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ON SOME NEW OR IMPERFECTLY KNOWN SPECIES OF WEST AMERICAN CRUSTACEA.

BY SAMUEL J. HOLMES.

PLATES XXXV-XXXVII.

IN THE present paper, while a few new species have been added, most attention has been given to the description of forms which have been very briefly characterized or given wrong generic or specific names. As I have had the opportunity of examining the types of several inadequately described species, it was thought best to redescribe and figure these forms so that their identification might be rendered a somewhat less hazardous undertaking. In a few cases the recognition of the species from the original description would be a practical impossibility; yet it is not customary to consider a species indeterminate if its type be extant, and there is danger, especially if the species is assigned to a wrong genus or family, that it will be unsuspectingly redescribed under a new name. This source of error at least will be largely eliminated by a fuller knowledge of these forms.

Most of the material upon which this paper is based was obtained from the California Academy of Sciences through the kindness of the former president of the Academy, Professor William E. Ritter.

more convex lower border of the upper orbital margin, the longer merus of the external maxillipeds, and in its much larger size, different granulation and coloring. The two species are very different.

From *palustris* (Milne-Edwards) this species is distinguished by the broader terminal segment of the abdomen, the different markings on the inner surface of the larger hand and the wider gap between the fingers. It resembles *U. minax*, but has a broader and less convex carapace; the meral joints of the ambulatory legs are narrower and the carpus of the larger hand is not crested on the inner side. It is not quite certain that the forms which Lockington referred, somewhat doubtfully, to *brevifrons* really belong to this species.

Tribe MACROURA.

Family CALLIANASSIDÆ.

Lepidophthalmus gen. nov.

Carapace laterally compressed and provided with a rostrum. Eye stalks flattened and scale-like, the eyes not rudimentary. Antennules with 2 long flagella. External maxillipeds with the ischium and merus operculiform and the second joint of the palp large and much dilated. First pair of thoracic legs unequal and chelate, the carpus and hand much wider than the preceding joints; second pair strongly compressed and furnished with small chelæ; third pair with the propodus flattened and expanded and furnished with a dense felt of short hairs, the dactyl small. First abdominal segment with a pair of uniramous appendages in both sexes; second pair of pleopods biramous and slender, the 3 following pairs broad and foliaceous. Uropods firm, not membranous or flexible, the outer ramus broad and thick, the inner ramus very much smaller than the outer. Telson short and firm.

This genus is quite closely allied to *Callianassa*, but differs in having the second joint of the palp of the external maxillipeds much dilated and in having the rami of the uropods firm and very unequal instead of membranous and of subequal size.

Lepidophthalmus Eiseni sp. nov.

PLATE XXXV, FIGS. 6–13.

Rostrum small but prominent, acuminate, rounded above, and somewhat upturned. The antero-lateral regions of the carapace are strengthened by a more or less calcified area, the posterior margin of which is slightly raised and in the form of a letter S; a similar partly calcified area on the supero-posterior portion of the branchial regions; the margin of the branchial regions is thickened, and separated from the main portion by a thin flexible membrane; just in front of the postero-lateral angle this thickened margin is expanded into a smooth, rounded sclerite in front of which the margin is thin and membranaceous. Ocular peduncles oblong, the inner margins straight and contiguous until a short distance behind the acute tips; corneæ large, occupying most of the peduncles; a prominent rounded tubercle at the anterior end of the corneæ next to the inner margin. Antennules with the first joint short, the third slender and tapering, somewhat over twice the length of the second, and furnished below with long hairs; flagella subequal to the peduncle, the upper flagellum nearly naked and slightly shorter than the lower one which is furnished with numerous long hairs on the lower side. Antennæ much longer than the antennules, but scarcely twice as long; first joint with the outer margin produced into a rim which projects over the opening of the green gland; last joint of the peduncle longer and much more slender than the preceding; the tip of the peduncle reaches a little beyond the middle of the last joint of the peduncle of the antennules. External maxillipeds with the ischium and merus broadly expanded, the merus much wider than long; first joint of the palp distally widened; second joint very large and flattened, the inner side strongly produced, the terminal joint small, curved, and articulated to the outer angle of the preceding one.

Chelipeds unequal, smooth and glossy; the ischium of the larger cheliped finely serrated below, with a slight convexity near the distal end which is furnished with a few small spines; merus with the inner and outer sides flattened and converging below; lower margin with a rounded portion which is furnished with hairs and several small teeth; a prominent curved spine on the outer side at the proximal end; carpus wider than long, the posterior angle evenly rounded, the margins somewhat incurved; hand in the male much longer than the carpus, a broad, roughened, shallow, hairy groove extending backward from the gap between the fingers upon the outer side of the palm, inner side with a roughened hairy area extending backward to a rounded elevation at the base; a few teeth between the bases of the fingers; a prominent tooth on the outer side of the inner margin of the pollex; dactyl with several prominent teeth, the tip curved. In the female the larger hand is similar to that of the male but there is no roughened patch on the inner side of the palm, and the roughened groove on the outer side is short and indistinct; there is a notch on the inner margin of the pollex but no prominent tooth, the inner margin of the dactyl, like that of the pollex, is minutely serrated but bears no teeth; the tip is curved as in the male. The small cheliped is much the same in both sexes, but the carpus is relatively somewhat shorter in the male; the ischium is very minutely serrated on the

