FOSSIL DECAPOD CRUSTACEANS FROM MEXICO

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The collection here described was, with one exception, given to the United States National Museum by the Aguila Oil Co. of Tampico. It represents two different faunas, one from eastern Mexico obtained by Dr. T. W. Vaughan (unless otherwise noted) and the other from Lower California collected by Dr. W. S. W. Kew. The former has affinities with the faunas of the southern United States, the West Indies, and Panama; the latter has, so far as species go, a fauna of its own.

Species from eastern Mexico

Harpactocarcinus americanus Rathbun	Eocene.
Xanthosia americana, new species	Oligocene.
Scylla costata Rathbun	Miocene or Oligocene.
Podophthalmus (?), species	Cretaceous.
Calappa zurcheri Bouvier	Oligocene.
Calappa flammea (Herbst)	Oligocene.
Raninoides mexicanus, new species	Miocene.
Callianassa pellucida Rathbun	Miocene.
Callianassa pustulata Withers	Eocene.

Species from Lower California

Lobonotus mexicanus, new species	Eocene.
Montezumella tubulata, new genus and species	Eocene.
Calappilia hondoensis, new species	Eocene.
Ranina (?), species	Eocene.
Callianassa tepetatensis, new species	Eocene.

Family XANTHIDAE

HARPACTOCARCINUS AMERICANUS Rathbun

Harpactocarcinus americanus Rathbun, Proc. U. S. Nat. Mus., vol. 73, 1928, art. 6, p. 3, pls. 2 and 3; Texas, Eocene.

Occurrence.—Zardo Creek, about 100 meters downstream from No. 108; Eocene; 1920; Coll. No. M 115 V; a fragmentary carapace with arm.

LOBONOTUS MEXICANUS, new species

Plate 1

Description of holotype.—The length of the carapace equals the width at the tip of the third or hepatic tooth. The surface is divided into a certain number of elevations all of which, as well as the marginal teeth, are surmounted by coarse granules. A median furrow runs from the mesogastric region to the frontal emargination. An oblique ridge occupies the hepatic region, and a larger one parallel to it fills the epibranchial region; a small crescentic furrow defines the inner branchial lobe, and a larger swelling occupies the remainder of the branchial region; a long narrow lobule is above and parallel to the margin of the intestinal region. Antero-lateral margin thick, fourth tooth much the largest, second tooth below the level of first and third. Front deflexed at the middle, outer corner turned down and separated by a groove from the obtuse inner angle of the orbit; two superior orbital furrows and one inferior and lateral.

Outer margin of ischium-merus of the endognath of the external maxilliped concave, ischial furrow deep and wide. Merus of cheliped with a large spine (broken off) on the upper margin distant from the extremity; upper-outer surface of carpus large, longer than wide, surface rough with tubercles or broken-off spines, a groove parallel to distal margin. Palm with straight lower margin, outer surface very convex from top to bottom and with longitudinal rows of spines or tubercles; fixed finger elongate (broken), inclined a little downward toward the tip. Outer ends of first segment of male abdomen oblique, of second segment slightly convex, of third segment angled; sides concave from third to seventh segment, the latter subtriangular, broader than long and broadest beyond the articulation.

Measurements.—Total length of carapace 33.8, width of same 39.7, fronto-orbital width 22.2, width of front 11.2 mm.

Occurrence.—Lower California: Ranchito on south side of Arroyo Colorado between ranches Matanzo and Colorado; upper Eocene; November 11, 1920; Coll. No. 9692. The holotype shows upper and lower surfaces of the body, a portion of the left cheliped and fragments of the legs. Cat. No. 371096, U. S. N. M.

Relation.—Carapace narrower than in *L. sculptus* A. Milne Edwards,[1] from the upper Oligocene [2] of Haiti, antero-lateral teeth shallow, thick and blunt, instead of spiniform, the epigastric lobes narrow instead of wide, the immovable finger only slightly deflexed.

[1] Ann. Sci. Nat., Zool., ser. 4, vol. 20, 1863, pl. 10, figs. 1–1*b*; ser. 5, vol. 1, 1864, p. 40.

[2] According to Glaessner in Pompeckj's Fossilium Catalogus, 1, Animalia, part 41, 1929, p. 451. A. Milne Edwards gives middle Tertiary, while the specimens in the Museum of the Philadelphia Academy of Natural Science were labeled "probably lower Miocene" by their collector.

While the lobules of the carapace correspond generally to those of *sculptus*, there are above the posterior margin 2 lobules separated on the median line, but in *sculptus* one continuous elevation. The form of the abdomen and the ornamentation of the cheliped are similar in the 2 species although the cheliped of *mexicanus* may be less rough.

XANTHOSIA [3] AMERICANA, new species

Plate 6, Figure 1

Description.—A very small carapace embedded in a hard matrix. Approximate length 3.4, width 6 mm. The fronto-orbital margin is nearly as long as the middle width of the carapace excluding spine; the greater part appears to be occupied by the orbits; there is a stout lateral spine, broken off; postero-lateral longer than antero-lateral margin. Surface well areolated; summit of areoles minutely granulated. Cardiac region nearly occupied by two round areoles; mesogastric region narrowly constricted, almost subdivided at middle, the anterior areole linear-oval, the posterior areole narrow triangular, not wholly separated from the roundish elevations at the posterior angles of the region; protogastric lobes swollen but undivided; three areoles crowded together at the inner angle of the branchial region, the outermost one the largest; in front of these an acute ridge runs across the branchial region in an obliquely transverse direction from the protogastric region to the lateral margin where it forms the axis of the large lateral spine. Between the spine and the tooth at the outer angle of the orbit there are two teeth on the antero-lateral margin. The true postero-lateral margin is visible and shows four sinuses separated by shallow teeth, indicating the position of the ambulatory legs. The details of front and orbit are not clear, but the orbit is seemingly defined by the thickened outer angle of the front; two closed orbital fissues. A low swelling is present behind each frontal lobe.

