

Measurements: Width of carapace, 11.6 millimeters; fronto-orbital width, 5.8 millimeters; width of orbit, 1.7 millimeters.

Relation: In the arrangement of the tubercles, this species resembles *H. pulchellus* Bittner⁴¹ from the Lutetian of the Venetian Alps, but is more squarely built and the fronto-orbital width greater.

Occurrence: Alabama: Prairie Creek, Wilcox County; Sucarnoochee beds, Midway, lower Eocene; L. C. Johnson, collector (264); one specimen.

Collection: U. S. National Museum; type, Cat. No. 371695.

Family RANINIDAE

Genus RANINOIDES Milne Edwards

Raninoides ovalis Rathbun, n.sp.

(Plate 18, figures 1-8)

Carapace suboval, about one and a half times as long as broad, fronto-orbital distance about equal to posterior margin; surface smoothly rounded from side to side and from back to front except for a short space behind the front margin, which is almost imperceptibly depressed nearly as far as the blunt and insignificant lateral tooth. Surface closely punctate and with larger scattered punctae; around the front and the antero-lateral margins, coarsely granulate; two crescentic lines in middle of carapace. Postero-lateral margin a raised line of granules set off by a groove; posterior margin nearly straight, corners rounded. No specimen has the anterior margin entire. The orbital fissures are open in the shape of a narrow V; the outer tooth is obliquely truncate, the next tooth transversely so; the space between the two innermost fissures is advanced only in the middle half where there is a shallow rounded lobe which may have had a pointed tip (fig. 5). This specimen has a smooth swelling on the right side of the carapace, indicative of an internal parasite. The pterygostomial region and the sternum are coarsely granulate; the chelipedal sternum bears a large swelling at its middle; the two following sections are thickened along the outer side and deeply furrowed in the middle. Of the abdominal segments, the first is narrower (from right to left) than the second, ends concave; the second has arcuate ends, the third is narrower; surface finely granulate.

A detached right palm (264) appears to belong here; it resembles a fragment of one which is attached to a carapace. Palm short and thick, surface covered with fine unequal, separated granules, coarser on the outer surface than elsewhere. Upper margin arcuate in profile, a proximal lobe above attachment of carpus; inner surface with a short, longitudinal furrow below upper margin; a corresponding, but shallower, depression on outer surface; distal end broken off near articulation with dactylus. The basal

⁴¹ A. Bittner: *Die brachyuren des Vicentinischen Tertärgebirges*, Denkschr. Akad. d. Wissensch., Wien, vol. 34 (1875) p. 75 [15] pl. 1, figs. 9 and 10.

portion of fixed finger indicates an almost vertical direction; a longitudinal linear carina on distal side.

Measurements: Largest specimen, length, about 27.2 millimeters; width, 20 millimeters. Length of a detached palm, 5.5 millimeters; height, 4.2 millimeters; thickness, 3.2 millimeters; height of dactylar opening, 2 millimeters; width of base of fixed finger, 0.9 millimeter.

Occurrence: Alabama; Sucarnoochee beds; L. C. Johnson, collector:

Prairie Creek and Allenton, Wilcox County (264); 32 carapaces (incomplete) and one wrist, Cat. Nos. 371501 and 371689.

Prairie Creek and Pine Barren section, Wilcox County (284); three specimens, Cat. No. 371692.

Collection: U. S. National Museum; type, Cat. No. 371689.

Genus NOTOSCELES Bourne

Notosceles bournei Rathbun

(Plate 16, figure 16; Plate 26, figure 5)

1928. *Notosceles bournei*. Rathbun, U. S. Nat. Mus., Pr., vol. 73, art. 6, p. 1, pl. 1.

Occurrence:

Arkansas: Buzzard Bluff, Section 16, Township 14 South, Range 26 West, Miller County; Midway; J. P. D. Hull, collector; two specimens, returned.

Texas: Navarro County, Thomas Jordan Survey, in core drill, Lane No. 1, depth 260 feet; Marland Oil Company; holotype, Cat. No. 369608.

Texas: Navarro County, near Kerens; Midway; D. W. Ohern, Borealis Oil Company, collector; one specimen, Cat. No. 371525.

Alabama: Prairie Creek and Allenton, Wilcox County; Sucarnoochee beds; L. C. Johnson, collector (264); one specimen consisting of three-fifths of a carapace with sternum attached, and another larger specimen showing the hinder half of the carapace and the left lateral spine; Cat. No. 371702.

Alabama: Black Bluff, Tombigbee River, Sumter County; Sucarnoochee beds: station 12032; 1929; Julia Gardner, collector; parts of three specimens, two of which show the sternum; Cat. No. 371696. From the same locality, one specimen collected by E. A. Smith, July 20, 1886.

Collections: U. S. National Museum, type, Cat. No. 369608; Hull collection, and Alabama Museum of Natural History.

Remarks: The pterygostomial suture runs near the postero-lateral margin of the carapace, especially at the widest part and gradually diverges from it posteriorly. The eleventh and twelfth sternal segments are each provided with a stout, granulated, marginal tooth overlapping the carapace.

Genus RANINELLA A. Milne Edwards

Raninella eocenica Rathbun, n.sp.

(Plate 18, figures 13-16)

Carapace about one and a third times as long as broad, convex from side to side, slightly so from back to frontal region which is horizontal or slightly ascending; carapace widest a little behind the middle; posterior margin slightly concave and nearly as long as the fronto-orbital distance. Surface closely punctate; granulate near the antero-lateral margin; a deep thumb-nail impression either side of the median line behind the middle of the carapace. Postero-lateral margin rimmed; antero-lateral thick, armed with two spines twice as far apart as the anterior spine is from the orbital

spine; the posterior spine is directed outward, the next one obliquely forward. At outer end of orbit a long, cylindrical spine directed forward, and close to it a tapering spine, then a notch; the front appears to be tridentate; all spines are incomplete. In front view the anterior edge of the carapace is strongly arched. The lower surface of the carapace is coarsely granulate, as are also the merus and the carpus of the cheliped. Sternum not known.

Occurrence: Alabama; Sucarnoochee beds:

Prairie Creek, Wilcox County; L. C. Johnson, collector (Coll. No. 264); four specimens, including type, and also a spine-bearing fragment, Cat. No. 371701.

Prairie Creek and Pine Barren section, Wilcox County; L. C. Johnson, collector (Coll. No. 284); three specimens, Cat. No. 371700.

Collection: U. S. National Museum; type, Cat. No. 371701.

Genus SYMETHIS Weber

1795. *Symethis*. Weber, Nomenclator entomologicus, p. 92.

1798. *Symethis*. Fabricius, Suppl. Entom. Syst., p. 371.

1888. *Zanclifer*. Henderson, *Challenger Rept.*, Zool., vol. 27, p. 34.

Symethis johnsoni Rathbun, n.sp.

(Plate 17, figures 12-17)

Carapace urn-shaped, having a large hepatic marginal spine directed obliquely forward and outward, in front of which the carapace narrows abruptly, and with subparallel or slightly diverging sides to the line of the orbits. A slender spine at outer angle of orbit. Between the orbits the carapace again abruptly narrows, forming a quadrate, subtruncate, bilobed rostrum. Carapace a little constricted behind the hepatic spine, then widening to a point in front of the middle, thence it narrows in a sinuous line to the slightly concave posterior margin. This margin is half as wide as the fronto-orbital distance. Surface closely covered with large punctae, becoming smaller on the anterior fourth or fifth; a blunt median ridge begins narrow at the posterior margin and gradually widens and disappears anteriorly; a short and narrow intermediate ridge runs obliquely forward from the posterior margin and parallel to the lateral margin. Lateral margin thick and granulate. Orbits large, nearly transverse.

Ischium of outer maxillipeds long and narrow, increasing in width a little from the proximal to the distal end; merus seemingly about half as long. Pterygostomial regions much swollen, granulated. Sternum between chelipeds of characteristic Raninid shape; the next segment is extended widely between cheliped and first leg; following segment relatively narrow, produced little laterally, the bases of the first and second legs being close

together. Abdomen narrow; first segment with oblique side margins; second much longer, increasing in width distally, lateral margins sinuous; third segment about two-thirds as long as the preceding.

Measurements: Holotype (371705), length of carapace to line of orbits, 23.2 millimeters; greatest width behind hepatic spine, 14.4 millimeters; fronto-orbital width, 8.4 millimeters; posterior width, 4.6 millimeters.

Remarks: Resembles the Recent *S. caribensis* in the front advanced abruptly beyond the orbits, and in the general arrangement of the sternal segments.

Occurrence: Alabama: Sucarnoochee beds, Midway:

Prairie Creek and Allenton, Wilcox County; L. C. Johnson, collector (264); 19 specimens, Cat. No. 371693; one holotype, Cat. No. 371705.

Prairie Creek and Pine Barren section, Wilcox County; L. C. Johnson, collector (284); 20 specimens, Cat. No. 371691.

Black Bluff, Sumter County; E. A. Smith, collector; July 20, 1886; two fragments (Ala. Mus. Nat. Hist.).

Collections: U. S. National Museum, type, Cat. No. 371705; Alabama Museum of Natural History.

Genus SYMNISTA Philippi
Symnista bidentata Rathbun, n.sp.

(Plate 18, figures 9-12)

Represented by a single small and incomplete specimen which is placed in this genus because of its long, egg-shaped body, narrow front, and prominent antero-lateral protuberance.

The specimen consists of perhaps two-thirds of a carapace with a large part of the right margin and a small part of the left margin, a cross-section of an orbit, and a large part of the pterygostomial regions. The cross-section of the carapace behind its middle is a broad oval. Near the hinder end of the fragment there is on the dorsal surface a pair of parallel impressions, indicating the position of gastro-cardiac area; if this surmise is correct, the entire length of the carapace would be unusually great compared to its width. The antero-lateral margin bears two teeth, subtriangular, depressed, the hinder one large and with a long posterior slope, the anterior one small. In front of these teeth the margin turns forward and slightly outward, and extends farther forward than the distance between the teeth. The anterior broken edge shows the cross-section of the orbit which is so large that it indicates a narrow space remaining for the front. Surface above and below closely punctate, the fine punctae having a scattering of larger ones; the lateral margin is thick and blunt. Buccal cavity long in proportion to its width.

Measurements: Holotype, width behind larger lateral spine, 7.6 milli-

meters; thickness at same level (measured through pterygostomian region), 4.2 millimeters; fronto-orbital width, (estimated) 6 millimeters; width of orbit, 1.6 millimeters.

Occurrence: Alabama: Prairie Creek and Allenton, Wilcox County; Sucarnoochee beds; L. C. Johnson, collector (Coll. No. 264); one specimen.

Collection: U. S. National Museum; type, Cat. No. 371742.

Family CALAPPIDAE

Genus CALAPPILIA A. Milne Edwards

Calappilia diglypta Stenzel

1934. *Calappilia diglypta*. Stenzel, Jour. Paleont., vol. 8, no. 1, p. 51, pl. 7, fig. 2a, b.

Differs from allied species in the much smaller number of its carapace tubercles.

Occurrence: Texas: Stone City, Burleson County. Claiborne group, Cook Mountain formation, Crockett member.

Family XANTHIDAE

Genus MENIPPE DeHaan

Menippe burnsi Rathbun, n.sp.

(Plate 19, figures 1-11)

Represented by three right major palms, two left minor palms, two left minor palms, and one right wrist with a fragment of the palm attached. Palms massive, almost as convex inside as outside, thickest at the middle. A furrow along the proximal end, inside and out. Outer layer covered with fine but separated granules and more distant punctae. The articulating condyle on the outside adjacent to the dactylus is somewhat elongate heartshaped, similar to the same lobe in Recent *Menippe*, and is set off by a deep groove. The major palm is much higher at the distal than at the proximal end; lower margin nearly straight, forming an acute angle with the distal margin; proximal end oblique. The minor palm has the upper and the lower surfaces more nearly parallel, the upper slightly arcuate and separated by a deep furrow from the prominent condyle at the proximal end; the palm is highest at the distal end, lowest at the proximal end. The stump of the fixed finger of the minor chela is slightly deflexed; the cross-section of the base occupies about a third of the height of the manus. The base of the dactylus appears to meet or nearly meet that of the propodal finger. The carpus of a right cheliped is a little longer, measured on the inner margin, than its greatest width; the tooth at inner angle is small, conical, and blunt. The proximal end of the lower margin of the attached palm is slightly concave, but whether it belongs to a major or a minor cheliped is undetermined.

One of the right palms is of relatively small size and is placed here with some reservation; the upper-outer surface is covered with coarse, separated granules, which do not perhaps represent the outer layer. None of the larger and more worn palms shows this granulation.

Measurements: Holotype, left palm, length of upper margin, 45 milli-

meters; length at middle, 53.6 millimeters; height at middle, 39.7 millimeters; distal height, (estimated) 41.3 millimeters; greatest thickness, 26.7 millimeters.

Additional material: A single dactylus or movable finger of the right cheliped is referred to this species. The granulation agrees with that on the stump of a finger attached to the holotype palm; the granules are unequal, separated at irregular intervals. The finger is thick throughout its height and length, tapers to a broad blunt tip, and curves inward almost imperceptibly. On both inner and outer surfaces there is a shallow longitudinal depression through the middle, which follows the curve of the finger and is broad at the proximal end and gradually diminishes, fading out midway of the length of the finger. There are also two inconspicuous rows of distant punctae on either side, but without the impressed groove common in the Recent *Menippe* just below the upper surface, inside and out. The prehensile edge shows traces of four or five low teeth.

Occurrence:

North Carolina: City quarry near cemetery, Wilmington, New Hanover County; Castle Hayne marl, Jackson formation, upper Eocene; 1902; Frank Burns, collector (3602); type lot; Cat. No. 371580.

South Carolina: Belle Broughton plantation, half a mile southeast of Creston, Calhoun County, on branch of Halfway Swamp; Santee limestone, basal Jackson formation, upper Eocene; 1917; C. W. Cooke, collector (Coll. No. 7990); one finger, Cat. No. 371581.

Collection: U. S. National Museum; type, Cat. No. 371580.

Menippe jaksonensis Rathbun, n. sp.

(Plate 19, figure 16)

Portion of a right minor chela, showing the inner surface of both fingers and the distal end of the palm. Distal margin of palm oblique so that the fixed finger is shorter than the dactylus. Both fingers are dark colored, almost black, the color reaching nearly to the base of the dactylus and occupying two-thirds, or more, of the immovable finger and ending proximally in a concave line; it is probable that the color runs farther back on the outer surface. Both fingers are bluntly pointed. The dactylus is narrow, subcylindrical, regularly tapering, and curved, and falls short of the tip of the dactyl when flexed; a line of punctae runs longitudinally below the middle; no prehensile teeth are evident. The immovable finger is elongate-triangular, with a sinuous lower margin, three broad, low teeth on prehensile edge, tip upturned; a row of punctae at lower third, subparallel to lower margin.

This species has a more slender dactyl than any of the Recent species in the Caribbean area, but approaches that of *M. obtusa*,⁴² in which, however, the propodal finger is longer and dark-colored throughout.

⁴² M. J. Rathbun: *The canceroid crabs of America of the families Euryalidae, Portunidae, Atelecyclidae, Cancridae, and Xanthidae*, U. S. Nat. Mus., Bull. 152 (1930) pl. 198, fig. 1.

Measurements: Length of dactylus, 10.7 millimeters; of fixed finger, upper margin, 6.5 millimeters.

Occurrence: Mississippi: Bluff on the west side of Town Creek, Jackson, 200 feet south of Rankin Street and $800 \pm$ feet west of South State Street; Jackson formation, upper Eocene; October 9, 1912; C. Wythe Cooke, collector (6465); holotype.

Collection: U. S. National Museum; type, Cat. No. 371589.

Menippe anomala Rathbun, n.sp.