lower margin which is devoid of spinules; merus with the outer side rounded and the lower margin smooth and armed with a single small spine near the base; carpus like that of the larger cheliped; hand narrower than that of the larger cheliped, somewhat contracted near the base of the fingers; fingers hairy, much longer than the palm, the inner margins not dentate; the pollex tapers from the base, but the dactyl is of the same width from the base to within a short distance from the tip; tips of the fingers curved and crossing when closed. A small tooth at the distal end of the lower margin of the ischium of the 2 following pairs of legs; coxa of the fourth pair enlarged and flattened horizontally, the outer margin sharp and rounded. First pair of abdominal appendages in the male small and uniramous; second pair biramous, the rami slender. The first pair of pleopods in the female is much larger than in the male but uniramous and nearly as long as the second pair which is very similar to that of the other sex; the following pairs are broad and foliaceous, with the outer margins incurved and furnished with hairs. Uropods with a large tooth on the peduncle over the interval between the rami; outer ramus large, thickened, armed with a small, sharp spine at the base, the anterior portion thickened at the base and sloping distally where it is covered with a dense felt of short hairs; posterior portion smooth and limited anteriorly by the abrupt and slightly overhanging edge of the thickened area; inner ramus oblong, very much smaller than the outer, and gliding on the smooth posterior portion of the latter. Telson very short, much broader than long, the middle portion of the posterior margin convex, the outer angles prominent but rounded. The sides of the third, fourth, and fifth abdominal segments are furnished with patches of fine hair.

Length of female specimen 115 mm., carapace 28 mm., large arm 50 mm., hand 20 mm., carpus 12 mm., small arm 40 mm., hand 17 mm., carpus 8.5 mm., telson 8 x 11 mm. Length of male specimen 110 mm., carapace 27 mm., large arm 60 mm., hand 27 mm., carpus 14 mm., small arm 45 mm., hand 22 mm., carpus 8 mm.

Three specimens, one male and two females, from San José del Cabo, Lower California, collected by Dr. Eisen. The types are in the possession of the California Academy of Sciences.

Family CRANGONIDÆ.

Crangon Lockingtonii sp. nov.

PLATE XXXV, FIGS. 14–16.

Crangon munitus Lockington (not Dana), Bull. Essex Inst. v. 10, p. 159, 1878.

Rostrum oblong, concave above, rounded in front and arching over the eye-stalks. Two strong spines on the median carina of the carapace; 2 pairs of spines opposite the interval between the median ones, the 4 situated in the same transverse line; suborbital and antennal spines well developed; a spine behind the antennal spine and in front of and external to the outer one in the transverse row; all the spines are prolonged posteriorly into a carina. Ocular peduncles short and stout, with a prominent rounded tubercle on the upper side at the margin of the large cornea. Antennules with a triangular tooth at the distal end of the first basal joint; outer flagellum flattened; inner flagellum much more slender than the outer one and scarcely half as long. Antennal scale short and broad, scarcely ½ the length of the carapace; peduncle nearly reaching the tip of the acicle. Anterior chelipeds stout, a spine on the lower side of the merus; carpus with a spine on the outer portion of the lower surface; hand oblong, inflated, about twice as long as wide, the margin against which the dactyl closes evenly convex and oblique, somewhat more nearly longitudinal than transverse; pollex spinous, oblique. Second pair of chelipeds very slender, about reaching the tip of the first pair. Abdominal segments rounded above. Telson rounded above but slightly flattened towards the base, much longer than the last abdominal segment but shorter than the carapace; the upper side is armed with 2 pairs of spinules; tip rounded and furnished with several long setæ.

Length of body 21 mm., carapace 6 mm., telson 4 mm., acicle 2.5 mm.

Described from the two specimens from Magdalena Bay, Lower California, which Lockington referred to *munitus*.

Type No. 3168 of the collection of the California Academy of Sciences; original number 109.

This species differs from *C. munitus* Dana in having a longer rostrum, much shorter inner flagellum of the antennules, stouter hand, longer sixth abdominal segment, and more slender uropods.

Order ARTHROSTRACA.

Suborder AMPHIPODA.

Family LYSIANASSIDÆ.

Anonyx nugax *(Phipps)*.

PLATE XXXV, FIGS. 17–19; PLATE XXXVI, FIG. 20.

Cancer nugax Phipps, Voy. North Pole, p. 192, pl. 12, fig. 3, 1774.
Anonyx nugax Miers, Ann. Nat. Hist. (4), v. 19, p. 135, 1877.
Lysianassa Fisheri Lockington, Proc. Calif. Acad. Sci. v. 7, p. 48, 1877.

I have examined Lockington's type specimen of *Lysianassa Fisheri* which was taken on the northern coast of Alaska. The specimen was dried and imperfect when it came into Mr. Lockington's hands; after soaking it for

some time in dilute formalin I found that its condition for study was much improved and more details were made out than would otherwise have been possible. Having been very briefly described and placed in a wrong genus it would scarcely be possible, except by an examination of the type, for this species to be identified.

Specimens of *Anonyx nugax* from the Arctic seas north of Europe differ in no essential feature from Lockington's type.

Family AMPHITHOIDÆ.

Amphithoë scitula *(Harford).*

PLATE XXXVI, FIGS. 21-24.

Dexamine scitulus Harford, Proc. Calif. Acad. Sci. v. 7, p. 116, 1877.