Occurrence.—Cortez pump station, Tepetate, 200 meters N. E. of S. W. slope of hill; altitude about 50 meters; Oligocene; November 17, 1920; Coll. No. M 23 V; holotype, Cat. No. 371098, U. S. N. M.

Relation.—This species has the same general form as *X. gibbosa* Bell,[4] the type species of the genus. It has the strong spine or protuberance at the lateral angle seen in *X. granulosa* (McCoy).[5]

[3] *Xanthosia* is referred provisionally to Fam. Dynomenidae by Glaessner, Fossilium Catalogus, 1, part 41, 1929, pp. 401 and 428.

[4] Mono. Fossil Malac. Great Britain, part 2, London, 1862 (1863), p. 3, pl. 1, figs. 4–6.

[5] Idem, p. 4, pl. 1, fig. 13.

Family ATELECYCLIDAE

MONTEZUMELLA, new genus

Atelecyclidae nov. gen. GLAESSNER, Fossilium Catalogus, 1, part 41, 1929, p. 446.

In shape and ornamentation of carapace resembling *Erimacrus*, but differing in the orbit which is broadly tubular viewed from above, concealing the eye. Postero-lateral margins of carapace unarmed. *Cancer fraasi* Lörenthey [6] belongs apparently in this genus and may be known as *Montezumella fraasi*.

MONTEZUMELLA TUBULATA, new species

Plate 2

Description.—Carapace suborbicular, a little longer than wide, widest at the middle; fronto-orbital distance great, more so than the posterior margin. Regions plainly indicated by broad furrows, gastric region divided into subregions, a curved furrow on the anterior branchial region. On the anterior half of the hepatic region there is a small, low, conical elevation. The mesogastric region is continued to the frontal margin, where it is depressed below the neighboring surface; parallel to the mesogastric furrows there is on each side a shallow groove leading from the outer margin of the submedian frontal tooth. The dorsal surface is covered with irregular tubercles or large granules. The fronto-orbital and antero-lateral margins are dentate, the teeth that remain being denticulate, each denticle tipped with a short, stout, movable spine. The median sinus of the front is deep U-form; on either side is a transversely oblong, ascending tooth each with 3 denticles at the extremity and an indication of one on the inner margin. Next to the submedian tooth and separated by a sinus narrower than the median one, there is an inner orbital tooth, rectangular in cross-section,[7] low and broad, and armed with 4 divergent spines. A broad rounded sinus separates this tooth from the outer orbital tooth or lamina; this is very broad, its free margin forming part of the antero-lateral slope; on the dorsal surface there is a closed fissure at the outer third; the free edge is spined. A cross-section of the orbit is shown on the left side; it is broad oblong with the corners rounded; the eye is short and stout. The 4 antero-lateral teeth of the carapace are known only from cross-sections (pl. 2, fig. 1); the third is the widest, the first and second of subequal width, the fourth narrow and thicker than the others. Lower surface of carapace granulate, the granules running smaller and closer than on the dorsum. Pterygostomian region and ster-

[6] Math.-naturw. Ber. aus Ungarn, vol. 25, 1907 (1909), p. 141, pl. 2, figs. 3*a* and 3*b*.
[7] Shown in plate 2, figure 2, on the left side.

num finely punctate and with low, flat granules. Lower border of orbit, buccal cavity and abdomen not known. The merus of the cheliped is massive, a cross-section near the large end is irregularly oblong (pl. 2, fig. 1, left). A cross-section of a palm (pl. 2, fig. 1) indicates 5 rows of spines on outer surface. A portion of a finger remains; the outer margin is armed with stout spines pointing distad; of 3 prehensile teeth preserved 2 are large, separated by a small one; a strong ridge (either dentate or spinate) lies nearest to the prehensile edge. The merus of the legs is elongate, slightly compressed, sides subparallel, a longitudinal groove through the middle of the anterior (under) side (pl. 2, fig. 3).

Measurements.—Male holotype, median length of carapace 43, extreme length of carapace 46.3, width of carapace 45.6, fronto-orbital width 15 mm.

Occurrence.—Lower California: Ranchito on south side of Arroyo Colorado between ranches Matanzo and Colorado; upper Eocene; November 11, 1920; Cat. No. 371095, U.S.N.M.

Family PORTUNIDAE

SCYLLA COSTATA Rathbun

Plate 3

Scylla costata RATHBUN, Publ. 291, Carnegie Inst. Washington, 1919, p. 170, pls. 4 and 5, pl. 6, figs. 3–5; Dominican Republic, probably Lower Miocene.—WITHERS, Ann. Mag. Nat. Hist., ser. 9, vol. 14, 1924, p. 229, pl. 6, figs. 1 and 2; Anguilla, Upper Oligocene.

Two right chelae of small specimens, palms respectively about 30.8 and 22.3 long, measured from the interdigital sinus along middle of palm. The larger chela has a palm similar in shape to that of the holotype, while the smaller one (pl. 3) is squarer, approaching that figured by Withers.

Occurrence.—Mexico; origin obscure. Original numbers 201 and M 159 C.

PODOPHTHALMUS (?), species

Plate 4, Figure 2

Description.—One specimen shows a portion of a carapace and the general outline of the left half; also the basal portion of the left eyestalk. Estimated length of carapace 22, estimated width 51 mm. Orbital margin very oblique, edge blunt; surface of orbit showing in front of it, in dorsal view. Lateral margin of carapace very sinuous, surface steeply inclined above the postlateral sinus, much as in *P. vigil* (Fabricius), a Recent and Pleistocene form. Carapace very incomplete and much broken.

