

VII.—THE MARINE AND TERRESTRIAL ISOPODS OF THE BERMUDAS,
WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.

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1. *The Marine Isopods of the Bermudas, with descriptions of thirteen New Species and three New Genera.*

There is almost no literature relating to the Marine Isopods of the Bermudas.

In 1891 Ives* described and figured a new species of *Cymodocea* from the Bermudas (*C. bermudensis*), which has since been referred to the genus *Dynamene*.

Several species of wide-spread distribution have been recorded from the Bermudas, as for example, *Idotea marina* (Linnæus), specimens of which are in the Smithsonian Institution. It was taken in abundance by the Yale party in 1901, in Hamilton Harbor.

Spence Bate† mentions, without any description, a species of *Bopyrus* from the Bermudas, parasitic on *Latreutes ensiferus* (Milne-Edwards), which is without doubt, identical with *Bopyroides latreuticola* Gissler, found on the same host at Beaufort, North Carolina.

The material for the present paper is the result of three expeditions to the Bermudas; one in 1876-7, when Prof. George Brown Goode collected a number of Isopods; one in 1898, undertaken by Prof. A. E. Verrill and party; and another in the spring of 1901, by Prof. A. E. Verrill and Mr. A. H. Verrill.

These collections contain both known and unknown species. Among the known species are to be mentioned specimens of *Dynamene bermudensis* Ives, and *Idotea marina* (Linnæus), already recorded from the Bermudas.

Also specimens of *Corallana quadricornis* Hansen, *Alcirona krebsii* Hansen, *Nerocila acuminata* Schiødt and Meinert, *Dynamene perforata* Moore, and *Cilicæa caudata* (Say), common to West

* Proc. Philad. Acad. Nat. Sci., 1891, p. 194.

† Report of the Scientific Results of the Exp. Voyage of H. M. S. Challenger, xxiv, p. 582, 1888.

Indian waters; *Tanais cavolinii* Milne-Edwards, *Leptochelia rapax* Harger, and *Leptochelia dubia* (Krøyer), the first and last named of wide distribution, and all three common to the Northeast coast of America. These species have not been previously recorded from the Bermudas.

The thirteen new species herein described are representatives of the following families: *Apseudidæ*, *Anthuridæ*, *Cirolanidæ*, *Sphæromidæ*, and *Janiridæ*. Three are the types of new genera.

CHELIFERA or TANAIIOIDEA.

Family Tanaidæ.

Tanais cavolinii Milne-Edwards.

Tanais cavolinii Milne-Edwards, in Audouin and Milne-Edwards, Précis d'Entomologie, i, pl. xxix, fig. 1, 1828; Hist. Nat. des Crust., iii, p. 141, pl. xxxi, fig. 6, 1840.

Tanais tomentosus Krøyer, Naturhist. Tidsskr., iv, p. 183, 1842; *ibid.* (2) ii, p. 412, 1847; Voy. en Scand., Crust., pl. xxvii, figs. 2a-q, 1849. Lilljeborg, Öfvers. Vet.-Akad. Förh., Årg., viii, p. 23, 1851. Meinert, Crust. Isop. Amph. Dec. Danaiaæ, p. 86, 1877.

Crossurus vittatus Rathke, Fauna Norwegens, p. 39, pl. 1, figs. 1-7, 1843.

Tanais hirticaudatus Bate, Rep. Brit. Assoc., 1860, p. 224, 1861.

Tanais vittatus Lilljeborg, Bidrag Känn. Crust. Tanaid, p. 29, 1865. Bate and Westwood, Brit. Sess. Crust., ii, p. 125, 1866. Stebbing, Trans. Devon. Assoc., 1874, p. 7, and 1879, p. 6; Ann. Mag. Nat. Hist., (4) xvii, p. 78, 1876. Verrill, Am. Jour. Sci. (3), x, p. 38, 1875. Harger, Proc. U. S. Nat. Mus., ii, p. 162, 1879; Rep. U. S. Fish Comm., pt. 6, p. 418-419, pl. xiii, figs. 81-82, 1880.

Tanais tomentosus G. O. Sars, Crust. of Norway, ii, pt. i, ii, p. 12, pl. v, 1896.

Tanais Cavolinii Dollfus, Bull. Soc. Zoöl. de France, xxi, p. 207, 1897; Mém. de la Soc. Zoöl. de France, xi, p. 35, 1898. Norman, Ann. Mag. Nat. Hist. (7), iii, pp. 332-333, 1899. (See Norman for synonymy and full reference.)

Hab. Castle Harbor, Bermudas, in dead coral, collected by A. E. Verrill and party.

Also found at Noank, Conn.; Long Island Sound; Greenland; west coast of Norway; British Isles; West France; Azores. Depth, 1-6 ft. (Verrill).

Leptochelia dubia (Krøyer).

Tanais dubius Krøyer, Naturh. Tidssk., iv, p. 178, pl. ii, figs. 20-22, 1842-3.

Paratanais algicola Harger, Am. Jour. Sci. and Art, xv, p. 377, 1878.

Leptochelia algicola Harger, Report U. S. Fish Com., pt. 6, p. 421, 1880.

Leptochelia dubia G. O. Sars, Archiv for Math. og Naturvid., p. 26, 1880; and p. 317, pl. x, xi, 1886.

Leptochelia algicola Dollfus, Mém. de la Soc. Zool. de France, xi, p. 44, 1898.

Leptochelia dubia Norman, Ann. Mag. Nat. Hist. (7), iii, p. 334, 1899.

? *Leptochelia incerta* Moore, Report U. S. Fish Com., ii, p. 165-166, 1901.

There are two males and a small number of females in the collection. The males and females agree with the original description and figures of *L. dubia* (Krøyer), the inner branch of the uropoda in both sexes consisting of five joints.*

There are also two specimens in the collection, both females, which have the inner branch of the uropoda two-jointed. Although this may be a new species of *Leptochelia*, I do not feel warranted with such scanty material, and with no males, to describe a new species of this genus.

Hab. Castle Harbor, Bermudas, collected by A. E. Verrill and party, in 1898. Also Jersey; Birterbuy Bay, Ireland; Falmouth Harbor; Valentia, Ireland; Mediterranean; Atlantic coast from Brittany to Senegal and Teneriffe; Northeast coast of N. America; Brazil.

Leptochelia rapax Harger.

Leptochelia rapax Harger, Proc. U. S. Nat. Museum, ii, p. 163, 1879. Report U. S. Fish Comm., pt. vi, p. 424, pl. xiii, figs. 89, 90, 1880.

Hab. Bermudas, collected by W. G. Van Name, May, 1901.

Also found at Annisquam, Mass., in 3 feet of water, on muddy bottom.

* There is no character of specific importance to separate *L. algicola* Harger from *L. dubia* (Krøyer) the males and females of *L. dubia* in the collection from the Bermudas agreeing with Harger's specimens as figured and described, with the exception that the Bermudian specimens have five joints to the inner branch of the uropoda instead of six. Stebbing has pointed out (Ann. Mag. Nat. Hist. (6) xvii, p. 158-159, 1896) that there is some variation in the number of joints in several species of *Leptochelia*, and *L. Edwardsii*, which Krøyer figures and describes as having seven joints to the inner branch, is now recognized as a synonymy of *L. savignyi*, which is figured and described by the same author as having six joints. It is not improbable, as Stebbing has suggested, that *L. savignyi* and *L. dubia* are identical.

Family **Apseudidæ.****Apseudes triangulata** Richardson, sp. nov.

PLATE XXXVII. FIGURES 1-5.

Body narrow, elongated, surface smooth.

Head with frontal margin produced at the middle in a rostrum like a spear point, whose sides near the base are excavated below the lateral expansion of the rostrum. On either side of the excavation thus formed the margin is acutely produced in a small anterior process. Lateral to this process is the ocular process, which is produced anteriorly about the same distance. The eyes are distinct and black and occupy almost the whole surface of the ocular lobe.

The first pair of antennæ have the first joint of the peduncle long, the inner lateral margin of which is armed with three long spines and one small one; the outer margin, with one large spine near the apex. The second joint is one-third the length of the first joint and is unarmed. The third joint is one-half as long as the second joint. The flagellum is composed of about fourteen joints; the secondary appendage of about seven joints. The peduncle of the second pair of antennæ extends to the end of the first joint of the peduncle of the first pair, and has an exopod developed at the base of the third joint. The flagellum is composed of about ten joints, and extends about half the length of the flagellum of the first pair of antennæ. There is a prominent spine on the epistoma.

The first free segment of the thorax is shortest, the two following ones being longer, the next two the longest, and the last but little longer than the first. The first segment is as wide as the head, the others decrease in width gradually. The antero-lateral margins of all the segments except the first are produced into one acute process, of the fourth and fifth free segments into two acute processes. The last segment bears a ventral spine.

The abdominal segments gradually decrease in width backwards. The sixth or terminal segment is produced on either side near the base into two acute processes. Beyond the last process the segment widens slightly for the attachment of the uropoda, and ends posteriorly in a triangular process. The uropoda are very long, the inner branch being half the length of the body, and composed of about twenty-five joints. The outer branch is composed of seven joints.

First gnathopods with the upper distal margin of the propodus, finely serrate and armed with a tooth near the articulation of the

dactylus. Second gnathopods have the merus armed with one spine at its distal extremity on the posterior margin, and one on the anterior margin; the carpus armed with two spines on its posterior and one on the anterior margin at the distal extremity; the margin of the propodus armed with three spines on the posterior margin, and one large spine and one small one at the distal extremity on the anterior margin. The dactylus is serrate on its inner margin. Exopods are present on both first and second gnathopods. The other legs are beset with spines.

The specimen is a female and has a large marsupium filled with eggs, extending the length of the first four free segments of the thorax.

Only one individual was collected by A. E. Verrill and party, in Harrington Sound, Bermudas.

Type specimen in Peabody Museum, Yale University. Cat. No. 3192.

Aapseudes propinquus Richardson, sp. nov.

PLATE XXXVII. FIGURES 6-9.

Body narrow, elongated, surface smooth.

Head with frontal margin produced in the middle in a long, acute, deflected process, from base of which on both sides there is an abrupt lateral expansion, the margin forming an outward curve which extends to the base of the ocular lobe and then proceeds straight to the lateral margin of the head. Ocular lobe produced in an acute process. Eyes large, black, occupying the whole of the ocular lobe.