Rostrum absent. Upper antennæ nearly as long as the body, the first 2 joints of subequal length; third joint about $\frac{2}{3}$ the length of the second and nearly reaching the middle of the last basal joint of the lower antennæ; flagellum much longer than the peduncle and composed of about 70 joints. Lower antennæ about $\frac{1}{3}$ the length of the upper; third joint not longer than wide, but longer than the preceding joints which are very short; last joint of the peduncle about $\frac{3}{4}$ the length of the preceding one; flagellum but little longer than the peduncle and composed of 26 joints. Mandibles with the molar tubercle prominent; the second joint of the palp narrow, the third joint wider than the second, tapering evenly toward the base, the nearly transverse distal margin furnished with setæ. Outer plate of the first maxillæ armed with 10 curved teeth; first joint of the palp longer than wide, the second distally widened. Second maxillæ with the inner plate narrower than the outer but nearly as long and setose on the entire inner margin. Maxillipeds with the inner plate very small, oblong, distally rounded, not reaching the middle of the first joint of the palp; outer plate moderately wide, reaching beyond the tip of the second joint of the palp, the inner margin armed with about 20 spines; first joint of the palp about half the length of the second, inner margin very short; third joint pyriform; fourth joint slender, tapering, and ending in a claw-like seta. Second, third, and fourth epimera subquadrate and increasing successively in length and breadth. First gnathopods with the elongated first joint produced into a rounded lobe at the antero-distal angle; second joint with an anterior lobe; third joint truncated distally, the postero-distal angle rounded and setose; fourth joint subtriangular, elongated, nearly as long as the hand, and strongly setose posteriorly; hand oblong, slightly widened distally, the palm convex and very oblique. Second gnathopods shorter and stouter than the first, the first joint with a lobe at the infero-distal angle which is similar to but smaller than that of the first pair; second joint with a prominent anterior lobe; third joint similar to that of the first pair, the inferior angle produced downward and thickly setose; fourth joint subtriangular, with a very prominent, rounded, thickly setose posterior lobe; hand similar to that of the first gnathopods but wider and having the palm somewhat less oblique. First pereiopods with the first joint broad, the postero-distal angle broadly rounded; second joint short; third and fourth joints rather wide, the third the longer; fifth joint tapering, slightly curved, and a half longer than the fourth; dactyl about half the length of the propodus. Second pereiopods similar to the first, the first joint convex on both margins. Third pereiopods with the side plate broad, quadrate, with a small posterior lobe whose lower margin is about at right angles to posterior side of the anterior portion; first joint very broadly ovate; third joint a half longer than the fourth; dactyl swollen at the base. Fourth pereiopods much longer than the third, the first joint oblong, convex anteriorly, the posterior margin convex above and concave below; second joint longer than wide; third, fourth, and fifth joints narrow and elongated; dactyl similar to that of the third pair; fifth pereiopods similar to the fourth, the first joint narrower but otherwise similarly shaped. Pleopods long, the rami nearly twice the length of the peduncles. First pair of uropods with the peduncle longer than the rami, reaching further back than the end of the sixth segment of the pleon, the upper margins armed with spines; outer ramus a little shorter than the inner; both are armed with spines on the upper side and a fascicle of spines at the tip. Peduncles of the second pair of uropods spiny above and reaching a little further back than the peduncles of the first pair; rami subequal to the peduncle in length, the outer a little the shorter. Peduncle of the last pair stout, flattened above, reaching a little beyond the middle of the rami of the preceding pair, the supero-distal margin finely denticulated; rami short, subequal, about half the length of the peduncle, outer ramus with 2 small, terminal spines; inner ramus flattened, tapering. Telson short, obtusely pointed.

Length nearly 1 inch.

This description is taken from Mr. Harford's type specimen of *Dexamine scitulus* from Magdalena Bay, Lower California. The eyes had lost their pigment and their outline could not be clearly made out. The specimen still retains traces of the beautiful purple color described by Mr. Harford.

Family OEDICERIDÆ.

Acanthostepheia behringanus *(Lockington).*

PLATE XXXVI, FIGS. 25-28.

Œdicerus behringiensis Lockington, Proc. Calif. Acad. Sci. v. 7, p. 47, 1877.
Acanthostepheia pulchra Miers, Ann. and Mag. Nat. Hist. 5th ser. v. 7, p. 47, pl. VII, figs. 1 and 2, 1881.
Acanthostepheia Malmgreni Stuxberg (not Goës), Evertebratfaunan i Sibiriens Ishaf. Vega-Expeditionens Vetenskapliga Jakttagelser, Bd. 1, pp. 724, 729, (wood cut). Della Valle, Fauna and Flora des Golfes von Neapel, 20 Monogr., Gammarini, p. 544, 1893 (in part).

Thoracic segments with a median carina on the posterior portion of the upper surface, the carina of the last segment interrupted in the middle and produced into a tooth at the posterior end; postero-lateral angles of the last 4 thoracic segments produced backwards and rounded. First 4 segments of the abdomen carinated above, the carinæ on the first 2 segments interrupted in the middle and produced posteriorly into a tooth; carina of the third segment continuous and terminating posteriorly in a narrow tooth which points obliquely upwards; anterior portion of the fourth segment smooth above and having a depression behind which is a tooth which is followed by a carina which extends to the posterior end of the segment where it may be produced into a small tooth; fifth and sixth segments very short above and smooth, postero-lateral angles of the first 3 abdominal segments very broadly rounded.

Head carinated above, the carina continued upon the long rostrum which is acute and strongly curved downwards; antero-lateral angle of the head acute, the margin above the angle concave. Eyes large, oval, situated in the base of the rostrum and almost contiguous above. Upper antennæ about $\frac{2}{3}$ the length of the lower and nearly $\frac{1}{3}$ the length of the body; first joint of the peduncle elongated, reaching nearly to the tip of the rostrum; second joint a little over half the length of the first and much more slender; third joint $\frac{1}{3}$ the length of the second; flagellum a little shorter than the peduncle. Fourth basal joint of the lower antennæ extending beyond the first joint of the upper for about $\frac{1}{3}$ its length; fifth joint more slender and somewhat longer than the fourth; flagellum about as long as the peduncle.

