

TWO NEW CRABS, *PARAPAGURISTES TUBERCULATUS*
AND *PALAEOXANTHO LIBERTIENSIS*, FROM THE
PRAIRIE BLUFF FORMATION (MIDDLE
MAASTRICHTIAN), UNION COUNTY,
MISSISSIPPI, U.S.A.

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Abstract.—Two new genera and species of fossil crabs, *Parapaguristes tuberculatus* and *Palaeoxantho libertiensis*, occur in the Prairie Bluff Formation in Union County, Mississippi. Associated with these taxa are *Prehepatus harrisi* Bishop, 1985, *Raninella?* sp., *Protocallianassa* sp., an indeterminate claw of a portunid, and claw fragments of a large lobster. The genus *Parapaguristes* is erected to include *P. tuberculatus* n. sp. and *P. whitteni* (Bishop, 1983). The new genus *Palaeoxantho* is morphologically similar to the xanthid genera *Xanthosia*, *Xantho*, and *Syphax*.

During October 1982, I was guided to a fossil echinoderm locality by Mr. Ralph Harris, a paraprofessional collector working with me in studies of fossil Cretaceous Mississippi decapod crustaceans. The exposure is situated just west of and below the Liberty School and Church in the SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 3, T 8S, R 3E, Union County, Mississippi. This locality, herein called The Liberty School Locality (Gale A. Bishop Locality 52 indicated herein GAB 52), is a scraped area just off the road to the northeast of a small ridge perpendicular to Sand Creek (Fig. 1). The rocks exposed in the scraped area consist of a few centimeters of marlstone overlain by three meters of sandy, fossiliferous limestone assignable to the Prairie Bluff Formation (Fig. 2), which is laterally equivalent to the clastic Owl Creek Formation. The Prairie Bluff Formation is unconformably overlain by the Paleocene Clayton Formation and unconformably overlies the Ripley Formation (Russell et al. 1982:11). The age of the Prairie Bluff Formation is Middle Maastrichtian (Russell et al. 1982:24).

The fauna from the Prairie Bluff appears to be diverse (Stephenson and Monroe 1940:

204). At the Liberty School Locality, the fauna (Fig. 3) is dominated by the heart urchin *Linthia variabilis* Slocum but includes numerous other taxa including *Baculites* sp., *Scaphites* sp., *Turritella* sp., *Exogyra costata*, *Pinna* sp., *Urceolabrum* sp. and numerous other molluscs. A small but integral part of this fauna are the decapods *Protocallianassa* sp., *Parapaguristes tuberculatus* n. gen., n. sp., *Palaeoxantho libertiensis* n. gen., n. sp., *Prehepatus harrisi* Bishop, 1985; *Raninella?* sp., claw fragments of *Hoploparia* sp., and an indeterminate claw of a portunid crab. Stephenson and Monroe (1940:208a) presented a faunal list for the Prairie Bluff Formation that included *Callicallianassa* sp., *Avitelmessus* n. sp., *Prehepatus* n. sp., *Raninoides ovalis* Rathbun, a portunid, and crab claws. These specimens are in the collections of the United States National Museum of Natural History but could not be located during a visit in 1984.