First pair of antennæ with first joint of peduncle long, and armed on inner lateral margin with two large spines and one small one near the base, and on distal end of outer margin with one large spine. Second joint less than one-third the length of first joint and unarmed. Third joint one-half as long as second joint. Flagellum composed of sixteen joints. Secondary appendage composed of eight joints. Second pair of antennæ with an exopod at base of third joint of peduncle; flagellum composed of ten joints. There is a conspicuous spine on the epistoma.

First two free segments of the thorax about equal in length, the three following ones longer, increasing in length, the last segment a little longer than the first two. The antero-lateral margins of all the segments are acutely produced, those of the fourth and fifth free

segments have two antero-lateral angulations. There is an anteriorly directed curved spine on the ventral surface of the first free segment. On the ventral surface of the second segment there is a straight spine directed posteriorly. The third, fourth, and fifth segments bear each a ventral curved spine directed anteriorly. The sixth segment has on the ventral surface a large, stout process.

The lateral margins of all the first five abdominal segments are drawn out in acute processes.

The terminal segment has two lateral angulations above the attachment of the uropoda. The posterior margin is triangulate. The inner branch of the uropoda is very long, equal in length to half the body, and is composed of thirty-four joints. The outer branch consists of eleven joints.

The first gnathopods have a tooth on the distal margin of the propodus near the articulation of the dactylus. There is a conspicuous spine on the posterior margin of the basis.

The second gnathopods have one spine at the distal end of the merus on the anterior margin; one spine at the distal end of the carpus on the anterior margin and two spines on the posterior margins of the same joint; four spines on the posterior margin of the propodus and two on the anterior margin at the distal extremity; the dactylus is serrate along the inner margin. Exopods are present on both first and second gnathopods. The other legs are beset with spines.

A few specimens, both males and females, were collected by A. E. Verrill and party at Bailey Bay and Castle Harbor, Bermudas, in 1898.

Type specimen from the Bermudas in Peabody Museum, Yale University. Cat. No. 3194.

This species is very closely related to *Apsuedes intermedius* Hansen* but differs in the following points.

1.—The first joint of the peduncle of the first pair of antennæ is armed with three spines on the inner margin, and one spine on the outer margin at the distal end. In *A. intermedius*, this joint is unarmed.

2.—In the increased number of joints in the flagella of both pairs of antennæ, there being sixteen joints in the flagellum of the first pair of antennæ, eight in the secondary appendage, and ten in the flagellum of the second pair of antennæ, while in Dr. Hansen's spe-

* Isopoden, Cumaceen, und Stomatopoden der Plankton-Expedition, p. 49-50, pl. v, fig. 10-10b, pl. vi, fig. 1, 1895.

cies the flagellum of the first pair of antennæ is composed of seven joints, the secondary appendage of three joints, and the flagellum of the second pair of antennæ of four joints.

3.—In the much greater length of the uropoda, the inner branch of which in *A. propinquus* is half the length of the body and composed of thirty-four joints, the outer branch consisting of eleven joints, while in *A. intermedius* the outer branch has only four joints, and the inner branch is only twice the length of the terminal abdominal segment and is composed of only fifteen joints.

Parapseudes goodei Richardson, sp. nov.

PLATE XXXVII. FIGURES 10-14.

Surface of body smooth ; color light yellow.

Head but slightly narrowed anteriorly. Eyes with large, brown ocelli and placed on ocular processes, articulated to the head. Frontal margin with a rostrum projecting between the basal joints of the first pair of antennæ. The base of the rostrum is constricted, the anterior margin broadly rounded.

The first pair of antennæ have the peduncle short, the first joint twice as long as the second, the third half as long as the second, all three with margins smooth, unarmed, but fringed with long hairs. The flagellum consists of seven joints ; the secondary appendage of four joints. The second pair of antennæ extend only to the end of the peduncle of the first pair ; the flagellum contains five joints ; a scale is articulated to the peduncle.

The first, second and third free thoracic segments are about equal in length, the following three being longer than the first three, and sub-equal. The first and second segments have a small epimeral lobe on the antero-lateral margin. The third segment has a small lobe about the center of the lateral margin. The lobes of the three following segments are situated post-laterally.

The abdomen is very short ; all the segments together not equaling in length the last two thoracic segments. The first five segments have the margins produced at the sides, with deep lateral incisions between the segments.

The terminal segment is triangulate posteriorly with the apex acute. The uropoda are quite half the length of the body ; the inner branch consisting of about twenty-five joints, the outer and smaller branch consisting of six joints. There are but four pairs of pleopoda.

The first pair of legs of the female are much more slender than those of the male. In the male there is a deep excavation on the distal margin of the propodus near the articulation of the dactylus, while in the female this excavation is comparatively small. In the male there is a spine within this excavation and one on the dactylus, both situated at the articulation of the dactylus and the propodus. Exopods are present on both pairs of gnathopods. All the other legs are very spinulose.

A few specimens (types) were collected by A. E. Verrill and party in 1898, at Castle Harbor, Bermudas, and one specimen was collected by G. Brown Goode at the Bermudas in 1876-7.

Type in Peabody Museum, Yale University. Cat. No. 3222.

This species has a close resemblance to *Parapseudes latifrons* (Grübe),* but differs in the following characters: in *P. goodei* the first pair of gnathopods are more robust; the propodus has a deep excavation near the articulation of the dactylus, within which is a large spine. There is also a spine on the dactylus.

The rostrum is constricted at the base in *P. goodei*, while in *P. latifrons* the line is unbroken from the apex of the rostrum to the lateral margin of the head.

The secondary appendage of the flagellum of the first antennæ is composed of four joints in *P. goodei* while in *P. latifrons* this appendage is composed of seven joints. The flagellum of the second pair of antennæ consists of five joints in *P. goodei*, while in Grübe's species it consists of eight joints.

FLABELLIFERA or CYMOTHOIDEA.

Family Anthuridæ.

Paranthura infundibulata Richardson, sp. nov.

PLATE XXXVIII. FIGURES 15-20.

♂. Body narrow, elongate; color yellow, with markings of black. Head with antero-lateral angles prominent, between which the frontal margin is excavate for the reception of the antennæ, the middle being produced in a conspicuous median point. The eyes are situated in the antero-lateral prolongations.

* *Rhoëa latifrons* Grübe, Die Insel Lussin und ihre Meeresfauna, p. 75, 1864.

Parapseudes latifrons G. O. Sars, Archiv for Math. og Naturvidenskab, Vol. xi, p. 304, pl. viii, 1886.

The first pair of antennæ have the basal joint long, oblong in shape, the other two joints of the peduncle being short and about equal in length ; the flagellum consists of nine joints.

The second pair of antennæ have the second joint of the peduncle very long, slightly exceeding in length the first and second peduncular joints of the first pair of antennæ. The second antennæ are geniculate at the articulation of the second and third joints. The other three joints, following the second, are of nearly equal length. The flagellum consists of a single tapering joint, furnished with hairs.

The first three thoracic segments are about equal in length, elongate, the first two having their posterior angles rounded. The fourth, fifth and sixth segments are equal in length, and one-third shorter than the first three. The seventh segment is about half as long as the preceding one, and has the posterior angles produced downwards.

The segments of the abdomen are distinct, and very short, all five anterior to the terminal segment being no longer than half the length of the seventh thoracic segment. The terminal segment is long and narrow, of the same width throughout its length, except at the apex, where the lateral margins are abruptly drawn out into processes, which curve upwards, giving a funnel-shaped appearance to the posterior end of the segment, which is very concave. The posterior margin is truncate and coarsely denticulate.

The inner branches of the uropoda do not quite reach the extremity of the terminal abdominal segment. The basal joint is about half the length of the terminal abdominal segment. The inner branch is extremely concave, with its entire margin denticulate, its ventral surface having a longitudinal carina. The outer and superior branch is long and narrow, quadrangular and somewhat narrowed posteriorly, and from the middle slightly curving upward, coarsely denticulate on its inner lateral and posterior margin, the teeth being rather widely separated. The branches of the uropoda and the terminal abdominal segment are fringed with hairs.

The first, second and third pairs of legs are sub-cheliform. The second and third pairs have the propodus similar in shape to the first pair, but more slender and armed on their posterior margin with seven or eight large conspicuous spines. The other legs are longer and more slender, and armed with four spines on the anterior margin of both the carpus and the propodus.

A number of specimens, all males, were collected by George Brown Goode in 1876-7, at the Bermudas.

Type specimens in Peabody Museum, Yale University. Cat. No. 3207.

Paranthura verrillii Richardson, sp. nov.

PLATE XXXVIII. FIGURES 21-22.

Body narrow, elongate. Color dark brown, with scattered black dots.

Head with lateral angulations prominent, rounded, between which the front is excavate on either side of a small median point. Eyes large, situated in the lateral angulations.

First pair of antennæ have the first joint of the peduncle oblong, the other two shorter and about equal in length, flagellum six to seven jointed. The second pair of antennæ have a five-jointed peduncle, (the first joint being short and indistinct,) of which the second and fifth joints are longest, the flagellum being consolidated into a single, flattened, tapering joint, furnished with hairs.

The first five thoracic segments are of equal length. The sixth is somewhat shorter than any of the others, and the seventh is half as long as the sixth.

The abdominal segments are distinct, the first five taken together being no longer than the seventh thoracic segment. The terminal abdominal segment is long and narrow, rectangular in shape, with margins entire. The basal joint of the uropoda is half as long as the terminal segment of the abdomen; the inner branch is rectangular, coarsely denticulate, and reaches the apex of the telson. The outer superior branch is narrow, elongate, rectangular, with margins coarsely denticulate, the teeth being close together.

The branches of the uropoda and the terminal abdominal segment are fringed with long hairs.

The first three pairs of legs are sub-chelate. The second and third pairs have the posterior margin of the propodus armed with spines, as in the preceding species. In the following four pairs of legs the anterior margin of the propodus is armed with four spines.

A single female was collected by A. E. Verrill and party in 1898, at the Bermudas. Depth, 1-2 feet.

Type specimen in Peabody Museum, Yale University. Cat. No. 3186.

Colanthura Richardson, gen nov.

Body narrow, elongate. First pair of antennæ composed of four joints, the last joint being the flagellar joint. Second pair of antennæ composed of five joints, the terminal joint fringed with hairs.

The first six segments of the thorax large, the seventh very short, abruptly narrower than the sixth, not as wide as the abdominal segments and devoid of legs.

The first three pairs of legs are sub-chelate, the three following pairs ambulatory.