First maxillæ with the inner plate about $\frac{2}{3}$ the length of the outer and furnished with 2 plumose setæ; outer plate armed distally with 7 spine-teeth each of which is furnished with 1 or 2 small curved teeth near the middle; first joint of the palp about as wide as long, second joint elongated, armed distally with several slender spines and reaching considerably beyond the end of the outer plate but not to the tip of the spine-teeth. Inner plate of the second maxillæ shorter than the outer but of about the same width. Inner plates of the maxillipeds very small, oblong, the distal margin furnished with spines and setæ and reaching scarcely beyond the base of the outer plates; outer plates not reaching the middle of the large second joint of the palp; third joint of the palp pyriform; fourth joint a large, curved, acute claw nearly as long as the preceding joint.

First gnathopods with the third joint truncated below and somewhat produced at the postero-inferior angle; carpus produced posteriorly into an oblong, distally rounded process which is curved downwards; hand ovate, anterior and posterior margins evenly curved and equally convex; palm occupying about $\frac{3}{4}$ the posterior margin and terminated by a short spine; dactyl rather slender, evenly tapering to a sharp point. The second gnathopods very closely resemble the first but are somewhat larger, with the propodus and the posterior lobe of the carpus slightly more narrow. First 2 pairs of pereiopods rather short, the dactyls $\frac{1}{2}$ the length of the propodi; the 2 following pairs longer with the dactyls slightly longer than the propodi; posterior pair of pereiopods large, elongated, nearly twice the length of the preceding pair and reaching beyond the tip of the uropods.

Peduncles of the uropods prismatic in section with prominent angles; peduncle of the first pair reaching to about $\frac{2}{3}$ the length of the peduncle of the second pair, rami acicular, somewhat flattened, shorter than the peduncle, the inner ramus broader and slightly longer than the outer; peduncle of the second pair of uropods reaching the extremity of that of the third pair; peduncle and rami of the third pair of subequal length. All the uropods are nearly alike in character and the tips of the rami extend to about the same distance posteriorly, those of the second pair slightly exceeding those of the first and third; the margins of the rami are armed with numerous minute spines. Telson oblong, a little longer than the upper portions of the 2 last abdominal segments, raised along the mid-dorsal line, broadly emarginate at the tip, and rounded at the postero-lateral angles.

Length 35 mm.

Described from Mr. Lockington's four type specimens which came from the "west coast of Alaska, north of Behring's Straits" (No. 3561, collection of the California Academy of Sciences).

This species is allied to *A. Malmgreni* (Goës) but differs in having a more strongly curved rostrum, in having the postero-lateral angles of the anterior abdominal segments flattened or broadly rounded, instead of produced into spines, and in having no tooth near the middle of the palm of the gnathopods. The general shape of the hands in the two species is also very different. It is probable that Stuxberg confused this species with *Malmgreni* as his figure, which is copied by Della Valle to illustrate the latter species, agrees closely with Miers' figure of *pulchra* and differs markedly from the original figure of *Malmgreni* given by Goës.

Family EUSIRIDÆ.

Rhachotropis aculeata *(Lepechin).*

Oniscus aculeatus Lepechin, Acta Acad. Sci. Imp. Petrop. 1780, p. 247, tab. VIII, fig. 1.

Rhachotropis aculeata Smith, Proc. U. S. Nat. Mus. v. 6, pp. 222, 229, 1884. Stebbing, Challenger Reports, v. 29, p. 954, 1888.

Pontogeneia aculeata Della Valle, Fauna und Flora des Golfes von Neapel, 20 Monogr. p. 616, tav. LIX, fig. 28, 1893.

A single specimen of this species was found in the bottle containing Lockington's types of *Oediceros behringiensis*. For further references and synonyms see Stebbing, *l. c.*, or the monograph of Della Valle.

Suborder ISOPODA.

Family LIGIIDÆ.

Styloniscus gracilis *Dana*.

PLATE XXXVI, FIGS. 29–31.

Styloniscus gracilis Dana, Proc. Acad. Nat. Sci. Phila. v. 7, p. 176, 1854. Stimpson, Jour. Bost. Soc. Nat. Hist. v. 7, p. 506, 1857. Stuxberg, Öfversigt af k. Vetensk. Akad. Förhandl. 1875, N:o 2, p. 43. Budde-Lund, Crust. Isop. Terrestria, p. 271, 1885. Richardson, Proc. U. S. Nat. Mus. v. 21, p. 867, 1899.
Alloniscus maculosus Harford, Proc. Calif. Acad. Sci. v. 7, p. 54, 1877.

Thoracic segments smooth, glossy, and of subequal length; postero-lateral and antero-lateral angles of the first 4 rounded, the postero-lateral angles of the last 3 segments acute and produced backwards.

Abdomen longer than wide, abruptly narrower than the thorax, the first 2 segments shorter than the others, the 3 following segments with the postero-lateral angles acute and produced backwards. Terminal segment twice as wide as long and very broadly rounded.

Head transverse, devoid of prominences, front broadly rounded. Eyes rather large reaching the lateral margins of the head. Antennules three-jointed, not exceeding the second basal joint of the antennæ; first joint broad, distally widened; second joint subcylindrical, slightly longer and much narrower than the first; third joint very minute and joined to one corner of the preceding. Antennæ nearly ½ the length of the body, first joint short, transverse, second and third joints oblong, cylindrical, subequal, fourth joint as long as the 3 preceding, fifth joint narrower and slightly longer than the fourth; flagellum about as long as the 2 preceding joints and composed of 13–15 articulations.

Mandibles short and very stout, having a large molar tubercle and a narrow dark-colored, dentate cutting edge, but no palp. First maxillæ with the inner plate short and furnished with 3 short-ciliated setæ, the upper 1 much shorter than the lower 2 which are of subequal length; outer plate narrow and armed with 5 curved teeth. Second maxillæ narrow, with 2 very small ciliated plates on the inner margin near the rounded tip. Inner plate of the maxillipeds with several short, densely ciliated processes on the transverse distal margin and a large ciliated seta on the inner side; palp five-jointed, the terminal joint minute.