(Plate 19, figures 12-15)

A portion of a right manus, the extremities lacking. Manus high, thick; outer surface very convex in a vertical direction, less convex longitudinally; upper surface continuous with the outer, longitudinally arched and covered with large separated granules, which are continued for a slight distance on the outer surface, more so at the proximal end than toward the dactyl; inner surface smooth and punctate, flat in the upper portion and along the lower border, but with a large swelling covering the middle portion of the proximal half of the manus; lower margin blunt—only a small part of it remains—and trending downward from the proximal end. The customary nodule above the articulation with the carpus is broken off; a short interspace exists between it and the carpus.

The arcuate upper margin, combined with the abruptly flattened inner surface, distinguishes this species from others.

Occurrence: North Carolina: City quarry near cemetery, Wilmington, New Hanover County; Castle Hayne marl, Jackson formation, upper Eocene; 1902; Frank Burns, collector (Coll. No. 3602).

Collection: U. S. National Museum; type, Cat. No. 371524.

Genus OCALINA Rathbun

Ocalina floridana Rathbun

1929. *Ocalina floridana*. Rathbun, U. S. Nat. Mus., Pr., vol. 75, art. 15, p. 2, pls. 1-3.

Occurrence: Florida: Alachua, Levy, and Marion counties. Ocala limestone, upper Eocene.

Collection: U. S. National Museum; type, Cat. No. 370956.

Genus HARPACTOCARCINUS A. Milne Edwards

Harpactocarcinus americanus Rathbun

1928. *Harpactocarcinus americanus*. Rathbun, U. S. Nat. Mus., Pr., vol. 73, art. 6, p. 3, pls. 2 and 3.

1929. *Xanthopsis americana*. Glaessner, Fossilium Catalogus, 1, pars 41, p. 395.

Type-locality: Texas: Little Brazos Creek, Brazos County, on both sides of the old Bryan and Brazos Valley Railroad bridge; holotype, Cat. No. 369607.

Additional localities:

Texas: San Augustine, San Augustine County; lower fossiliferous bed; November 28, 1908; T. W. Vaughan, collector (5119); one specimen, Cat. No. 371582.

Texas: Northeast of Moseley's Ferry, northwestern Brazos County; Cook Mountain formation of the lower Claiborne of the horizon of the Moseley Ferry beds, upper Eocene; John Vick, collector; four specimens, Cat. No. 371578.

Texas: Dunn ranch, Brazos County; Cook Mountain formation; 1930; P. H. McCauley, W. S. Adkins, collectors.

Louisiana: Half a mile north of Natchitoches Parish; Wahtubbee, lower Claiborne, Eocene; 1894; T. W. Vaughan, collector (2912); one female, Cat. No. 147438.

Mississippi: Wahtubbee Hills, cut on New Orleans and Northeastern Railway, 4 miles south of Enterprise, Clark County; lower Claiborne; 1894; Frank Burns, collector; one major claw of male; Cat. No. 371584.

Collections: U. S. National Museum, type, Cat. No. 369607; University of Texas.

Harpactocarcinus rathbunae Stenzel

1934. *Harpactocarcinus rathbunae*. Stenzel, Jour. Paleont., vol. 8, no. 1, p. 46, pl. 6, fig. 2a, b.

Differs from *H. americanus* in its greater size and in the lower margin of the right manus very sinuous.⁴³

Occurrence: Texas: Little Brazos River, Brazos County. Claiborne group, Cook Mountain formation, Crockett member.

Harpactocarcinus sp. Stenzel

1934. *Harpactocarcinus*, sp. Stenzel, Jour. Paleont., vol. 8, no. 1, p. 46, pl. 6, fig. 3.

This species has a form of chela intermediate between those of the two preceding species.

Occurrence: Texas: Little Brazos River, Brazos County. Claiborne group, Cook Mountain formation, Crockett member.

Harpactocarcinus mississippiensis Rathbun, n.sp.

(Plate 21, figures 9-11)

In the female specimen at hand, the carapace is badly cracked and the margins for the most part broken away. Carapace subcircular, broader than long; convex from side to side and much more so from front to back, the anterior and the posterior margins invisible in dorsal view; surface covered with fine punctae irregular in shape and size; marginal teeth unknown. Orbits far apart, subcircular, upper margin thickened, tubular. Front between the orbits triangular, nearly three times as broad as long.

Chelipeds massive, unequal, the right the larger. Outer surface of merus broader than long, outer surface of carpus much longer than broad. Outer surface of manus convex from upper to lower edge, irregularly pitted and bearing four longitudinal rows of small tubercles, one on the upper margin, the second near it but diverging a little distally; two rows further apart at middle of manus and composed of somewhat smaller tubercles. These disappear on the distal part of the major manus. The number of tubercles in the various rows, beginning at the top, are as follows: Minor palm, 7, 7, 8+, 5+; major palm 4+, 8, 7, 4. In the space be-

⁴³ I am not convinced that *H. rathbunae* is distinct from *americanus*. The chelae of the latter vary with age, the lower margin in the younger nearly horizontal, but in the older gradually bending downward except at the tip.

tween the second and the third rows of the major palm are two groups of tubercles at either end, four in the proximal group and five in the distal; breaks in the shell have destroyed all but two tubercles in the proximal group of the minor palm. A shallow punctate groove on the fixed finger is continued a ways on the palm. Fingers stout, tips blunt; fixed finger nearly horizontal, convex below, prehensile margin slightly sinuous, in the main convex; dactylus slightly curved, inner margins nearly straight, unarmed. Merus of ambulatory legs broad, compressed.

Of the female abdominal segments, the first is broad, the second much narrower, the third nearly as broad as the first, the fourth, fifth, and sixth a little broader and subequal to one another in width. As to length (in the direction of the axis of the animal), the first segment is short in the middle, longer at the ends; the second, third, and fourth are a little longer and subequal to one another, the fifth is a little longer, the sixth is fully twice as long as the fifth, the seventh is concealed.

Measurements: Holotype, female, length of carapace, 71 millimeters; estimated minimum width of same, 81.5 millimeters; fronto-orbital width, 44.5 millimeters; interorbital width, 34.5 millimeters; length of propodus of major chela, 40.2 millimeters; height of same, 25.3 millimeters; length of propodus of minor chela, 36 millimeters; height of same, 21.6 millimeters.

Relation: Approaches *H. rotundatus* A. Milne Edwards⁴⁴ from the nummulitic terrain of Verona, in proportions of carapace and the double row of tubercles on the upper part of the palm. In our species the middle of the front is more advanced, and the palm is tuberculated through the middle. The surface of the carapace is suggestive of *H. punctulatus* (Desmarest) figured by that author;⁴⁵ the abdomen is similar to that of the same species.⁴⁶

Occurrence: Jackson formation, upper Eocene:

Mississippi: Large ravine below old reservoir at Yazoo City, about one mile south of the Yazoo and Mississippi Valley Railroad station, along street-car line; October 11, 1912; E. N. Lowe and C. W. Cooke, collectors (6472); one female, holotype; Cat. No. 371577.

Alabama: Choctaw County, N. H. Boss and A. R. Kellogg, collectors, 1929: Old Sanford Mitchell field about 2 miles southeast of Melvin, Section 24, Township 11 North, Range 5 West, October 12, one right chela; 2.4 miles by road south of Melvin, southeast quarter of Section 26, Township 11 North, Range 5 West, October 22, one right chela.

Collection: U. S. National Museum; type, Cat. No. 371577.

⁴⁴ A. Milne Edwards: *Monographie des crustacés fossiles de la famille des cancériens*, Ann. Sci. Nat., Paris, Zool., ser. 4, vol. 18 (1862) p. 71, pl. 10, figs. 2-2d.

⁴⁵ A.-G. Desmarest in Brongniart and Desmarest: *Histoire naturelle des crustacés fossiles*, Paris (1822) pl. 7, fig. 3.

⁴⁶ *Op. cit.*, pl. 7, fig. 4.

Genus ZANTHOPSIS M'Coy

Zanthopsis errans Woods

(Plate 21, figures 15-17)

1922. *Xanthopsis errans*. Woods, in Bosworth, Geol. N. W. Peru, p. 115, pl. 17, figs. 7-10; Clavilithes series, Negritos formation.

This much worn specimen shows the essential characters of the species: Four tubercles on the outer surface of the palm, two rows of tubercles on the curved upper surface, a slender propodal finger, and the stump of a mammoth dactyl. The socket of the dactyl is at least as wide and as high as the cross-section of the base of the fixed finger.

Occurrence: Mississippi: Clark County; Wahtubbee horizon, lower Claiborne, middle Eocene; Frank Burns, collector; one right chela, Cat. No. 139148.

Collections: U. S. National Museum; Sedgwick Museum, Cambridge, type.

Zanthopsis carolinensis Rathbun, n.sp.

(Plate 20, figures 1, 2)

A male showing the greater part of the carapace (margin excepted), the sternum, and the abdomen. Carapace about six-sevenths as long as broad, convex in all directions especially antero-posteriorly. Surface not very uneven, a narrow shallow depression begins at the margin of the front, widens backward, merging with the mesogastric region. Either side of the middle, a broad deep longitudinal furrow bounds the metagastric to the intestinal region and anteriorly turns outward toward the hepatic region. A narrow furrow borders the posterior margin. The following smoothly rounded elevations are noted: One large and low on each protogastric region; one large and high at the inner angle of the branchial region; one smaller, a little farther outward and forward; one high in transverse line with cardiac region; and one lower in the same line but farther out. In the furrows alongside the urogastric-cardiac connection there are two linear crescentic granulated elevations. Two granules side by side at the metagastric region, two farther apart on the cardiac region, and one median on the intestinal or postcardiac region. Front narrow, four-lobed.

Sternum narrow, anterior end in front of chelipeds deeply recessive. At the articulation with the chelipeds there is a large prominent oblong tubercle. The lateral lobes of the coalesced (third to fifth) segment of the abdomen are prominent; the segment is not much longer than its anterior or distal width. The penultimate segment gradually diminishes; its length is two-thirds of its proximal width. Terminal segment subtriangular.

Measurements: Male holotype, length of carapace, 61.2 millimeters; width of same, 70 millimeters; width of front, 15 millimeters; of orbit, 6 millimeters.

Occurrence: South Carolina: Creston, Orangeburg County; lower Claiborne, middle Eocene; T. W. Vaughan, collector (4585).

Collection: U. S. National Museum; type, Cat. No. 371586.

Zanthopsis peytoni Stenzel

1934. *Zanthopsis peytoni*. Stenzel, Jour. Paleont., vol. 8, no. 1, p. 49, pl. 7, fig. 1a-c.

Differs from all other species of the genus by the pair of spines on the posterior margin. The bosses of the protogastric region are quite conspicuous though low; the branchial regions carry five bosses.

Occurrence: Texas: Several places in Leon County. Claiborne group, Mount Selman formation, Weches member, bed d.

Zanthopsis peytoni var. *parva* Stenzel

1934. *Zanthopsis peytoni* var. *parva*. Stenzel, Jour. Paleont., vol. 8, no. 1, p. 51.

Smaller than the specific form.

Occurrence: Texas: Several places in Leon County. Claiborne group, Mount Selman formation, Weches member, bed g.

Genus XANTHILITES Bell

Xanthilites alabamensis Rathbun, n.sp.

(Plate 20, figures 3-16)

Carapace hexagonal, antero-lateral shorter than postero-lateral margin, and cut into four strong triangular teeth. Of these, the first or orbital tooth points forward, the second and third obliquely forward and outward, the third the wider, whereas the fourth, the largest of all, is directed outward and slightly upward. Front divided into two oblique lobes, each of which is divided into two smaller lobules; the interspaces are U-shaped, the median narrower than the lateral. Sides of front, at base of eyestalks, concave. Upper margin of orbit transverse; width of orbit from tip to tip a little less than width of front; in the upper margin, two obscure notches indicated by short closed fissures and not interrupting the general direction of the margin. In front view the orbits appear oblong and slope obliquely downward outwardly; the front is deflected to a point a little below the middle of the orbit. The general surface of the carapace is rough with fine scabrous granules, but the elevated portions—the 12 bosses, the antero-lateral teeth, the thickened parts of the fronto-orbital margin—are covered with coarse granules. The median regions, gastric and cardiac, are separated on either side by a deep furrow from the branchio-hepatic regions; in this furrow opposite the shallow gastro-cardiac depression there is a deep thumbnail impression. Shallow grooves define the protogastric from the mesogastric region and the hepatic from the orbital and branchial regions. The bosses are distributed as follows: one protogastric (paired), one mesogastric, covering the greater part of the region, one cardiac, one hepatic, the smallest of all, three branchial; of these, one is in a transverse line with the lateral tooth and the mesogastric boss, another is at the inner angle of the region and a little behind the transverse line; the third is sub-conical, above the postero-lateral margin and directed outward and upward.

Orbits deep; a prominent tooth at inner angle of lower border, broadly rounded and nearly as advanced as the outer lobule of the front, its outer slope forming with the outer tooth of the orbit a broad and deep V-shaped notch, its inner slope bordered in the hinder part by a small, conical tooth, mostly hidden in ventral view. Pterygostomial region finely granulate. Basal segment of antennules subtriangular, large, exposed surface uneven and partly granulate, oblique outer margin in front view in line with outer margin of outer lobule of front. Basal segment of antennae small, wedged in the orbital hiatus. A strong endostomial crest present. Epistome deeply notched outside the crest and with a median buttonhole notch. Anterior part of sternum uneven, elevations granulated; female abdomen of moderate width, male abdomen not known.

Chelipeds stout; merus nearly as broad as long on the outer surface, lower margin thick; carpus much broader than long, the upper surface prolonged inward in a broad, flat, triangular tooth. Palm heavy, increasing in width from proximal to distal end, distal height nearly as great as superior length and twice as great as thickness; outer surface convex in a vertical direction, ornamented with a pattern of tubercles or elevations: one elongate, near and parallel to the distal end and composed of two tubercles partly or wholly fused; a round boss at the center; above it two slender, pear-shaped tubercles, pointing obliquely toward the carpus; above the lower margin on the proximal half there is a row of four slender, irregular-shaped tubercles, the proximal one crescentic, the next one an inverted V, the others linear. Upper and lower margins thick; on the inner surface below the upper margin and just behind the middle there is a large depressed lobe, pointing distad. Fingers of moderate size, widely separated at base by a broad U-shaped sinus in the palm. Fixed finger horizontal or nearly so, sometimes bent a little downward; the outer surface is depressed through its middle; the prehensile edge bears two small teeth arranged crosswise at base, followed by six teeth in single file. Dactylus strongly arched, thick; a large basal prehensile tooth directed backward, followed by two small teeth. Ambulatory legs narrow; only the merus is preserved.

Measurements: Holotype, approximate length of carapace, 17.6 millimeters; width of same, 24.8 millimeters; fronto-orbital width, 13 millimeters; width of front, 5.3 millimeters. Largest carapace, width, 35.4 millimeters. Palm, middle length to sinus, 15.7 millimeters; superior length, 14 millimeters; distal height, 13.6 millimeters. Largest palm, height, 17.2 millimeters.

Relation: This species seems to be nearest to *X. bavaricus* Lörenthey⁴⁷ from the Eocene of Bavaria. Whereas the general shape of the carapace

⁴⁷ E. Lörenthey: *Beiträge zur Decapodenfauna des Ungarischen Tertiärs*, Természettudományi Füzetek, vol. 21 (1898) p. 142, pl. 11, figs. 2a-2e, 3a, 3b.

and the outline of front and antero-lateral margin are similar in the two species, *X. bavaricus* lacks the small round bosses of *alabamensis* and also the ornamentation of the palm.

Occurrence: Alabama; Sucarnoochee beds, Midway:

Prairie Creek, Allenton and Pine Barren section, Wilcox County; L. C. Johnson, collector (Coll. Nos. 264, 281, 284); many specimens; Cat. Nos. 371690, 371694, 371699, 371707. One carapace with right cheliped attached is holotype (Cat. No. 371708).

Pine Barren Creek, Wilcox County; L. C. Johnson, collector; one fragment.

Estelle, Wilcox County; one specimen.

Collections: U. S. National Museum, type, Cat. No. 371708; Alabama Museum of Natural History.

Genus PANOPEUS Milne Edwards
Panopeus estellensis Rathbun, n.sp.