The abdominal segments are well defined and distinct from one another. The terminal abdominal segment is rounded, entire. The inner branch of the uropoda is likewise rounded; the outer and superior branch arches over the telson.

This genus agrees with both *Hyssura* Norman and Stebbing and *Cruregans* Chilton in the absence of the seventh pair of legs, but differs from the first named in the structure of the antennæ, both pairs of antennæ in *Hyssura* having multi-articulate flagella; in the structure of the outer branch of the uropoda, which in *Hyssura* does not arch over the telson; and in the structure of the mouth parts. *Colanthura* differs from *Cruregans* in the presence of eyes, which are wanting in *Cruregans*, and in the structure of the outer branch of the uropoda, the outer branch in *Cruregans* being very narrow and not arching over the squamiform telson, while in *Colanthura* the outer branch is broad and arches over the rounded terminal segment. The structure of the mouth parts is the same as found in the genera *Paranthura*, *Calathura* and *Cruregans*.

Colanthura tenuis Richardson, sp. nov.

PLATE XXXVIII. FIGURES 23-28.

Body narrow, elongate; surface smooth; color light yellow. Head with a prominent median process extending between the first pair of antennæ. Antero-lateral angles prominent, produced, reaching the distal end of the first joint of the peduncle of the first pair of antennæ. Eyes large, conspicuous.

First pair of antennæ consist of four joints, the terminal or flagellar joint being fringed with long hairs. The second pair of antennæ are composed of five joints, the terminal joint being fringed with hairs.

The first three thoracic segments are about equal in length. The fourth and fifth segments are each much longer than any of the

three preceding segments, and are about alike in size. The sixth segment is short, not quite as long as any one of the first three segments. The seventh is very short, being one-third the length of the sixth segment, and in both specimens examined is devoid of legs.

The segments of the abdomen are distinct, the first five together not being as long as the sixth thoracic segment. The last thoracic segment is abruptly narrower than the sixth, and is likewise somewhat narrower than the abdominal segments.

The terminal segment of the body is linguiform, the posterior margin evenly rounded and smooth. The inner branch of the uropoda is likewise rounded posteriorly with a smooth margin. The outer and superior branch arches over the telson. Both branches, as well as the terminal abdominal segment, are fringed with hairs.

The first pair of legs are cheliform, the propodus unarmed. The second and third pairs are also cheliform, but smaller, with the propodus armed on the posterior margin with five spines. The three following pairs of legs are ambulatory in character. The seventh pair are wanting.

Two specimens were collected by A. E. Verrill and party at the Bermudas in 1898. Both specimens are adult females, the marsupium in one being very large and extending the entire length of the thorax, from the second segment.

Type specimen in Peabody Museum, Yale University. Cat. No. 3252.

Anthelura affinis Richardson, sp. nov.

PLATE XXXVIII. FIGURES 29-32.

Body narrow, elongate. Head with small median point. Eyes distinct, situated in antero-lateral angulations.

Antennæ of both pairs with flagella consisting of several joints, and fringed with long hairs at the tip. Maxillipeds consist of five joints.

First three thoracic segments about equal in length. Three following segments somewhat longer, and sub-equal. Seventh segment fully half the length of preceding segment.

All the segments of the abdomen distinctly defined. Terminal segment narrowly linguiform, roundly triangulate at the apex and with smooth margins.

Outer superior branch of uropoda long, oval, reaching quite to the extremity of the terminal abdominal segment, and arching over the telson. Inner branch with posterior margin widely rounded and

extending beyond telson. Both branches have the margins smooth, entire.

First gnathopods with small hand. Dactylus short. Free inner margin of propodus furnished with hairs. Second gnathopods and first periopods similar in shape to, but smaller in size than, first pair of gnathopods. The free inner margin of the propodus is beset with two spines, the carpus with one spine. The remaining periopods have a single spine at the distal margin of the propodus and two spines on the carpus.

One specimen, a female, was collected by A. E. Verrill at the Bermudas in 1901.

Type in Peabody Museum of Yale University. Cat. No. 3349.

This species differs from *A. elongata* Norman, in the shape of the outer branch of the uropoda, in the length of both branches, as compared with the terminal abdominal segment, and in the fact that the margins of the outer branch in our species are smooth and not crenulate, as in *A. elongata*.

Family Cirolanidæ.

Colopisthus Richardson, gen. nov.

Head transversely elongated. Eyes situated in the middle of the lateral margins at the extreme edge and elevated knob-like above the surface.

Both pairs of antennæ short; second pair reach the posterior margin of the first thoracic segment.

First five abdominal segments consolidated into one short segment. Terminal segment strongly keeled in the median longitudinal line.

Colopisthus parvus, Richardson, sp. nov.

PLATE XXXVIII. FIGURES 33-36.

Head transversely elliptical, the anterior and posterior margins rounded. The eyes are situated in the middle of the lateral margins at the extreme edge, and are elevated above the surface of the head like knobs. The head is concave between the eyes.

The first pair of antennæ are short, not much longer than the width of the head, and reach the end of the last peduncular joint of the second pair of antennæ; the flagellum contains three joints.

The second pair of antennæ are also short, extending to the posterior margin of the first thoracic segment; flagellum consists of seven joints.

The first thoracic segment is longest. The others are sub-equal with well defined epimera.

The first five abdominal segments are all coalesced into one segment. The terminal segment is triangular and strongly keeled along the median longitudinal line.

The inner branches of the uropoda extend beyond the tip of the terminal segment, are broadly oval and fringed with hairs. The outer branches are narrowly oval, about half as wide as the inner branches, and shorter.

Color light yellow, with numerous black dots.

About seven specimens were collected by A. E. Verrill and party at Bailey Bay, Bermudas, in 1898. Found at low water in corallines. Others were collected in 1901 at Waterloo, on Castle Harbor, Bermudas.

Type specimen from the Bermudas in Peabody Museum, Yale University. Cat. No. 3179.

Family **Corallanidæ.**

Corallana quadricornis Hansen.

Corallana quadricornis Hansen, Vidensk. Selsk. Skr. (6), natur. og math. Afd., v, p. 382, pl. vii, fig. 2, 1890.

Hab. Bermudas, at the Flatts; at Long Bird Island in the cavities of a massive, black keraotse sponge, living on the grassy sand-flats at low tide; Castle Harbor, in the same sponge. Also St. Thomas, West Indies.

Family **Alcironidæ.**

Alcirona krebsii Hansen.

Alcirona krebsii Hansen, Vidensk. Selsk. Skr. (6), natur. og math. Afd., v, pp. 391-393, pl. viii, figs. 1-19, 1890.

PLATE XXXVIII. FIGURES 38a, 38b.

Hab. Castle Harbor, Bermudas, in the cavities of living bathing sponges and in dead coral. Two specimens (No. 33, 34) were taken from the fins of a Hamlet Grouper, in May;* St. Thomas, West Indies.

* The colors of these, in life, were as follows: Ground color, pale flesh-color; head and tail, yellowish brown; seven transverse, irregular bands of yellowish brown, those of the middle of the body with two points projecting forward, so as to show a tendency to form two dorsal lines of brown. A. E. V.

Family Cymothoidæ.

Nerocila acuminata Schiøedte and Meinert.

Nerocila acuminata Schiøedte and Meinert, Naturhist. Tidsskr., xiii, pp. 48-50, pl. iii, figs. 5-6, 1881-83.

Hab. Bermudas, collected by George Brown Goode in 1876-7. Also recorded from Beloxi, Miss.; St. Anna, Mexico; Fort Macon, North Carolina.

Family Sphæromidæ.

Cilicæa caudata (Say).

Nesea caudata Say, Jour. Phil. Acad., i, p. 482, 1818. Milne-Edwards, Hist. Nat. des Crustacés, iii, p. 219, 1840.

Cymodocea caudata Ives, Proc. Phil. Acad. Nat. Sci., p. 188, pl. vi, figs. 11-14, 1891.

Cilicæa caudata Richardson, Proc. U. S. Nat. Museum, xxiii, p. 536, 1901.

Hab. Bermudas, at Harrington Sound, Castle Harbor, and the Flatts. Also Egg Harbor, N. J.; Beaufort, N. C.; No Name Key, Fla.; between Salt Pond Key and Stock Island; Key West, Fla.; Sugarloaf Key, Fla.; N. W. end St. Martin's Reef, Fla.; Sarasota Bay, Fla.; off Progreso, Yucatan.

Found on the surface; also at the depth of 1 to 12 feet.

Dynamene bermudensis (Ives).

Cymodocea bermudensis Ives, Proc. Phil. Acad. Nat. Sci., p. 194, pl. vi, figs. 15, 16, 1891.

Hab. Bermudas. Also Punta Rassa, Fla.; Cedar Keys, Fla.; Key West, Fla.; No Name Key, Fla.; Sarasota Bay, Fla.; Beaufort, N. C.

Dynamene perforata Moore.

Dynamene perforata Moore, Report U. S. Fish Com., ii, pp. 173-174, pl. x, figs. 9-19, 1901.

PLATE XXXIX. FIGURE 39.

Head broader than long; eyes situated post-laterally. First pair of antennæ with the first two peduncular joints large, the second half as long as the first; the third joint long and slender, twice as long as second joint; flagellum consists of seven joints. The first two peduncular joints of the second pair of antennæ are of equal length; the following three of equal length and longer than the first two; the flagellum consists of about seven joints, and extends to the posterior margin of the third thoracic segment.

The thoracic segments are of equal length, with the exception of the first, which is slightly longer. The seventh segment is produced

backwards in two rounded lobes, one on either side of the median line, and close together.

The first abdominal segment has two suture lines at either side, indicative of coalesced segments. The terminal segment is very convex at the base, and has four small tubercles, forming a square on the convexity. Its apex has a heart-shaped opening, formed by the prolongation of the lateral margins, which prolongations meet anteriorly, and are divergent posteriorly, so that a triangular excavation is formed on the posterior end of the segment immediately below the heart-shaped opening.

The two branches of the uropoda are similar in shape and size. They are large, very much expanded, rounded posteriorly, with margins distinctly crenulate or denticulate, and extend some distance beyond the tip of the terminal abdominal segment.

The color is brown, with markings of black. Surface smooth, with the exception of the abdomen, which is very granular.

A number of specimens (13) were collected by George Brown Goode in 1876-7, at the Bermudas.

Several specimens differ from the specimen described in not having the 7th thoracic segment produced in lobes, and are without the four small tubercles at base of terminal segment. Several differ in having the uropoda not longer than the terminal segment.

