is very minute. The second pair of antennæ are composed of four articles, the last article being also minute.

The first four segments of the thorax have the lateral parts longer than the middle of the dorsal region. The epimera of the first four segments are placed on the anterior half of the lateral margin, lateral to the ovarian bosses; they are distinct and well developed on one side

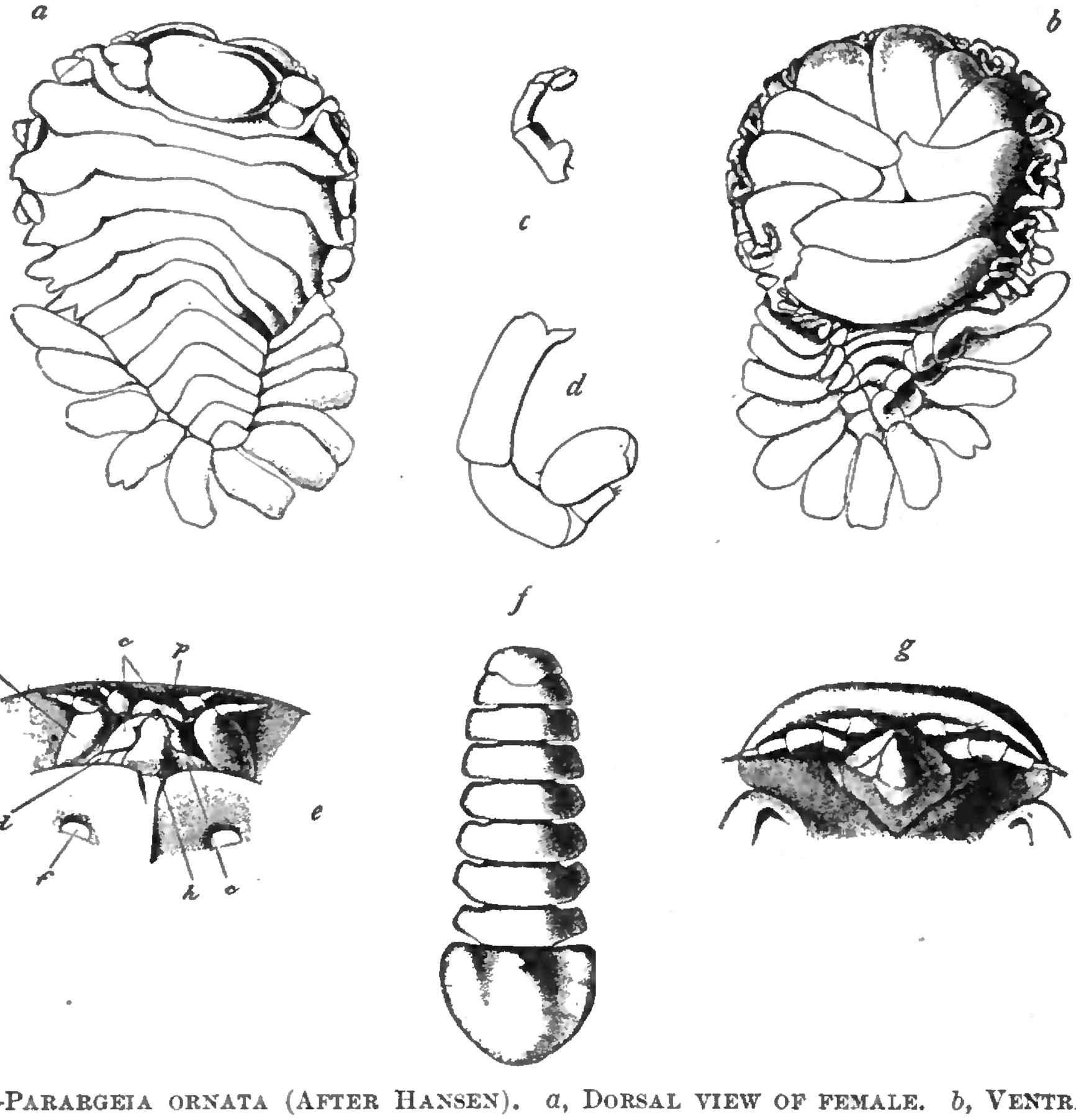


FIG. 598.—PARARGEIA ORNATA (AFTER HANSEN). *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF FEMALE. *c*, LEG OF SEVENTH PAIR OF FEMALE. *d*, LEG OF SEVENTH PAIR OF MALE. *e*, HEAD OF FEMALE (VENTRAL VIEW). *f*, DORSAL VIEW OF MALE. *g*, HEAD OF MALE (VENTRAL VIEW).