Occurrence.—Villagran, Tamaulipas, on Rio Santa Lucia; in shale: upper Cretaceous series; November 8, 1920; Coll. No. M 10 V.

Relation.—Compare *P. domingensis* Rathbun, Haiti, lower Miocene.[8]

Family CALAPPIDAE

CALAPPA ZURCHERI Bouvier

Plate 4, Figure 3; Plate 5, Figure 3

Calappa zurcheri Bouvier, Bull. Mus. Hist. Nat., Paris, vol. 5, 1899, p. 189, text-fig.; Panama, Miocene.

Description.—Carapace narrow and high; at the summit is one of the largest tubercles; behind it are 3 median tubercles, the first and third of which are of medium size, the second very small; in front of the large median tubercle and on either side is a large gastric tubercle; from each of these an irregular row of 6 unequal tubercles extends to the postero-lateral angle of the carapace. Between this and the median row there is a curved row of 6 directed from the inner branchial angle toward the tooth on the postero-lateral margin; the second tubercle is larger than the others. On the antero-lateral slope are 8 tubercles in 3 vertical rows, and nearly all of good size. There are several other small scattered tubercles. The front part of the carapace is obscure, although the position of the orbits can be made out (pl. 5, fig. 3). The posterior margin has a small lobe either side of the middle; outside it begins the slightly projecting wing, of which the first two or most posterior teeth are lobiform, the next two subtriangular, dentiform, and projecting laterally, the most anterior of all the most acute and marking the widest point of the carapace.

C. zurcheri is said to be widest at the third clypeal tooth, counting from behind. This seems to be true of the left side of the figure given by its author, the fourth tooth being broken off. A glance at the right side shows the fourth tooth extending laterally beyond the third. This is the case with the Mexican specimen, which there is little doubt is conspecific with the Panamian.

Measurements.—Approximate length of carapace 31, width 42.4 mm.

Occurrence.—Transcontinental R. R. east of Los Naranjos; third horizon below *Lepidocyclina gigas;* Oligocene; November 18, 1920; Coll. No. M 33 V.

CALAPPA FLAMMEA (Herbst)

Cancer flammeus Herbst, Natur. Krabben u. Krebse, vol. 2, 1794, p. 161, pl. 40, fig. 2; vol. 3, pt. 3, 1803, p. 19.

Calappa flammea Bosc, Hist. Nat. Crust., vol. 1, 1802, p. 185.

[8] Publ. No. 291, Carnegie Inst. of Washington, 1919, p. 175, pl. 2, figs. 7 and 8.

Calappa marmorata LATREILLE, Hist. Nat. Crust., vol. 5, 1803, p. 392. Not *Cancer marmoratus* Fabricius, Mant. Insect., vol. 1, 1787, p. 319; nor Herbst, Natur. Krabben u. Krebse, vol. 1, 1790, p. 261, pl. 20, fig. 114, which is a *Pachygrapsus*.

Occurrence.—Cortez pump station, Tepetate, 200 meters N.E. of S.W. slope of hill; altitude about 50 meters; Oligocene; Nov. 17, 1920; Coll. No. M 23 V; a piece of the major finger of a small specimen.

Genus CALAPPILIA A. Milne Edwards

Calappilia A. MILNE EDWARDS, in Bouillé, Paléontologie de Biarritz et de quelques autres localites des Basses-Pyrénées, Compte-rendu des travaux du Congrès Scientifique de France, session 39, Pau, 1873, p. 434 [8]. Genotype, *C. verrucosa* A. Milne Edwards.

Carapace not extended over the ambulatory legs and without large lateral spines. Front very narrow, having 2 small, slightly divergent points, much like those of *Calappa*.

CALAPPILIA HONDOENSIS, new species

Plate 5, Figures 1 and 2

Description.—Carapace exposed, margin incomplete; broader than long, very convex, especially in the antero-posterior direction. Lateral margin strongly arched, and unarmed back to a small postero-lateral tooth which does not project as far as the line of the lateral margin or the hind margin; the latter is obscure. The longitudinal furrows separating the median area from the lateral are broad and deep. Surface covered with tubercles unequal and well separated; about 45 on the branchial region, 11 of which follow the margin; on the cardiac region an elongate median tubercle surrounded by 8 smaller ones regularly placed, and behind this pattern a single large one; 2 small urogastric tubercles side by side; 2 largest of all are median on the gastric region, in front of them an arc of 4, and in addition several smaller ones. The anterior border of the carapace is absent; on the right side, however, one gets a hint of the position of the orbit. A narrow strip visible below the side margin of the carapace is finely granulate.

Measurements.—Greatest width of carapace 18.7, width at postero-lateral tooth 14.8, approximate height 6.2 mm.

Occurrence.—Lower California: In Arroyo Hondo, 1 km. above junction with Arroyo Conejo; upper sandstone of Tepetate formation, Upper Eocene; December 2, 1920; Coll. No. 9695; Cat. No. 371094, U. S. N. M.

Relation.—This species in the quality of its ornamentation has a strong resemblance to the type species of the genus, *C. verrucosa*[9]

[9] A. Milne Edwards, C. R. trav. Congrès Sci. France, session 39, Pau, 1873, pl. 4, fig. 3.

from the lower Oligocene (?) of Biarritz, but the arrangement of the tubercles is different—the cardiac region has 2 median tubercles in one cluster instead of a single centred tubercle, and the inner part of the branchial region is isolated and its pattern consists of a cluster in which one tubercle is surrounded by 6 or 7; in our species the branchial region is not subdivided, nor a group of tubercles isolated. Both species have a small tooth at postero-lateral angle. A comparison of figures[10] shows a striking difference in the proportions of the carapace, *verrucosa* longer than broad, *hondoensis* broader than long. However, the author's illustration of *verrucosa*[10] does not correspond with the statement of measurement, width 9 mm., length 8; a proportionate length for our incomplete type-specimen would be 16.6, which is reasonable and in conformity with the position of the orbital angle.