Order Decapoda Latreille, 1803

Infraorder Anomura

H. Milne-Edwards, 1832

Superfamily Paguroidea Latreille, 1803

Family Paguridae Latreille, 1803

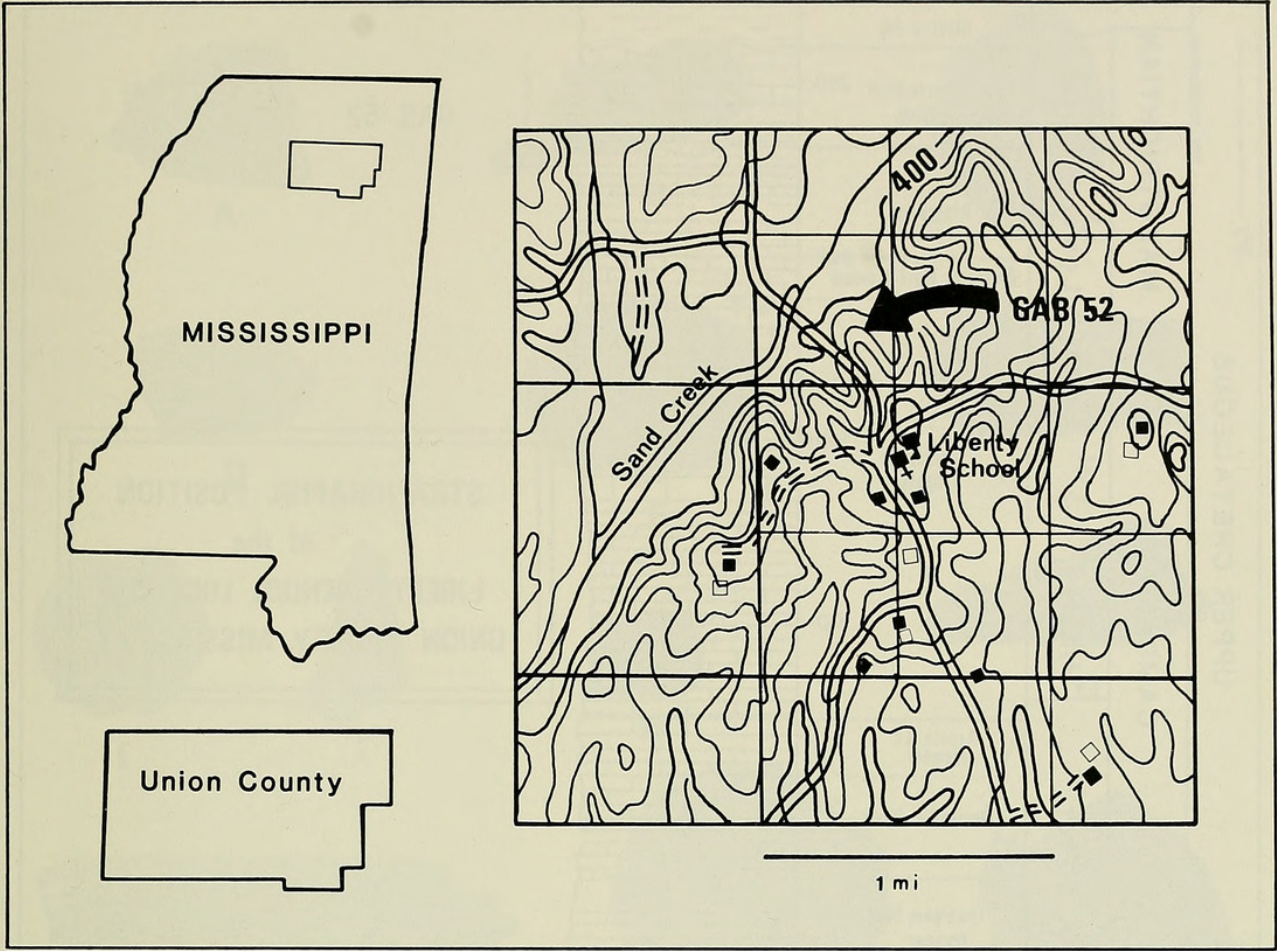


Fig. 1. Geographic setting of the Liberty School Locality.

Subfamily Pagurinae Latreille, 1803
Parapaguristes, new genus

Type species.—*Paguristes whitteni* Bishop, 1983.

Diagnosis.—Claws large, equal, longer than high, thick and biconvex; upper and lower margins convex, proximal margin strongly oblique, distal margin vertical, paralleled by furrows on front and back; fixed finger short, blunt, and downturned; top margin on inner face more or less overturned into horizontal crest; surface ornamented by coarse tubercles.

Etymology.—*Parapaguristes* is derived from *Para* (Greek, near to) + *Paguristes* (Greek, a genus of (hermit) crab); gender masculine.

Occurrence.—The two species that comprise *Parapaguristes* are both from the east-central Mississippi Embayment occurring

in the Coon Creek Formation (*P. whitteni* Bishop, 1983) and Prairie Bluff Chalk (*P. tuberculatus* n. sp.) and range from early to middle Maastrichtian in age.

Parapaguristes whitteni (Bishop, 1983)
Fig. 5B

Synonymy.—*Paguristes whitteni* (Bishop, 1983:420–424, figs. 3F, 4.

Diagnosis.—Chelipeds large, equal, similar, biconvex and inflated, upper margin overturned into horizontal crest; finger downturned; ornamented by longitudinal rows of tubercles on outerface.

