

THE FIRST NON-MARINE LOWER CRETACEOUS OSTRACODS FROM GHANA, WEST AFRICA

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ABSTRACT. The first ostracods from the non-marine Lower Cretaceous ('West African Wealden') of Ghana are described and figured. Three species belong to the genus *Cypridea*, two are referred to '*Metacypris*', and one species might belong to *Cyclocypris* (?). All species appear to be new; they are left under open nomenclature because of scarcity of material. The ostracod assemblage shows closer affinities to the European Wealden than to the 'West African Wealden' in other occurrences.

A NUMBER of sedimentary basins with non-marine Lower Cretaceous formations ('West African Wealden') are known along the West African coast from Nigeria in the north to Angola in the south. Recently, evidence of an occurrence outside that region came to light when ostracods of Wealden appearance and age were found in Ghana in the Kobnaswaso-1 borehole put down by the Gulf Oil Corporation. As far as the writer is aware, this is the first record of non-marine Cretaceous in Ghana. There is no known surface outcrop of such formations.

The small fauna contains species of the genera *Cypridea*, '*Metacypris*', and a species whose affinities are not quite clear (*Cyclocypris*?). At present, only a few specimens of each species are available for description, and it is considered that they do not provide a sufficiently good basis for detailed description and for comparisons. Because of this scarcity of material, and also because of the poor state of preservation in most cases, description in open nomenclature is preferred. However, the uniqueness of the fauna, the first of its kind from Ghana, justifies publication.

Stratigraphic position. The ostracod-bearing non-marine strata in the Kobnaswaso-1 well-section are overlain by marine Albian at a depth of around 1,200 m.; they are therefore of Lower Cretaceous, pre-Albian age. This fits well with the general stratigraphic situation of the 'West African Wealden' of Gabon and Angola.

The ostracod fauna seems to consist of two separate faunules occurring at different depths. The lower (older) Faunule 1, from around 3,000-m. depth, includes the species:

Cypridea sp. A
Cypridea sp. B
Faunule 1 *Cypridea* sp. C
'*Metacypris*' sp. A
Cyclocypris? sp. A
and some further species which are too poorly
preserved to deserve description

The higher (younger) Faunule 2, from around 2,100-m. depth, includes the species:

'*Metacypris*' sp. B
'*Metacypris*' sp. (different from B, fragments only,
not described)
Faunule 2 '*Metacypris*' sp. (different from all other species,
preservation too poor for description)

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SYSTEMATIC DESCRIPTIONS

Order OSTRACODA Latreille 1802
 Family CYPRIDIDAE Baird 1845
 Subfamily CYPRIDEINAE Martin 1940
 Genus CYPRIDEA Bosquet 1852

Cypridea sp. A

Plate 45, fig. 1a-c

Description. Carapace in lateral view rather elongate, in dorsal view with both ends well rounded. Greatest height at about one-third to one-quarter of length. Right valve larger than left valve. Beak relatively small, not very pointed, strongly curved. Each valve with two very shallow depressions, one in an antero-dorsal position, another in a postero-medial/mid-posterior/postero-dorsal position. Surface of shell rather smooth, not visibly pitted or provided with spines.

Affinities. *Cypridea* sp. A seems very like an undescribed species found in the English Wealden by Dr. F. W. Anderson (*in litt.*). There is also some similarity to *Cypridea fracta* Ljubimova 1956, from the Upper Cretaceous of Mongolia, but the latter seems to be much larger than *Cypridea* sp. A.

Occurrence. Borehole Kobnaswaso-1, Ghana. Species belongs to Faunule 1.

Dimensions of figured specimen, SMF Xe 5482: Length 0.85 mm., height 0.51 mm., breadth 0.39 mm.

