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A NEW CRAB, *EOMUNIDOPSIS COBBANI* N. SP. (CRUSTACEA, DECAPODA), FROM THE PIERRE SHALE (EARLY MAASTRICHTIAN) OF COLORADO

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ABSTRACT—A new species of galathid crab, *Eomunidopsis cobbani,* occurs in the Larimer and Richard Sandstones (Pierre Shale) of Larimer County, Colorado. This new species extends the stratigraphic range of the genus in North America from latest Albian or earliest Cenomanian and Recent into the latest Campanian or earliest Maastrichtian and expands the paleogeographic range from the Gulf Coastal Plain into the Western Interior of the United States. The species is described from 48 specimens and occurs with *Homolopsis*? sp., a diverse molluscan fauna, and fossil wood fragments. *Eomunidopsis cobbani* and *Homolopsis* sp. form a third possible decapod assemblage, the *Galathea* Assemblage, described from the Western Interior of the United States.

INTRODUCTION

COLLECTIONS OF invertebrate fossils containing a new species of crab, *Eomunidopsis cobbani,* have been made from several localities in Late Cretaceous rocks along the Front Range of Colorado. These collections were brought to my attention and loaned to me by Dr. W. A. Cobban, Paleontology and Stratigraphy Branch, U.S. Geological Survey (Denver).

Some 25 carapaces of *Eomunidopsis cobbani* and associated leg fragments are contained in eight collections (Table 1) from the Larimer and Richard Sandstones of latest Campanian or earliest Maastrichtian Age. The small crabs are found scattered through sandstone associated with numerous molluscs and fossil wood fragments.

Eomunidopsis cobbani dominates a decapod assemblage that includes one other decapod, an indeterminate *Homolopsis.* The *Eomunidopsis* Assemblage joins two other previously described decapod assemblages: the *Dakoticancer* Assemblage (Bishop, 1971, 1981) and the *Notopocorystes* Assemblage (Bishop, 1983). The carapace nomenclature of Stenzel (1945) is followed for the sake of consistency.

SYSTEMATIC PALEONTOLOGY

Glaessner (1969, p. 482) recognized four genera in the subfamily Galatheinae: *Galathea* Fabricius, 1793; *Munida* Leach, 1820; *Palaeomunida* Lörenthey, 1902; and *Protomunida* Beurlen, 1930. These taxa are largely differentiated on the nature of the rostrum; *Galathea* has a simple, triangular, denticulate rostrum with no medial ridge whereas the other three genera have a complex rostrum subdivided into long spines, with a medial ridge, or flanked by small spines (or "teeth").

Patrulius (1960) established the genus *Paragalathea* to be used in conjunction with *Palaeomunida* Lörenthey for assignment of galathids from the Jurassic and Cretaceous of Europe. In 1963 Houša established *Mesogalathea,* which was subsequently determined to be a junior synonym of *Paragalathea* by Via Boada (1982, p. 3). Via Boada (1981) established the new genus *Eomunidopsis,* for which he provided a diagnosis in 1982 (p. 13). The Cretaceous galathid material from Colorado is assigned to *Eomunidopsis.*

Order DECAPODA
Infraorder ANOMURA
H. Milne-Edwards, 1832
Superfamily GALATHEOIDEA
Samouelle, 1819
Family GALATHEIDAE Samouelle, 1819
Subfamily GALATHEINAE Samouelle, 1819
Genus EOMUNIDOPSIS Via Boada, 1981

Type species.—*Galathea navarrensis* (Van Straelen, 1940, p. 2, Pl. 1, figs. 3, 4).

Diagnosis.—Cephalothorax elongate, bearing prominent transverse ridges. Regions well delimited by grooves. Rostrum characterized by tridentate tip, lacking serrations on the lateral border and ornamented by one medial carina (after Via Boada, 1982, p. 13).

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TABLE 1—Location, stratigraphy, biostratigraphy, and collectors of *Eomunidopsis cobbani*, Larimer County, Colorado.

USGS locality	Location	Stratigraphy	Number of specimens *	**	***	Biostratigraphy	Collector
D 372	W½, sec. 19, T11N, R68W	Larimer SS	2	0	1	*B. reesidei*	Gayle R. Scott Wm. A. Cobban
16217	NW¼ NE¼, sec. 19, T11N, R68W	Larimer SS	1	4	3	*B. reesidei*	Roy G. Coffin
D 2719	Center SW¼, sec. 12, T9N, R69W	Larimer SS	0	0	1	*B. reesidei*	Gayle R. Scott
D 2715	SE¼ SW¼, sec. 25, T9N, R69W	Larimer SS	3	1	0	*B. reesidei*	Gayle R. Scott
16214	SE¼ NE¼, sec. 19, T9N, R68W	Richard SS	15	5	2	*B. jenseni*	Roy G. Coffin
D 2599	Center SW¼, sec. 24, T8N, R69W	Larimer SS	1	2	2	*B. reesidei*	Gayle R. Scott
D 301	SW¼ SW¼, sec. 1, T6N, R69W	Larimer SS	1	0	0	*B. reesidei*	Gayle R. Scott
16093	SE¼ NE¼, sec. 19, T9N, R69W	Richard SS	1	1	2	*B. jenseni*	Wm. A. Cobban
		Total	24	13	11		

* Carapaces, ** claws, and *** fragments.