Family RANINIDAE

RANINA (?), species

Plate 6, Figure 2

Description.—A fragment of an appendage resembles somewhat the left wrist or carpus of a Raninid. It shows the greater part of the outer surface and part of the upper surface; the narrow end (at the left in the figure) represents the distal articulation with the manus; the adjacent concave margin borders the manus; the article is very thick, but the inner surface is lacking. The outer surface is rough with granules of varying size, toward the lower edge becoming very fine and then disappearing. On the upper surface which curves over inward, granules are few and scattered; 7 in all and 2 tubercles. The greatest length of the fragment is 19.8 mm.

Occurrence.—Lower California: In Arroyo Hondo, 1 km. above junction with Arroyo Conejo; upper sandstone of Tepetate formation, upper Eocene; December 2, 1920; Coll. No. 9695.

Although it is impossible to place this specimen definitely, its shape and ornamentation will permit future identification.

RANINOIDES MEXICANUS, new species

Plate 4, Figure 1

Description.—The exact position of this species is problematic. The general form of the carapace behind the spine on the anterior portion of the side margin is urn-shaped; spine directed forward and slightly outward; a broad rounded sinus within or anterior to

[10]A. Milne Edwards, C. R. trav. Congrès Sci. France, session 39, Pau, 1873, pl. 4, fig. 3.

the spine and an appreciable narrowing of the carapace at this point. Surface covered with very fine granules placed rather near together.

Measurements.—Width of carapace just in front of the spine 10 mm., width just behind the spine 11 mm.

Occurrence.—Tuxpan, State of Vera Cruz; highest beds, Hill C; Miocene; S. Smith collector; one specimen showing portion of carapace including the base of the posterior of the lateral spines on each side; holotype, Cat. No. 371092, U. S. N. M.

Family CALLIANASSIDAE

CALLIANASSA PELLUCIDA Rathbun

Callianassa pellucida RATHBUN, Publ. 291, Carnegie Inst. of Washington, 1919, p. 165; Anguilla, West Indies; Oligocene.

Occurrence.—Zacamixtle, Tuxpan, State of Vera Cruz; November 19, 1920; Miocene: Bed at top of Azteca Incline; Coll. No. M 35 V; one right movable finger and fragments of a left movable finger, free from matrix; also several fragments embedded. Beds 25 to 35 feet above top of Azteca Incline; Coll. No. M 37 V; portion of finger embedded in matrix.

CALLIANNASSA PUSTULATA Withers

Callianassa pustulata WITHERS, Geol. Mag., vol. 63, 1926, p. 106, pl. 9, figs. 5–9; Barbados, Upper Eocene.

Occurrence.—Trail, Las Piedras to Palma Sola, by Ajoloco, 1610 m. north and 1360 m. east of Las Piedras; Eocene; December 7, 1920; M 123 V; 2 right palms and 1 left palm free from matrix, margins incomplete, height of largest one 9 mm.; also 3 palms partially embedded.

CALLIANASSA TEPETATENSIS, new species

Plate 6, Figures 3 and 4

Description.—A fragment of the palm of a right chela of large size. Outer surface very convex, inner surface relatively flat, but with a depression near the middle of the upper portion and another on the distal half of the lower surface. The margin articulating with the carpus appears to reach nearer the lower margin than the upper; it forms an obtuse angle with the upper margin. On the outer surface a little behind the fixed finger there is a cluster of large granules of which only 7 remain. From the position of the interdigital sinus, it appears that the dactyl must have been narrower at base than the fixed finger. The lower proximal half of the inner surface of the palm is covered with large flat granules near but not close together. The incomplete upper margin is rough with

13 granules (or small hair-sockets), and just below on the inner surface a row of 5 large distant sockets.

Measurements.—Approximate height 22, length from the interdigital sinus to the proximal margin measured in a line subparallel to the upper margin 22.3 mm.

Occurrence.—Lower California: In Arroyo Hondo, 1 km. above junction with Arroyo Conejo; upper sandstone of Tepetate formation, upper Eocene; December 2, 1920; Coll. No. 9695; Cat. No. 371093, U. S. N. M.

EXPLANATION OF PLATES

PLATE 1

Lobonotus mexicanus, holotype, × 1½

FIG. 1. Front view.
2. Dorsal view.
3. Ventral view.

PLATE 2

Montezumella tubulata, holotype, × 1½

FIG. 1. Right profile, showing position of antero-lateral teeth.
2. Dorsal view.
3. Ventral view.

PLATE 3

Scylla costata, right chela, × 2

FIG. 1. Lower view.
2. Inner view.
3. Outer view.
4. Top view.