Remarks.—*Parapaguristes whitteni* is well known, being represented by nearly all elements of the chelipeds. In my assignment to *Paguristes*, I pointed out (Bishop 1983) the relatively poor concurrence of this species with the genus *Paguristes*, with the

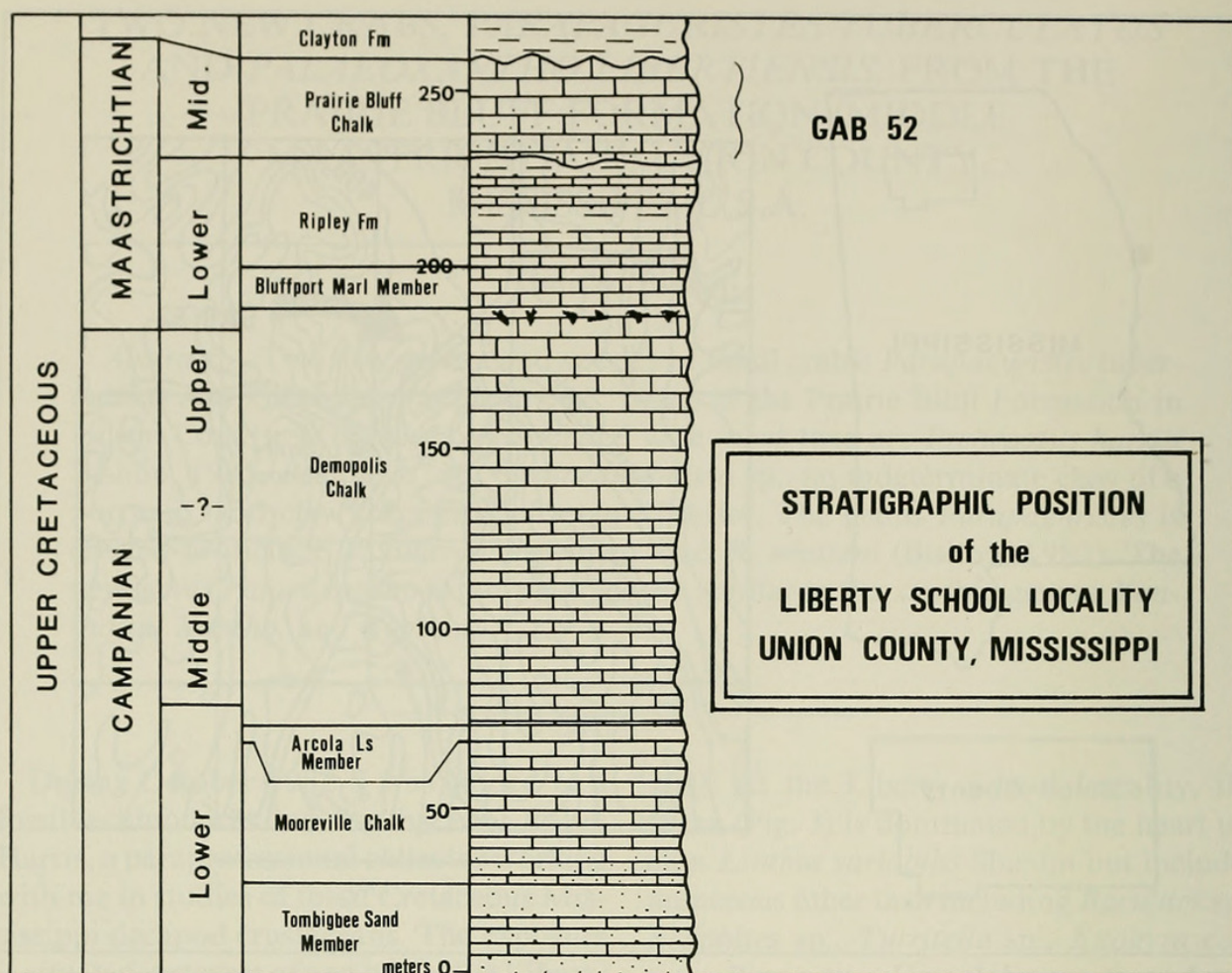


Fig. 2. Stratigraphic setting of the Liberty School Locality.

suggestion of Forest (Bishop 1983:419) and now myself that it is better to erect a new taxon for fossils such as *Paguristes whitteni* than to try to assign them to existing taxa in which they really do not fit. The description of taxa based solely upon claws is necessary because certain taxa have differentially mineralized exoskeletons leading to preferential preservation, as in the hermit crabs.

Parapaguristes whitteni was described from a sample of 30 specimens, all claws.

Parapaguristes tuberculatus, new species
Figs. 3D, 4, 5A

Diagnosis.—Claws large, biconvex, equal, palm longer than high; overturned horizontal crest on top margin of inner face reduced to subtle ridge paralleling margin; entire claw

ornamented by random pattern of large tubercles alternating with granules.