EOMUNIDOPSIS COBBANI n. sp.
Figures 1–3; Table 1

Etymology.—This species is named in honor of Dr. W. A. Cobban, whose work on the ammonoid paleontology of the Western Interior Cretaceous now allows us to accurately determine the relative ages of these fossils and whose collecting of numerous decapods has significantly furthered our knowledge of this group.

Types.—The specimens figured in this paper were taken from three U.S. Geological Survey collections, two of which yielded all the figured types of *Eomunidopsis cobbani* and one of which yielded the unnamed *Homolopsis* sp. claws associated with *E. cobbani*. United States Geological Survey collection D 370 consists of the holotype carapace (Figure 2.1; USNM 370191), a paratype leg (Figure 3.2; 370192), and 21 unfigured paratypes (USNM 370193). United States Geological Survey collection D 2599 consists of a paratype carapace (Figure 2.2; USNM 370194), a paratype claw (Figure 3.1; USNM 370195), and 4 unfigured paratypes (USNM 370196). The two figured *Homolopsis* sp. claws (Figure 4.1; USNM 370197 and Figure 4.2; USNM 370198) were taken from USGS (Denver) collection 16214.

Occurrence.—All known specimens (Table 1) of this species come from the Larimer and Richard Sandstones of Larimer County, Colorado, either from the zone of *Baculites reesidei* Elias, 1933, or *Baculites jenseni* Cobban, 1962, which are currently assigned a latest Campanian or earliest Maastrichtian Age (Obradovich and Cobban, 1975, p. 36).

Diagnosis.—Carapace long (L/W = 1.6), relatively rectangular behind rostrum, widest at ⅔ distance from front; covered by continuous transverse ornamentation bands (Figure 1). Rostrum 25 percent frontal width comprising about 25 percent total length of crab, unridged (?) and terminated by three forward-facing, short denticulations. Legs oval, covered by rugosity produced into pustules; chelipeds long, slim and covered by shingle-like rugae.

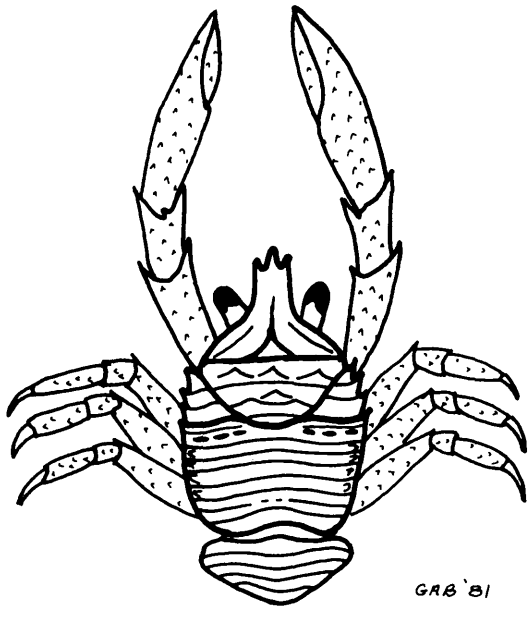

FIGURE 1—Dorsal reconstruction of *Eomunidopsis cobbani* (with hypothetical appendages). Bar represents approximately 1 cm.

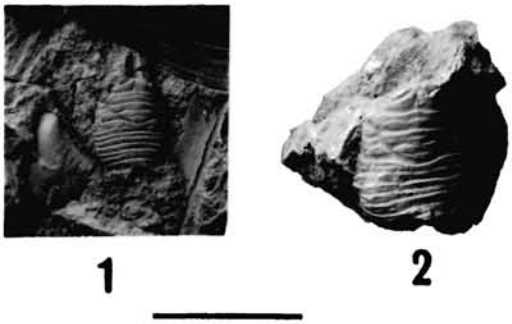

FIGURE 2—Dorsal view of carapace of *1*, holotype (USNM 370191) and *2*, paratype (USNM 370194) of *Eomunidopsis cobbani*. Bar represents 1 cm.