of the body, but small on the opposite side. Ovarian bosses are present on all the segments, occupying the anterior half of the lateral margin, and placed on the inner side of the epimera. Epimera are not present on the last three segments of the thorax, and the ovarian bosses occupy the entire upper portion of the lateral margin, being produced on one side of the body in large rounded lobes. The posterior half of the lateral margin forms a large and conspicuous lobe or expansion on all the segments.

All six segments of the abdomen are distinct, and they gradually decrease in size from the first to the last segment, which is rounded posteriorly. The lateral parts of these segments are not developed. The uropoda are simple and single-branched, and consist of two elongated lamellæ attached to the sixth abdominal segment. There are five pairs of double-branched pleopoda attached to the first five segments.

The outer branch of each pleopod is elongate and simulates the uropoda in appearance. The outer branches are all similar in shape and of nearly equal size. The inner branches are small, elongated or rounded, and sac-like. They are not conspicuous in a dorsal view, whereas the outer lamellæ form a conspicuous border around the abdomen, where they seem to be attached to the lateral margins of the segments.

There are five pairs of incubatory lamellæ which entirely inclose the marsupial cavity, the lamellæ overlapping in the medial ventral line. The basis of all the legs is furnished with a high rounded carina.

The male is 4½ mm. long and 1½ mm. wide in the region of the thorax. The abdomen at the base is 2 mm. wide. The anterior margin of the head is rounded. The eyes are absent. The first pair of antennæ are composed of three articles. The second pair are composed of five or six articles. All seven segments of the thorax are distinct. The legs are all prehensile.

The segments of the abdomen are consolidated in a single segment, which is wider at the base than the segments of the thorax. Its posterior margin is widely rounded. Near the base of the segment is a single prominent tubercle in the median line. There are no pleopoda nor uropoda.

94. Genus PROBOPYRUS Giard and Bonnier.

Segments of abdomen in female dorsally defined; lateral parts or pleural lamellæ not developed.

Five pairs of double-branched pleopods are present.

Uropoda wanting.

Segments of abdomen in male fused dorsally, but defined on the lateral margins. Five pairs of small tuberculiform pleopods present.

Uropoda wanting.

Branchial parasites.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS PROBOPYRUS.

a. Male with the first four segments of the abdomen defined laterally by deep incisions, the last two fused in a large and broad terminal piece.
Probopyrus pandalicola (Packard)

a′. Male with all the segments of the abdomen defined laterally by deep incisions.

b. Species large. First incubatory lamella with the distal segment produced posteriorly in a lobe at the outer angle.

c. Abdomen of male nearly as long as broad....*Probopyrus floridensis* Richardson

c′. Abdomen of male nearly twice as broad as long.

d. Body of male wide, thick-set; head and thorax two and a half times or less longer than abdomen.....*Probopyrus bithynis* Richardson

d′. Body of male narrow; head and thorax three and a half times longer than abdomen..... .....*Probopyrus alphei* Richardson

b′. Species small. First incubatory lamella with the distal segment produced posteriorly at the inner angle.....*Probopyrus latreuticola* (Gissler)

PROBOPYRUS PANDALICOLA (Packard).

Bopyrus (?) LEIDY, Proc. Acad. Nat. Sci. Phila., 1879, Pt. 2, p. 198.—HARGER, Report U. S. Commissioner of Fish and Fisheries, 1880, Pt. 6, p. 312.

Bopyrus pandalicola PACKARD, Zoology for Students and General Readers, 1879, pp. 308–309.

Bopyrus palæmoneticola PACKARD, Zoology for High Schools and Colleges, 1881, p. 289.

Bopyrus manhattensis GISSLER, Scientific American, XLV, Sept. 3, 1881, p. 151.

Bopyrus palæmoneticola GISSLER, American Naturalist, XVI, 1882, pp. 6–12.

Probopyrus palæmoneticola GIARD and BONNIER, Bull. Scient., XIX, 1888, p. 4.—STEBBING, Hist. Crust., 1893, p. 416.

Bopyrus palæmoneticola RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 578.