PLATE 4

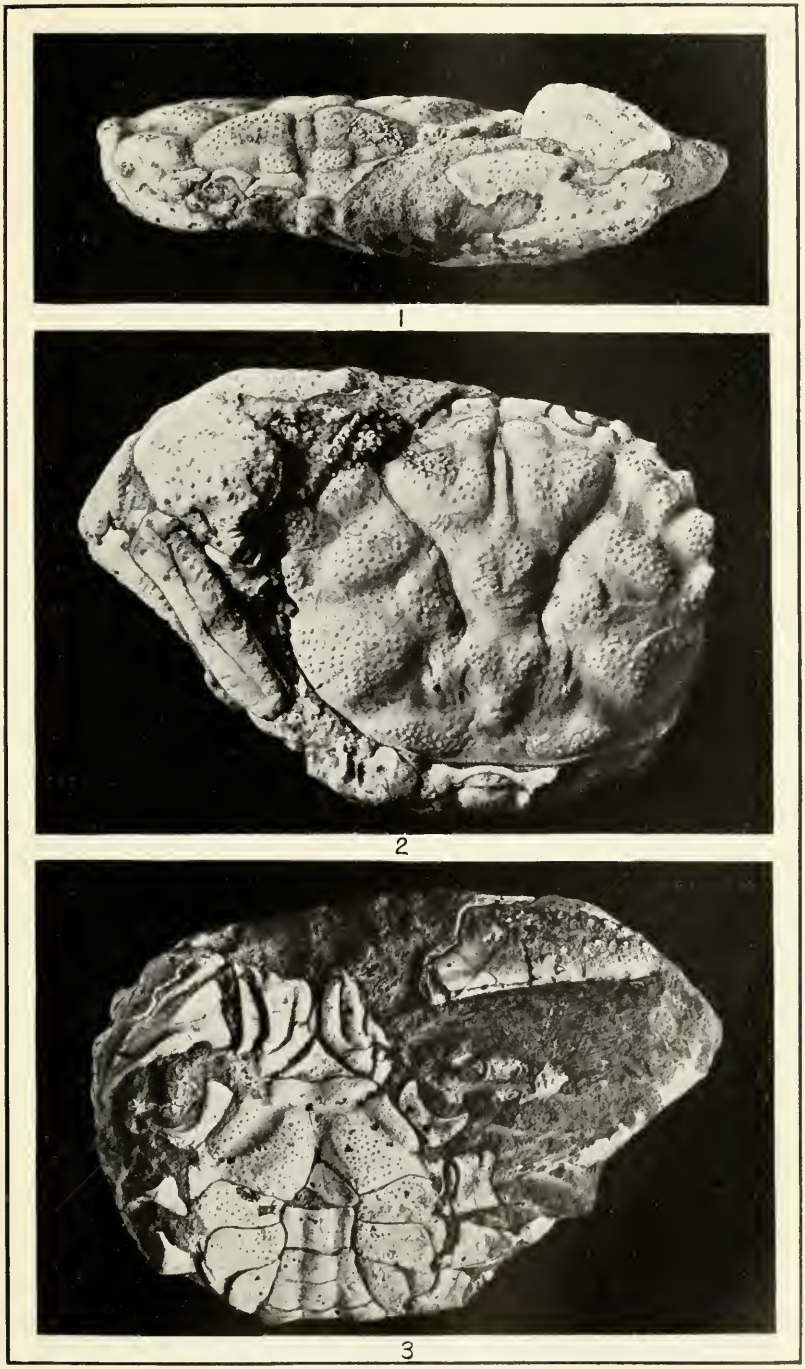
FIG. 1. *Raninoides mexicanus*, holotype, dorsal view of 2 fragments of carapace, × 3.
2. *Podophthalmus* (?), species, dorsal view, × 2.
3. *Calappa zurcheri*, right profile, × 1½.

PLATE 5

FIG. 1. *Calappilia hondoensis*, holotype, right profile, × 2.
2. Same specimen, dorsal view, × 2.
3. *Calappa zurcheri*, dorsal view, × 1½.

PLATE 6

FIG. 1. *Xanthosia americana*, holotype, dorsal view, × 8.
2. *Ranina* (?), species, carpus of cheliped, × 3.
3. *Callianassa tepetatensis*, holotype, outer view, × 2. The top line is at upper right of figure.
4. Same specimen, inner view. The top line is at lower right of figure.



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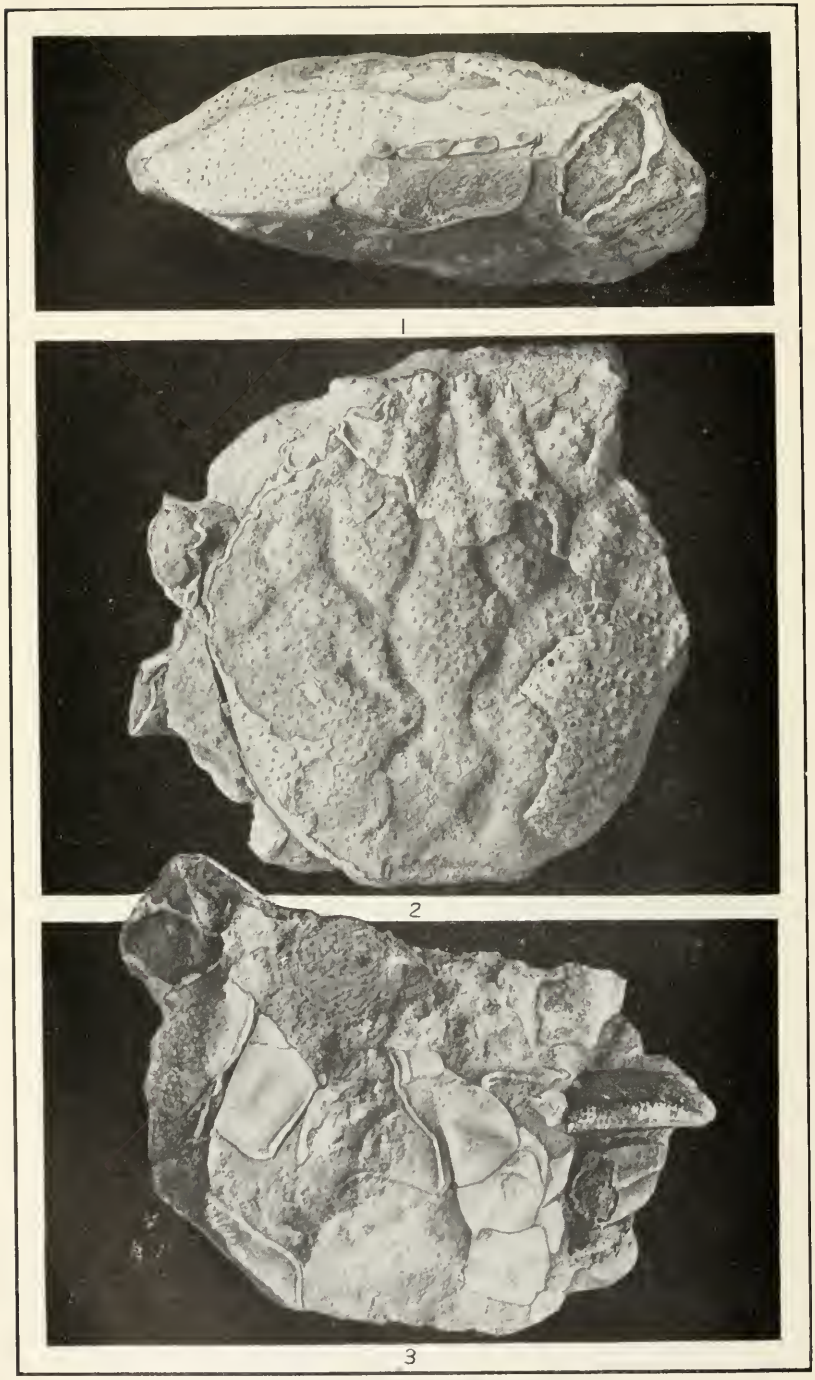
LOBONOTUS MEXICANUS