(Plate 16, figures 17, 18)

Two dactyls of right major chelipeds; the smaller is the holotype. The dactyl is rather high throughout its length until near the tip where it rapidly diminishes. The basal tooth is large, and directed backward; of the five remaining teeth, the first and the third are somewhat larger than the others. On the outer surface a little above the middle a longitudinal row of fine punctae with larger ones at intervals; on the inner surface a similar row similarly placed but in a shallow groove. Other scattered punctae are inconspicuous.

The paratype is the same shape as the holotype; it has lost its outer layer and shows no markings; the basal tooth is wide but reduced in length; it is followed by seven smaller teeth, of which the second and the fourth are the largest.

Length of holotype, 6 millimeters.

In shape these fingers resemble those of mature specimens of the Recent *P. occidentalis*.⁴⁸ In *occidentalis* there is on each side of the finger a row of punctae near the upper margin and another half way between that row and the prehensile teeth.

Occurrence: Alabama: Estelle, Wilcox County; Sucarnoochee beds, Midway, lower Eocene; holotype and paratype.

Collection: Alabama Museum of Natural History; types.

Genus GALENOPSIS A. Milne Edwards
Galenopsis americana Rathbun, n.sp.

(Plate 21, figures 19-22)

One palm of right chela, the distal extremity lacking, also a part of the outer surface. Greatest height (14.5 millimeters) about equal to superior

⁴⁸ M. J. Rathbun: *The canceroid crabs of America*, U. S. Nat. Mus., Bull. 152 (1930) p. 348, pl. 161.

length; height diminishes toward proximal end. Palm thick, lower surface evenly rounded from outer to inner surface; upper margin bending inward in its proximal half where it is bluntly carinate. Outer surface evenly rounded and in large part ornamented with a pattern of low reticulating ridges; inner surface uneven, highest in the middle, depressed above the lower margin, and below the distal portion of the upper margin and again below the proximal end. Surface finely granulate above, and finely punctate on the reticulating ridges.

The external pattern suggests that represented by A. Milne Edwards⁴⁹ for *G. purchisonii*, but the shape is more that of Stoliczka's figures⁵⁰ of the same species.

Occurrence: Alabama: Pine Barren region, Wilcox County; Sucarnoochee beds, Midway, lower Eocene; L. C. Johnson, collector; one right palm.

Collection: U. S. National Museum; type, Cat. No. 371743.

Family XANTHIDAE

Genus and species undetermined

(Plate 24, figure 29)

A merus of a left ambulatory leg of a large species; compressed, outer surface convex, inner surface less so, having a shallow longitudinal depression on the upper half; lower margin straight, upper arcuate; both ends broken off. Lower surface and lower half of outer surface rough with separated granules sunk in pits or sockets, the granules directed distad. Upper half of outer surface and all of the inner surface except the depression, covered with small, inconspicuous scattered sockets. Length (incomplete), 26.2 millimeters; width at middle, 9.6 millimeters.

This merus resembles in shape those of *Ocalina*, but the surface of those appears smooth.

Occurrence: Alabama: Pine Barren Creek, Wilcox County; Midway, lower Eocene; L. C. Johnson, collector (7-11); one specimen.

Collection: Alabama Museum of Natural History.

Genus PLAGIOLOPHUS Bell

Plagiolophus bakeri Rathbun, n.sp.

(Plate 21, figure 23)

Represented by one specimen showing the carapace only. Carapace divided into 14 unequal and irregular raised areas covered with disc-like granules mostly of large size but with some smaller ones near the edges;

⁴⁹ A. Milne Edwards: *Monographie des crustacés fossiles de la famille des cancériens*, Ann. Sci. Nat., Zool., ser. 5, vol. 3 (1865) pl. 9, fig. 1c.

⁵⁰ F. Stoliczka: *Observations on fossil crabs from Tertiary deposits in Sind and Kutch*, Geol. Surv. India, Mem., Palaeontol. Indica, ser. 7, vol. 1, no. 14, pt. 1 (1871) pl. 3, figs. 2c, 2d.

five are gastric, three of them large and subtriangular, the mesogastric elevation not prolonged on the narrow part of that subregion, epigastric lobes small; hepatic area small, oblong, parallel to the antero-lateral margin; branchial areas, three, the anterior obliquely transverse, the intermediate one small, situated at inner angle, the posterior one large, subquadrilateral, prolonged in a point toward the postero-lateral angle of the carapace. Disc-like granules also ornament the dorsal surface of the front and orbits and of the last two lateral teeth. Front subtruncate, medially furrowed; orbits oblique and with two superior closed fissures, indicated by furrows. Antero-lateral margin slightly arcuate, with four teeth not counting the orbital tooth; the first is low, formed by the continuation of a suborbital ridge and is armed with stout, blunt spinules; the other three are small but dentiform, and armed to some extent with spinules; lower surface of carapace rough with short spinules or pointed granules, and behind the second lateral tooth projecting sideways beyond the dorsal surface. A row of fine granules along the posterior margin; on either side above the margin a small cluster of little larger granules. Grooves between granulated areas deep and smooth and covered with minute punctae.

Measurements: Holotype, length of carapace, 17.3 millimeters; width at last lateral tooth, 19.7 millimeters; width at subbranchial regions, 20.3 millimeters; fronto-orbital width, 14.3 millimeters; width of front, 5.4 millimeters.

Relation: The ornamentation of the carapace is similar in character to that of the Cretaceous *P. formosus*⁵¹ (Reuss) although the areas are of different shape and arrangement. The lateral margin is produced in *formosus* to a pronounced lateral angle, whereas that of *bakeri* is almost longitudinal behind the second tooth.

Occurrence: Texas: Moseley's Ferry, northwestern Brazos County; Cook Mountain formation of the lower Claiborne of the horizon of the Moseley Ferry beds, upper Eocene; gift of Charles L. Baker, Houston; one specimen.

Collection: U. S. National Museum; type; Cat. No. 371574.

Family MAJIDAE

Genus STENOCIONOPS (Leach ms.) Desmarest

Stenocionops suwanneana Rathbun, n.sp.

(Plate 21, figures 1-3)

Holotype and only specimen: A left propodus of cheliped showing the greater part of the palm and a fragment of the immovable finger. Palm two and a half times as long, measured through the middle, as its greatest

⁵¹ *Glyphithyreus formosus* Reuss. A. E. Reuss: *Zur kenntniss fossiler krabben*, Denksch. k. Akad. Wiss. math. natur. Cl., vol. 17 (1859) p. 4, pl. 2, figs. 1-3. *Plagiolophus formosus*. A. Milne Edwards: *Monographie des crustacés fossiles de la famille des cancériens*, Ann. Sci. Nat., Zool., ser. 5, vol. 3 (1865) p. 332, pl. 10, figs. 1, 1a.

height; it is lowest at the proximal end and increases gradually to the distal end, except for a slight swelling along the middle of the lower margin. Upper and lower margins thick and broadly rounded and showing an indication of fine irregular granulation. Palm thickest along the middle line; on both the outer and the inner surfaces there is a blunt, longitudinal elevation which slopes gradually to the upper and the lower margins; at the middle the thickness is two-thirds as great as the height; the surface inside and out is covered with low irregular elongate granules or tubercles arranged crosswise of the palm and to some extent forming clusters which range roughly in three or four longitudinal series. The surface near the fingers is depressed and almost smooth; below the finger it is plainly granulate. The immovable finger is directed slightly downward; it is relatively small, its basal thickness and height subequal; it tapers rapidly; the tip is lacking.

Measurements: Length of propodus, below, 33 millimeters; above, 24.5 millimeters; at middle, 30 millimeters. Height at distal end of palm, 11.8 millimeters; at proximal end, 9.5 millimeters; at middle, 10.7 millimeters; thickness at middle, 7.2 millimeters.

Relation: Shape of palm akin to, but much shorter than, that of Recent *S. furcata* (Olivier)⁵² found on the coast of Georgia and Florida.

Occurrence:

Florida: Rowland's Bluff, Suwannee County; Ocala limestone, Eocene; L. C. Johnson, collector (Coll. No. 365), U. S. Geological Survey.

Collection: U. S. National Museum; type, Cat. No. 137885.

OLIGOCENE

Order DECAPODA

Family CALLIANASSIDAE

Genus CALLIANASSA Leach

Callianassa berryi Rathbun, n.sp.

(Plate 21, figures 12-14)

Holotype a right manus. Upper and lower margins subparallel, curving toward each other at the proximal end, which is vertical. Distal margin at articulation of dactylus also vertical. Lower distal end of palm lacking. Outer surface much more convex than the inner, its lower two-fifths covered with large, separated granules or round sockets. Lower edge thin, compressed, blunt, without ornamentation on the outer face; on the inner face close to the edge there is a row of about 12 oblique sockets with a few smaller ones interspersed; they are sublinear in shape, and have a tuberculiform base near the edge of the palm, followed distally by an oblong depression; the larger of these depressions doubtless held a tuft of hairs,

⁵² M. J. Rathbun: *The spider crabs of America*, U. S. Nat. Mus., Bull. 129 (1925) p. 449, pls. 160 and 161.

the smaller ones a single hair. The inner surface has a depression in its lower distal portion. The lower two-thirds of this surface is covered with coarse granules like those on the outer surface. The distal third of the upper margin is thick and broadly rounded; but further back the margin is surmounted by a thin, narrow edge; on the inner side of this there are about six small punctae with unequal intervals; in the same line, but on the distal third, are the bases of two stout spines, one at the end of the rim, the outer half way between that point and the distal end of the segment; on the outer side of the upper margin four small punctae can be discerned. At the distal end of the inner surface, bordering the articulation, there is a narrow band of fine granules. Higher up the articulating condyle is prominent. The corresponding edge of the outer surface is broken away except at the lower end, where it is granulated.

Relation: Distinguished from other species with a square-built palm by the great roughness of both inner and outer surfaces, the presence of two strong spines on the upper margin and of a row of obliquely placed sockets along the inner surface of the lower margin.

Measurements: Length of palm from interdigital sinus measured along inner surface, 17.8 millimeters; greatest width, 16.2 millimeters; width of dactylar opening, or thickness of palm at distal end, 5.3 millimeters; greatest thickness of propodal finger, measured on the adjacent palm, 3 millimeters.

Occurrence: Mississippi at Vicksburg, Warren County; Glendon limestone, Vicksburg group, Oligocene; loaned by E. W. Berry.

Collection: Johns Hopkins University; type.

Callianassa vaughani Rathbun

See page 104.

Family RANINIDAE

Genus RANINA Lamarek

Ranina georgiana Rathbun, n.sp.

(Plate 21, figures 7, 8)

A carapace with the anterior and the posterior ends incomplete; convex from side to side, much less so from front to back; lateral margins strongly arcuate, postero-lateral margins nearly straight viewed from above. The ornamentation consists of transverse pectinated ridges, each point of which shows a minute pit; the points are separated by short longitudinal furrows. These raised lines begin at the lateral margin; some are continued across the carapace, others terminate not far from the middle, and overlap one another. Each ridge is accentuated by a narrow groove in front of it. The base of the rostrum has a median carina with a groove on either side and a raised margin; on the left side a short, broad tooth is visible on the orbital margin. At least five short spines on antero-lateral margin.

The ornamentation of the dorsal surface is similar to that of *R. porifera*

Woodward,⁵³ but is coarser, the transverse lines farther apart. In *R. georgiana* there are 17 lines, counting along the left side, whereas in *R. porifera* 17 lines occupy not more than two-thirds the length of the carapace.

Measurements: Length of carapace of type (incomplete), 30.6 millimeters; greatest width, 25.6 millimeters.

A larger specimen, 40 millimeters wide, from Alabama was received later. The outer angle of the front terminates in a spine (tip broken) which appears to overreach the remainder of the front. The lateral margin between second and third carinae shows a pair of spines the posterior of which is longer, stouter, and more curved.

Occurrence: Georgia; Glendon limestone, Vicksburg, lower Oligocene:

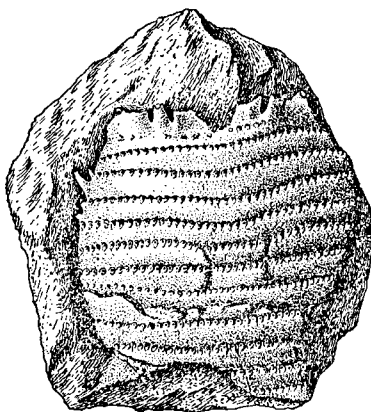


FIGURE 2.—*Ranina georgiana*

Alabama, Oligocene. United States National Museum, Catalogue Number 372809. Natural size.

Old factory about $1\frac{1}{2}$ miles above Bainbridge, Decatur County; 1920; T. W. Vaughan, collector (Coll. No. 3397).

Alabama; Glendon limestone: St. Stephens Bluff, Tombigbee River, Clarke County; C. W. Cooke, W. H. Monroe, and R. B. Stewart, Coll. No. 12168; Cat. No. 372809.

Collection: U. S. National Museum, type, Cat. No. 371714.

Family PORTUNIDAE
Genus CALLINECTES Stimpson
Callinectes alabamensis Rathbun, n.sp.

(Plate 21, figures 4-6)

Holotype a left manus, incomplete and with the inner surface lacking. Upper surface level, with a blunt longitudinal carina on either side; the

⁵³ H. Woodward: *On the oldest known British crab (Palaeinachus longipes) from the Forest Marble, Malmesbury, Wilts.* Geol. Soc. London, Quart. Jour., vol. 22 (1866) p. 592, pl. 26, fig. 18.

surface becomes narrower in the proximal half, the outer carina sinuous in dorsal view and more so in side view, the distal half dipping downward; both carinae terminate distally in a stout spine. On the outer surface there are three blunt carinae which converge from the distal to the proximal end, the middle one the strongest, terminating abruptly a short distance behind the interdigital sinus; the lowest carina gradually fades out toward the carpus. A strong articulating condyle just below the end of the upper carina. Lower surface broadly rounded, increasing in width proximally from the finger end. Surface finely and closely granulate and with scattered punctae of variable size.

Measurements: Height of palm, 13.7 millimeters; length, incomplete, 21.2 millimeters; approximate thickness, 6.6 millimeters.

Relation: Near *C. reticulatus*⁵⁴ of Panama but with a different surface, granulated instead of reticulated, lateral carinae more convergent, upper surface wider in its distal half instead of narrower.

Occurrence: Alabama; Byram marl?, Vicksburg group, Oligocene: Perdue Hill, Monroe County; loaned by E. W. Berry.

Collection: Johns Hopkins University; type.

Genus NECRONECTES A. Milne Edwards

*Necronectes vaughani*⁵⁵ Rathbun, n.sp.

(Plate 22, figures 7-11)

Carapace about two-thirds as long as wide, high in the middle, sloping down in all directions toward the border. Metagastric region highest, a little in front of the middle of the carapace. Behind this point on the branchial region there is an oblique row of three subparallel prominences, the anterior one the larger, close to the cervical suture, the second one rounder, the third narrow and elongate. The furrow behind the anterior swelling is prolonged outward for a short distance parallel to the cervical suture. At the inner angle of the branchial region there is a small round boss or tubercle bordered on the inner side by a curved linear elevation. The protogastric regions form each a large smooth elevation. Cardiac region only partially divided by a narrow and shallow median furrow. The groove separating the branchial from the metagastric and the anterior cardiac regions is deep. Hepatic region depressed and scarcely separable from the neighboring regions. A broad median furrow extends from the mesogastric region to frontal margin. Surface finely and densely granulate. Front wider and more advanced than orbit, armed with four spines, two of which are close together at middle and divergent, the others at the outer angles and forming the inner boundary of the orbit. Orbit rather deeply cut, outer tooth less advanced than inner; next it a shallow tooth

⁵⁴ M. J. Rathbun: *Decapod crustaceans from the Panama region*, U. S. Nat. Mus., Bull. 103 (1919) p. 163, pl. 66, figs. 5-7.