The females do not have the heart-shaped opening in the terminal segment.

Specimens described are in Peabody Museum, Yale University. Cat. No. 3204.

The above species was described and figured as new, but the manuscript had not been sent to print when Mr. Moore's Report on the Porto Rican Isopoda was published, in which he described *Dynamene perforata*.

It was thought best to publish the author's description and figures, for although in the text Mr. Moore mentions the fact that the uropoda are serrate or crenulate, he does not show this in his drawings. The figures published here bring out this point.

Sphæroma crenulatum Richardson, sp. nov.

PLATE XXXIX. FIGURE 40.

Surface of body smooth. Color, light brown, with markings of black.

Head rounded in front with small median point, on either side of which is small excavation. Eyes situated post-laterally.

First pair of antennæ with the first joint of the peduncle long ; second joint half as long as first ; third joint equal in length to first ; flagellum of five joints reaches the post-lateral margin of the head.

Second pair of antennæ extend to the middle of the first thoracic segment.

Thoracic segments subequal. Lateral margins straight. Epimera distinctly separated from segments.

First abdominal segment long, a little longer than any of the thoracic segments, with two suture lines. Terminal segment very convex, surface smooth, posterior margin widely rounded. Uropoda not extending beyond tip of terminal segment. Inner branch somewhat pointed at its extremity, margin smooth. Outer branch widely rounded and crenulate on the posterior edge.

Legs similar, all ambulatory, with small curved dactyli.

A number of specimens were collected at the Bermudas in 1876-7, by George Brown Goode.

Type in Peabody Museum, Yale University. Cat. No. 3250.

VALVIFERA.

Family Idoteidæ.

Idotea marina (Linnæus).

Oniscus marinus Linnæus, Fauna Suecica, p. 500, 1761 ; Syst. Nat. (ed. xii), p. 1060, 1766.

Oniscus tridens Scopoli, Entom. Carniolica, p. 415, 1763.

Oniscus balticus Pallas, Spic. Zoöl. (9), p. 67, pl. iv, fig. 6, 1772.

Stenosoma irrorata Say, Journ. Acad. Nat. Sci. Philad., i, p. 423, 1818.

Idotea tricuspidata Desmarest, Dict. des Sci. Nat., xxviii, p. 373, pl. xlvi, fig. 11, 1823.

Idotea irrorata Milne-Edwards, Hist. Nat. Cr., iii, p. 132, 1840. Verrill and Smith, Invert. Vineyard Id., pp. 22, 275, pl. v, fig. 23, from Report U. S. Comm. Fish and Fisheries, i, pp. 316, 569, 1873. Harger, Rep. U. S. Fish Comm., pt. 6, p. 343, pl. v, fig. 24-26, 1880.

Idotea marina Miers, Journ. Linn. Soc. Lond., xvi, p. 25-31, 1883. (See Miers for synonymy.)

Hab. Bermudas, at the Flatts Inlet, collected by A. E. Verrill and party. Also British Isles ; Kattegat ; Baltic ; Dutch coast ; coast of France ; Mediterranean ; Black and Caspian Seas ; Atlantic coast of North America, from Nova Scotia and the Gulf of St. Lawrence to North Carolina. South America at Desterro and Rio Janeiro, Brazil ; New Zealand ; Red Sea ; Java.

ASELLOTA or ASELLOIDEA.Family **Janiridæ.****Carpias** Richardson, gen. nov.

Head without rostrum; frontal margin straight. Both pairs of antennæ multi-articulate; the second pair much longer than the body, and with a scale-like appendage articulated to the peduncle. Uropoda long, much longer than abdomen.

The first pair of legs in the male are prehensile and remarkably long, being one and two-thirds times the length of the body; are greatly enlarged distally, forming a broad club-like hand armed with triangular processes, to which is articulated a moveable finger, the propodus, likewise armed with triangular processes.

The ambulatory legs are simple, biunguiculate, and are of normal structure.

Carpias bermudensis Richardson, sp. nov.

PLATE XXXIX. FIGURES 42-45.

PLATE XL. FIGURE 41.

Surface of body smooth. Color yellow, with odd shaped markings of black.

Head narrower than first thoracic segment, with lateral margins rounded, entire. Frontal margin straight, antero-lateral angles not produced, rounded. Eyes large, with many ocelli, and situated on the lateral margins of the head.

The first pair of antennæ have the basal segment of the peduncle enlarged, the next two segments successively narrower, all about equal in length; the flagellum is multi-articulate, composed of about fourteen joints. The second pair of antennæ have a scale-like appendage outside of the third joint; the fourth and fifth joints are long, the fifth a little longer than the fourth; the flagellum is much longer than the body, and is composed of about one hundred joints.

The first thoracic segment is wider than the head; the lateral margins are straight, entire. The second and third segments have the lateral margins excavate, the anterior and posterior angles produced, with the epimeron situated in the excavation. The fourth segment has the anterior angle produced, the epimeron being situated in the excavation of the entire posterior part of the segment. The fifth, sixth and seventh segments have the lateral margins entire, the epimeron showing at the posterior part of the segment.

The terminal segment of the body is about as broad as long, the entire margin smooth, with a small rounded lobe between the basal joints of the uropoda.

The uropoda are very long, much longer than the abdominal segment. The basal joint is about two-thirds the length of the abdominal segment, and is narrower at the base than at the apex. The two branches are of nearly equal length, the outer one being slightly shorter, and are longer than the basal joint.

The first pair of legs in the male are remarkably long, being one and two-thirds times the length of the body, and are prehensile. The basis is as long as the width of the first thoracic segment, and has the distal end very much enlarged and inflated. The ischium is not more than half the length of the basis. The merus is a little longer than the basis, and is enlarged at its distal end. The carpus is very much elongated, is longer than the ischium, is greatly enlarged distally, and has its upper distal margin armed with three large triangularly-shaped processes. The propodus has the inner surface armed with two long, sharp triangular processes, its distal end being widely expanded and rounded on the inner surface. The dactylus is biunguiculate.

The other legs are of normal structure, ambulatory in character, and biunguiculate. In the female the first pair of legs are similar in structure and size to the other legs.

A number of individuals were collected by George Brown Goode at the Bermudas.

Type specimens in Peabody Museum, Yale University. Cat. No. 3203.

Stenetrium stebbingi Richardson, sp. nov.

PLATE XXXIX. FIGURES 46-49.

Body long, narrow, depressed. Color light yellow, with markings of black.

Head narrowed posteriorly, widening anteriorly; the antero-lateral angles produced into narrow acute processes, curving slightly inward; the anterior margin is produced in a rostrum, which is truncated, on either side of which is a triangular process. Eyes obliquely situated on the anterior portion of the head.

First pair of antennæ are placed between the two triangular processes and the rostrum; the first peduncular joint is large, broad, the two following joints narrow; the flagellum is composed of nine

joints and reaches a little beyond the middle of the fourth peduncular joint of the second pair of antennæ.

The second pair of antennæ have the first three joints short, the third joint being provided with an exopod, the fourth and fifth joints long and of equal length; the flagellum is multi-articulate.

The first thoracic segment has the lateral margins straight, the anterior angles acutely produced forwards. The lateral margins of the second, third and fourth segment are also straight, with the epimera evident about the middle.

The fifth and sixth segments have the posterior half of the lateral margin rounded, the epimera evident below. The seventh segment has the lateral margin acutely produced posteriorly, the epimera evident on the posterior margin of the segment within the processes. The thoracic segments are all widely separated from each other by deep lateral incisions.

The terminal segment of the body has the lateral margin produced backwards in two small spines, between which the posterior margin is widely rounded. The uropoda are double branched, the branches being nearly equal in length and about as long as the basal joint.

The first pair of legs are subchelate. In the male the carpus is postero-distally produced in a markedly long process, which extends half the length of the propodus, its entire margin being fringed with long hairs. The propodus is elongate, its lower two-thirds being fringed with long hairs on the posterior margin, the upper third or distal margin being provided with three large spines, the inner one being bifurcate; the dactylus is long and also fringed with hairs upon its inner margin, and extends half its length beyond the last digital spine, almost touching the carpal process. The ischium is antero-distally produced in a short process.

The other legs are simple, biunguiculate.

In the female the carpus of the first pair of legs is not produced in as long a process as in the male. The propodus is shorter than in the male, more triangular in shape, denticulate on its distal margin, with a long, acute, digital spine. The dactylus does not extend beyond the digital spine. The ischium is antero-distally produced in a process fringed with hairs.

A number of individuals were taken by A. E. Verrill and party at Bailey Bay, Bermudas, in corallines, at low water, and at Harrington Sound, in 1898. Other specimens were collected at the Bermudas in 1876-7 by G. B. Goode.

Type specimens from Harrington Sound in Peabody Museum, Yale University. Cat. No. 3209.

Janira minuta Richardson, sp. nov.

PLATE XXXIX. FIGURES 50-52.

Surface of body smooth. Color light yellow, almost white, spotted with black.

Head with frontal margin straight; eyes large, conspicuous, oblong, and situated at the lateral margin. First pair of antennæ with the three peduncular joints equal in length, the first one, however, being very much the broadest, the second a little stouter than the third; flagellum multi-articulate, composed of about ten or eleven joints. The second pair of antennæ have a scale outside the third joint of the peduncle; flagellum multi-articulate, much longer than the body. Thoracic segments subequal in length. First segment with the lateral margin entire, epimeron not evident from a dorsal view. Second and third segments with margins entire, straight, epimera evident about the middle of the segments. Fourth segment with the posterior half of the lateral margin slightly excavate, the epimeron evident in the excavation. The last three segments with the lateral margins entire, the epimera evident as small lobes at the post-lateral angles.

The terminal segment is about as broad as long, rounded posteriorly with a median lobe between the peduncular joints of the uropoda. The uropoda extend much beyond the terminal segment, being longer than that segment. The outer branch is somewhat shorter than the inner branch; both branches are longer than the peduncle, and are fringed with long hairs.

In the female the first pair of legs are prehensile; the others are simple walking legs, with biunguiculate dactyli. In the male, however, the first pair of legs are modified, though prehensile. The carpal joint is very much enlarged and is produced on the inside, at its outer distal end, in a long, acute process, between which and the articulation of the propodus are two long acute processes about half as long as the outer process. The propodus is similar to that of the female; the dactylus is biunguiculate.

A number of specimens, both males and females, were collected by A. E. Verrill and party in 1898, at Castle Harbor, Bermudas.