FOR EXPLANATION OF PLATE SEE PAGE 10.



MONTEZUMELLA TUBULATA

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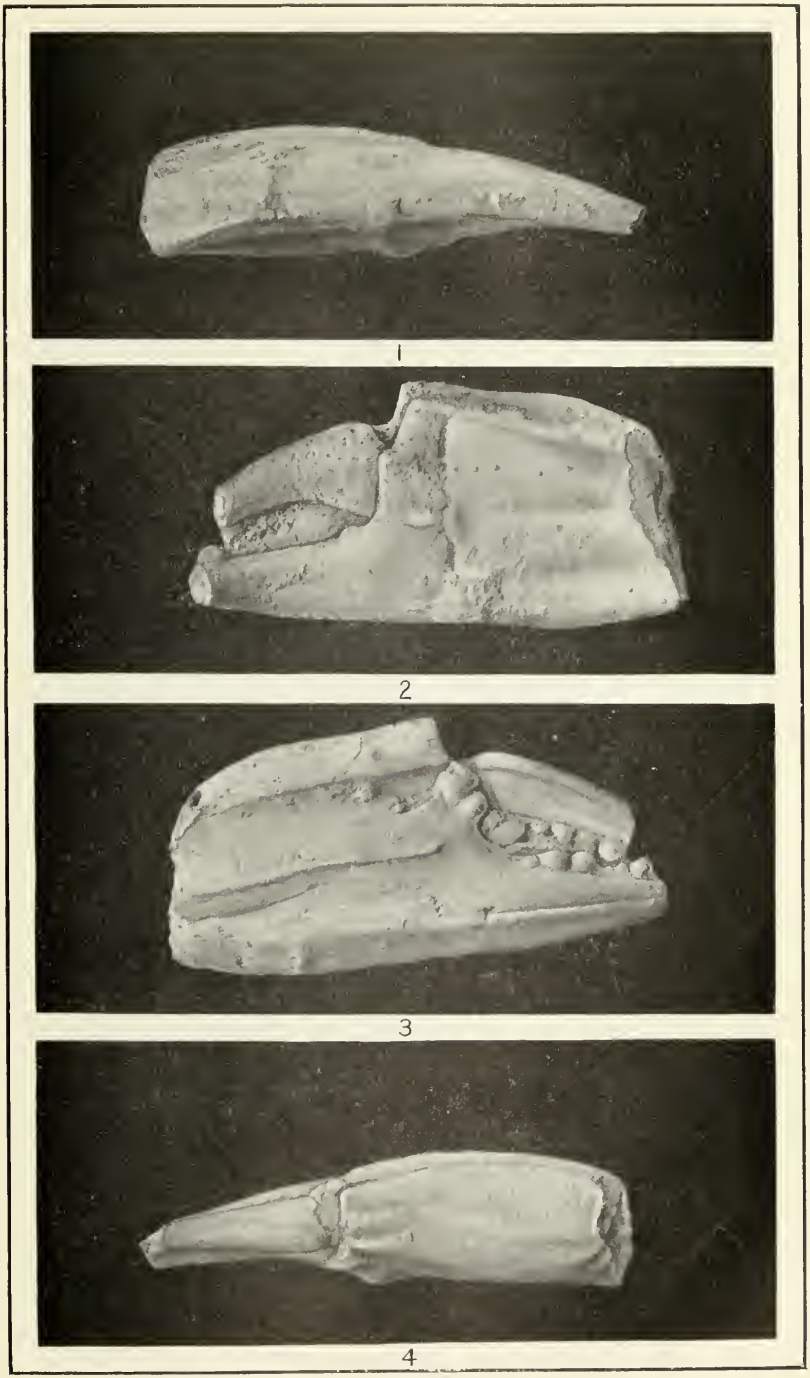