Cypridea sp. B

Plate 45, fig. 2a-c

Description. Carapace in lateral view elongate, dorsal angles rounded but fairly distinct; carapace in dorsal view with both ends rounded, anterior end tapering. Greatest height of carapace at about one-quarter of length. Beak well rounded, strongly curved. Right valve larger than left valve. Surface of shell coarsely pitted. Blunt spines on both valves, apparently more strongly developed on the smaller left valve. Two of the spines are more prominent than the others, one in an antero-dorsal position, another in a dorso-medial position. Some minor spines along the lower part of anterior margin of the valves, as well as immediately behind the beak-furrow, within the postero-ventral region, and especially in the postero-dorsal region immediately above and slightly behind the posterior strong spine.

EXPLANATION OF PLATE 45

All specimens figured are from borehole Kobnaswaso-1, Ghana, West Africa; non-marine Lower Cretaceous, older than Albian. Specimens deposited in the Senckenberg-Museum, Frankfurt am Main, Germany: (SMF), numbers refer to catalogue Xe. Magnifications are all about $\times 68$.
 Fig. 1a-c. *Cypridea* sp. A. Carapace, SMF Xe 5482. a, right side; b, left side; c dorsal view.
 Fig. 2a-c. *Cypridea* sp. B. Carapace, SMF Xe 5483. a, right side; b, left side; c dorsal view.
 Fig. 3a-c. *Cypridea* sp. C. Carapace, SMF Xe 5484. a, left side; b, right side; c, dorsal view.
 Fig. 4a-c. *Cylocypris?* sp. A. Carapace, SMF Xe 5485. a, left side; b, right side; c, dorsal view.
 Fig. 5a, b. '*Metacypris*' sp. A. Carapace, SMF Xe 5486. a, right side; b, dorsal view.
 Fig. 6a, b. '*Metacypris*' sp. B. Carapace, SMF Xe 5487. a, left side; b, dorsal view.

Affinities. According to Dr. F. W. Anderson (*in litt.*), *Cypridea sp. B* (and also *C*) compare closely with some of the subspecies of *C. clavata* (Anderson) found in the English Weald Clay. *Cypridea sp. B* shows some features of the species *Cypridea (Morinina) maringaensis* (Grekoff 1957), from the Wealden of the Congo basin, but the two species are not identical in all respects.

Occurrence. Borehole Kobnaswaso-1, Ghana. Species belongs to Faunule 1.

Dimensions of figured specimen, SMF Xe 5483: Length 0.81 mm., height 0.46 mm., breadth 0.30 mm.

Cypridea sp. C

Plate 45, fig. 3a-c

Description. In general outline somewhat similar to *Cypridea sp. B*. Anterior dorsal angle however at about one-quarter to one-third length of carapace, triangular. Dorsum rather steeply inclined. Right valve larger than left. Surface of shell coarsely pitted, and covered with numerous, more or less strongly developed spines, their arrangement apparently similar to *Cypridea sp. B*.

Remarks. The surface of the shell could not be cleaned properly. Sediment particles were still cemented to the shell substance and obscured certain ornamental features.

Affinities. The spinose surface ornamentation seems to follow the same general pattern as in *Cypridea sp. B*, from which *sp. C* differs in the more pronounced development and also the higher position of the anterior dorsal angle, and in the more spiny surface. See also under *Cypridea sp. B*.

Occurrence. Borehole Kobnaswaso-1, Ghana. The species belongs to Faunule 1.

Dimensions of figured specimen, SMF Xe 5484: Length 0.82 mm., height 0.46 mm.

Subfamily CYCLOCYPRIDINAE Kaufmann 1900

Genus CYCLOCYPRIS Brady and Norman 1889

Cyclocypris? sp. A

Plate 45, fig. 4a-c

Description. Carapace extremely inflated, egg-shaped in lateral and in dorsal view. Dorsum strongly convex. Greatest height at about one-half of length of carapace. Right valve slightly larger than left. Surface of shell smooth.