Description.—Claws large, biconvex, longer than high ($L/H = 1.4$), highest at distal third, upper and lower margins convex; distal margin vertical, paralleled by shallow furrows; proximal margin oblique, rounding evenly onto upper margin. Entire surface covered by coarse tubercles interspersed with very small granules in random pattern except for relatively smooth area on inner face along proximal articulation and bottom of distal marginal grooves. Tubercles conical; those on upper and lower margins tilted slightly distally; fixed finger apparently downturned.

Comparison.—*Parapaguristes tuberculatus* differs from *Parapaguristes whitteni* by being ornamented more richly and evenly, by its less well developed overturned crest

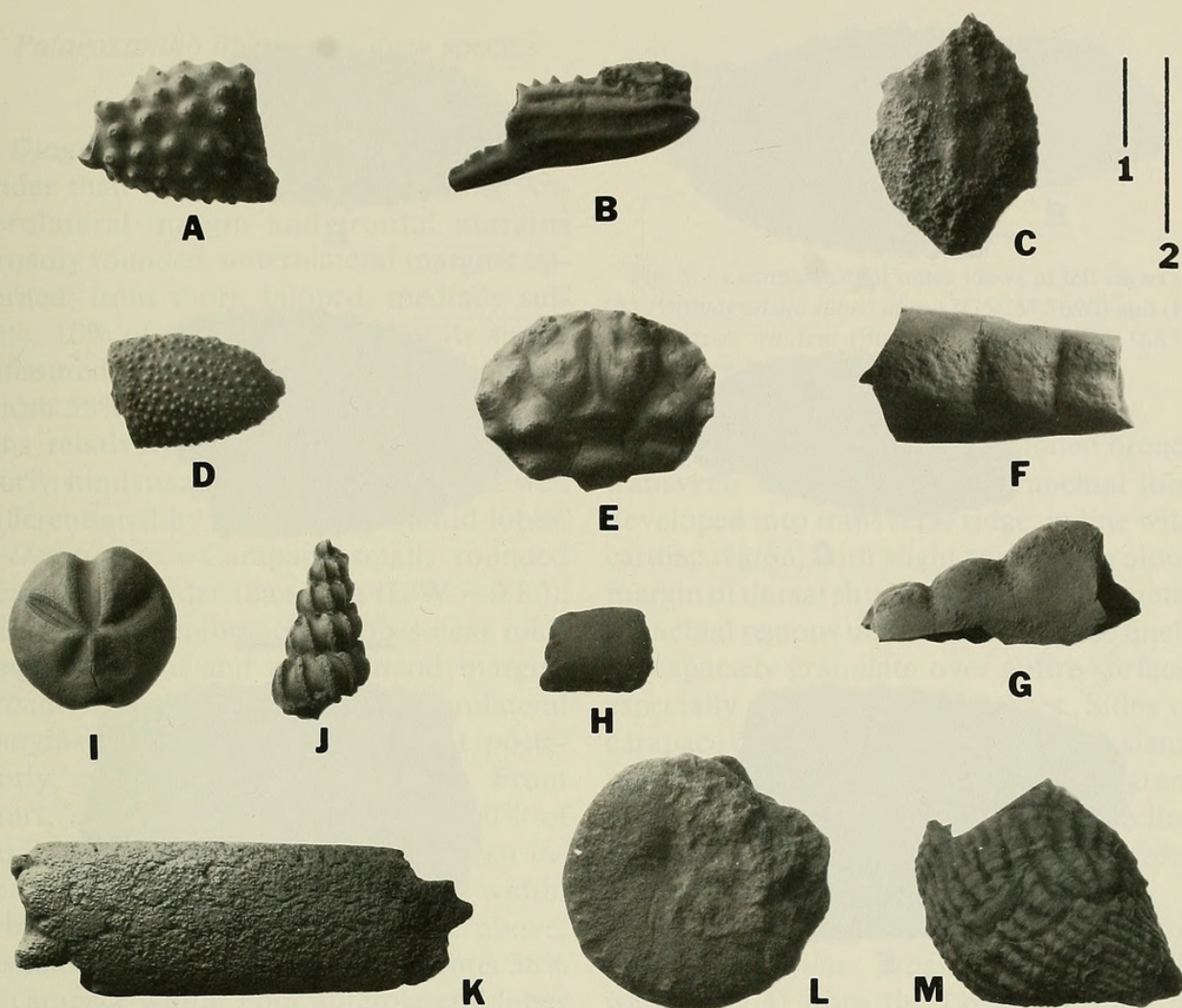


Fig. 3. Important elements of the Liberty School fauna. A, *Prehepatus harrisi* Bishop, 1985 (GSCM 1687); B, Portunid(?) claw (GAB 52-14); C, *Raninella?* sp. (GAB 52-13); D, *Parapaguristes tuberculatus* n. sp. (GSCM 1690); E, *Palaeoxantho libertiensis* n. sp. (GSCM 1692); F-G, Occlusional surface of crushing claw of lobster or crab (GAB 52-5); H, *Callianassa* sp. (GAB 52-4); I, *Linthia variabilis* Slocum, 1909 (GAB 52-6); J, *Urceolabrum* sp. (GAB 5207); K, *Baculites* sp. (GAB 52-8); L, *Scaphites* sp. (GAB 52-9); and M, *Exogyra costata* Say, 1820 (52-10); exhibiting healed predation breaks. (Bar scales—1 cm; Scale 1, Figs. A, D, F-G, I-M; Scale 2, Figs. B-C, E, H.)

on the upper part of the inner face, and its smaller size (Fig. 5).

Etymology.—Named for the exceedingly tuberculate claws.

Types.—The holotype (GSCM 1690) and paratype (GSCM 1691a, b) of *Parapaguristes tuberculatus* are deposited in the collection of the Georgia Southern College Museum, Georgia Southern College, Statesboro, Georgia 30460.

Occurrence, sample size, and preservation.—Four specimens were collected from the Liberty School Locality: the holotype, a

single left claw; the paratypes, a pair of claws found in close proximity to one another and a single right claw. The exoskeleton is preserved intact and the claws are filled with sediment.

Section Brachyrhyncha Borradaile, 1907
Superfamily Xanthoidea MacLeay, 1838
Family Xanthidae MacLeay, 1838
Palaeoxantho, new genus

Type species.—*Palaeoxantho libertiensis* n. sp.