Legs very spiny below; dactyls short, furnished with several setæ and 1 or 2 spines below near the tip. Uropods slender, fully ½ the length of the abdomen; peduncle oblong, flattened, the inner angle strongly produced backwards; rami slender, microscopically scabrous but devoid of spines; inner ramus exceeding the outer in length but slightly more slender, the tip furnished with setæ.

The body is furnished with scattered fine short hairs which are more conspicuous on the posterior margins of the segments.

Length $\frac{7}{16}$ inch.

Described from three type specimens of Mr. Harford's *Alloniscus maculosus* (No. 2594) from Angel Island, Bay of San Francisco.

Family CIROLANIDÆ.

Cirolana Harfordi *(Lockington)*.

PLATE XXXVII, FIGS. 32–38.

Ægа Harfordi Lockington, Proc. Calif. Acad. Sci. v. 7, p. 46, 1877.
Cirolana californica Hansen, Vidensk. Selsk. Skr. ser. 6, Natur. og math. Afd. 5, 1890, pp. 338, 339 (fide Richardson).
Cirolana Harfordi Richardson, Proc. U. S. Nat. Mus. v. 21, p. 822, 1899.

Body nearly smooth. Sides of the thorax nearly parallel, the first segment marked longer than the subequal following ones, the antero-lateral angles produced forward as a triangular, acute or subacute process which commonly covers the lower part of the eye. Epimera oblong, the postero-lateral angles of the first 3 segments rounded, those of the last 4 acute and produced backwards. The epimeral suture on the first segment is much less distinct than in the others and extends upwards and forwards to the upper corner of the head. The lower margins of the epimera are bordered by a broad raised line which is wider in front than behind and which becomes successively wider in front in the posterior segments until it includes the larger portion of the epimera.

Abdomen short, the first segment concealed by the thorax, the 3 following ones of equal length, and concave behind; fifth segment longer in the middle and shorter at the sides than the preceding ones, the posterior margin nearly straight (usually a little convex); postero-lateral angles of the first 2 segments acute but commonly concealed by the epimeron of the last thoracic segment; postero-lateral angle of the third segment subacute or narrowly rounded, that of the fourth produced and rounded; lateral angle of the fifth segment subacute but concealed by that of the preceding segment. Telson equilaterally triangular, a little longer than the preceding segments of the abdomen, the lateral margins concave near the bases of the uropods, but otherwise nearly straight; tip rounded and furnished with short spines which are longest near the center and extend only a short distance along the sides.

Head transverse, the front broadly and evenly rounded, the frontal margin raised; a transverse impressed line extending across the front part of the head from the upper sides of the eyes. Antennules reaching the posterior margin of the head, the peduncle reaching the anterior border of the eye and beyond the tip of the third joint of the antennæ but scarcely to the middle of the fourth; first joint rounded, about as wide as long; second joint a little longer than wide; third about as long as the first 2; flagellum about as long as the base and composed of 10-16 articulations. Antennæ about half the length of the body; fifth joint slightly longer than the fourth, and about equal in length to the first 3; flagellum nearly twice the length of the peduncle.

quadrate external lobe; fourth joint about ⅓ the length of the fifth; flagellum considerably longer than the peduncle.

Mandibles with a large, elongated molar tubercle; palp three-jointed, the second joint longer than the first, widest near the middle and setose on the distal half of one side; third joint shorter than the second, arcuate and tapering to a point furnished with a few long setæ, the concave side thickly setose. Inner plate of the first maxillæ with 5 ciliated setæ at the distal end; outer plate with about 12 curved, denticulated teeth. Second maxillæ oblong, the inner plate with the distal margin ciliated and very oblique; outer plates reaching to the distal margin of the inner, their transverse distal margins furnished with long setæ. Maxillipeds with 7 or 8 blunt hooks on the inner margin of the inner plate.

First pereiopods with the first joint broad, the posterior margin more convex than the anterior; second joint longer than wide, third joint with an anterior pointed lobe, fourth joint very small and triangular; hand oblong, both margins about equally convex, the lower armed with stout spines; dactyl large, closing against nearly the whole length of the palm, the inner margin furnished with obliquely set spines which become larger toward the tip. Second pereiopods longer than the first, the first joint convex on both margins and twice as long as wide; second joint about as long as the fourth and strongly convex in front; third joint subtriangular, produced downward at the antero-distal angle; fourth joint armed below with 9 spines; fifth joint shorter than the fourth and armed below with 4 strong spines and a smaller fifth spine near the proximal end, the distal end produced into a pointed lobe beside the dactyl; dactyl armed below with 4 spines which increase in size toward the slender tip. Third and fourth pereiopods similar to the second. The last 3 pairs of pereiopods are longer and relatively more slender than the first pair and have the fifth joint as long as the fourth.

First pair of pleopods very small and oblong; second pair not fused in the middle, and forming an operculum over the succeeding ones. Caudal stylets but slightly longer than the abdomen, the peduncle oblong, flattened, armed with 5 spines on the inner and 4 on the outer margin; inner angle produced; outer ramus slender, spinulous, longer than the peduncle and setose at the tip.

The body is covered with short setæ which become longer on the margins.

Length $\frac{6}{10}$ inch.