Probopyrus palæmoneticola BONNIER, Travaux de la Station Zool. de Wimereux, VIII, 1900, pp. 342–343, pl. XXXI.—RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, p. 66.—PAULMIER, Bull. New York State Museum, 1905, pp. 185–186.

Localities.—Atlantic City, on *Palæmonetes vulgaris* Say; from New Hampshire to Florida, on *P. vulgaris;* East Providence, Rhode Island, on *P. vulgaris;* Acushnet River, Massachusetts, on *P. vulgaris;* Baldwin Lodge, Mississippi, on *Palæmonetes* sp.; Latana, Florida, on *Palæmonetes;* Brooklyn, New York.

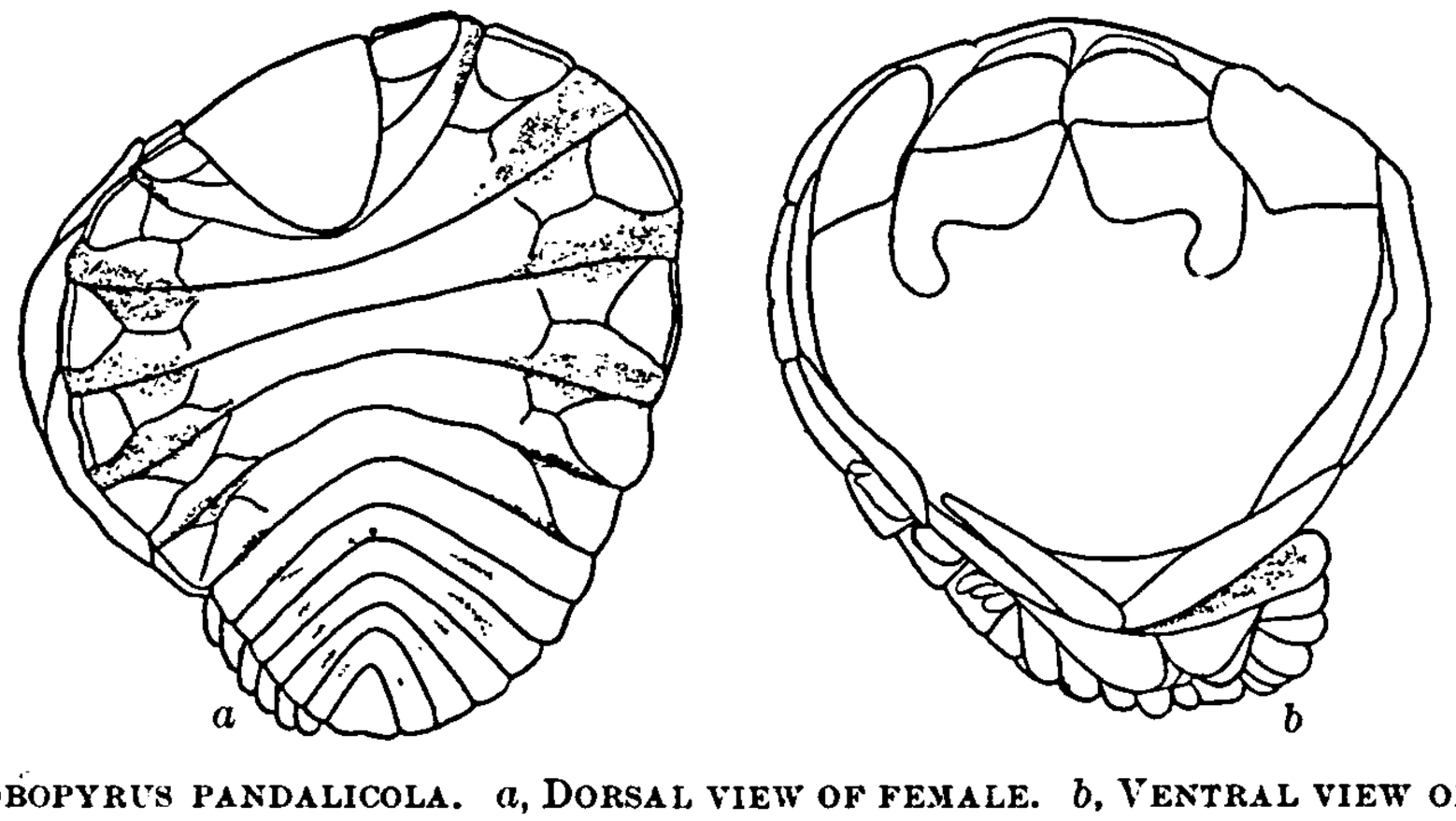


FIG. 599.—PROBOPYRUS PANDALICOLA. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 4.