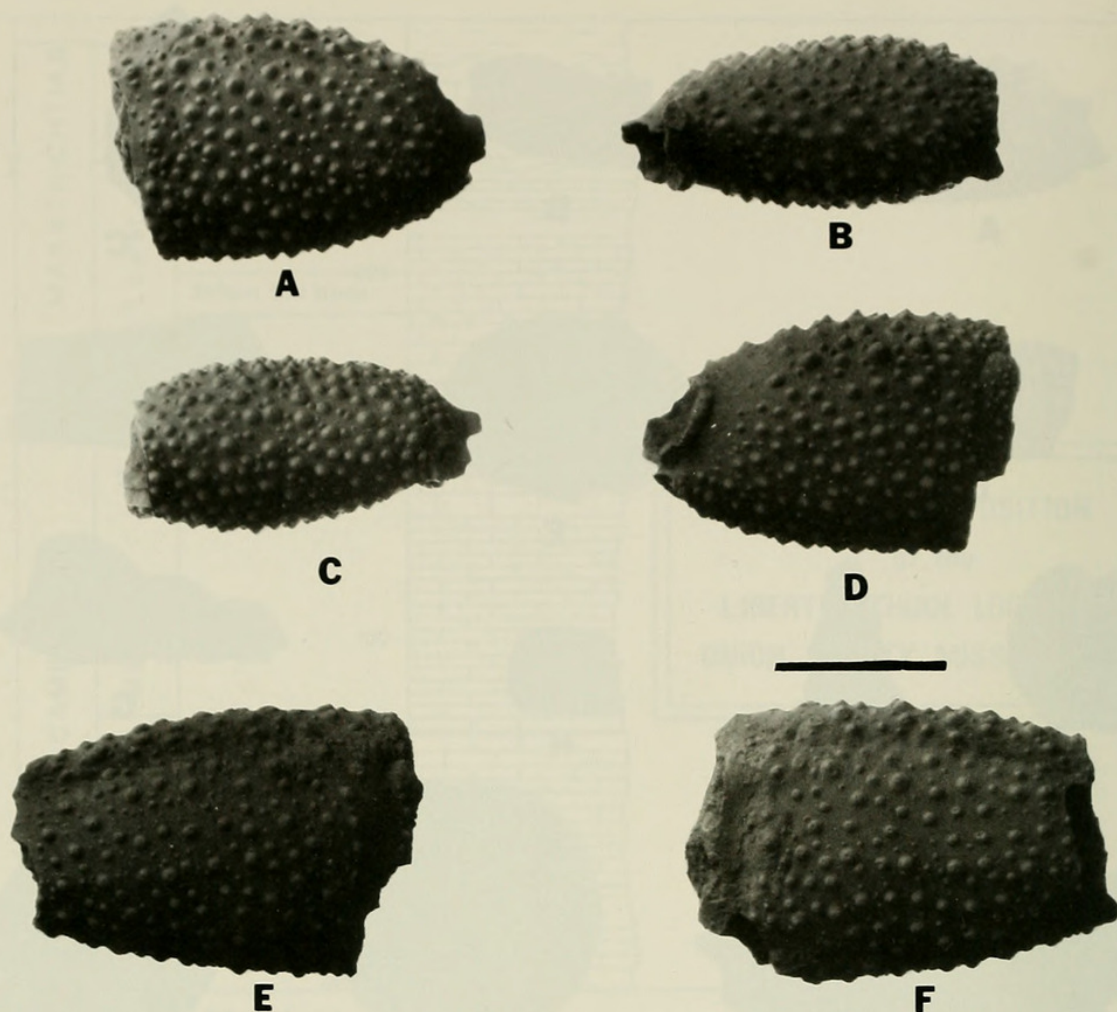


Fig. 4. Photographs of *Parapaguristes tuberculatus*. A-D, Outer, top, bottom, and inner views of holotype left claw (GSCM 1680); E-F, Outer view of paratype claw pair (GSCM 1691a, b). (Bar scale = 1 cm.)

Diagnosis.—Carapace oval-pentagonal, wider than long, widest across epibranchial lobes; anterolateral margins upturned, front rounded; posterolateral margins relatively straight; converging posteriorly; posterior margin unknown; rostrum bilobed and sulcate; orbits small, bifissured above; fronto-orbital width 58% of carapace width. Carapace well differentiated into tumid lobes by well defined grooves.

Etymology.—From the combination of *Paleo* (Greek, old) + *Xantho* (Greek, one of Cyrene's attendant nymphs).

Occurrence.—*Palaeoxantho* is known only from the middle Maastrichtian Prairie Bluff Formation at the Liberty School Locality (GAB 52) in Union County, Mississippi.

Remarks.—*Palaeoxantho* is similar to the xanthid genera *Syphax* A. Milne-Edwards, 1863 (Eocene France), *Xantho* Leach, 1804 (Miocene-Pleistocene, Europe and Fiji; Recent, Indopacific, Mediterranean, Eastern Atlantic), and *Xanthosia* (Albian-? Paleocene, Europe, North America, ? W. Africa). *Palaeoxantho* has the same general shape and groove morphology as *Syphax* but has better differentiated, more tumid regions, a trend carried even further by *Xantho* with its more differentiated but less tumid carapace. *Palaeoxantho* differs from these by its upturned lateral margins, its general flatness, and the tumidity of its carapace. *Palaeoxantho* is relatively narrower and thicker than *Xanthosia* but bears a resemblance to that genus (and many other xanthids).

Palaeoxantho libertiensis, new species

Figs. 3E, 6