This description is taken from the single type specimen of Mr. Harford (No. 2609, collection of the California Academy of Sciences). One of the caudal stylets was missing and in the other the inner ramus is much shorter than the outer. This is doubtless due to its having been lost and only partially regenerated. Its stump-like appearance would suggest this explanation; besides in several other specimens that I refer to this species the inner ramus is the longer of the two.

caudal stylets are shorter than the uropods. This is probably due to the fact that the individuals were not full grown, as they were all of smaller size than the type, and a careful comparison of mouth parts and other structures revealed no other important differences. A larger specimen taken from a well in Humboldt County, California, had the caudal stylets as long as those of the type.

All the specimens examined (which had been in alcohol for a long time) were of a grayish color, the segments of the thorax being marked with rounded or oblong spots of a lighter color.

I have compared the type and several other specimens of this species with specimens of *Asellus communis* Say from Massachusetts, Michigan, and Illinois. The two species are closely allied, but may be readily distinguished by the fact that the epimera in *tomalensis* are covered by the thoracic segments while in *communis* considerable portions of them are visible from above.

The form recently described as *Asellus tomalensis* by Miss Richardson is quite different from this species, as I have determined by a re-examination of Mr. Harford's type. Miss Richardson's species is much more slender, the antennæ longer, and the posterior segments of the thorax notched instead of rounded.

Family SPHÆROMIDÆ.

Sphæroma pentodon *Richardson.*

PLATE XXXVII, FIG. 43.

Head with the anterior margin bordered by a prominent raised line; median frontal process small and rounded; a conspicuous groove on either side in front of the eye into which the uropods are received when the animal is rolled up; the distance between the anterior ends of the grooves is slightly more than ⅓ the length of the anterior margin of the head. Epistome triangular, the lateral margins sinuated, the lower margin deeply concave, the acute apex in contact with the median process of the front. Eyes rather large, oval. Antennules reaching about to the posterior margin of the head; first joint flattened and rugose anteriorly, with a small lobe at the supero-proximal angle which fits into an emargination on either side of the median

second thoracic segment; last 2 joints of the peduncle subequal; flagellum longer than the peduncle and composed of 12–15 joints.

Thoracic segments of subequal length, each crossed by a transverse ridge which becomes fainter to obsolescence on the anterior segments; postero-lateral angles of the segments produced backwards, those of the first 4 segments subacute, those of the last 3 becoming successively more rounded posteriorly. Anterior segment of the pleon crossed anteriorly by a faint line, and marked by 2 lines on either side which do not reach the middle of the dorsal surface; a transverse, roughened line across the middle portion of the segment. Caudal shield strongly convex, broadly rounded behind, roughened with small granulations and marked with a double longitudinal row of small tubercles which extend a little behind the middle of the dorsal surface; a transverse tubercle at the posterior end giving the segment, when viewed laterally, the appearance of being turned up at the tip. Rami of the caudal lamellæ subequal, acute, and scarcely reaching beyond the tip of the caudal shield; outer ramus armed with 4 or 5 sharp teeth (including the terminal one) on the distal portion of the outer margin; inner ramus devoid of teeth and fitting closely over the outer one.

Color olivaceous.

Length 9 mm.

Found in marshy ground in San Francisco Bay, California.

This species is quite different from *S. oregonensis* Dana; the body is more convex, the head not so much set back into the first thoracic segment, the caudal shield much longer and much less flattened. In *oregonensis* the caudal shield is perfectly smooth above and the outer ramus of the uropods is devoid of teeth. In the character of the outer uropods and several other features it resembles *S. quadridentatum* Say of the Atlantic coast, but the thorax is narrower, the epimera less distinct, the eyes larger and the uropods shorter and more acute.

UNIVERSITY OF MICHIGAN,
ANN ARBOR, MICHIGAN.

EXPLANATION OF PLATE XXXV.

The outlines of all the figures were drawn by means of a camera lucida.

Figs. 1–5. *Uca brevifrons*.

Fig. 1. Outline of animal.
Fig. 2. Large hand.
Fig. 3. Inner face of merus of large cheliped.
Fig. 4. Small hand.
Fig. 5. Ischium and merus of external maxilliped.

Figs. 6–13. *Lepidophthalmus Eiseni*.