FIGURE 3—*1*, chela (manus) (USNM 370195) and *2*, walking leg segment (USNM 370192) of *Eomunidopsis cobbani*. Bar represents 1 cm.

Description.—Carapace relatively rectangular, lateral margins convex, hind margin concave, anterolateral margins rounded, rostrum moderately developed. Carapace longer than wide (L/W = 1.6), widest at ⅔ distance from anterior, rostrum approximately 25 percent of total length. Carapace broadly convex transversely, slightly convex longitudinally.

Carapace ornamented (Figure 2) by grooves and transverse asymmetrical bands with steep anterior and gentle posterior slopes. Cervical groove deep, transverse, slightly sinuous. Antennar groove deep, slightly sinuous running forward and outward. Gastro-orbital groove shallow, indistinct, forming an acute angle (opening posteriorly) at base of rostrum. Branchio-cardiac groove very indistinct. Groove along posterior margin deep, subparallel to hind margin. Entire carapace covered by continuous transverse bands interrupted only by the cervical and antennar grooves.

Cephalic arch ahead of antennar grooves has 5 bands and a frontal ridge above each orbit. Posterior 3 bands truncate against antennar groove; band 4 discontinuous, terminates on the antennar groove and lateral margin; band 5 runs to the lateral margin; band 6 consists of orbital ridges along frontal margin. On some specimens these bands have 1–3 discontinuous shingle-like rugae on them. Rostrum approximately 25 percent of frontal width, narrowing slightly anteriorly, and terminating in 3 forward-facing projections. Area between cervical and antennar groove consists of 3 transverse bands that terminate against antennar groove and on lateral margin, where they are produced into lateral spines.

Scapular arch covered by 9 transverse bands. Band 1 lies immediately behind cervical groove and is faintly separated from band 2 by discontinuous transverse furrow. Band 2 has three transverse tubercles on branchial regions. Bands 3–8 with slight raised area along lateral margins. Bands 7–8 not separated by groove on intestinal region.

Abdomen and sternum unknown.

Chelipeds (Figure 3.1) long (7.5–16 mm) and stout; chelae probably equal, increasing in height from proximal articulation to end of manus. Manus and fixed finger about same length. Chelae completely covered by shingle-like asymmetrical rugae, steepest slopes distal.

Legs slim, oval in cross-section; ornamented by rugae (Figure 3.2). Exoskeleton very thin.

Comparison.—*Galathea cretacea* Stenzel, 1945, and *Galathea? limonitica* Stenzel, 1945, from the Texas Cretaceous (latest Albian or earliest Cenomanian Pawpaw Shale, Tarrant County) appear to belong in *Eomunidopsis*. *Eomunidopsis limonitica* differs from *E. cretacea* and *E. cobbani* by having an areolated cephalic arch. *Eomunidopsis cobbani* differs from both *E. cretacea* and *E. limonitica* by having continuous ornamentation across the carapace instead of the discontinuous banding of the other two. *Eomunidopsis cobbani* also differs from *E. cretacea* by having fewer bands and a more convergent front.

Remarks.—The systematics of galathid decapods in the recent and geologic record are difficult to reconcile because of differences of available data in recent and fossil material.

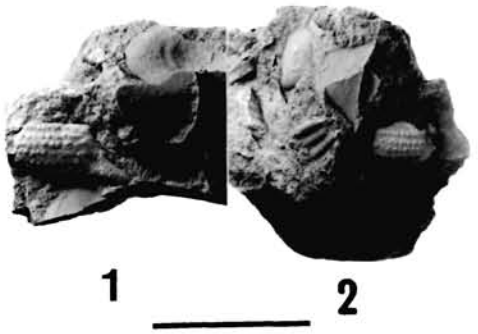

FIGURE 4—Claws of *Homolopsis* sp. (USNM 370197 and 370198) associated with *Eomunidopsis cobbani*. Bar represents 1 cm.

It is beyond the scope of this description to try to review such problems unless solutions are immediately obvious and clearly warranted. It appears that *Eomunidopsis limonitica,* because of its differentiation of the cephalic arch, is different enough from *E. cretacea* and *E. cobbani* to warrant placing it into a separate taxon (as was indicated by Stenzel's remarks, 1945, p. 432).

Eomunidopsis cobbani extends the genus *Eomunidopsis* into North America, where it ranges from the latest Albian or earliest Cenomanian into the latest Campanian (Kauffman, 1975, p. 188) or earliest Maastrichtian (Obradovich and Cobban, 1975, p. 36), and extends the paleogeographic range of the Cretaceous galathids in North America from the Gulf Coastal Plain into the Western Interior.

Associated with the specimens assignable to *Eomunidopsis cobbani* are 3 chelae (Figure 4) and a probable carapace fragment of another crab, probably a *Homolopsis.*

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