Diagnosis.—Carapace ovate-pentagonal, wider than long, widest near middle. Anterolateral margin and frontal margins broadly rounded, anterolateral margins upturned; front short, bilobed, medially sulcate, 10% of carapace width; orbits small, bifissured above, upturned; frontal-orbital width 58% of carapace. Posterolateral margins relatively straight, converging posteriorly; hind margin unknown. Carapace well differentiated by grooves into tumid lobes.

Description.—Carapace small, rounded pentagonal, wider than long ($L/W = 0.80$), widest across epibranchial lobes near mid-length. Frontal and anterolateral margins broadly rounded, upturned, posterolateral margins fairly straight, convergent posteriorly, posterior margin unknown. Front short, medially grooved, bilobed, 10% of carapace width; frontal region between inner angles of orbits 33% of carapace width; orbits small, upturned, bifissured above, distance between outer edges of orbits 58% of carapace width. Four anterolateral lobes present (frontal, hepatic, and 2 epibranchial), hepatic placed at anterior of convergent posterolateral margin. Carapace well differentiated by grooves into tumid regions; scapular arch separated from cephalic arch by sinuous cervical furrow. Cephalic arch differentiated into mesogastric lobe, triangular behind with narrow anterior tongue; very large, tumid protogastric lobes; small longitudinally elongate epigastric lobes; slightly tumid hepatic lobes, and poorly defined frontal areas. Scapular arch well differentiated into tumid regions; cardiac lobe rounded-hexagonal, separated from mesogastric lobe by broad transverse depression (continuing across entire dorsal shield), epibranchial regions differentiated into 3 bosses, 2 marginal, anterior at widest part of carapace and both produced into upturned wings, and one large boss forming most of region; epibranchial region separated from