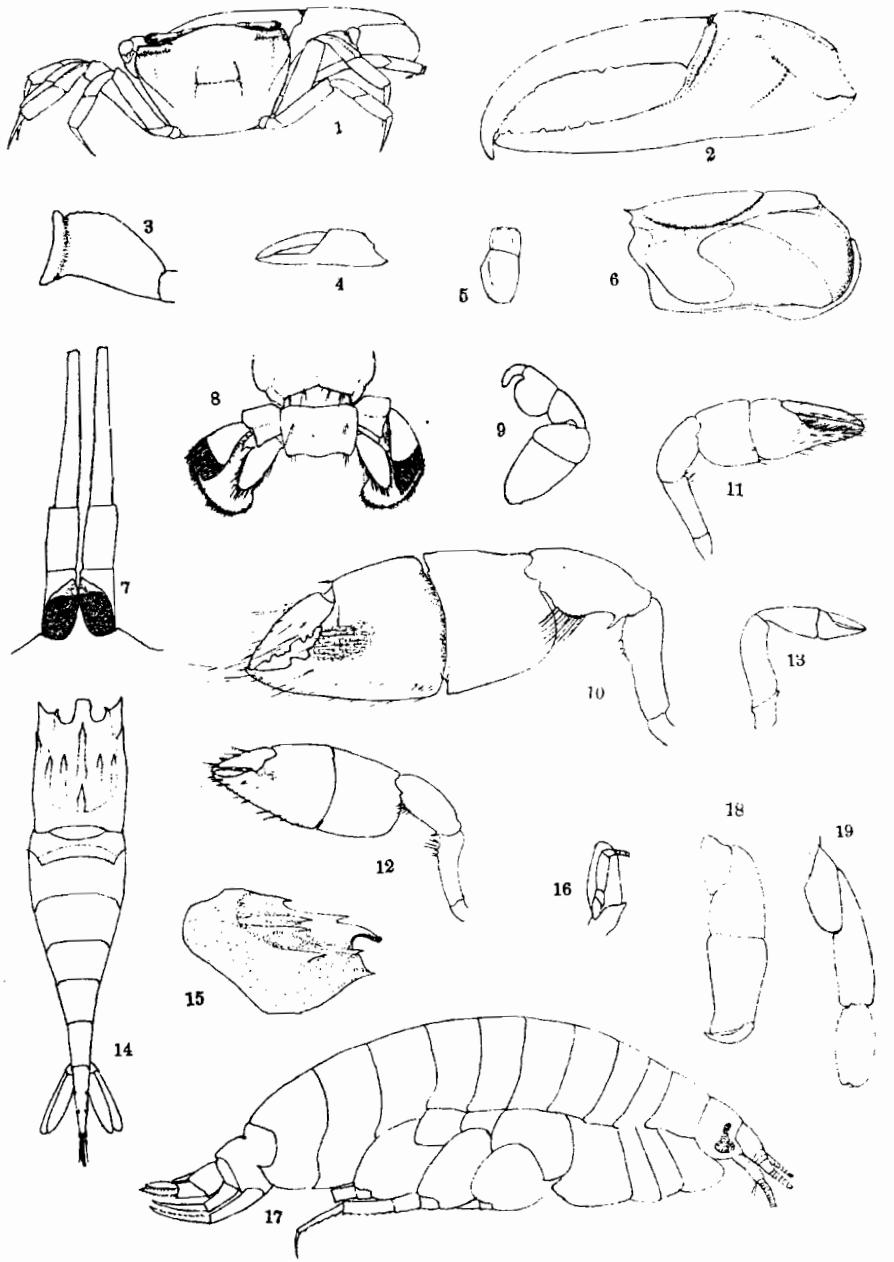
Fig. 6. Lateral view of carapace; membranous portion stippled.
Fig. 7. Rostrum, ocular peduncles, and bases of the antennules.
Fig. 8. Uropods and telson.
Fig. 9. Outline of external maxilliped.
Fig. 10. Large hand of the male.
Fig. 11. Small hand.
Fig. 12. Large hand of the female.
Fig. 13. Second cheliped.

Figs. 14–16. *Crangon Lockingtonii*.

Fig. 14. Carapace and abdomen.
Fig. 15. Lateral view of carapace.
Fig. 16. Peduncle and acicle of antenna.

Figs. 17–19. *Anonyx nugax*.

Fig. 17. Outline of body.
Fig. 18. Part of first gnathopod.
Fig. 19. Part of second gnathopod.



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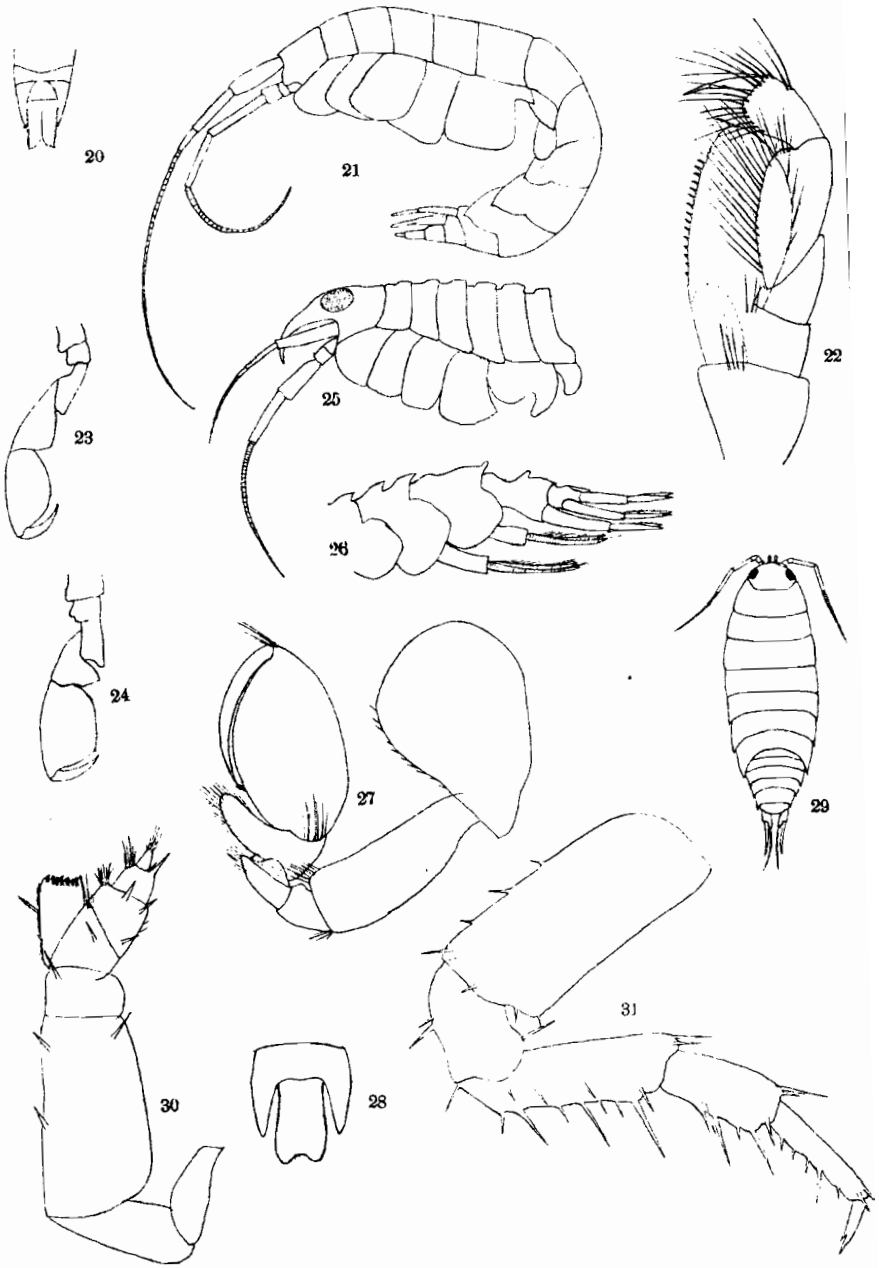
EXPLANATION OF PLATE XXXVI.