⁵⁵ Named for Dr. T. Wayland Vaughan, for many years in charge of Coastal Plain investigations of the U. S. Geological Survey.

marked on either side by a deep linear impression. Between this tooth and the front a broader more advanced tooth separated by a wide interval. The antero-lateral teeth increase in width from the first to the eighth; they are subtriangular and trend forward except the eighth which is directed outward, is narrower than the preceding, and is surmounted by a blunt ridge prolonged inward for a little on the carapace.

Buccal cavity with parallel sides; ischium of outer maxilliped with a deep longitudinal groove nearer the inner than the outer margin; exognath as wide as outer section of endognath. Lower surface of carapace broad, sternum correspondingly narrow, narrower than in *Portunus*, coarsely granulate, a large boss near the attachment of the cheliped; margin just anterior to the cheliped much swollen. Merus of cheliped stout; immovable finger stout, smooth outside and beneath, not carinate, but with a shallow, punctate, longitudinal depression through the middle.

Measurements: Holotype, median length of carapace, 45.3 millimeters; length to tip of submedian spine, 47.4 millimeters; width of front, 10.2 millimeters; width of orbit, that is, from tip of outer tooth of front to tip of outer tooth of orbit, 7.6 millimeters; width of carapace at base of posterior lateral tooth, 66 millimeters; Florida carapace, length from posterior margin to anterior end of mesogastric region, 54 millimeters.

Occurrence: Lower Oligocene:

Mississippi: Vicksburg, Warren County; Glendon limestone, Vicksburg; two carapaces (one is holotype); loaned by E. W. Berry. From hard ledge at Glass Bayou; October 18, 1912; C. W. Cooke, collector (6446); three specimens, incomplete, Cat. No. 371728.

Mississippi: Southeast corner of northwest quarter of northeast quarter, Section 22, Township 5 North, Range 3 East; within town limits of Brandon; on State highway 18; Pelahatchee quadrangle; Glendon limestone, Vicksburg; M. A. Pentz, collector; one specimen showing ventral surface; loaned by Johns Hopkins University.

Florida: Marianna, Jackson County; Marianna limestone in quarry; D. S. Mossom, collector; one specimen of carapace considerably larger than any other but lacking all the dentate margins; Cat. No. 371697.

Collections: U. S. National Museum; Johns Hopkins University, type.

MIOCENE

Order DECAPODA

Family CALLIANASSIDAE

Genus CALLIANASSA Leach

Callianassa floridana Rathbun, n.sp.

(Plate 24, figures 1-11)

The material consists of upwards of 40 fingers, movable and immovable, representing chiefly the major chela. The major dactylus is about three

times as long as wide, the prehensile edge finely and closely denticulate and interrupted at middle by a broad, subrectangular cut and by a narrower notch at the articulating end; between the two is formed a broad truncate tooth. On the outer surface on the lower half there is a longitudinal row of four large equidistant sockets at the level of the top of the middle notch, two sockets on either side of the notch. A little below the upper margin and above the penult socket of the lower row there is a single large socket. Upper margin bluntly carinate in proximal half; immediately below it a row of eight or more sockets ending at finger tip. Below the distal third of these sockets a narrow carina bearing a row of eight or ten minute sockets. A broad smooth ridge extends through the middle of the inner surface; a single socket at its middle. A row of three sockets above lower margin, two on the distal half, the third on the proximal half.

The major propodal or immovable finger is narrow, the prehensile edge swollen at the middle in a low broad tooth. Outer surface with a row of three sockets unevenly spaced above the lower margin; just outside the prehensile margin a row of seven sockets, the distal one not far from the tip. Prehensile edge smoothly carinate, except at the proximal end where there is a row of granules; the carina is set off by a groove on the inner surface, which is bordered by a longitudinal raised area which may, or may not, have a linear shallow depression through its distal half or two-thirds and which at its proximal end is coarsely granulate, the granulation extending variably, but usually about a third the length of the finger; on the inner side of the lower margin there is a row of approximately 12 sockets, placed closer together on the proximal half.

A few small fingers associated with those described above are thought to be dactyls of minor chelipeds. The outer surface has three large punctae in a row parallel to the lower margin, also a fourth puncta above the interval between the two proximal punctae and a little below the upper margin. Upper margin thick, bearing along its inner side about nine punctae, those at the proximal end smaller and closer than the others; alongside and lower down on the inner surface there is a short, acute carina rough with fine granules; on the lower half of the surface there is a row of three punctae, the proximal interspace the longer; above this interspace and midway to the upper margin there is a single socket.

Measurements: Length of large major dactyl, holotype, 12.5 millimeters; of large major propodal finger, 9.6 millimeters; of largest minor dactyl, 7 millimeters.

Relation: The shape of the prehensile margin of the major dactyl of the chela is similar to that of *C. latidigita*⁵⁶ from the lower Miocene of Santo Domingo, but the latter is thicker and more cylindrical; the immovable finger is much shorter and more triangular than in the Floridian species.

⁵⁶ M. J. Rathbun: *West Indian Tertiary decapod crustaceans*, Carnegie Inst. Washington, Pub. 291 (1919) p. 165, pl. 9, figs. 10 and 11.

Occurrence: Florida: Chipola formation, Alum Bluff group, lower Miocene:

Calhoun County: one mile below Bailey's Ferry on Chipola River; from banks of river above white limestone bed; Frank Burns, collector (Coll. No. 2213); one dactyl of minor chela (Cat. No. 371467).

Liberty County: Lower bed at Alum Bluff on Apalachicola River; calcareous red sand bed; 1889; Frank Burns, collector (Coll. No. 2211); type lot.

Collection: U. S. National Museum; type, Cat. No. 371469.

Callianassa matsoni Rathbun, n.sp.

(Plate 24, figures 23-28)

Four examples of a nearly smooth, subrectangular, convex palm with a narrow immovable finger. Holotype, outer surface exposed: palm slightly longer than greatest height, which diminishes little from the proximal to the distal end. Outer surface convex in a vertical direction. Base of finger not more than one-third height of palm; above it a deep U-shaped sinus; the distal lobe of the palm below the articulation with the dactylus is oblique-perpendicular, bordered by a row of large granules and with a short stout tooth near the lower end of its distal surface. Above the lower margin of the palm, a row of about 12 small sockets; a larger socket in same line on finger; a socket above and one below the digital sinus; a row of sockets below the prehensile edge of the propodal finger.

Paratypes: These show granulation on the outer surface of the palm for a short distance about the sinus; also a few granules on the inner surface of the lobe as well as along its margin. The upper surface of the palm is thick and smoothly rounded except at the proximal end, where it forms on the inner side a thin edge which is bent inward; only two punctae are visible on this surface. Two of the three paratypes have the stump of the finger in line with the lower margin of the palm instead of inclined downward a little as in the holotype; the lower margin of the palm is straight and at right angles to the proximal margin, the upper margin is slightly arched, the distal height a little less than the proximal; furthermore, the upper margin is carinated for at least half its length. From 15 to 17 sockets along the inner side of the lower margin. On the inner surface below the distal end of the upper margin, a row of three sockets slanting downward toward the dactyl. These two specimens appear to belong to the chelipeds of the female or to the minor chelipeds of the male.

Associated with these are two detached movable fingers, one of which is complete. It is stout and armed with three teeth or lobes on the prehensile edge, two close together near the proximal end and one smaller near the tip. The sockets are obscure but number four or five on the upper surface, one just below and outside near proximal end, four on the outer

surface above the lower edge, and three in a similar position on the inner surface.

A third finger from Columbia County is similar to the preceding and is accompanied by a wrist of a small cheliped which may belong to this species. It is broader than long, upper and lower edges thin and sharp, outer surface with a few minute sockets along lower margin, one near the middle of upper margin, three widely separated along proximal margin. On the inner surface two sockets are visible along upper margin.

Measurements: Holotype, right major palm, length to middle of distal lobe, 18.5 millimeters; proximal height, 14.3 millimeters; distal height, 13.7 millimeters; height of finger at base, 4.6 millimeters.

Occurrence:

Florida; U. S. Geological Survey:

Wakulla County: Sopchoppy; Chipola formation;⁵⁷ September 8, 1913; George C. Matson, collector (Coll. No. 7468); one right major palm, holotype (Cat. No. 371470).

Hamilton County: White Springs; Chipola formation. At water level at wagon bridge (Suwannee River); 1908; George C. Matson, collector (4976); one right (minor?) palm (Cat. No. 371471).

Columbia County: Spring on left bank of Suwannee River about 100 yards above Rock Island and about half a mile above White Springs; No. 3 of section; Chipola formation: November 4, 1913; T. W. Vaughan, E. H. Sellards, and C. W. Cooke, collectors (C-92-13) 6776; one right movable finger and left wrist; Cat. No. 371464.

Marion County; midway between Anthony and Martin, just east of cross roads; Tampa limestone; C. W. Cooke, collector (7353); right and left palm; Cat. No. 371893.

Florida: exact locality not given; one left major palm, one right (minor?) palm, two movable fingers; Cat. No. 371463.

Collection: U. S. National Museum; type, Cat. No. 371470.

Callianassa suffolkensis Rathbun, n.sp.

(Plate 24, figures 20-22)

Two right movable fingers, distinguished by unusually prominent carinae, of which there are two on the inner surface, two above, one outside, in addition to the acute prehensile edge. Inner carinae blunt and smooth, the lower one narrow and near the prehensile granules, the upper one twice as broad and a little above the middle; in the intervening furrow, nine small sockets; in the upper furrow of the inner surface, four large evenly spaced sockets on the proximal two-thirds. On the upper surface the innermost carina is narrow and high; on the inner side of its proximal third there is a row of small irregular punctae; the outer carina of the upper

⁵⁷ C. Wythe Cooke (*Geology of Florida*, Florida Geol. Surv., 20th Ann. Rept., 1927-28 (1929) p. 116) refers Sopchoppy and White Springs to the Hawthorn formation.

surface is acute and sinuous and rough with about 15 unequal sockets on its inner slope; its outer slope is deeper, leading to the carina of the outer surface and is rough with sockets, two or three deep. Outer carina running through the middle, and smooth, broad, and high; below it there are roughly two rows of punctae. Prehensile edge shows about 19 crowded granules in the inner surface, but viewed from outside appears sharp and crenulate except at the proximal fourth.

Measurements: Length of type finger above, 7 millimeters; greatest width of outer surface, 2.3 millimeters. A paratype incomplete measures 3.2 millimeters in its greatest width.

Occurrence: Virginia; Yorktown formation, upper part: Nansemond County: U. S. Geological Survey:

Three miles northeast of Suffolk; one right movable finger, holotype (Cat. No. 166064).

Two and a half miles northwest of Suffolk; proximal two-thirds of right movable finger, paratype (Cat. No. 166063).

Collection: U. S. National Museum; type, Cat. No. 166064.

Callianassa atlantica Rathbun

1873. *Callianassa stimpsoni*. Smith, U. S. Commr. of Fish and Fisheries, Rept. for 1871-1872, pt. 1, p. 549 [255], pl. 2, fig. 8; not *C. stimpsonii* Gabb, Palaeontology of California, vol. 1, sec. 4 (1864) p. 57, pl. 9, fig. 1, a, b, c.

1926. *Callianassa atlantica*. Rathbun, U. S. Nat. Mus., Bull. 138, p. 107; Recent.

Occurrence:

Virginia: Isle of Wight County: Three quarters of a mile north of Zuni; Yorktown formation; one immovable finger of major chela (Cat. No. 166065).

Virginia: Nansemond County: half a mile below Suffolk waterworks dam; Yorktown formation, upper part; one movable finger of major chela (Cat. No. 166067).

North Carolina: Bertie County: Colerain Landing, Chowan River; Yorktown formation; three immovable fingers of major chelae (Cat. No. 166066).

Collection: U. S. National Museum.

Type localities: Long Island Sound to Southern States; Recent.

Callianassa vaughani Rathbun

(Plate 26, figures 6, 7)

1918. *Callianassa vaughani*. Rathbun, U. S. Nat. Mus., Bull. 103, p. 148, pl. 63, figs. 10-13; Panama.

Occurrence: Mexico; River Bank, San Fernando, in east-central Tamaulipas. March 3, 1907. Upper Oligocene-Miocene. One palm, two movable fingers.

Collection: University of Texas.

Family PAGURIDAE

Genus PETROCHIRUS Stimpson

Petrochirus inequalis Rathbun

(Plate 23, figure 6)

1919. *Petrochirus inequalis*. Rathbun, Carnegie Inst. Washington, Publ. 291, p. 167, pl. 9, figs. 13-15; type-locality, Amina River, Yaqui Valley, Santo Domingo; lower Miocene.⁵⁸

⁵⁸ Oligocene (Glaessner). M. F. Glaessner: *Fossilium catalogus*, 1. Animalia, pars 41 (1929) p. 312.

Occurrence: Florida: Calhoun County: north bank of Tenmile Creek at wagon bridge on road from Forestville to Marianna, probably about 20 miles from Marianna; Chipola formation, lower Miocene; November 18, 1914; C. W. Cooke and W. C. Mansfield, collectors (7151); U. S. Geological Survey; a much worn left propodal finger (distal half); Cat. No. 371466.

Collection: U. S. National Museum; type, Cat. No. 324467.

Petrochirus bowieri Rathbun

1911. "*Petrochirus cf. granulatus Olivier sp.*" Toulou, Jahrb. der k. k. Geolog. Reichsanstalt, Wien, vol. 61, p. 511 [25], pl. 30 [1], fig. 13; Gatun; Middle Miocene.

1918. *Petrochirus bowieri*. Rathbun, U. S. Nat. Mus., Bull. 103, p. 153.

The clusters of tubercles on the fingers are crowded close together, mostly of large size, no small clusters or single tubercles interspersed; the clusters in general are broader than long in the direction of their axes, they consist of 12 to 15 tubercles in addition to a row of granules on the distal border.

Fla. Geol. Surv.
Bull. 8 (1932)
pl. 34, figs.
6, 11; p. 233.
(explan. of pl.)

Occurrence: Florida: Liberty County; probably upper Miocene (in Florida); U. S. Geological Survey: On Evans farm, Section 6, Township 2 South, Range 6 West, half a mile east of Evans and about 4 miles south of Hosford; obtained at about water level of Telogia Creek; November 6, 1925; W. C. Mansfield, collector (1/957); fingers of left cheliped of a large specimen; Cat. No. 371260.

Collection: U. S. National Museum.

Type: Geological collection, Vienna Technical University.

Genus PAGURISTES Dana

Paguristes chipolensis Rathbun, n.sp.

(Plate 24, figures 12-15)

The dactylus of a right chela and the propodus of a right ambulatory leg: Upper surface of dactylus about $2\frac{1}{2}$ times as long as its greatest width; prehensile edge with a large tubercle at proximal end, followed by a row of about 16 small granules which diminish successively in size and disappear before reaching tip of finger; outer margin marked by a row of 11 rather large separated granules; near the prehensile edge an irregular row of eight or nine granules alternating with punctae; between the outer and inner rows are smaller scattered granules which form roughly two rows. Outer surface rough with raised sockets, the upper row of about 13 alternating large and small, the next row of seven or eight; this is followed by a row of nine simple punctae. Lower surface with two rows of punctae.

Propodus of ambulatory leg armed with short stout spines above and below; inner surface covered with acute tubercles and granules; outer surface rough with reticulating elevations, and having a depressed punctate line through the center and a row of punctae above the lower margin.

Measurements: Length of dactylus of right chela, holotype, 5.2 millimeters; greatest width, 2 millimeters. Length of propodus of ambulatory 5.4 millimeters; width, 1.7 millimeters.

Occurrence: Florida: Calhoun County: one mile below Bailey's Ferry on Chipola River; from banks of river above white limestone bed; Chipola formation, Alum Bluff group, lower Miocene; Frank Burns, collector (2213).

Collection: U. S. National Museum; type, Cat. No. 371465.

Family CALAPPIDAE

Genus CALAPPA Weber

Calappa flammea (Herbst)

1794. *Cancer flammeus*. Herbst, Natur. Krabben u. Krebse, vol. 2, p. 161, pl. 40, fig. 2.
 1901. *Calappa flammea*. Rathbun, U. S. Fish Comm. for 1900, Bull., vol. 20, pt. 2, p. 84, pl. 2, and synonymy; Recent.