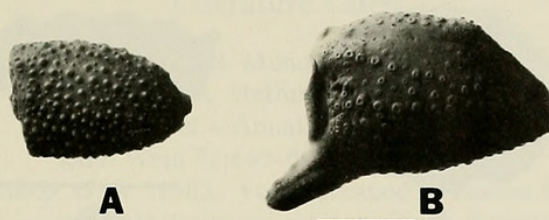


Fig. 5. Comparison of outer views of left claws of (A) *Parapaguristes tuberculatus* (GSCM 1690) and (B) *Paraguristes whitteni* (Bishop, 1983) (GSCM 1683). (Bar scale = 1 cm.)

mesogastric lobe by aforementioned broad, transverse depression; mesobranchial lobe developed into transverse ridge, in line with cardiac region, with slight tumid area along margin of dorsal shield; intestinal and meta-branchial regions unknown. Carapace finely and sparsely granulate over entire surface, especially on summits of bosses. Sides of carapace downturned, nearly vertical, slanting slightly under dorsal shield; sides granulate, faint grooves present on sides in line with ends of cervical groove and groove separating marginal epigastric bosses.

Comparison.—*Palaeoxantho libertiensis* resembles *Syphax crassus* (A. Milne-Edwards, 1864) from the Lower Tertiary of southern France in carapace outline but differs significantly from it by having straighter posterolateral margins, a better areolated carapace, and upturned anterolateral margins. *Palaeoxantho libertiensis* is similar to *Titanocarcinus serratifrons* A. Milne-Edwards in carapace outline but differs in having a better areolated carapace, upturned anterolateral margins, and lacking the pronounced dentate anterolateral margins. *Palaeoxantho libertiensis* resembles *Xantho impressus* (Lamark) from the Recent in its general carapace shape and areolation but differs from it by being relatively narrower, having a better areolated carapace, and by its lack of differentiation of the protogastric and epibranchial lobes. *Palaeoxantho libertiensis* differs from species of *Xanthosia* by being relatively more oval, thicker (i.e., not flattened), narrower, by having a more rounded front, a better areolated carapace,

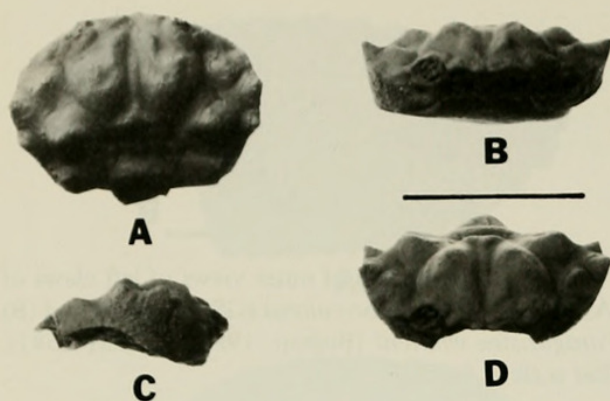


Fig. 6. *Palaeoxantho libertiensis* seen in: A, dorsal; B, anterior; C, right lateral; and D, oblique anterior views, holotype (GSCM 1692). (Bar scale = 1 cm.)

and upturned anterolateral margins. In spite of these major differences, *P. libertiensis* resembles species of *Xanthosia* in a general way, and specifically is more similar to *Xanthosia granulosa* (McCoy) and *Xanthosia buchii* (Reuss) but still very different from them as expressed above.

Etymology.—The trivial name *libertiensis* is derived from the type locality near the Liberty School and Church.

Type.—The holotype (GSCM 1692) of *Palaeoxantho libertiensis* is deposited in the collection of the Georgia Southern College Museum, Georgia Southern College, Statesboro, Georgia 30460.

Occurrence.—One partial carapace has been collected from the Prairie Bluff Formation near the Liberty School and Church in Union County, Mississippi.

Conclusions

The decapods of the Prairie Bluff Formation represent the youngest Late Cretaceous fauna known in North America. As more of this fauna is described and compared to the older and younger Gulf Coast crab faunas, it may be possible to document the presence or absence of a mass extinction event among decapods of the Gulf Coastal Plain at the Cretaceous-Tertiary boundary.