Type specimens in Peabody Museum, Yale University. Cat. Nos. 3194 and 3261.

Jæropsis rathbunæ Richardson, sp. nov.

PLATE XL. FIGURES 53, 54, 55a, 55b, 55c.

Body elongate, depressed, segments loosely articulated; surface smooth; color uniformly light, almost white.

Head with a median excavation, on either side of which the frontal margin is produced into angulations. On either side of these angulations is another excavation, on the outside of which are lateral angulations. A rounded lobe is placed in the median excavation. The eyes are small and are situated near the lateral margins about half way between the anterior and posterior margins. The first pair of antennæ consist of five joints, the two first joints being large, the three following ones small, the last fringed with hairs. The second pair of antennæ have a rudimentary flagellum, consisting of five or six joints; the peduncle has the third and fifth joints long and oval in shape, the fourth joint somewhat triangular.

The thoracic segments are loosely articulated. The lateral margins are straight, with no indication of epimera.

The terminal segment of the body is rounded in outline, the posterior margin excavated at the insertion of the uropoda, which do not extend beyond the edge of the segment, thus preserving the oval outline. Between the uropoda there is an acute median projection.

The legs are all simple, with biunguiculate dactyli.

One specimen was collected by A. E. Verrill and party at the Bermudas, and another by G. B. Goode; from the same locality.

Type specimens in Peabody Museum, Yale University. Cat. No. 3251.

Six species of this genus have been heretofore described: *Jæropsis lobata* Kæhler, *Jæropsis marionis* Beddard, *Jæropsis neo-zealandica* Chilton, *Jæropsis lobata* Richardson, *Jæropsis Dollfusi* Norman, and *Jæropsis curvicornis* (Nicolet).* The present species adds another to the above list. It is named in honor of Miss Mary J. Rathbun.

* *Jæra curvicornis* Nicolet, in Gay's Hist. de Chile, iii, p. 263, Zoöl. Atlas, Crust., No. 3, fig. 10, 1849. This species should be referred to the genus *Jæropsis*.

EPICARIDEA or BOPYROIDEA.

Family **Bopyridæ.**

Bopyroides latreuticola Gissler.

Bopyroides latreuticola Gissler, Am. Nat., xvi, pp. 591-594, 1882.

Bopyrus, sp. ?, Spence Bate, Report of the Scientific Results of the Exploring Voyage of H. M. S. Challenger, xxiv, p. 582, 1888.

Bopyroides latreuticola Richardson, Proc. U. S. Nat. Museum, 1901, p. 579.

Hab. Bermudas, parasitic on *Latreutes ensiferus* (Milne-Edwards), (Spence Bate); Beaufort, North Carolina, parasitic on *Latreutes ensiferus* (Milne-Edwards).

A *Bopyrid* parasitic on *Clibanarius tricolor* was collected by G. Brown Goode at the Bermudas in 1876-7.

2.—*The Terrestrial Isopoda of the Bermudas, with a Description of a New Genus of Armadillididæ.*

Dollfus, in his report on the terrestrial isopoda of the Challenger Expedition,* recorded from the Bermudas a number of well-known forms common to other localities. In his list were included *Tylos niveus* Budde-Lund, *Porcellio lævis* Latreille, *Metoponorthus sexfasciatus* Budde-Lund, *Armadillidium vulgare* (Latreille), and *Ligia exotica* Roux.

In addition to these forms, the collection made by Prof. A. E. Verrill and parties at the Bermudas, in 1898 and 1901, also contains the following described forms common to other localities: *Tylos Latreilli* Audouin and Savigny, *Metoponorthus pruinosus* (Brandt), and *Actoniscus ellipticus* Harger.

Only three new species, one of which is also the type of a new genus, are described herein.

*Bull. Soc. d'Études Scientifiques de Paris, xii, p. 1-8, 1890.

ONISCOIDEA.

Family Tylides.

Tylos Latreilli Audouin and Savigny.

PLATE XL. FIGURE 56.

Tylos armadillo Latreille, Cuvier Règne animal, ed. 2, iv, p. 142, 1829. Guérin, Iconogr. Crust., p. 35, pl. xxxvi, fig. 4.

Tylos Latreilli Audouin and Savigny, Descript. de l'Égypte, p. 285-87, pl. xiii, fig. 1, 1827. Milne-Edwards, Hist. Crust., iii, p. 188, 1840; Règne anim. Crust., pl. lxx, bis., f. 2. Lucas, Expl. d'Alg., i, p. 73, 1849. Heller, Verh. zoöl.-bot. Ver., Wien, xvi, p. 732, 1866. Miers, Proc. Zoöl. Soc. Lond., p. 674, 1877. Budde-Lund, Crust. Isop. Terrestria, p. 273, 274, 1885. (See Budde-Lund for synonymy.)

Tylos armadillo Dollfus,* Mém. Soc. Zoöl. de France, p. 550, 1896.

Body elliptical in outline, very convex, and able to be contracted into a ball. Surface smooth or minutely granular and setigerous. Color yellow or light brown, marked with black spots.

Head with front not marginate; lateral angulations produced into lobes, which are truncate. Epistome forming a triangular shield, advancing some distance beyond the surface of the head. Eyes situated post-laterally. External antennæ, with a five-jointed peduncle and a flagellum consisting of four joints, extends to the posterior margin of the second thoracic segment.

The seven thoracic segments are subequal. The epimera of the first segment are represented by a thickening of the lateral edge, which is incised or cleft posteriorly. The epimera of all the other segments are dorsally separated by distinct suture lines.

The first two abdominal segments have their lateral margins covered by the seventh thoracic segment. The three following segments complete the elliptical outline of the body, their lateral margins forming a line curving inwards towards the terminal segment. The last abdominal segment is quadrangular in outline, its post-lateral angles rounded, and extends a little distance beyond the epimera of the preceding segment. The uropoda are transformed into opercular valves. At the posterior end of each large lamellar valve is a small setose joint. The third, fourth and fifth abdominal segments have

* In the Bull. Soc. d'Études Scientifiques de Paris, xiith year, pl. i, fig. 4, 1890. Dollfus gives figures of *Tylos niveus* Budde-Lund and *Tylos Latreilli* Audouin and Savigny.

plates on the ventral side extending from the margin inwards in the form of lamellæ, those of the fifth segment being longest and largest, but not meeting in the median line, being a little distance apart.

The legs are simple, ambulatory.

Three specimens were collected by Mr. J. M. Jones at the Bermudas, and about twenty more by Prof. A. E. Verrill and party at the same locality in 1898. Others were collected in 1901 at Long Bird Is., Bermudas.

Tylos niveus Budde-Lund.

Tylos niveus Budde-Lund, Crust Isop. Terr., p. 278, 1885. Dollfus, Bull. Soc. d'Études Scientifiques de Paris, xiith year, p. 8, pl. i, fig. 4a, 1890.

Hab. Bermudas (Dollfus). Also Key West (Budde-Lund).

Family **Oniscidæ**.

Porcellio lævis Latr.

Porcellio lævis Latreille, Hist. Nat. des Crust. and Insectes, vii, p. 46, 1804.

Porcellio degeerii Audouin and Savigny, Descript. de l'Égypte, p. 289, pl. xiii, fig. 5.

Porcellio eucercus Brandt, Bull. Soc. Imp. d. Moscou, vi, p. 177, 1833.

Porcellio syriacus Brandt, Bull. Soc. Imp. d. Moscou, vi, p. 178, 1833.

Porcellio musculus Brandt, Bull. Soc. Imp. d. Moscou, vi, 1833.

Porcellio cinerascens Brandt, Bull. Soc. Imp. d. Moscou, vi, p. 178, 1833.

Porcellio dubius Brandt, Bull. Soc. Imp. d. Moscou, vi, p. 178, 1833.

Porcellio poeyi Guérin, Comptes Rendus, p. 132, 1837.

Porcellio urbicus Koch, Deutsch. Crust., p. 36.

Porcellio flavipes Koch, Berichtig, etc., p. 206, pl. 8, fig. 97.

Porcellio cubensis Saussure, Mém. Soc. phys., Genève, xiv, p. 477, pl. v, fig. 35, 1858.

Porcellio sumichrasti Saussure, Mém. Soc. phys., Genève, xiv, p. 478, pl. v, fig. 36, 1858.

Porcellio cotillæ Saussure, Mém. Soc. phys., Genève, xiv, p. 478, pl. v, fig. 37, 1858.

Porcellio aztecus Saussure, Mém. Soc. phys., Genève, xiv, p. 479, pl. v, fig. 38, 1858.

Porcellio mexicanus Saussure, Mém. Soc. phys., Genève, xiv, p. 479, pl. v, fig. 39, 40, 1858.

Porcellio lævis Budde-Lund, Crust. Isop. Terrestria, p. 138-141, 1883. (See Budde-Lund for synonymy and full reference.)

Porcellio lævis Dollfus, Bull. Soc. d'Études Scient. de Paris, xiith year, p. 4, 1890.

Habitat, Bermudas, collected by George Brown Goode. Bermudas (Dollfus). Distribution world-wide.

Porcellio parvicornis Richardson, sp. nov.

PLATE XL. FIGURE 57.

Body ovate, surface marked with minute granulations. Color yellow, with markings of light brown.

Head with median lobe small, widely rounded. Lateral lobes small, rounded. Eyes distinct, and situated on lateral lobes of head. Exterior antennæ short, about one-third the length of the body: flagellum two-jointed, first joint very much shorter than second joint, about one third shorter.

Thoracic segments subequal, with the exception of the first, which is a little longer than any of the others.

First two abdominal segments with lateral parts hidden by the preceding thoracic segment. Three following segments with lateral parts expanded, the margins continuing the oval outlines of the body. Terminal segment triangular, with sides somewhat incurved and rounded at the apex. Basal joint of uropoda reaching a little more than half the length of the last abdominal segment. Inner branch extends a short distance beyond the terminal segment of the body; outer branch extends but very little beyond inner branch.

One specimen was collected by A. E. Verrill at the Bermudas in 1901.

Type specimen in Peabody Museum, Yale University. Cat. No. 3353.

Metoponorthus sexfasciatus Budde-Lund.

Metoponorthus sexfasciatus Budde-Lund, Crust. Isop. Terrestria, pp. 167-168, 1885. Dollfus, Bull. Soc. d'Études Scientifiques de Paris, xiith year, p. 4, 1890.