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SCYLLA COSTATA

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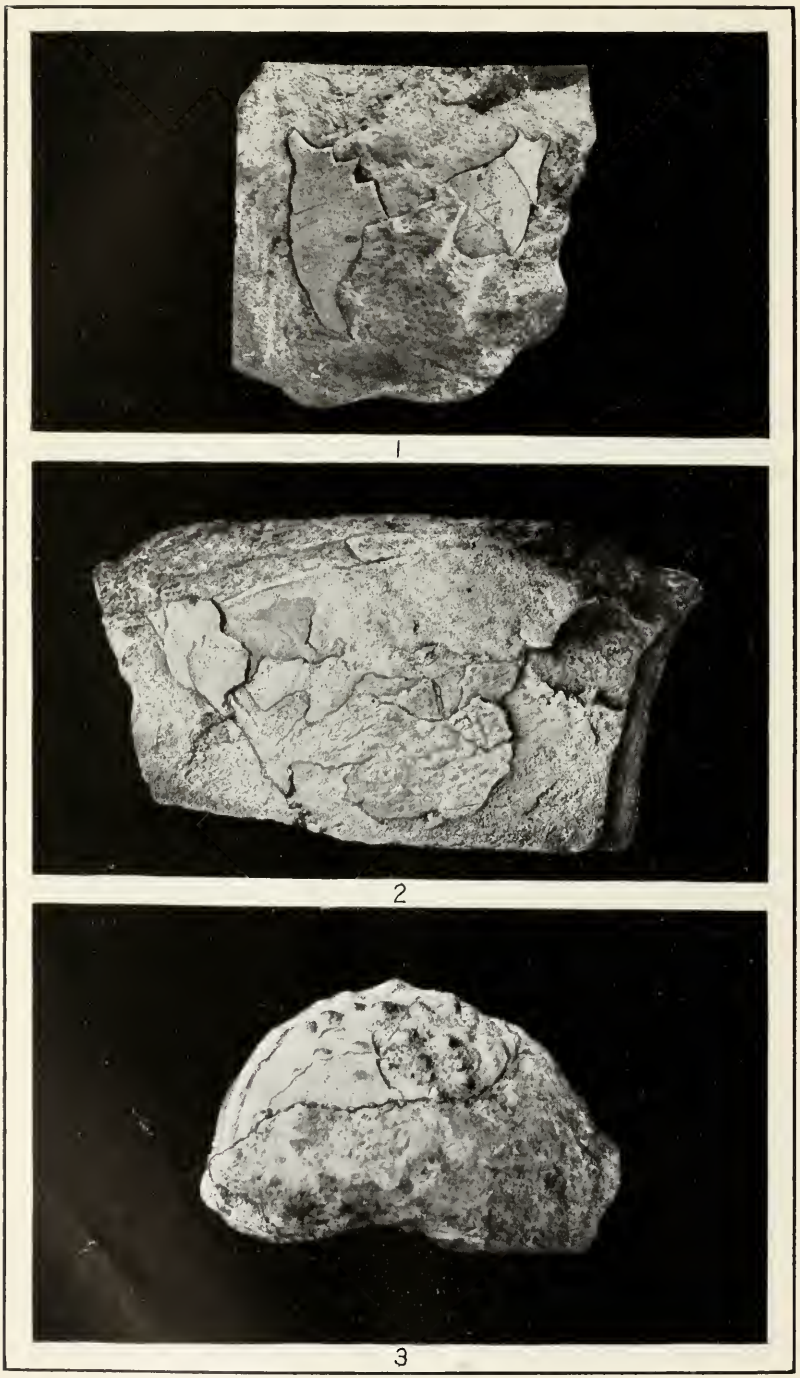

1. RANINOIDES MEXICANUS. 2. PODOPHTHALMUS (?). 3. CALAPPA ZURCHERI

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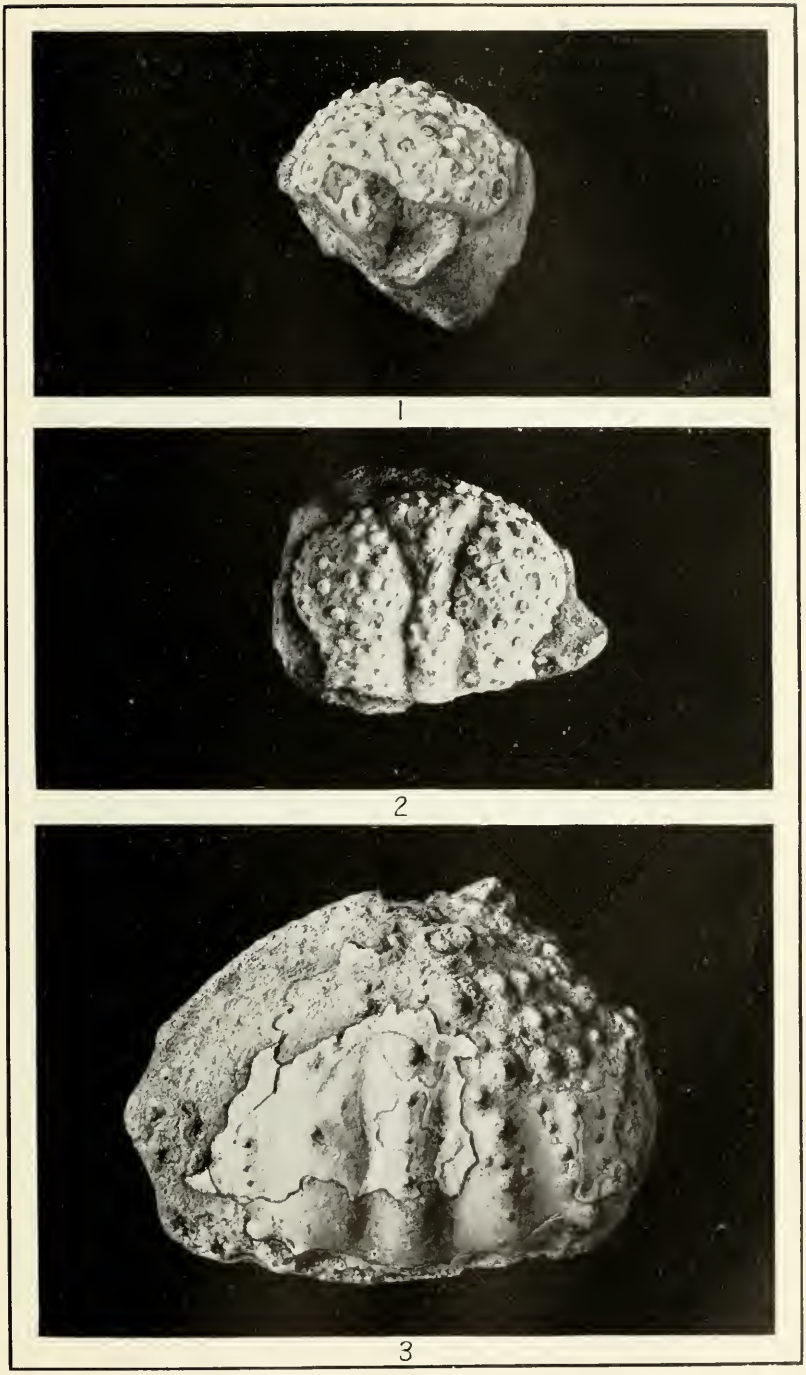