Occurrence: Florida:

Okaloosa County: West bank of Yellow River, half a mile east of postoffice, Oak Grove; Oak Grove sand, Alum Bluff group, middle Miocene; Frank Burns, collector (2646); a dactylus of the right, major chela of a small specimen; Cat. No. 135917.

Okaloosa County: Oak Grove bridge, base of bluff, Yellow River; Oak Grove sand; 1908; T. W. Vaughan, collector (5631); one major finger; Cat. No. 371455.

Okaloosa County: Right bank of Yellow River, 400 feet below the bridge near Oak Grove; Oak Grove sand; October 20, 1914; T. W. Vaughan, C. W. Cooke, and W. C. Mansfield, collectors (7054); two major fingers; Cat. No. 371452.

Walton County: Shell marl, Vaughans Creek [locally, Blounts Creek], 6 miles south of DeFuniak Springs; Choctawhatchee marl, upper part of middle Miocene; Florida Geological Survey; fingers of a right chela; returned to sender.

Walton County: Shell Bluff, Section 4, Township 3 North, Range 21 West; high bluff back from Shoal River; Shoal River formation, Alum Bluff group, middle Miocene; Frank Burns, collector (3742); one major finger; Cat. No. 371454.

Washington County: Near water level at Boynton Landing, on Choctawhatchee River, 35½ miles by water from mouth of river, probably about 18 miles by land from Caryville, 32 miles by water; Chipola formation, Alum Bluff group, lower Miocene; E. H. Sellards, collector (7893); two fragments of fingers; Cat. No. 371453.

Calhoun County: One mile below Bailey's Ferry, on the Chipola River; from river banks above white limestone bed; Chipola formation; Frank Burns, collector (2213); three major fingers; Cat. No. 371451.

Collections: U. S. National Museum, Florida Geological Survey.

Type: Not extant; Recent.

Family LEUCOSIIDAE

Genus PERSEPHONA Leach

Persephona punctata (Linnaeus)

1758. *Cancer punctatus*. Linnaeus, Syst. Nat., ed. 10, p. 630 (part).
 1918. *Persephona punctata*. Hay and Shore, Bur. Fisheries, Bull., vol. 35, 1915-1916, p. 423, pl. 32, fig. 9, and synonymy.

Occurrence:

Virginia:

Nansemond County: At Calhoun Bridge about 3 miles northwest of Suffolk; Yorktown formation; May 22, 1922; W. C. Mansfield, collector (1/197); one arm; Cat. No. 371472.

Tidewater Railroad, 1½ miles north of Suffolk; Yorktown formation; one arm; Cat. No. 166055.

Tidewater Railroad, 1½ miles north of Suffolk; Yorktown formation; four arms; Cat. No. 166056.

One mile northeast of Suffolk; Yorktown formation; one arm; Cat. No. 166057.

Suffolk; Yorktown formation; B. L. Miller, collector; dactylus of right cheliped; Cat. No. 166061.

North Carolina:

Pitt County: 8 to 9 miles south of Greenville; Yorktown formation (?); one arm; Cat. No. 166058.

Duplin County; Magnolia; Duplin formation; one arm; Cat. No. 166060.

South Carolina:

Charleston County: Bolton Phosphate Company; Stono River; upper Miocene, formation (?); one arm; Cat. No. 166059.

Collection: U. S. National Museum.

Type: Recent.

Family PORTUNIDAE

Genus PORTUNUS Fabricius

Portunus (Portunus) sayi (Gibbes)

1850. *Lupa sayi*. Gibbes, Amer. Assoc. Adv. Sci., Pr., 3rd meeting, p. 178 [14].
 1903. *Portunus (Portunus) sayi*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 37, text-figs. 6 and 7, pl. 14, and synonymy.

Occurrence: Florida; lower Miocene: Calhoun County; North bank of Tenmile Creek at wagon bridge on road from Forestville to Marianna, Jackson County, probably about 20 miles from Marianna; Chipola formation, Alum Bluff group; November 18, 1914; C. W. Cooke and W. C. Mansfield, collectors (7151); one right immovable finger; Cat. No. 371462.

Collection: U. S. National Museum.

Type: Not located; Recent.

Portunus, sp.

(Plate 24, figure 30)

Fingers of left claw, nearly meeting; outer layer not preserved; propodal finger over twice as long as proximal height, lower margin straight, as is also the adjacent part of the manus, grasping edge slightly sinuous, a blunt ridge above lower margin, and one less marked along the prehensile margin; dactyl not more than two-thirds as wide as fixed finger, carinated above, a blunt ridge along middle of outer surface, finger tapering gradually to tip, proximal third lacking.

Measurements: Length of prehensile edges, 24.8 millimeters; height of fixed finger at base, 10.8 millimeters.

Related, as to scarcity of ridges, to the Recent and much smaller *P. (Achelous) depressifrons* (Stimpson)⁵⁹ which is abundant on the Florida coast.

Occurrence: Florida: Gadsden County; Aspalaga Bluff, Apalachicola River, about 10 feet above river level; Tampa limestone, lower Miocene; W. C. Mansfield and G. M. Ponton, collectors (12286); Cat. No. 371892.

Collection: U. S. National Museum.

Genus *CALLINECTES* Stimpson

Callinectes sapidus Rathbun

1896. *Callinectes sapidus*. Rathbun, U. S. Nat. Mus., Pr., vol. 18, p. 352, pls. 12; 24, fig. 1; 25, fig. 1; 26, fig. 1; 27, fig. 1, and synonymy; Recent and fossil.

Occurrence:

Virginia: Accomac County: Gaugatha Beach; September, 1894; James P. Lucas, collector; specimen returned to sender.

U. S. Geological Survey:

Virginia: Nansemond County: One mile northeast of Suffolk, in drainage ditch; Yorktown formation; tip of left movable finger of small specimen; Cat. No. 166070.

Florida: Calhoun County: One mile below Bailey's Ferry, on Chipola River; from banks of river above white limestone bed; Chipola formation, Alum Bluff group, lower Miocene; Frank Burns, collector (2213); tip of finger; Cat. No. 371456.

Florida: Liberty County: Lower bed at Alum Bluff, on Apalachicola River; calcareous red sand bed; Chipola formation; Frank Burns, collector (2211); 15 fragments of fingers; Cat. No. 371457.

Collections: U. S. National Museum, James P. Lucas.

Type: Recent.

Genus *NECRONECTES* A. Milne Edwards

Necronectes drydeni Rathbun, n.sp.

(Plate 22, figures 12, 13)

A single specimen showing the carapace and the ventral surface of the body and the right arm. Carapace nearly half again as broad as long,

⁵⁹ M. J. Rathbun: *The canceroid crabs of America*, U. S. Nat. Mus., Bull. 152 (1930) p. 84, pl. 41.

slightly convex in the middle portion, lateral rim depressed especially at the hepatic region. Surface smooth, punctate. Carapace badly crushed in the gastric and frontal regions; edge of front destroyed. A furrow leads backward from either side of the mid-orbital tooth. Lateral teeth low, broader than long, except perhaps the seventh and the eighth; the latter is narrower at base than the seventh; the first tooth is small and triangular, the second to the sixth inclusive are more or less lobiform, and blunt pointed. The comparative width of the teeth is as follows: No 1 narrowest, 2 and 8, 3 and 4, 5 and 6, 7 widest. Ischium of outer maxillipeds with raised inner portion which is one-third of the width of the article and is set off by a deep groove. The abdomen is somewhat wider than in the male of *N. proavitus*⁶⁰ but probably is that of a male, as segments 4 and 5 at least are fused. The telson is longer in proportion to its width than in *proavitus*. There is a deep median groove in the sternum in front of the abdomen; there is no impressed line on the sternum between the maxillipeds, as in *proavitus* and *vaughani*. The right arm is stout, posteriorly curved, and extends laterally a little beyond the carapace.

Measurements: Length of carapace of male holotype, 57 millimeters (approximate); width of same, 84.3 millimeters; posterior length of arm, 27.6 millimeters; thickness at middle, 13.6 millimeters.

Occurrence: Maryland: Calvert County: A float about 100 feet south of Calvert Beach, probably from "zone 17"; Choptank formation; August 28, 1929, A. L. Dryden, Jr., collector.

Collection: Johns Hopkins University; type.

✓ *Scylla floridana* sp. nov. Plate 23, figures 7, 8

Genus SCYLLA DeHaan

Scylla floridana Rathbun, n.sp.

(Plate 23, figures 7, 8)

The distal half of a large right chela embracing the fingers and the articulating condyle of the palm. Distal section of palm nearly twice as high as thick; condyle bituberculate, tubercles projecting well outward, the upper proximal one smaller than the other. Fingers shaped much as in the major chela of the Recent *Scylla serrata*,⁶¹ propodal finger considerably wider than dactyl; both are widest at base and taper gradually to a point; thick and smoothly rounded along the arcuate outer margin; prehensile margins irregularly dentate, a large tooth at base of dactyl (tip broken off), margin of fixed finger straight except at tip where it curves upward, margin of dactylus a little concave; gap between closed digits narrow, at the widest half as high as base of dactylus. There is an indication of a faint impressed longitudinal line on the propodal finger, similar to that in *serrata*. Midway

⁶⁰ *Gatunia proavita* Rathbun. M. J. Rathbun: *Decapod crustaceans from the Panama region*, U. S. Nat. Mus., Bull. 103 (1919) p. 168, pls. 54-56, 58, figs. 16 and 17.

⁶¹ *Cancer serratus* Forskål. Peter Forskål: *Descriptiones animalium quae in itinere orientali observavit* (1775) p. 90.

of the height of the palm at the break there is a small elevation which may be the beginning of a ridge.

Measurements: Estimated height of palm at distal end, 32.6 millimeters; thickness, 18.2 millimeters; length of fingers on prehensile margins, 42.6 millimeters; basal height of propodal finger, 17.4 millimeters; basal height of dactylus, 14 millimeters.

Occurrence: Florida: East bank of Apalachicola River along Florida Highway 1, Chattahoochee, Gadsden County; near top of Tampa limestone here exposed; April 13, 1931, G. M. Ponton and W. C. Mansfield, collectors.

Collection: U. S. National Museum; type, Cat. No. 371717.

Family CANCRIDAE

Genus CANCER Linnaeus

Cancer borealis Stimpson

1930. *Cancer borealis*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 182, fig. 30, and synonymy.

Occurrence: Virginia: Just below Old Grove wharf, left bank of James River, about 2 miles below Camp Wallace, James City County; lowest bed; lower part of Yorktown formation. W. C. Mansfield, collector (1/470a); one right propodal finger; Cat. No. 371461.

Collection: U. S. National Museum.

Type: Not extant; Recent.

✓ *Cancer irroratus* Say

1817. *Cancer irroratus*. Say, Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 39, pl. 4, fig. 2 (part, male).

✓ Occurrence: Maryland: Plum Point, Calvert County, Chesapeake Bay; Calvert formation; Martin Burkenroad, collector; one movable finger of large specimen; Cat. No. 372808.

Collection: U. S. National Museum.

Type: Not extant; Recent.

✓ *Cancer proavitus* Packard

1900. *Cancer proavitus*. Packard, Amer. Acad. Arts and Sci., Pr., vol. 36, p. 3, pl. 1, fig. 1-3.

1900. *Cancer proavitus*. Packard, Amer. Assoc. Adv. Sci., Pr., vol. 49, p. 239.

1905. *Cancer proavitus*. Cushman, Amer. Nat., vol. 39, p. 386, pl. 2, fig. 14.

Occurrence: Massachusetts: Gay Head, Marthas Vineyard; greensand layer, upper Miocene; J. B. Woodworth, U. S. Geological Survey, collector; one right palm of large size, cotype; Cat. No. 371433.

Same locality; J. H. Clarke, collector; one male cotype showing the body (Boston Society Natural History).

Collections: U. S. National Museum, cotype, Cat. No. 371433; Boston Society of Natural History, cotype.

Family XANTHIDAE

Genus MENIPPE DeHaan

Menippe floridana Rathbun, n.sp.

(Plate 22, figures 1-6)

Holotype, a large dactylus or movable finger of a left cheliped, short in proportion to its height; height at insertion, 23 millimeters; length (chord

of upper margin), 43.3 millimeters; thickness at base, 11.5 millimeters. Finger curving gradually inward and thickness gradually diminishing to the tip which is large and blunt; inner, upper, and outer surfaces smooth to the touch, set with flattened close granules, inner surface considerably flattened, two irregular rows of punctae, but no grooves, on the inner and the outer surfaces. The prehensile teeth are worn off, but there are indications of four teeth.

Occurrence: Florida; Choctawhatchee marl: Maryland; Chaptain

Calhoun County: Abes Spring, Chipola River; W. C. Mansfeld, collector (1/959); one right movable finger; Florida Geological Survey.

Liberty County: Hosford [formerly Coes Mill]; T. W. Vaughan, collector (3671); prehensile edge of a right immovable finger; Cat. No. 371719.

Leon County: Herveys Creek; Florida Geological Survey (8656); one left movable finger, holotype, Cat. No. 371718.

Collections: U. S. National Museum, type, Cat. No. 371718; Florida Geological Survey.

Menippe nodifrons Stimpson

1859. *Menippe nodifrons*. Stimpson, Lyc. Nat. Hist. N. Y., Ann., vol. 7, p. 53 [7].

1930. *Menippe nodifrons*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 479, pl. 198, fig. 3, pl. 199, and synonymy; Recent.

Occurrence: Florida:

Walton County: Shell marl, Vaughan's Creek [locally Blount's Creek], 6 miles south of De Funiak Springs; Choctawhatchee marl, upper part of middle Miocene; Florida Geological Survey; one fragment from proximal inner end of palm at articulation with wrist; returned to sender. This insignificant piece has the characteristic thick shell of *Menippe*, and the granulation resembles that of *nodifrons* rather than of *mercenaria*.

Liberty County: Lower bed at Alum Bluff, Apalachicola River, calcareous red sand bed; Chipola formation, Alum Bluff group, lower Miocene; 1889; Frank Burns, collector (2211), U. S. Geological Survey; two right propodal fingers; Cat. No. 371460.

Collections: U. S. National Museum; Florida Geological Survey.

Type: Not extant; Recent.

Genus LOBONOTUS A. Milne Edwards

Lobonotus foerstei Rathbun, n.sp.

(Plate 23, figures 9, 10)

The type specimen shows the carapace, part of the sternum, and the short basal articles of a cheliped. The carapace lacks a margin; the regions in their shape and ornamentation indicate a *Lobonotus*. The middle gastric region (meso- and metagastric) is circumscribed except posteriorly near median line; immediately in front of its widest point there is a small round low elevation; protogastric regions elevated; branchial region highest in a ridge nearly transverse but inclined obliquely backward toward the lateral margin; a broad depression separates the gastric and the branchial regions from the hepatic elevation; no epigastric lobes visible; a transverse break across the carapace obscures the posterior regions, but the posterior part of the branchial region is elevated. Surface covered with small punctae

and larger granules which point forward and are more numerous on the elevations than in the depressions and thin out toward the anterior border of the carapace. Width of carapace a little more than 40 millimeters.

Occurrence: Massachusetts: Marthas Vineyard; greensand layer, upper Miocene: Gay Head cliffs: August-September 1889, A. F. Foerste and J. B. Woodworth, collectors (4008), one specimen, holotype, Cat. No. 371431; June, 1894, W. H. Dall, collectors (2606), one fragmentary specimen; Cat. No. 371432.

Collection: U. S. National Museum; type, Cat. No. 371431.

Genus *PANOPEUS* Milne Edwards

Panopeus herbstii Milne Edwards

1834. *Panopeus herbstii*. Milne Edwards, Hist. Nat. Crust., vol. 1, p. 403.

1930. *Panopeus herbstii*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 335, text-figs. 52, 53, pls. 156, 157, and synonymy.

? ✓ Maryland. Calvert Beach 2 mi. below Governor's Pier, Choptank River, 5 mi. E of P. 496162

Occurrence: The specimens examined are all fingers, chiefly of rather small crabs from the Miocene. U. S. Geological Survey.