Hab. Bermudas (Dollfus). Also Mediterranean and Canaries, Madeira, Azores, Spain, France, Algeria.

Metoponorthus pruinus (Brandt).

Porcellio pruinus Brandt, Consp. Monogr. Crust. Isop. terrestr., p. 19, fig. 21, 1833.

Porcellio maculicornis Koch, Deutschlands Crustacéen, p. 34, 1840. Stuxberg, Ofversigt af Vetensk. Akad. Forhandl., No. 2, p. 55, 1875.

Metoponorthus pruinus Budde-Lund, Crust. Isop. Terrestria, pp. 169, 170, 1885. Sars, Crust. of Norway, ii, pts. ix-x, p. 184, pl. lxxx, fig. 2, pts. xi, xii, p. 185, 1898. (See Budde-Lund for synonymy and full reference.)

Habitat, Bermudas at Harrington Sound, collected by Prof. Rankin, of Princeton; and at Walsingham, Castle Island, and Tucker's

Island Cave, collected by A. E. Verrill, 1901. Also Europe, North America, South America, North Africa, Sumatra, Madagascar.

Leptotrichus granulatus Richardson, sp. nov.

PLATE XL. FIGURE 58.

Body roughly and minutely granulated. Color light reddish or yellowish brown, with markings of dark brown in patches on each segment, forming four longitudinal rows, the two median rows not extending anteriorly beyond the third segment of the thorax in one specimen, and in the other being almost obsolete.

The head is produced in front in a prominent rounded median lobe, and at the sides in large rounded lateral lobes. The eyes are small, but distinct, and are placed at the base of the lateral lobes. The external antennæ are very short, not reaching the anterior angle of the first thoracic segment. The fourth joint of the peduncle is not longer than the third; the flagellum is composed of two joints, the first of which is about half the length of the second.

The thoracic segments are subequal in length, the lateral parts broadly expanded.

The first two abdominal segments have the lateral parts undeveloped. The third, fourth and fifth segments are broadly expanded laterally, the outer margins forming a continuous and unbroken line with the margins of the thoracic segments. The terminal segment of the abdomen extends but a distance of half its length beyond the epimera of the preceding segment; its surface is smooth. The basal joint of the uropoda attains half the length of the terminal segment. The inner branch reaches the apex of the last segment. The outer branch extends half its length beyond this.

Two specimens were collected by A. E. Verrill and party at the Bermudas in 1898. They were found in dead coral at Castle Harbor.

Type in Peabody Museum, Yale University. Cat. No. 3333.

This species cannot be identified with any of the described species of the genus: *L. panzerii* (Audouin and Savigny), *L. tauricus* Budde-Lund, *L. squamatus* Budde-Lund, and *L.* lentus* (Budde-Lund), although it seems more closely related to the last named than to any of the former.

* See Dollfus, Mém. Soc. Zoöl. de France, pp. 542-543, 1896.

Family **Armadillididæ.****Armadillidium vulgare** (Latreille).

Armadillo vulgaris Latreille, Hist. Crust., vii, p. 48, 1804; Gen. Crust., i, p. 71, 1806. Leach, Edinb. Encycl., vii, p. 406. Lamarck, Hist. Nat. an. s. vert., v, p. 152, 1818.

Armadillo pilularis Say, Crust. United States, Journ. Acad. Nat. Sci., Philad., p. 432, 1818.

Armadillidium vulgare Budde-Lund, Crust. Isopoda Terrestria, pp. 66-68, 1885. Dollfus, Bull. Soc. d'Études Scient. de Paris, xiith year, p. 4, 1890. Sars, Crust. of Norway, ii, pts. ix-x, pl. 80, pts. xi-xii, p. 189-190, 1898.

Hab. Bermudas, collected by G. B. Goode in 1876-7; and by A. E. Verrill, in 1901, at Tucker's Island; Bermudas (Dollfus). Common in all parts of Europe and neighboring regions of Asia and Africa; North America.

Uropodias Richardson, gen. nov.

Head with the front produced in a prominent rounded lobe. Eyes small, obscure. External antennæ, with a flagellum of two joints, the second joint the smaller of the two.

First six thoracic segments with the lateral parts lamellarly expanded. Seventh segment as long as the six preceding segments, but with the lateral parts undeveloped, and not wider than the first two abdominal segments, which likewise have the lateral parts or epimeral plates undeveloped. Abdomen not narrower than thorax, the lateral parts of the third, fourth and fifth segments being expanded and continuing the regular outline of the body. The abdominal segments equal in length and half as long as the thoracic segments. Terminal segment quadrangular in shape, the posterior margin produced in a median rounded lobe. The outer branch of the uropoda is large, broad, flattened, with rounded margins; the inner branch is smaller and narrower, and rounded posteriorly.

There are only six pairs of legs, the appendages of the last thoracic segment being wanting.

Uropodias bermudensis Richardson, sp. nov.

PLATE XL. FIGURES 59, 60.

Body very convex, able to be contracted into a ball. Surface smooth. Color uniformly light brown.

Head large, produced in front in a prominent rounded projection. Eyes very small, obscure, and situated about the middle of the lateral margin. The external antennæ, with a flagellum of two joints, extend to the middle of the first thoracic segment, and are geniculate at the articulation of the third and fourth joints.

The thoracic segments are subequal in length. The seventh segment is abruptly narrower than the preceding six, and not wider than the first two abdominal segments. The seventh thoracic and the first and second abdominal segments have the lateral parts or epimeral plates undeveloped. The first six thoracic and the third, fourth and fifth abdominal segments have the lateral parts lamellarly expanded, so that the regular outline of the body is preserved, the third abdominal segment not being narrower than the six thoracic, whose lateral portions extend down laterally beyond the seventh thoracic and the first and second abdominal.

The terminal abdominal segment is quadrangular, with the posterior margin produced in a median rounded lobe. The uropoda extend but a short distance beyond the epimeral plates of the fifth abdominal segment. The outer branch is broad, flattened and round; the inner branch is smaller and narrower, and posteriorly rounded.

There are but six pairs of legs, those of the seventh thoracic segment being wanting.

A few specimens were collected by A. E. Verrill and party at the Bermudas in 1898, and at Castle Island in 1901, under stones, in dry places.

Type in the Peabody Museum, Yale University. Cat. No. 3224.

Family *Trichonisaidæ*.

Actoniscus ellipticus Harger.

Actoniscus ellipticus Harger, Am. Jour. Sci. (3), xv, p. 373, 1878; Proc. U. S. Nat. Mus., ii, p. 157, 1879; Report U. S. Fish Comm., pt. vi, p. 309, pl. i, fig. 3, 1880.

Hab. Bermudas, collected by G. B. Goode, 1876-7 (one specimen of a brown and yellow mottled color); and near Hungry Bay, Bermudas, near salt water under decayed sea-weed and stones, collected by A. E. Verrill in 1901. Savin Rock, near New Haven; Stony Creek, Long Island Sound.

Family Ligiidæ.

Ligia baudiniana Milne-Edwards.

Ligia baudiniana Milne-Edwards, Hist. des Crust., iii, pp. 155-156, 1840.

? *Ligia baudiana* Spence Bate, Ann. Mag. Nat. Hist. (4), i, pp. 443, 446, 1868.

? *Ligia baudiniana* Saussure, Mém. Soc. phys. Genève, xiv, p. 476, 1858.

Ligia exotica Dollfus, Bull. Soc. d'Études Scientifiques de Paris, xiith year, p. 7, 1890.

Ligia exotica hirtitarsis Dollfus, Bull. Soc. d'Études Scientifiques de Paris, xiith year, p. 7, 1890.

Ligia baudiana Ives, Proc. Acad. Nat. Sci. Phila., pp. 185, 186, pl. vi, fig. 2, 1891.

Ligia baudiniana Richardson, Proc. United States Nat. Museum, xxiii, p. 574, 575, 1901.

Ligia gracilis Moore, Report U. S. Fish Comm., ii, pp. 161-176, pl. 7-11, 1901.

PLATE XL. FIGURE 61.

Hab. Bermudas, collected by George Brown Goode in 1876-77, and by A. E. Verrill and party in 1898 and 1901; Bermudas, collected by J. M. Jones; Bermudas (Dollfus); San Juan d'Ulloa, Mexico (Milne-Edwards); Yucatan (Ives); Rio Janeiro (Spence Bate); Cuba (Saussure.)

"At the Bermudas the *Ligia* occurs in great abundance on the ledges and cliffs along all the shores. It runs with surprising activity and quickly seeks refuge in the cracks and crevices of the ledges, so that it is not easy to capture without injury.

Its dark, bluish-gray color is not particularly protective here, unless in the night, owing to the light color of most of the rocks, but on darker rocks it would be decidedly protective." A. E. V.

It is doubtful if the specimens found at Cayenne by Miers* and identified by him as *Ligia baudiniana* really were that species. I am inclined to think they should be referred to *Ligia exotica*. In his description of them, Miers states that the antennæ are very long, reaching in one specimen to the extremity of the body, and in the other specimen not quite, but almost to the extremity. The first was probably the male and the other the female of *L. exotica*. There has been much difference of opinion in regard to these two species, *Ligia baudiniana* and *Ligia exotica*, the former being considered by Budde-Lund† and Dollfus‡ as a synonym of the latter, although Dollfus states of the specimens found at the Bermudas, and

* Proc. Zoöl. Soc. Lond., p. 670, 1877.

† Crust. Isop. Terrestria, p. 267, 1885.

‡ Bull. Soc. d'Études Scientifiques de Paris, xiith year, p. 7, 1890.

which he identified as *L. exotica*, that they differed from the specimens of *L. exotica* in his collection from Senegal in the thickness of the tarsus, which was furnished with long, stiff hairs in the males. However, he did not consider this a specific character; it could only be sufficient to distinguish a variety, for which he proposed the name *hirtitarsis*. His specimens should undoubtedly be referred to *Ligia baudiniana*, the characters of which, as a distinct species, near, perhaps, but not identical with *Ligia exotica*, I shall endeavor to point out.

A comparison of male specimens of *Ligia baudiniana* and *Ligia exotica* show the following points of difference:

First, in the size and formation of the body, *Ligia baudiniana* being the smaller species, with the body more compact than in *L. exotica*, which has the segments very loosely articulated.

Second, in the length of the antennæ, which in *L. baudiniana* do not extend beyond the last segment of the thorax (which character is constant, being true of all the specimens examined), while in *L. exotica* the antennæ reach the extremity of the body in all the specimens examined.