The decapods of the Prairie Bluff occur as rare elements in the fossil assemblages dominated by echinoids and molluscs, not

as decapod-dominated assemblages. It is anticipated that few new additional taxa will be discovered; hence, the importance of describing the known decapods becomes more significant. To attain this end, I have described a new *Prehepatus* from the Prairie Bluff (Bishop 1985) and in this paper have described two new species (*Parapaguristes tuberculatus* and *Palaeoxantho libertiensis*). Three additional Prairie Bluff decapod taxa are known and in hand. One of those is represented by large claw fragments of a shell-crushing decapod (Fig. 3F, G). This taxon is known from many localities ranging from the Demopolis Formation through the Prairie Bluff in Mississippi and Alabama and will soon be described. The fauna also includes a raninid crab assigned to *Raninella?* (Fig. 3C) which may be the same taxon reported by Stephenson and Monroe (1940:208a) as *Raninoides ovalis* Rathbun. The collection also contains a claw of a brachyuran (Fig. 3B) which probably belongs to a portunid crab. A similar claw, from the Coon Creek Formation, was named and assigned as a lobster, *Eryma flecta* Rathbun, 1926, and maintained in that taxon in 1935 (Rathbun 1935:21). Both claws appear to belong to portunid crabs. I hesitate to name and make such reassignment until the portunid cited by Stephenson and Monroe (1940:208a) is examined. A callianassid claw (Fig. 3J) is likewise not named, because it is difficult to make even a generic assignment based on unique claws of the callianassids (Rathbun 1935:29). *Prehepatus harrisi* Bishop, 1985, may prove to be the same as *Prehepatus* n. sp. cited by Stephenson and Monroe (1940:208a). I am also looking forward to seeing the specimen of *Avitelmessus* n. sp. cited by them.

The decapods now known from the middle Maastrichtian Prairie Bluff Formation of Northern Mississippi include:

Fig. 3F–G Claw fragments indet.

Fig. 3J *Callianassa?* sp.

Fig. 3D *Parapaguristes tuberculatus* n. sp.

Fig. 3C *Raninella(?)* sp. (?=*Raninoides*

ovalis Rathbun: Stephenson and Monroe, 1940)

Fig. 3A *Prehepatus harrisi* Bishop, 1985
(?= *Prehepatus* n. sp. Monroe)

Fig. 3E *Palaeoxantho libertiensis* n. sp.

Fig. 3B Portunid claws indet. (=? *Eryma* cf. *flecta* Rathbun and ?=portunid of Stephenson and Monroe 1940)

No Fig. *Avitelmessus* n. sp. (Stephenson and Monroe, 1940)

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Literature Cited

- Bachmayer, F., and R. Mundlos. 1968. Die tertiären Krebse von Helmstedt bei Braunschweig Deutschland.—*Annalen Naturhistorische Museum Wein* 72:649–692.
- Bishop, G. A. 1983. Fossil decapod Crustacea from the Late Cretaceous Coon Creek Formation, Union County, Mississippi.—*Journal of Crustacean Biology* 3:417–430.
- . 1985. A new crab, *Prehepatus harrisi* (Crustacea, Decapoda) from the Coon Creek and Prairie Bluff Formations, Union County, Mississippi.—*Journal of Paleontology* 59:1028–1032.
- Rathbun, M. J. 1926. Decapoda. In B. Wade, ed., *The fauna of the Ripley Formation on Coon Creek, Tenn.*—U.S. Geological Survey Professional Paper 137:184–191.
- . 1935. Fossil Crustacea of the Atlantic and Gulf Coastal Plain.—*Geological Society of America, Special Paper* 2:1–160.
- Russell, E. E., D. M. Keady, E. A. Mancini, and C. E. Smith. 1982. Upper Cretaceous in the lower Mississippi Embayment of Tennessee and Mississippi: Lithostratigraphy and biostratigraphy. Earth Enterprises, Inc., 50 pp.
- Stephenson, L. W., and W. H. Monroe. 1940. The Upper Cretaceous deposits.—*Mississippi State Geological Survey, Bulletin* 40:1–296.

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Bishop, Gale A. 1986. "2 New Crabs, *Parapaguristes tuberculatus* And *Paleoxantho libertiensis*, From The Prairie Bluff Formation (Middle Maastrichtian), Union County, Mississippi, Usa." *Proceedings of the Biological Society of Washington* 99, 604–611.

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