Virginia:

Westmoreland County: Nomini Cliffs; probably Calvert formation; one finger; Cat. No. 166087.

Surry County: Claremont in marl pit; fossils taken from wall of pit and picked up from weathered-out material scattered about the floor of the pit; the uppermost Miocene bed around Claremont; Yorktown formation; June 22, 1922; W. C. Mansfield, collector (1/250); one finger; Cat. No. 371475.

Southampton County: Sycamore; Yorktown formation; one finger; Cat. No. 166079.

Southampton County: Maddelys Bluff; probably Yorktown formation; one finger; Cat. No. 166080.

Nansemond County: 1½ miles southeast of Reid's Ferry; Yorktown formation; two fingers; Cat. No. 166075.

Nansemond County: 1½ miles north of Suffolk; Yorktown formation; one finger; Cat. No. 166085.

Nansemond County: Suffolk; Yorktown formation; one finger, Cat. No. 166084.

Nansemond County: Half a mile below Suffolk Water Works Dam; Yorktown formation; one finger; Cat. No. 166075.

North Carolina:

Hertford County: Tar Ferry, Willocan Creek; Yorktown formation; L. W. Stephenson, collector; eight specimens, Cat. No. 166078; one specimen, Cat. No. 166086.

Hertford County: Mt. Pleasant Landing, Chowan River; Yorktown formation; one specimen, Cat. No. 166088.

Bertie County: Colerain Landing, Chowan River; Yorktown formation; six specimens, Cat. No. 166081.

Bertie County: Mt. Gould Landing, Chowan River; Yorktown formation; four specimens; Cat. No. 166083.

Bertie County: Half to three-quarters of a mile above Edenhous Point, Chowan River; Yorktown formation; eight specimens; Cat. No. 166082.

Edgecombe County: Half a mile above Bell's Bridge, Tar River; probably Yorktown formation; one specimen; Cat. No. 166067.

Craven County: Neuse River, right bank about 3 miles above Cherry Point; Yorktown formation; W. C. Mansfield, collector (1/893); one specimen; Cat. No. 371474.

Robeson County: 1½ miles northeast of Fairmont; Duplin formation; one specimen; Cat. No. 166072.

Collection: U. S. National Museum.

Type: Paris Museum; Recent.

Genus *EURYTIUM* Stimpson

Eurytium limosum (Say)

1818. *Cancer limosa*. Say, Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 446.

1930. *Eurytium limosum*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 423, pl. 176, figs. 1, 2, and synonymy.

Occurrence: Miocene; U. S. Geological Survey:

North Carolina: Columbus County: Lake Waccamaw; Duplin formation; three fingers; Cat. No. 166071.

Florida: Calhoun County: One mile below Bailey's Ferry, on Chipola River; from banks of river above white limestone bed; Chipola formation, Alum Bluff group, lower Miocene; Frank Burns, collector (2213); seven fingers of small specimens; Cat. No. 371458.

Florida: Liberty County: Lower bed at Alum Bluff, Apalachicola River; calcareous red sand bed; Chipola formation; 1889; Frank Burns, collector (2211); 30 fingers; Cat. No. 371459.

Collection: U. S. National Museum.

Type: Not extant; Recent.

Family GONEPLACIDAE
Genus ARCHAEOPLAX Stimpson
✓ *Archaeoplax signifera* Stimpson

(Plate 23, figures 1-5)

1863. *Archaeoplax signifera*. Stimpson, Boston Jour. Nat. Hist., vol. 7, p. 584 [2], pl. 12.
1900. *Archaeoplax signifera*. Packard, Amer. Acad. Arts and Sci., Pr., vol. 36, p. 7, pl. 1, fig. 4, pl. 2.
1905. *Archaeoplax signifera*. Cushman, Amer. Nat., vol. 39, p. 383, pl. 1, pl. 2, figs. 1-13.

Occurrence: Massachusetts: Marthas Vineyard, Dukes County; greensand layer, upper Miocene:

✓ Gay Head cliffs: August-September, 1889, A. F. Foerste and J. B. Woodworth, collectors (4006, 4007, 4012, 4014), two carapaces incomplete and more than 50 fragments, Cat. Nos. 371424-371427, 371434; June, 1894, W. H. Dall, collector (2606), 15+ fragments, Cat. No. 371428.

✓ Weyquosque Cliffs (eastern marl bed); September 1889; Foerste and Woodworth, collectors (4008); four specimens and fragments; Cat. No. 371430.

✓ Nashaquitsa Cliffs, Chilmark Cliff Section; September 1889; J. B. Woodworth, collector (4013); two specimens; Cat. No. 371429.

Collections: U. S. National Museum; Boston Society of Natural History, types.

Family MAJIDAE
Genus EUPROGNATHA Stimpson
Euprognatha, sp.

(Plate 24, figures 16-19)

Two left dactyls of chelae. Two longitudinal rows of punctae on outer and inner surfaces, one row on upper surface. Prehensile teeth shallow, irregular.

Occurrence: Florida: Hosford [formerly Coes Mill], Liberty County; upper Miocene; T. W. Vaughan, collector (3671); Cat. No. 371715.

Collection: U. S. National Museum.

Genus LIBINIA Leach
Libinia emarginata Leach

1815. *Libinia emarginata*. Leach, Zool. Misc., vol. 2, p. 130, pl. 108.
1925. *Libinia emarginata*. Rathbun, U. S. Nat. Mus., Bull. 129, p. 311, text-figs. 103 and 104, pls. 110-113, and synonymy.

Occurrence: North Carolina: 1½ miles above Murfreesboro, Hertford County; U. S. Geological Survey; one right movable finger; Cat. No. 166069.

Collection: U. S. National Museum.

Type: British Museum; Recent.

Libinia dubia Milne Edwards

1834. *Libinia dubia*. Milne Edwards, Hist. Nat. Crust., vol. 1, p. 300, pl. 14 bis, fig. 2.
 1925. *Libinia dubia*. Rathbun, U. S. Nat. Mus., Bull. 129, p. 313, text-figs. 105 and 106, pls. 114, 115, 122, fig. 1, and synonymy.

Occurrence: Virginia: Nansemond County: Suffolk; Yorktown formation; B. L. Miller, U. S. Geological Survey, collector; one right movable finger; Cat. No. 166068.
 Collection: U. S. National Museum.
 Type: Paris Museum: Recent.

Order STOMATOPODA

Family CHLORIDELLIDAE
 Genus GONODACTYLUS Latreille
Gonodactylus oerstedii Hansen

1895. *Gonodactylus oerstedii*. Hansen, Isopoden, Cumaceen u. Stomatopoden der Plankton-Exped., p. 65; Recent.

The bispinose tip of the process from the peduncle of the right uropod or appendage of sixth abdominal segment of a large specimen.

Occurrence: North Carolina: Nash County: 3½ miles northwest of Rockymount; St. Mary's formation; U. S. Geological Survey; Cat. No. 166062.
 Collection: U. S. National Museum.
 Type: Recent.

PLIOCENE

Order DECAPODA

Family PAGURIDAE
 Genus PETROCHIRUS Stimpson
 ✓ *Petrochirus bowieri* Rathbun

For synonymy, see under "Miocene," page 105.

Occurrence: Florida; Caloosahatchee marl.

Glades County: About 6 miles northwest of Clewiston; dredged at a depth of 30 to 40 feet; J. C. Simpson, collector.

Collection: Florida Geological Survey.

Miocene Specimen
 Fig'd Fla. Geol. Surv.
 Bull. 8 (1932), p. 34 f. 6, 11.
 q.v.

Family XANTHIDAE
 Genus MENIPPE DeHaan

✓ *Menippe nodifrons* Stimpson

For synonymy, see under "Miocene," page 110.

Occurrence: Same as the preceding.

Collection: Florida Geological Survey.

→

✓ *Menippe* sp. N.C.

Genus PANOPEUS Milne Edwards
 ✓ *Panopeus herbstii* Milne Edwards

For synonymy, see under "Miocene," p. 111.

Occurrence: North Carolina; Waccamaw formation:

- ✓ Bladen County: Walker's Bluff, Cape Fear River; one specimen; Cat. No. 166089.
- ✓ Columbus County: Neill's Eddy Landing, Cape Fear River; one specimen; Cat. No. 166074.
Collection: U. S. National Museum.

Genus EURYTIUM Stimpson
✓ *Eurytium limosum* (Say)

For synonymy, see under "Miocene," page 111.

Occurrence: North Carolina; Waccamaw formation:

- ✓ Bladen County: Walker's Bluff, Cape Fear River; four fingers; Cat. No. 166090.
- ✓ Columbus County: Neill's Eddy Landing, Cape Fear River; one immovable finger; Cat. No. 166091.
Collection: U. S. National Museum.

Family PARTHENOPIDAE

Genus PARTHENOPE Weber

✓ *Parthenope (Platylambrus) charlottensis* Rathbun, n.sp.

(Plate 24, figures 31-34)

Holotype, the propodus of a left cheliped. The upper surface is four times as long as its greatest width excluding marginal spines, and bears dorsally a number of short conical spines arranged mostly in two rows, one row near the outer edge, the other just inside the middle line. On the outer margin are ten large flat spines, with a short narrow one between the seventh and the eighth (counting from the wrist); the spines are in the same plane as the upper surface; the two distal spines lack their tips, the remaining eight are nearly of a size, their axes nearly at right angles to the propodal margin, and their proximal margins a little more convex than their distal margins. On the inner margin of the palm are 21 short, triangular, blunt spines inclined obliquely upward and distad; these spines are thick and coarsely granulated below, which gives them a lumpy appearance; with a few exceptions they increase in size toward the distal end. The lower surface is nearly smooth and is a trifle narrower than the upper; its inner border consists of about 36 tubercles including those on the finger. The narrow inner surface has a few coarse scattered granules. The propodal finger is inclined strongly downward, the prehensile margin broad and triangular, having a short blunt tooth not far from the tip.

Measurements: Greatest length of upper surface of palm, 33.8 millimeters; greatest width, spines excluded, 8.2 millimeters; greatest width, spines included, 14 millimeters; length of propodus measured on lower margin to end of finger, 35 millimeters.

Relation: Closely allied to the Recent *P. (Platy.) serrata*⁶² which inhabits

⁶² M. J. Rathbun: *The spider crabs of America*, U. S. Nat. Mus., Bull. 129 (1925) p. 516, pls. 180, 181, 275, figs. 7-10.

the coast from Cape Hatteras to Brazil. In that species the spines of the outer margin alternate large and small, and the spines of both outer and inner margins trend strongly distad.

Occurrence: Florida: Charlotte County: Alligator Creek, Willcox; Caloosahatchee marl; U. S. Geological Survey.

Collection: U. S. National Museum; type, Cat. No. 371716.

PLEISTOCENE

Order DECAPODA

Family HOMARIDAE

Genus HOMARUS Weber

Homarus americanus Milne Edwards

1837. *Homarus americanus*. Milne Edwards, Hist. Nat. Crust., vol. 2, p. 334.

1893. *Homarus americanus*. R. Rathbun, Fisheries and Fishery Industries of U. S., sec. 1, p. 781, pl. 271.

Occurrence:

Long Island Sound, dredged three quarters of a mile off shore from Westbrook, Connecticut, by Bert Stevens, July 1, 1927; a pair of claws encrusted with *Balanus* and Recent Bryozoans.

Chaleurs Bay, New Brunswick; Leda clay (R. Chalmers, 1886).

Collections: American Museum of Natural History; Geological Commission of Canada, Ottawa.

Type: Paris Museum; Recent.

Family CALLIANASSIDAE

Genus CALLIANASSA Leach

Callianassa atlantica Rathbun

For synonymy, see under "Miocene," page 104.

Occurrence: Maryland: St. Mary's County: Wailes Bluff; Talbot formation; Frank Burns, collector (2032); one movable, one immovable finger; Cat. No. 371724.

Same locality and formation; lower bed; W. C. Mansfield, collector (8932); one movable finger; Cat. No. 371725.

Collection: U. S. National Museum.

Type: Recent.

Family CALAPPIDAE

Genus CALAPPA Weber

Calappa flammea (Herbst)

1860. *Calappa marmorata*. F. S. Holmes, Post-Pleiocene Fossils of South Carolina, p. 8, pl. 2, fig. 6.

For further synonymy, see under "Miocene," page 106.

Occurrence: South Carolina: Colleton County: Sandy beds, Wadmalaw Sound (F. S. Holmes).

Collection: Museum, College of Charleston, S. C.

Type: Not extant; Recent.

Family LEUCOSIIDAE
Genus PERSEPHONA Leach
Persephona punctata (Linnaeus)

1860. *Guia punctata*. F. S. Holmes, Post-Pleiocene Fossils of South Carolina, p. 8, pl. 2, fig. 8.

For further synonymy, see under "Miocene," page 106.

Occurrence: North Carolina: Carteret County: Open Land Project, about 10 miles northwest from Beaufort and about 6 miles from North River; Pamlico formation; May 6, 1925; W. C. Mansfield, collector (1/892); two arms; Cat. No. 371473.

South Carolina: Colleton County: Sandy beds, Wadmalaw Sound (F. S. Holmes).

Collection: U. S. National Museum; Museum, College of Charleston, S. C.

Type: Recent.

Family PORTUNIDAE
Genus CALLINECTES Stimpson
Callinectes sapidus Rathbun

1860. *Lupa dicantha*. F. S. Holmes, Post-Pleiocene Fossils of South Carolina, p. 9.

1891. *Callinectes hastatus*. R. P. W[hitfield], Science, vol. 18, no. 460, p. 300.

1906. *Callinectes sapidus*. W. B. Clark, Md. Geol. Survey, pleistocene, p. 172, pl. 41, figs. 1 and 2 (not 3).

For further synonymy, see under "Miocene," page 107.

Occurrence:

Massachusetts: Sankaty Head, Nantucket; J. Howard Wilson, collector.

New Jersey: Hudson River tunnel (R. P. Whitfield).

New Jersey: Cape May formation: H. G. Richards, collector: Ocean County: Seaside Heights, one chela, Cat. No. 371929; Beach Arlington, one finger, Cat. No. 371931. Cape May County: Stone Harbor, one finger, Cat. No. 371930; Two Mile Beach, 20 fingers, Cat. Nos. 371258, 371933-371936.

Maryland: St. Mary's County; Wailes Bluff; Talbot formation; Frank Burns, collector (2032); two fingers; Cat. No. 146701.

Maryland: Wailes Bluff; lower bed; Talbot formation; W. C. Mansfield, collector (8932); fragments of four fingers; Cat. No. 371727.

Maryland: Wailes Bluff; left bank of Potomac River, half to three quarters of a mile above the residence of the late Col. Wailes; taken from the lower bed, or the bed below the oyster bed; Talbot formation; June 26, 1925; L. W. Stephenson, W. C. Mansfield, and W. P. Popenoe, collectors (1/902); two fingers; Cat. No. 371726.

Maryland: Near mouth of Choptank River, Cook Point, Dorchester County; Talbot formation (W. B. Clark).

Maryland: Ocean City, Worcester County; H. G. Richards, collector; three chelae; Cat. No. 371932.

Virginia: Northampton County: Broadwater; Ray Phillips, collector; one large specimen; Cat. No. 371729.

North Carolina: Carteret County: Core Creek Canal, north of Beaufort; one finger; Cat. No. 371263.

South Carolina: Colleton County: Sandy beds, Wadmalaw Sound (F. S. Holmes).

Collection: U. S. National Museum, Maryland Geological Survey, Johns Hopkins University; Museum, College of Charleston, S. C.; American Museum of Natural History.

Type: Recent.

Family CANCRIDAE
Genus CANCER Linnaeus
Cancer irroratus Say

1817. *Cancer irroratus*. Say, Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 59, pl. 4, fig. 2 (part, male).

1861. *Cancer irroratus*. Hitchcock, Maine Board Agric., Sixth Ann. Rept., p. 277; marine clays near Portland.

Occurrence:

Maine: Westbrook, Cumberland County: from landslide on the Stroudwater River; Leda clay; 11 specimens, fragmentary; Charles B. Fuller, collector. The landslide was about three miles from the present coast.

