orb.

Globigerina mexicana Cushman

Globorotalia chapmani Parr

Gumbelina rugosa Parr

Ostracode fragments

Sponge spicules

Bryozoa

Fish teeth

This assemblage resembles closely the fauna described by Parr (1938) and later studied by Coleman (1950). It is at present the lowest known occurence of an Eocene fauna in the Perth Basin.

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