Affinities. The species is referred very doubtfully to *Cyclocypris*, only because of the shape of carapace and its small size. No internal details are known, and its resemblance to species of *Cyclocypris* might be completely superficial. The species 'Ostracode D 65', from the 'Wealden' of the Congo basin, figured by Grekoff 1960, shows some similarity.

Occurrence. Borehole Kobnaswaso-1, Ghana. Species belongs to Faunule 1.

Dimensions of figured specimen, SMF Xe 5485: Length 0.52 mm., height 0.44 mm., breadth 0.45 mm.

Subfamily LIMNOCYOTHERINAE Sars 1925
Genus METACYPRIS Brady and Robertson 1870

'*Metacypris*' sp. A

Plate 45, fig. 5a-b

Description. Carapace in lateral view elongate, both ends well rounded, in dorsal view posterior end rounded but not blunt, anterior end tapering. Two sulci are developed: median sulcus rather narrow, not very deep, reaching down to three-quarters of carapace height; anterior sulcus small, shallow, length about one-third of carapace height. Between the two sulci a knoblike, rather circular lobe. Surface of shell densely pitted or reticulate, apparently no other ornamentation.

Affinities. '*Metacypris*' sp. A seems to be different from all remaining species of '*Metacypris*' (and similar genera) so far described.

Remarks. The species described here under '*Metacypris*' probably belong to *Theriosynoecum* Branson 1936. There is no information on internal structures (especially the hinge), however, and so it is very difficult to make reference to any particular one of the superficially similar genera in the *Metacypris*-*Gomphocythere*-*Theriosynoecum*-*Bisulco-cypris* group. It therefore seems best to leave these species under '*Metacypris*', as has been done in previous cases (Krömmelbein 1965).

Occurrence. Borehole Kobnaswaso-1, Ghana. Species belongs to Faunule 1.

Dimensions of figured specimen, SMF Xe 5486: Length 0.55 mm., breadth 0.22 mm.

'*Metacypris*' sp. B

Plate 45, fig. 6a-b

Description. Carapace in lateral view more or less rectangular, both ends broadly rounded; in dorsal view carapace with blunt posterior end, anterior end rather pointed. Median sulcus relatively deep and broad, anterior sulcus short and rather shallow. Surface of shell pitted and bearing blunt nodes forming a distinct pattern of five nodes on the posterior part of valves. The lobe between the sulci bears nodes also, of which the strongest is situated in a low antero-median position. Some weaker nodes on the shell in front of the anterior sulcus.

Affinities. The large, broad carapace shows a pattern of nodes similar to the European Wealden species *Theriosynoecum fittoni* (Mantell 1844); for comparison see Pinto and Sanguinetti 1962 (pl. 11, figs. 4, 5), and Sohn and Anderson 1964. The poor preservation of the material available for study unfortunately does not allow clarification of the question of the possible specific identity of the two species under consideration. This question is of some importance in tracing the palaeogeographic relationship between the West African and the European Wealden.

Occurrence. Borehole Kobnaswaso-1, Ghana. The species belongs to Faunule 2, together with some other species of '*Metacypris*', which are represented in the samples only by poorly preserved fragments and do not deserve description.

Dimensions of figured specimen, SMF Xe 5487: Length 0.90 mm.

CONCLUSIONS

The few ostracod species from the 'West African Wealden' of Ghana show a relatively poor preservation. They offer, therefore, only a slight basis for fully systematic description. However, it can be said that on the whole the species encountered show no close affinities to those described from other occurrences of the 'West African Wealden' as could have been expected. Surprisingly enough, the Ghana assemblage is strikingly similar to that of the English Weald Clay of Barremian age. This is especially true for the *Cypridea* species and for *Theriosynoecum* sp. A.

It is hoped that further material from Ghana will help to clarify these most interesting palaeogeographic relations between two distant regions.