This single manus in this collection is of small size and differs from typical specimens in this particular, that the upper row of granules on the outer surface is in line with the globular condyle articulating with the carpus, instead of being above the condyle.

New Jersey: Two-mile Beach; Cape May formation; H. G. Richards, collector; 27 fingers; Cat. No. 371259, 371937-371941.

Maryland: St. Mary's County: Wailes Bluff; left bank of Potomac River, half to three quarters of a mile above the residence of the late Col. Wailes. Taken from the lower bed, or the bed below the oyster bed; Talbot formation; June 26, 1925; L. W. Stephenson, W. C. Mansfield, and W. P. Popenoe, collectors (1/902); two left chelipeds, one showing the four large segments, the other the chela and carpus; Cat. No. 371710.

Maryland: Wailes Bluff; Talbot formation; Frank Burns, collector (2032); two chelae, one with carpus attached; Cat. No. 371711.

Florida: Miami Beach; H. G. Richards, collector; two fingers, returned to sender.

Collections: U. S. National Museum; Portland Society of Natural History (Charles B. Fuller collection).

Type: Not extant; Recent.

Family XANTHIDAE

Genus PANOPEUS Milne Edwards

Panopeus herbstii Milne Edwards

For synonymy, see under "Miocene," page 111.

Occurrence:

Massachusetts: Sankaty Head, Nantucket; J. Howard Wilson, collector; returned to sender.

New Jersey: Two-mile Beach; Cape May formation; H. G. Richards, collector; five fingers; Cat. Nos. 371942-371945.

Maryland: St. Mary's County: Wailes Bluff; lower bed; Talbot formation; W. C. Mansfield, collector (8932); three fingers; Cat. No. 371722.

Same locality and collector; upper bed; (8933); one finger; Cat. No. 371720.

South Carolina: Bolton Phosphate Company, Stone River; immovable finger; Cat. No. 166073.

Collection: U. S. National Museum.

Genus MENIPPE DeHaan

Menippe mercenaria (Say)

1818. *Cancer mercenaria*. Say, Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 448.

1860. *Pseudocarcinus mercenaria*. F. S. Holmes, Post-Pleiocene Fossils of South Carolina, p. 8, pl. 2, fig. 7.

1930. *Menippe mercenaria*. Rathbun, U. S. Nat. Mus., Bull. 152, p. 472, text-fig. 78, pl. 191-193.

Occurrence: South Carolina: Colleton County: Sandy beds, Wadmalaw Sound (F. S. Holmes).

Collection: Museum, College of Charleston, S. C.

Type: Not extant; Recent.

Family OCYPODIDAE

Genus OCYPODE Fabricius

Ocyhode albicans Bosc

1801-1802. *Ocyпода albicans*. Bosc, Hist. Nat. Crust., vol. 1, an X, p. 196 (not pl. 4, fig. 1).

1918. *Ocyhode albicans*. Rathbun, U. S. Nat. Mus., Bull. 97, p. 367, pls. 127 and 128, and synonymy.

Dorsal surface of carapace and surface of chelipeds and legs covered with a hard coating of sand. The ornamentation of the pterygostomial region, the ischium of the outer maxilliped, the sternum and abdomen and the base of the rostrum coincides with that of the Recent well-known "ghost crab."

Occurrence: Florida (probably); J. J. White collection; one large ♀; Cat. No. 371733.
Collection: U. S. National Museum.

Genus *UCA* Leach
Uca pugnax (Smith)

1870. *Gelasimus pugnax*. Smith, Conn. Acad. Arts and Sci., Tr., vol. 2, p. 131, pl. 2, fig. 1, pl. 4, figs. 2-2d.

1918. *Uca pugnax*. Rathbun, U. S. Nat. Mus., Bull. 97, p. 395, pl. 139, and synonymy.

Occurrence:

New Jersey: Anglesea, Cape May County; Cape May formation; H. G. Richards, collector; three chelae; Cat. No. 371946.

Delaware: Rehoboth Beach, Sussex County; H. G. Richards, collector; four leg fragments; Cat. No. 371947.

Collection: U. S. National Museum.

Type: Peabody Museum, Yale University; Recent.

Uca subcylindrica (Stimpson)

1859. *Gelasimus subcylindricus*. Stimpson, Lyc. Nat. Hist. New York, Ann., vol. 7, p. 63.

1918. *Uca subcylindrica*. Rathbun, U. S. Nat. Mus., Bull. 97, p. 419, pl. 155, pl. 160, fig. 5, and synonymy.

Occurrence: Texas: Brooks County: 7.3 miles north of Encino post office, in roadside caliche pit; A. C. Trowbridge, collector (9095); 16 major palms with more or less of the fixed finger attached, and 6 major movable fingers; Cat. No. 371712.

Collection: U. S. National Museum.

Cotypes: Museum of Comparative Zoology; Recent.

Family MAJIDAE

Genus HYAS Leach

Hyas araneus (Linnaeus)

1758. *Cancer araneus*. Linnaeus, Syst. Nat., ed. 10, vol. 1, p. 628.

1925. *Hyas araneus*. Rathbun, U. S. Nat. Mus., Bull. 129, p. 253, text-figs. 91 and 92, pls. 92 and 93, and synonymy.

Occurrence: Maine: Westbrook, Cumberland County: Landslide on the Stroudwater River; one specimen showing the propodus and dactylus of an ambulatory leg. Landslide at Cumberland Mills, 1868; one specimen of chela and wrist. Leda clay, Pleistocene.

Collection: Portland Society of Natural History (Charles B. Fuller collection).

Type: Not extant; Recent.

Libinia emarginata Leach

1815. *Libinia emarginata*. Leach, Zool. Misc., vol. 2, p. 130, pl. 108.

1925. *Libinia emarginata*. Rathbun, U. S. Nat. Mus., Bull. 129, p. 311, text-figs. 103 and 104, pl. 110-113.

Occurrence: New Jersey: Cape May County: Cape May formation; Two Mile Beach, one finger, Cat. No. 371948; Cape May, one finger tip, Cat. No. 371949.

Collection: U. S. National Museum.

Type: British Museum; Recent.

✓ *Libinia dubia* Milne Edwards

1834. *Libinia dubia*. Milne Edwards, Hist. Nat. Crust., vol. 1, p. 300, pl. 14 bis, fig. 2.

1925. *Libinia dubia*. Rathbun, U. S. Nat. Mus., Bull. 129, p. 313, text-fig. 105, pl. 114, 115, 122, fig. 1.

✓ Occurrence: New Jersey: Two Mile Beach, Cape May County; Cape May formation; eight fingers; Cat.

Nos. 371950-371952. *Libinia dubia* (Milne Edwards); Talbot formation; Cape May County, New Jersey.

Collection: U. S. National Museum.

Type: Paris Museum; Recent.

Order STOMATOPODA

Family CHLORIDELLIDAE

Genus CHLORIDELLA Miers

✓ *Chloridella empusa* (Say)

1818. *Squilla empusa*. Say, Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 250.

1844. *Squilla empusa*. DeKay, Nat. Hist. New York, pt. 6, Crust., p. 32, pl. 13, fig. 54.

1905. *Chloridella empusa*. Rathbun, Boston Soc. Nat. Hist., Occas. Pap., vol. 7, p. 29.

Occurrence: Maryland: St. Mary's County:

Wailes Bluff; left bank of Potomac River, half to three-quarters of a mile above the residence of the late Col. Wailes; lower bed, or the bed below the oyster bed; Talbot formation; June 26, 1925; L. W. Stephenson, W. C. Mansfield, and W. P. Popenoe, collectors (1/902); one telson; Cat. No. 371732.

Wailes Bluff; lower bed; Talbot formation; W. C. Mansfield, collector (8932); one terminal article of second thoracic appendage; Cat. No. 371731.

Collection: U. S. National Museum.

Type: Philadelphia Academy of Natural Sciences; Recent.

BIBLIOGRAPHY

Adkins, Walter Scott

1918. The Weno and Pawpaw formations of the Texas Comanchean. Univ. Texas, Bull. 1856, p. 62.

1928. Handbook of Cretaceous fossils. Univ. Texas, Bull. 2838, p. 83.

Ammon, Ludwig von

1882. Ein Beitrag zur Kenntniss der vorweltlichen Asseln. Sitzungsber. math. phys. Cl. k. b. Akad. Wiss. München, vol. 12, p. 519, pls. 1-4.

Bell, Thomas

1850. In F. Dixon, Geology and Fossils of the Tertiary and Cretaceous formations of Sussex, pl. 38, fig. 2.

1863. A monograph of the fossil malacostracous Crustacea of Great Britain. Part II. Crustacea of the Gault and Greensand, p. 21, pl. 4, fig. 9-11.

Bittner, Alexander

1875. Die Brachyuren des Vicentinischen Tertiärgebirges. Denkschr. Akad. d. Wissensch., Wien, vol. 34, p. 75 [15], pl. 1, figs. 9 and 10.

Bosc, Louis Augustin Guillaume

1801-1802. Histoire Naturelle des Crustacés, contenant leur description et leurs mœurs, vol. 1, an X, p. 196.

Carter, James

1898. A contribution to the palaeontology of the decapod Crustacea of England. Geol. Soc. London, Quart. Jour., vol. 54, pl. 1, fig. 1.

Clark, William Bullock

1906. Systematic paleontology, Pleistocene. Md. Geol. Surv., Pleistocene, p. 172-174, pl. 41, figs. 1, 2.

Cooke, Charles Wythe and Stuart Mossom

1929. The Geology of Florida. Florida Geol. Surv., 20th Ann. Rept., 1927-1928, p. 116.

Credner, Hermann

1870. Die Kreide von New Jersey. Deutsch. geol. Ges., Zeitschr., vol. 22, p. 241.

Cushman, Joseph Augustine

1905. Fossil crabs of the Gay Head Miocene. Am. Nat., vol. 39, p. 381-390.

Davis, William Thompson and Leng, Charles William

1927. Cretaceous fossils from Staten Island. Staten Island Inst. Arts and Sci., Pr., vol. 4, p. 47, pls. 2, 3 (upper).

Dekay, James Ellsworth

1844. Nat. Hist. N. Y., pt. 6, Crustacea, p. 32, pl. 13, fig. 54.

Desmarest, Anselme-Gaëtan

1822. In Brongniart and Desmarest, Histoire naturelle des Crustacés fossiles. Les Crustacés proprement dits, p. 130, pl. 7, figs. 3, 4. Paris.

Edwards, Alphonse Milne

1862-1865. Monographie des Crustacés de la famille des Cancériens. Ann. Sci. Nat., Zool., sér. 4, vol. 18 (1862) p. 71, pl. 10, fig. 2-2d; sér. 4, vol. 20 (1862) pl. 9, fig.

1-1d; sér. 5, vol. 1 (1864) p. 44; sér. 5, vol. 3 (1865) pl. 9, fig. 1c; p. 332, pl. 10, fig. 1, 1a.

1879. *Isopode gigantesque des grandes profondeurs de la mer.* Compt. Rend., vol. 88, p. 21.

1879. *Note sur quelques Crustacés fossiles appartenant au groupe des Macrothalmiens.* Bull. Soc. Philom., ser. 7, vol. 3, p. 117.

Edwards, Henri Milne

1834-1837. *Histoire Naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux*, vol. 1, p. 300, 402, pl. 14, bis., fig. 2; vol. 2, p. 334.

Fabricius, Johann Christian

1798. *Supplementum Entomologiae Systematicae*, p. 371.

Forskål, Peter

1775. *Descriptiones Animalium quae in itinere orientali observavit P. Forskål*, p. 90.

Fritsch, Antonin Jan and Kafka, Josef

1887. *Die Crustaceen d. böhm. Kreideformation*, p. 40.

Gabb, William More

1864. *Description of the Cretaceous fossils.* Calif. Geol. Surv., Pal., vol. 1, sect. 4, p. 57, pl. 9, fig. 1a, b, c.

Gibbes, Lewis R.

1850. *On the Carcinological collections of the cabinets of Natural History in the United States.* Am. Assoc. Adv. Sci., Pr., vol. 3, p. 178 [14].

Glaessner, Martin F.

1929. *Fossilium Catalogus*, vol. 1, pt. 41, p. 395.

Hansen, Hans Jacob

1895. *Isopoden, Cumaceen und Stomatopoden der Plankton-Exped. Ergebnisse der Plankton-Expedition der Humboldt-Stiftung*, Bd. II, p. 65.

Harris, Gilbert Dennison

1894. *The Tertiary geology of southern Arkansas.* Ark. Geol. Surv., Ann. Rept. 1892, vol. 2, p. 36, pl. 1, fig. 2a, b.

Hay, William Perry and Shore, Clarence Albert

1918. *The Decapod Crustaceans of Beaufort, N. C. and the surrounding region.* Bur. Fisheries, Bull., vol. 35, 1915-1916, p. 423, pl. 32, fig. 9, and synonymy.

Henderson, John Robertson

1888. *Report on the Anomura collected by H. M. S. Challenger during the years 1873-76.* Challenger report, Zool., vol. 27, p. 34.

Herbst, Johann Friedrich Wilhelm

1794. *Versuch einer Naturgeschichte der Krabben und Krebse nebst einer systematischen beschreibung ihrer verschiedenen arten*, vol. 2, p. 161, pl. 40, fig. 2.

Hill, Robert Thomas

1901. *Geography and geology of the Black and Grand prairies, Texas.* U. S. Geol. Surv., Ann. Rept. 21, pt. 7, p. 302.

Hitchcock, Charles Henry

1861. *General report upon the geology of Maine.* Maine Bd. Agric., 6th Ann. Rept., p. 277.

Holmes, Francis S.

1860. *Post-Pleiocene Fossils of South Carolina*, p. 8, pl. 2, figs. 6, 7, 8, p. 9.

Johnson, Charles Willison

1905. Annotated list of the types of invertebrate Cretaceous fossils in the collection of the Academy of Natural Sciences, Philadelphia. Philadelphia Acad. Nat. Sci., Pr., vol. 57, p. 28.

Kafka, Josef. See Fritsch.

Leach, William Elford

1815. Zoological Miscellany, vol. 2, p. 130, pl. 108.

Leng, Charles William. See Davis.

Linnaeus, Carolus

1758. Systema Naturae, ed. 10, vol. 1, p. 628, 630 (part).

Lörenthey, Emerich

1898. Beiträge zur Decapodenfauna des ungarischen Tertiärs. Természettudományi Füzetek, vol. 21, p. 142, pl. 11, figs. 2a-2e, 3a, 3b.

Mantell, Gideon Algernon

1822. The fossils of the South Downs, or Illustrations of the Geology of Sussex. London.

Maury, Carlotta Joaquina

1930. O Cretaceo da Parahyba do Norte. Serviço Geológico Mineralógico do Brasil, Monog. 8, p. 111, pl. 4, figs. 1 and 2.

McCoy, Frederick

1849. On the classification of some British fossil Crustacea with notices of new forms in the University Collection at Cambridge. Ann. Mag. Nat. Hist., ser. 2, vol. 4, p. 175, text figures.

1854. On some new Cretaceous Crustacea. Ann. Mag. Nat. Hist., ser. 2, vol. 14, p. 118, pl. 4, fig. 3.

Morton, Samuel George

1830. Synopsis of the organic remains of the ferruginous sand formation of the United States, with geological remarks. Am. Jour. Sci., vol. 17, p. 287.

Mossom, Stuart. See Cooke.

Ortmann, Arnold Edward

1897. On a new species of the palinurid genus *Linuparus* found in the Upper Cretaceous of Dakota. Am. Jour. Sci., ser. 4, vol. 4, p. 290-296.

Packard, Alpheus Spring, Jr.

1900. A new fossil crab from the Miocene greensand bed of Gay Head, Marthas Vineyard, with remarks on the phylogeny of the genus *Cancer*. Am. Acad. Arts, Sci., Pr., vol. 36, p. 1-9.