Fig. 20. *Anonyx nugax.*
Fig. 20. Terminal portion of abdomen, seen from above.

Figs. 21–24. *Amphithoë scitula.*
Fig. 21. Outline of body.
Fig. 22. Maxilliped. Some of the spines near the tip of the outer plate have been broken off.
Fig. 23. First gnathopod.
Fig. 24. Second gnathopod.

Figs. 25–28. *Acanthostepheia behringanus.*
Fig. 25. Anterior portion of body.
Fig. 26. Abdomen.
Fig. 27. First gnathopod.
Fig. 28. Telson and sixth abdominal segment, seen from above.

Figs. 29–31. *Styloniscus gracilis.*
Fig. 29. Outline of body.
Fig. 30. Maxilliped.
Fig. 31. First pereiopod.



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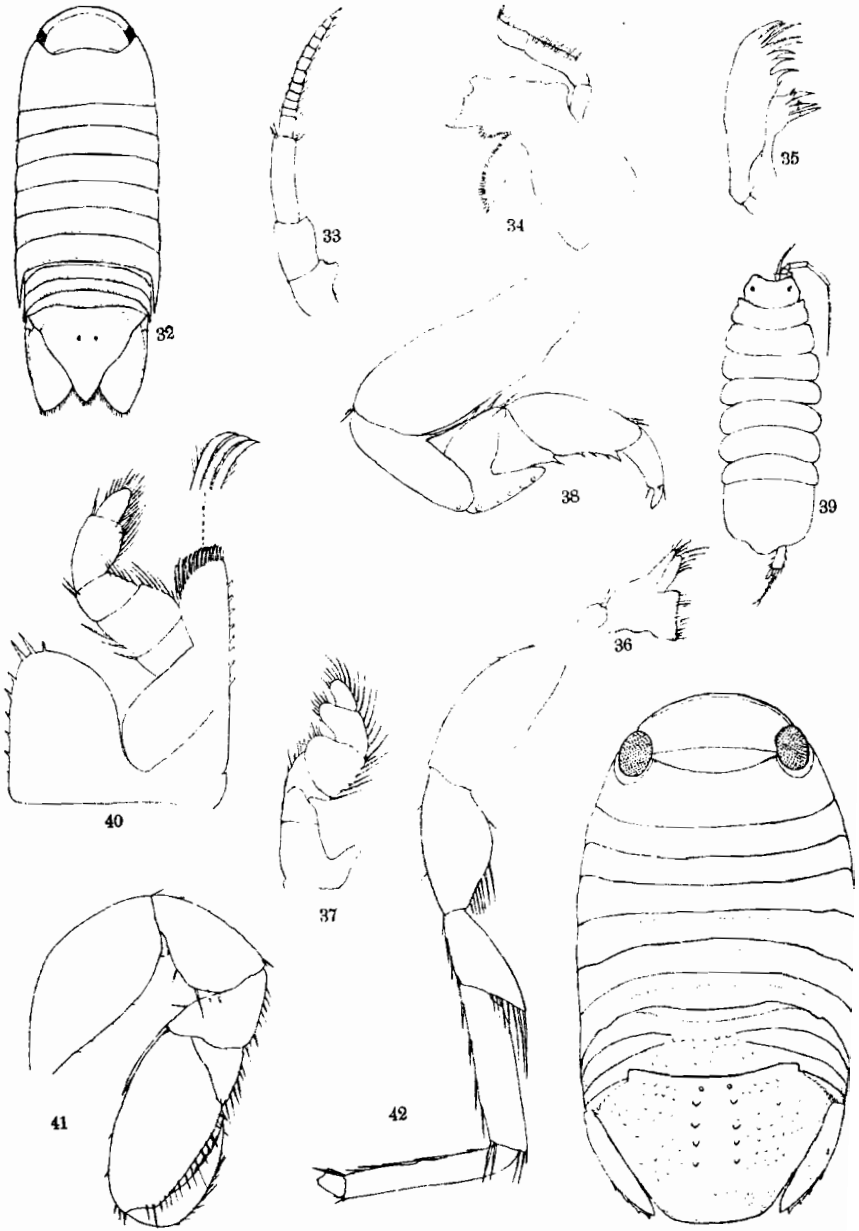
EXPLANATION OF PLATE XXXVII.

Figs. 32–38. *Cirolana Harfordi.*
- Fig. 32. Outline of body.
- Fig. 33. Antennule.
- Fig. 34. Mandible.
- Fig. 35. First maxilla.
- Fig. 36. Second maxilla.
- Fig. 37. Maxilliped.
- Fig. 38. First pereiopod. The spines have been broken off from the under side of the third joint.

Figs. 39–42. *Asellus tomalensis.*
- Fig. 39. Outline of body.
- Fig. 40. Maxilliped.
- Fig. 41. First pereiopod.
- Fig. 42. Last pereiopod. A part of the dactyl has been broken off.

Fig. 43. *Sphæroma pentodon.*



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