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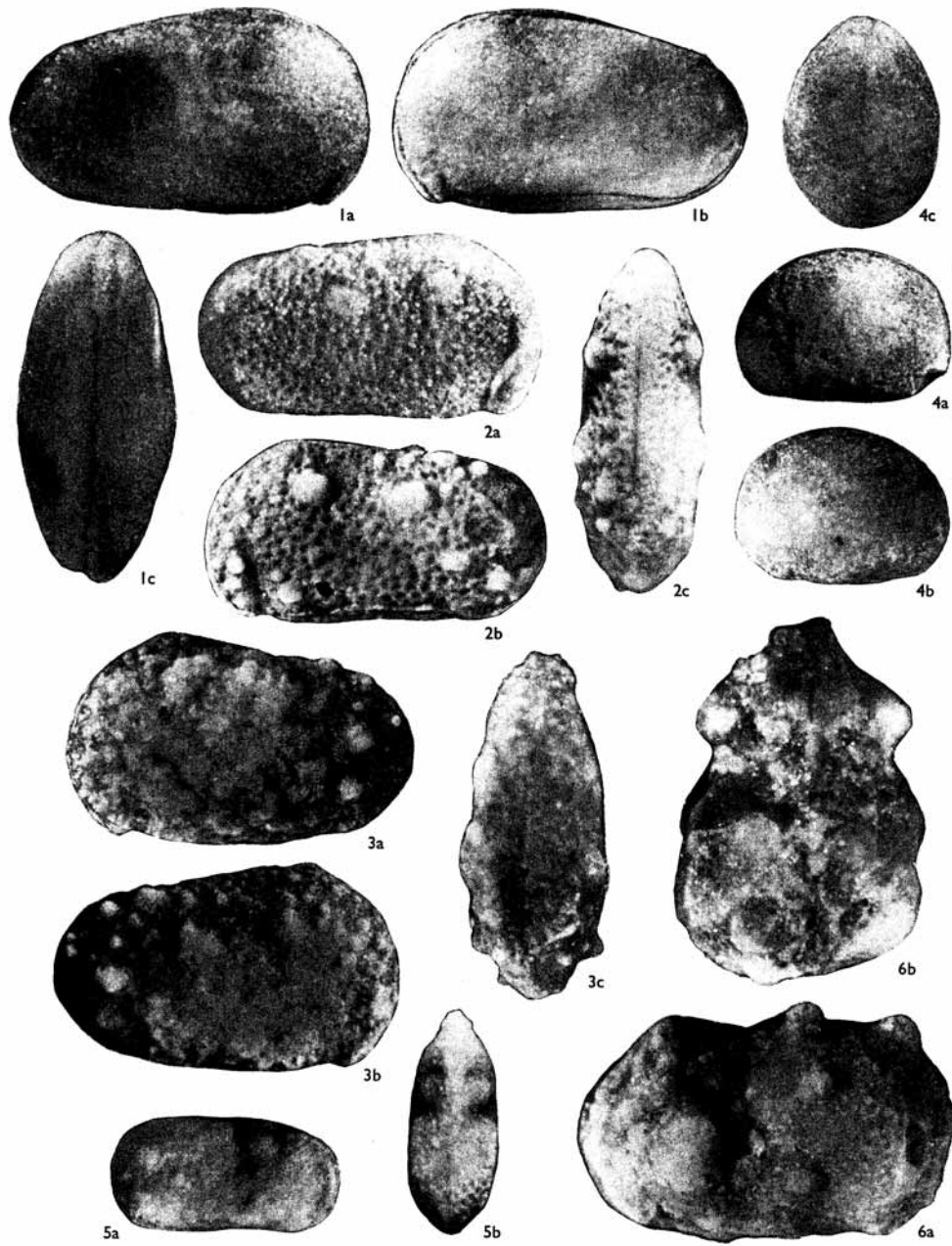
The specimens figured are deposited in the collections of the Senckenberg-Museum, Frankfurt/M., Germany.

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