1900. A partial phylogeny of the genus *Cancer*. Am. Assoc. Adv. Sci., Pr., vol. 49, p. 239.

Pelseneer, Paul

1886. Notice sur les Crustacés décapodes du Maestrichtien du Limbourg. Mus. Roy. Hist. Nat. Belgique, Bull., vol. 4, p. 170 [10], fig. 6.

Pilsbry, Henry Augustus

1900. Crustacea of the Cretaceous formation of New Jersey. Philadelphia Acad. Nat. Sci., Pr., vol. 53, p. 111-118.

1916. Arthropoda in Upper Cretaceous, Md. Geol. Surv., p. 361-370.

1916. Systematic Paleontology of the Upper Cretaceous deposits of Maryland. (Arthropoda). Md. Geol. Survey, Upper Cretaceous, p. 361, pl. 10, figs. 1-4, 8, 9.

Rathbun, Mary Jane

1896. The genus *Callinectes*. U. S. Nat. Mus., Pr., vol. 18, p. 352, pls. 12, 24, fig. 1, 25, fig. 1, 26, fig. 1, 27, fig. 1.

1901. The *Brachyura* and *Macrura* of Porto Rico. U. S. Fish Commission for 1900, Bull., vol. 20, pt. 2, p. 84, pl. 2, and synonymy.

1905. Fauna of New England, List of the Crustacea. Boston Soc. Nat. Hist., Occ. Pap., vol. 7, p. 29.

1917. New species of South Dakota Cretaceous crabs. U. S. Nat. Mus., Pr., vol. 52, p. 385-391.

1918. The Grapsoid Crabs of America. U. S. Nat. Mus., Bull. 97, p. 367, pls. 127, 128, p. 395, pl. 139, p. 419, pls. 155, 160, fig. 5.

1919. Decapod crustaceans from the Panama region. U. S. Nat. Mus., Bull. 103 (1918) not issued until Jan., 1919, p. 123-184.

1919. West Indian Tertiary decapod crustaceans. Carnegie Inst. Washington, Pub. 291, p. 157-184, 9 plates.

1923. Decapod crustaceans from the Upper Cretaceous of North Carolina. N. C. Geol. Surv., vol. 5, p. 407, pl. 102, figs. 1-3 (p. 403-408).

1925. The Spider Crabs of America. U. S. Nat. Mus., Bull. 129, p. 253, text figs. 91, 92, pls. 92, 93, p. 311, text figs. 103, 104, pl. 110-113, p. 313, text figs. 105, 106, pls. 114, 115, 122, fig. 1, p. 449, pl. 160, 161, p. 516, pl. 180, 181, 275, figs. 7-10.

1925. *In* Hull, J. P. D.: Guide notes on the Midway in southwestern Arkansas. Am. Assoc. Petr. Geol., Bull., vol. 9, no. 1, p. 168 (p. 167-170).

1926. The fauna of the Ripley formation on Coon Creek, Tennessee. U. S. Geol. Surv., Prof. Pap. 137, p. 185, pl. 63, figs. 1-6, 8-11, p. 187, pl. 66 (p. 184-191).

1926. The fossil stalk-eyed crustacea of the Pacific slope of North America. U. S. Nat. Mus., Bull. 138.

1928. Two new crabs from the Eocene of Texas. U. S. Nat. Mus., Pr., vol. 73, art. 6, 6 pages, 3 plates.

1929. A new crab from the Eocene of Florida. U. S. Nat. Mus., Pr., vol. 75, art. 15, 4 pages, 3 plates.

1930. The Cancroid Crabs of America of the Families Euryalidae, Portunidae, Atelecyclidae, Cancridae, and Xanthidae. U. S. Nat. Mus., Bull. 152, p. 37, text figs. 6, 7, pl. 14, p. 84, pl. 41, p. 182, fig. 30, p. 335, text-figs. 52, 53, pl. 156, 157, and synonymy, p. 348, pl. 161, p. 423, pl. 176, figs. 1, 2, and synonymy, p. 472, text fig. 78, pl. 191-193, p. 478, pl. 193, fig. 1, p. 479, pl. 198, fig. 3, 199.

1931. A new fossil palinurid from Staten Island. Staten Island Inst. Arts and Sci., Pr., vol. 5, p. 161-162.

Rathbun, Richard

1893. Fisheries and Fishery Industries of United States, sect. 1, p. 781, pl. 271.

Reed, Frederick Richard Cowper

1911. New Crustacea from the lower Greensand of the Isle of Wight. Geol. Mag., n.s., Dec. 5, vol. 8, 116, pl. 7, fig. 2.

Reeside, John Bernard

1927. The Cephalopods of the Eagle sandstone and related formations in the western interior of the United States. U. S. Geol. Surv., Prof. Pap. 151.

Reuss, August Emanuel

1859. Zur Kenntniss fossiler Krabben. Denksch. k. Akad. Wiss. math. natur. Cl., vol. 17, p. 4, pl. 2, figs. 1-3.

Roemer, Friedrich Adolph

1887. *Graptocarcinus texanus*, ein Brachyure aus der oberen Kreide von Texas. Neues Jahrb. Min., Geol., Pal., vol. 1, p. 173.

Say, Thomas

1817-1818. An account of the crustacea of the United States. Philadelphia Acad. Nat. Sci., Jour., vol. 1, p. 59, pl. 4, fig. 2, p. 57-458.

Schlüter, Clemens

1862. Die Macruren Decapoden der Senon- und Cenomanbildungen Westphalens. Zeitschr. d. deutschen Geol. Ges., vol. 14, pl. 11, fig. 5.

Schuchert, Charles

1905. Catalogue of the type specimens of fossil invertebrates in the Department of Geology. U. S. Nat. Mus., Bull. 53, p. 484.

Smith, Sidney Irving

1870. Notes on American Crustacea. No. 1. Oeypodoidea. Conn. Acad. Arts and Sci., Tr., vol. 2, p. 131, pl. 2, fig. 1, pl. 4, figs. 2-2b.

1873. Report upon the Invertebrate Animals of Vineyard Sound and adjacent waters, with an account of the physical features of the region. U. S. Commr. Fish and Fisheries, Rept. for 1871-1872, pt. 1, p. 549 [255], pl. 2, fig. 8.

Stenzel, Henryk Bronislaw

1934. Decapod Crustaceans from the Middle Eocene of Texas. Jour. Pal., vol. 8, no. 1, p. 41, pl. 6, figs. 2a, b, 3, p. 49, pl. 7, figs. 1a-c, p. 51, pl. 7, figs. a, b, p. 53, pl. 7, figs. 3a-f, p. 55, pl. 7, figs. 4a, b.

Stimpson, William

1859. Notes on North American Crustacea, No. 1. N. Y. Lyc. Nat. Hist., Ann., vol. 7, p. 53 (7), p. 63.

1860. Notes on North American Crustacea, in the Museum of the Smithsonian Institution. No. II. N. Y. Lyc. Nat. Hist., Ann., vol. 7, p. 225 [97], pl. 3, fig. 5.

1863. On the fossil crab of Gay Head (Marthas Vineyard, Mass.). Boston Jour. Nat. Hist., vol. 7, p. 583-589.

Stoliczka, Ferdinand

1871. Observations on fossil crabs from Tertiary deposits in Sind and Kutch. Geol. Survey India, Mem., Palaeontol. Indica, ser. 7, No. 14, 1871, vol. 1, part 1, pl. 3, figs. 2c, 2d.

Toula, Franz

1911. Die jungtertiäre Fauna von Gatun am Panamakanal. Jahrb. der k. k. Geolog. Reichsanstalt, Wien, vol. 61, p. 511 (25), pl. 30 (1), fig. 13.

Weber, Fridericus

1795. Nomenclator entomologicus, p. 92.

Weller, Stuart

1905. The fauna of the Cliffwood, New Jersey, clays. N. J. Geol. Surv., Ann. Rept. for 1904, p. 136, 139, 141, pl. 15, figs. 4-6; Jour. Geol., vol. 13, p. 328, figs. 4-6.

1907. A report on the Cretaceous paleontology of New Jersey, based upon the stratigraphic studies of George N. Knapp. N. J. Geol. Surv., Pal. ser., vol. 4, p. 846, pl. 110, figs. 12-15, p. 848, pl. 110, figs. 16, 17 (p. 843-853), Atlas, pl. 111, figs. 16-19.

White, Charles Abiathar

1881. Descriptions of new invertebrate fossils from the Mesozoic and Cenozoic rocks of Arkansas, Wyoming, Colorado, and Utah. U. S. Nat. Mus., Pr., vol. 3, 1880 (1881) p. 161; vol. 4 (1881) p. 137, pl. 1, figs. 10 and 11.

1882. On certain Cretaceous fossils from Arkansas and Colorado. U. S. Nat. Mus., Pr., vol. 4, p. 131, pl. 1, figs. 10, 11.

Whiteaves, Joseph Frederick

1885. Report on the invertebrata of the Laramie and Cretaceous rocks of the vicinity of the Bow and Belly rivers and adjacent localities in the Northwest Territory. Can. Geol. Surv., Contr. Can. Pal., vol. 1, pt. 1, p. 87, pl. 11.

1885. Note on a decapod crustacean from the Upper Cretaceous of Highwood River, Alberta, Northwest Territory. *Royal Soc. Can., Tr.*, vol. 2, sect. 4, p. 237-238.

1895. On some fossils from the Nanaimo group of the Vancouver Cretaceous. *Royal Soc. Can., Pr., Tr.*, ser. 2, vol. 1, p. 132, 133.

1903. On some additional fossils from the Vancouver Cretaceous, with a revised list of the species therefrom. *Can. Geol. Surv., Mesozoic fossils*, vol. 1, pt. 5, p. 323, 325.

Whitfield, Robert Parr

1880. *In* C. A. White: Contributions to paleontology. U. S. Geol. Surv. Terr. for 1878, 12th Ann. Rept., p. 37, pl. 16, figs. 1a-c, pl. 17, fig. 1a.

1891. The common edible crab found fossil in the Hudson River tunnel. *Science*, vol. 18, no. 460, p. 300.

Whitney, Francis Luther

1913. Fauna of the Buda Limestone. *Texas Acad. Sci., Tr.*, 1910-1912, vol. 12, p. 27, pl. 13, figs. 1, 2, 3.

Winton, Will McClain

1925. The geology of Denton County. *Texas Univ., Bull.* 2544, p. 71, pl. 15, fig. 2.

Withers, Thomas Henry

1922. On a new brachyurous Crustacean from the Upper Cretaceous of Jamaica. *Ann. Mag. Nat. Hist.*, ser. 9, vol. 10, pls. 16 and 17.

Woods, Henry

1922. *In* Bosworth, Geology of northwestern Peru, p. 115, pl. 17, figs. 7-10.

1925-1926. A monograph of the fossil macrurous Crustacea of England. *Palaeont. Soc. London, Mem.*, vol. 77 (1923) p. 26, 39; vol. 78 (1924) pl. 10, fig. 6.

Woodward, Henry

1866. On the oldest known British Crab (*Palæinachus longipes*) from the Forest Marble, Malmesbury, Wilts. *Geol. Soc. London, Quart. Jour.*, vol. 22, p. 592, pl. 26, fig. 18.

1870. Contributions to British fossil Crustacea. *Geol. Mag.*, vol. 7, p. 496, pl. 22, figs. 3-6.

1900. Further note on podophthalmous crustaceans from the Upper Cretaceous formation of British Columbia. *Geol. Mag.*, n. s., dec. 4, vol. 7, p. 392-401, 433-435.

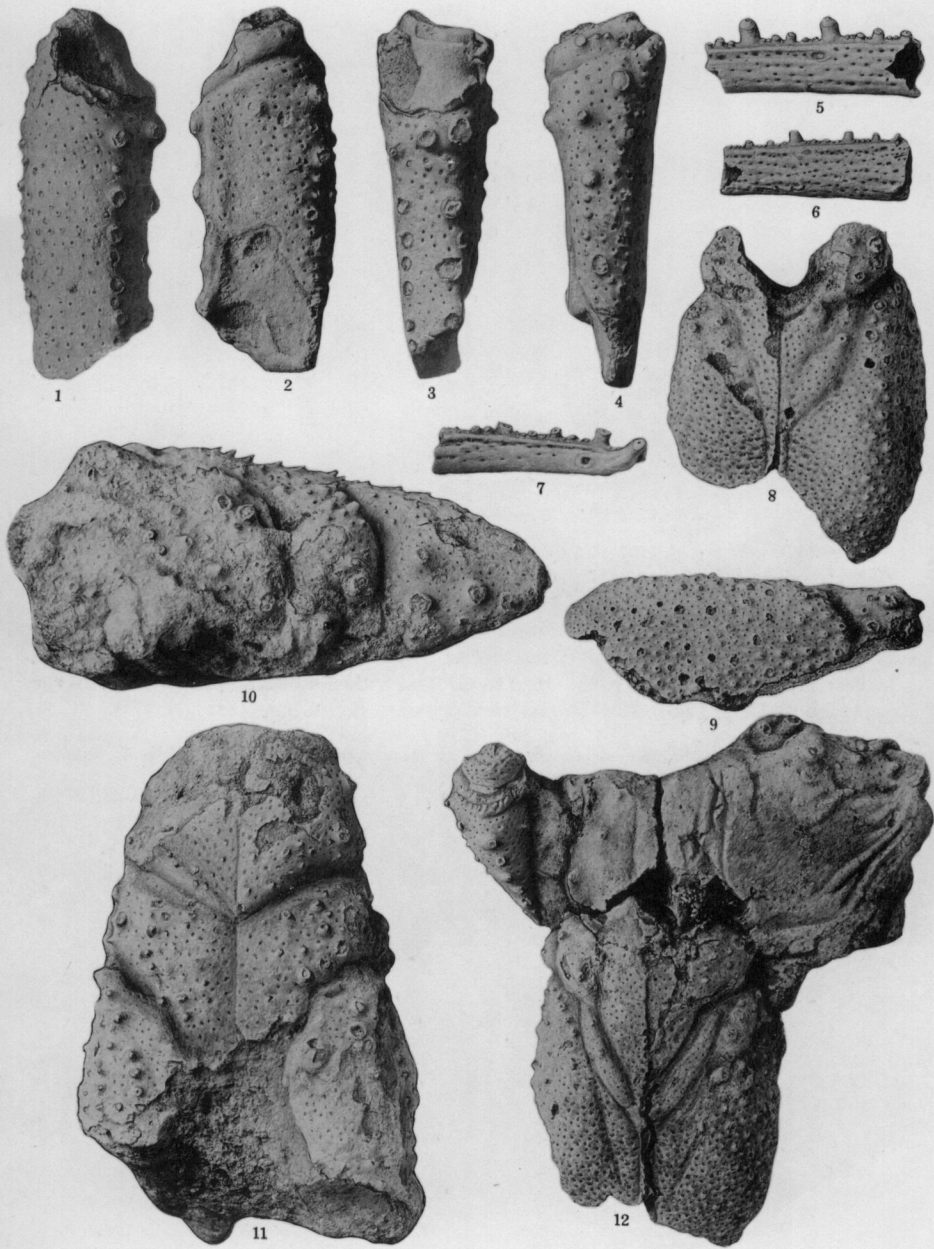
EXPLANATION OF PLATES

PLATE 1—CRUSTACEA FROM THE CRETACEOUS

FIGURES 1-12.—*Enoploclytia tumimanus* Rathbun, n.sp. From Selma chalk in vicinity of Prairie Creek, Allenton and Pine Barren section, Wilcox County, Alabama; L. C. Johnson; Sec. 32 and 34, T. 12 S., R. 10 E.; Cat. No. *73799. [See page 18.]

1-4.—Upper, lower, inner, and outer views of left arm (264), $\times 1.44$. 5-7.—Fragments of fingers, showing teeth (264), $\times 1.44$. 8, 9.—Dorsal view and right profile of largest carapace (284), $\times 1.08$. 10, 11.—Dorsal view and right profile of holotype carapace (284), $\times 1.08$. 12.—Dorsal view of smallest carapace (284), $\times 1.08$.

* Unless otherwise stated, the catalogue numbers are those of the United States National Museum. Numbers in parenthesis indicate those used by senders.



CRUSTACEA FROM THE CRETACEOUS