Third, in the length of the peduncle of the antennæ, which in *L. baudiniana* extend to the posterior margin of the second thoracic segment, the last two joints being shorter than in *L. exotica*, the peduncle of whose antennæ reach the posterior margin of the third thoracic segment.

Fourth, in the character of the first pair of legs in the two species, those of *L. exotica* (plate xl, figs. 62a, 62b,) having the propodus furnished near the apex with a conspicuous process, oval and produced, the carpus and merus not being fringed with a thick row of long stiff hairs, while those of *L. baudiniana* (fig. 61) have the propodus simple, unarmed and without a conspicuous process, the carpus and merus being fringed along the entire posterior margin with a row of long stiff hairs.

Fifth in the shape of the terminal segment of the body, the angle in the middle of the posterior margin being more acutely produced in *L. exotica* than in *L. baudiniana*, and the lateral angulations being also much more produced. In the color of the two forms, *L. baudiniana* being much lighter in color, the color extending to the margins of the segments, while in *L. exotica* there is a colorless border on the lateral and posterior edges of all the segments.

In the females of the two species the first pair of legs are simple. The antennæ are shorter than in the males, and the peduncle of the

antennæ is also shorter. In the female of *L. exotica* the antennæ do not quite reach the extremity of the body; in the female of *L. baudiniana* they do not quite reach the extremity of the thorax. In the female of *L. exotica* the peduncle of the antennæ extends only to the posterior margin of the second thoracic segment; in the female of *L. baudiniana* the peduncle of the antennæ does not extend beyond the posterior margin of the first thoracic segment.

The species recently described by Mr. Moore* as *Ligia gracilis*, found at Porto Rico, is identical with *Ligia baudiniana*. The type specimens of *Ligia gracilis*, which have been placed in the U. S. Nat. Museum, have been carefully examined by Mr. Moore and myself since the publication of his paper, and exhibit the same characters found in *Ligia baudiniana*. The leg of the first pair, figured by Mr. Moore, is the leg of the female, which does not present the row of stiff hairs on the carpus and merus, as found in the male.

Although Mr. Moore did not investigate the differences existing between *L. exotica* and *L. baudiniana*, and was misled by such eminent authorities as Dollfus and Budde-Lund,† who consider the latter species a synonym of the former, yet he regarded his specimens, when compared with specimens of *L. exotica*, as specifically distinct. Although *Ligia gracilis* cannot be considered new, yet the fact that Mr. Moore considered his specimens specifically different from *L. exotica*, and his identification of them later with *L. baudiniana* give additional weight to the view that *Ligia baudiniana* is distinct from *Ligia exotica*.

* Report U. S. Fish Commission, ii, pp. 161-176, pl. 7-11, 1901.

† It is very doubtful if Budde-Lund ever had specimens of *L. baudiniana*. He places *L. baudiniana* in the synonymy of *L. exotica*, with a question mark.

EXPLANATION OF PLATES.

PLATE XXXVII.

- Figure 1.—*Aapseudes triangulata* R., sp. nov. Head. $\times 35$.
 Figure 2.—The same. Segments of thorax and abdomen. $\times 19\frac{5}{7}$.
 Figure 3.—The same. Segments of abdomen and part of uropods. $\times 35$.
 Figure 4.—The same. First gnathopod. $\times 35$.
 Figure 5.—The same. Second gnathopod. $\times 35$.
 Figure 6.—*Aapseudes propinquus* R., sp. nov. Head. $\times 35$.
 Figure 7.—The same. Segments of thorax and abdomen. $19\frac{5}{7}$.
 Figure 8.—The same. Last four segments and part of uropods. $\times 35$.
 Figure 9.—The same. First gnathopod. $\times 35$.
 Figure 10.—*Parapseudes goodei* R., sp. nov. Head and first thoracic segment. $\times 35$.
 Figure 11.—The same. General figure. $\times 19\frac{5}{7}$.
 Figure 12.—The same. Abdomen with uropods and last thoracic segment. $\times 35$.
 Figure 13.—The same. First gnathopod of female. $\times 35$.
 Figure 14.—The same. First gnathopod of male. $\times 35$.

PLATE XXXVIII.

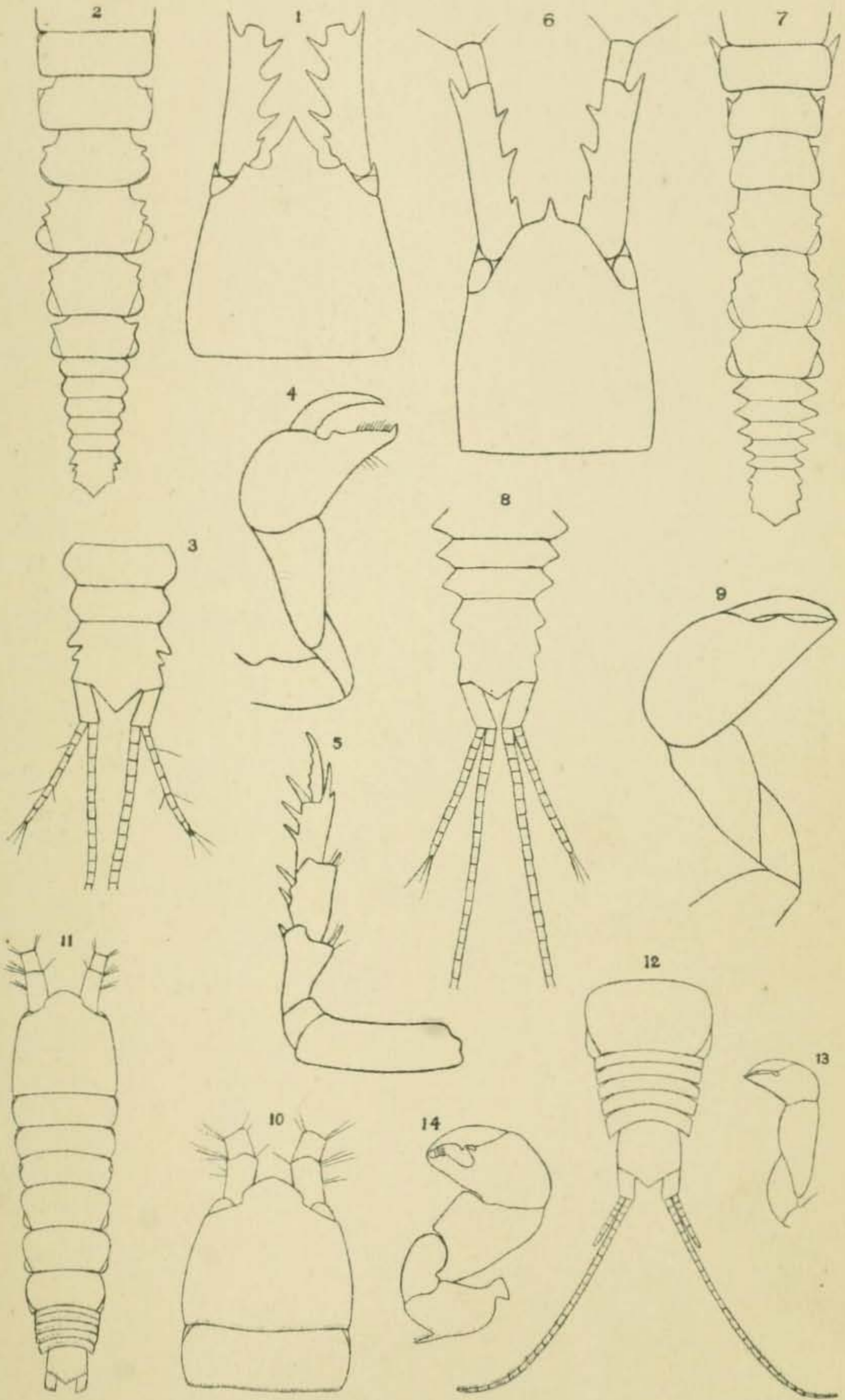
- Figures 15a, 15b.—*Paranthura infundibulata* R., sp. nov. Mandible and maxillipeds. $\times 33$.
 Figure 16a.—The same. Antenna of first pair. $\times 33$.
 Figure 16b.—The same. Antenna of second pair. $\times 33$.
 Figure 17.—The same. Last four thoracic segments and abdomen. $\times 11\frac{3}{5}$.
 Figure 18.—The same. Lateral view of abdomen. $\times 11\frac{3}{5}$.
 Figure 19.—The same. First gnathopod. $\times 32\frac{4}{5}$.
 Figure 20.—The same. Second gnathopod. $\times 32\frac{4}{5}$.
 Figure 21a.—*Paranthura verrillii* R., sp. nov. Antenna of first pair. $\times 32\frac{4}{5}$.
 Figure 21b.—The same. Antenna of second pair. $\times 32\frac{4}{5}$.
 Figure 22.—The same. Last two thoracic segments and abdomen. $\times 11\frac{3}{5}$.
 Figure 23.—*Colanthura tenuis* R., sp. nov. Head and antennæ. $\times 62$.
 Figure 24.—The same. General figure. $\times 18\frac{2}{5}$.
 Figure 25.—The same. Abdomen and last two thoracic segments. $\times 62$.
 Figure 26.—The same. Lateral view of uropoda. $\times 62$.
 Figure 27.—The same. First pair of legs. $\times 62$.
 Figure 28.—The same. Second pair of legs. $\times 62$.
 Figure 29.—*Anthelura affinis* R., sp. nov. General figure. $\times 32\frac{4}{5}$.
 Figure 30.—The same. First gnathopod. $\times 62$.
 Figure 31.—The same. Second gnathopod. $\times 62$.
 Figure 32.—The same. Sixth periopod. $\times 62$.
 Figure 33.—*Colopisthus parvus* R., sp. nov. General figure. $11\frac{3}{5}$.
 Figure 34.—The same. Head and first two thoracic segments. $\times 18\frac{2}{5}$.
 Figure 35.—The same. First maxilla. $32\frac{4}{5}$.
 Figure 36.—The same. Second maxilla. $32\frac{4}{5}$.
 Figure 37.—The same. Maxilliped. $\times 32\frac{4}{5}$.
 Figure 38a.—*Alcirona krebsii* Hansen. First maxilla. $\times 32\frac{4}{5}$.
 Figure 38b.—The same. Maxilliped. $\times 32\frac{4}{5}$.