1, 2. CALAPPILIA HONDOENSIS. 3. CALAPPA ZURCHERI

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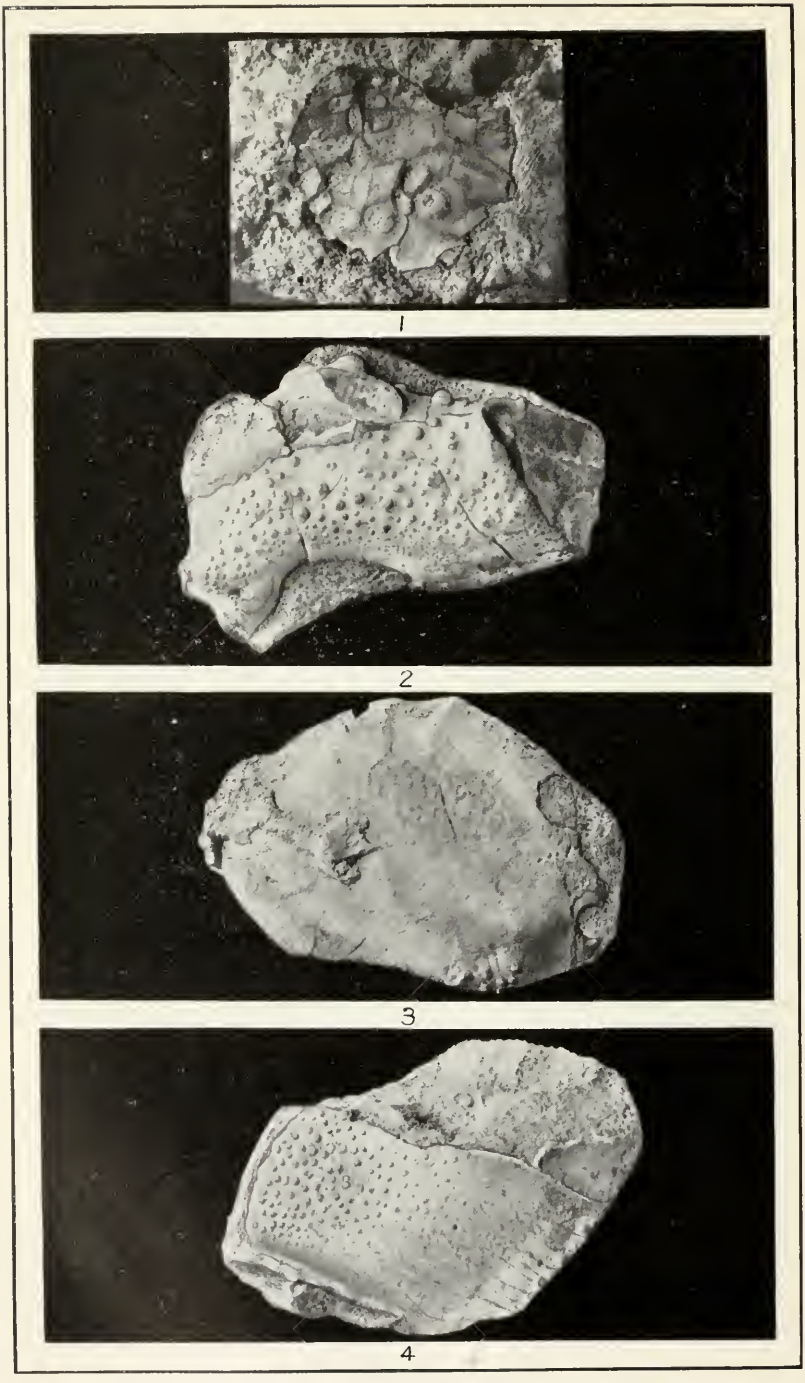

1. XANTHOSIA AMERICANA. 2. RANINA (?). 3, 4. CALLIANASSA TEPETATENSIS

FOR EXPLANATION OF PLATE SEE PAGE 10.