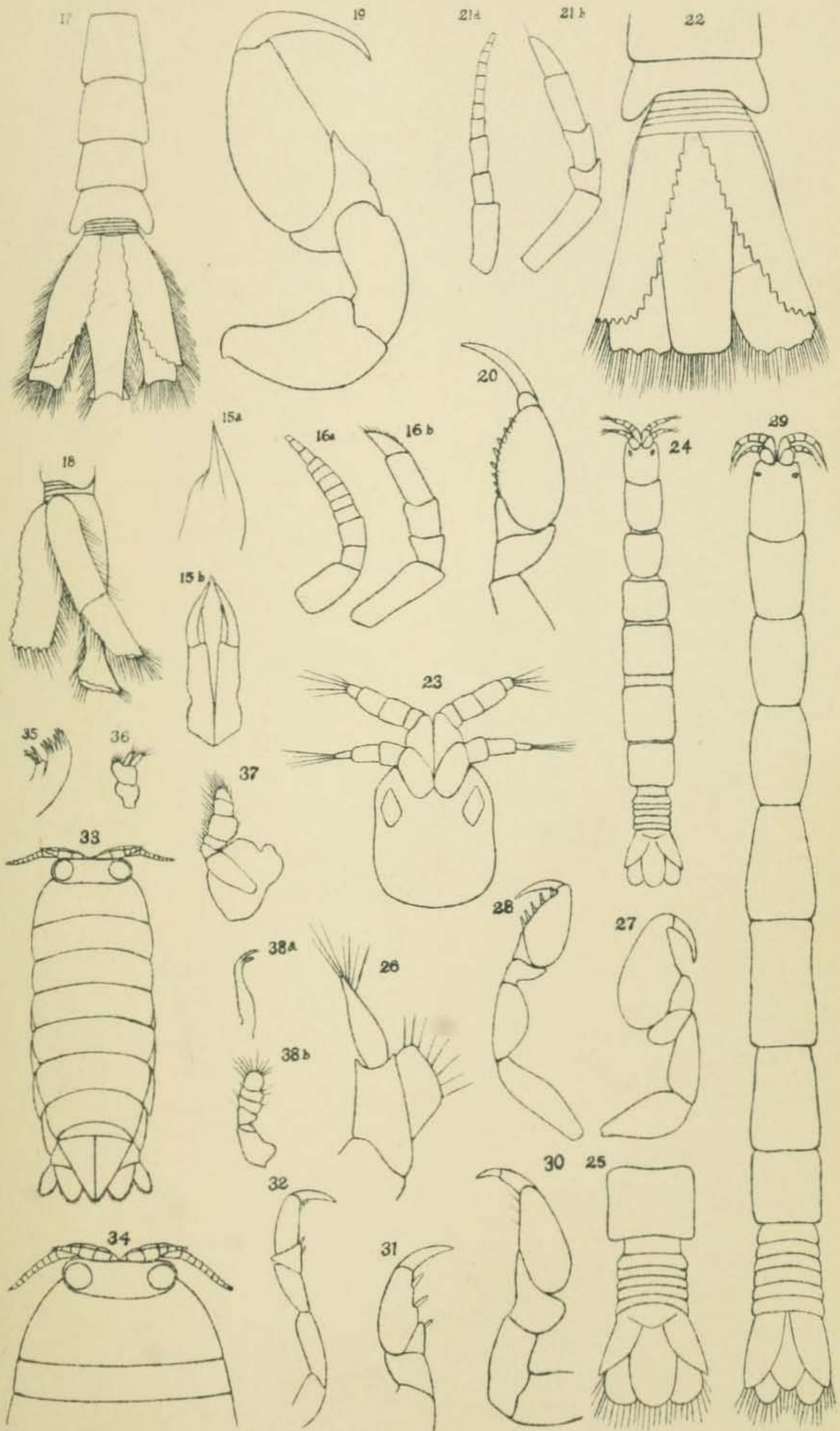
PLATE XXXIX.

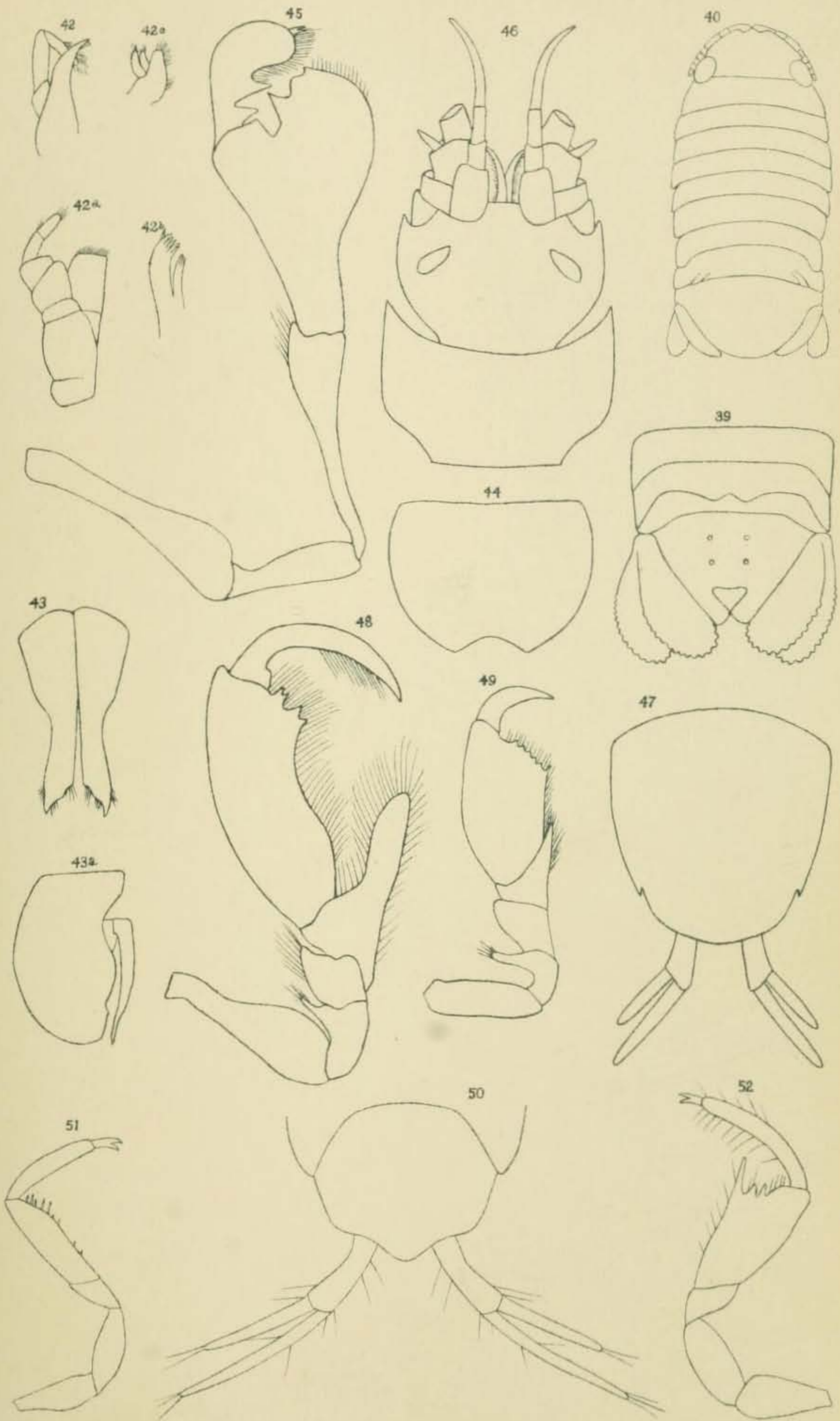
- Figure 39.—*Dynamene perforata* Moore. Last two thoracic segments and abdomen. $\times 17\frac{1}{4}$.
- Figure 40.—*Sphæroma crenulatum* R., sp. nov. General figure. $\times 17\frac{1}{4}$.
- Figure 41.—See plate xl.
- Figure 42.—*Carpias bermudensis* R., sp. nov. Mandible. $\times 58$.
- Figure 42a.—The same. Maxilliped. $\times 58$.
- Figure 42b.—The same. First maxilla. $\times 58$.
- Figure 42c.—The same. Second maxilla. $\times 58$.
- Figure 43.—The same. Male operculum. $\times 58$.
- Figure 44.—The same. Female operculum. $\times 58$.
- Figure 45.—The same. First leg of male. $\times 30\frac{3}{4}$.
- Figure 46.—*Stenetrium stebbingi* R., sp. nov. Head and first thoracic segments. $\times 30\frac{3}{4}$.
- Figure 47.—The same. Terminal segment of body and uropoda. $\times 30\frac{3}{4}$.
- Figure 48.—The same. First leg of male. $\times 30\frac{3}{4}$.
- Figure 49.—The same. First leg of female. $\times 30\frac{3}{4}$.
- Figure 50.—*Janira minuta* R., sp. nov. Terminal segment and uropoda. $\times 58$.
- Figure 51.—The same. Leg of first pair of female. $\times 58$.
- Figure 52.—The same. Leg of first pair of male. $\times 58$.

PLATE XL.

- Figure 41.—*Carpias bermudensis* R., sp. nov. General figure. $\times 18\frac{2}{5}$.
- Figure 53.—*Jæropsis rathbunæ* R., sp. nov. Head and first thoracic segment. $\times 32\frac{4}{5}$.
- Figure 54.—The same. Terminal segment and uropoda. $\times 32\frac{4}{5}$.
- Figure 55a.—The same. Mandible. $32\frac{4}{5}$.
- Figure 55b.—The same. Mandible. $32\frac{4}{5}$.
- Figure 55c.—The same. Maxilliped. $32\frac{4}{5}$.
- Figure 56.—*Tylos armadillo* Latreille. Operculum.
- Figure 57.—*Porcellio parvicornis* R., sp. nov. General figure.
- Figure 58.—*Leptotrichus granulatus* R., sp. nov. General figure. $\times 11\frac{3}{5}$.
- Figure 59.—*Uropodias bermudensis* R., sp. nov. Head and first thoracic segment. $\times 62$.
- Figure 60.—The same. Abdominal segments and last two thoracic segments. $\times 62$.
- Figure 61.—*Ligia baudiniana* Milne-Edwards. First leg of male. $\times 11\frac{3}{5}$.
- Figure 62a.—*Ligia exotica* Dollfus. First leg. $\times 11\frac{3}{5}$.
- Figure 62b.—The same. Terminal joints. $\times 11\frac{3}{5}$.







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