Description.—Color of body white, with patches of black on the lateral margins of all the thoracic segments on both sides of the body. Head and abdomen also with a few scattered black markings. Legs of both sides white; patches of black on the ventral side of the lateral margins of both sides of the thorax. Incubatory lamellæ with patches of black on all the plates of both sides.

Head deeply set in thorax; anterior margin straight; posterior margin rounded. Eyes wanting. Ovarian bosses present on the first four segments of the thorax at the anterior part of the sublateral margin; epimera evident as narrow plates lateral to the ovarian bosses. The epimera occupy the entire lateral margins on the last three segments. The segments of the abdomen are distinct. The terminal segment is broad, more or less bilobed. The pleopoda consist of five pairs of

double-branched lamellar appendages, closely crowded together on the ventral side of the abdomen.

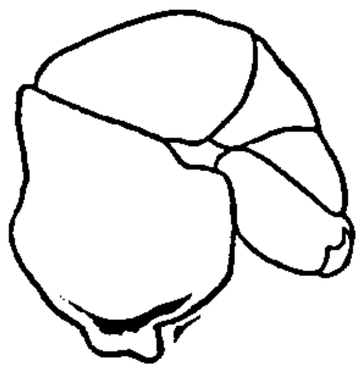


FIG. 600.—PROBOPYRUS PANDALICOLA. LEG OF SIXTH PAIR OF ADULT FEMALE. × 39.

The five pairs of incubatory lamellæ surround a large open area normally filled with eggs. The first pair have the terminal lobe of the distal segment large, well defined, and incurved.

All the legs have a high quadrangularly shaped expansion or carina on the basis.

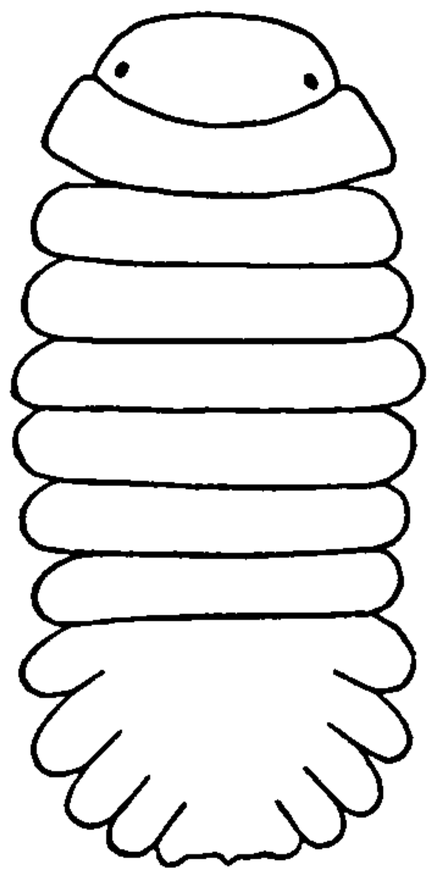


FIG. 601.—PROBOPYRUS PANDALICOLA. MALE. × 41.

Male with all the segments of the thorax distinct, and with the lateral margins contiguous. First four segments of the abdomen well defined at the sides, but fused in the middle of the dorsal surface. The last two segments form a single large piece, the fused terminal segment being indicated only by a small median point on the posterior margin. The body is a little more than twice as long as wide. Eyes are present. The rudimentary pleopoda are pairs of small oval processes, one pair on each abdominal segment. The abdomen is about one and a half times as broad as long.

PROBOPYRUS FLORIDENSIS Richardson.

Probopyrus floridensis RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, pp. 70–71.

Locality.—Satsuma Island, above St. John's River, Florida, on *Palæmonetes exilipes* Stimpson.

Body of female light brown, with the head, abdomen, ovarian bosses, and epimera light yellow, almost white. Markings of black are present all over thorax and a few black lines are present on the abdomen. The incubatory lamellæ are almost entirely covered with black markings, so that the color is uniformly dark. The lateral parts of the thorax on the ventral side have markings of black, those of one side being in patches with yellow areas separating them, all the legs of this side being yellow. The legs of the opposite side are dark.

Head deeply set in thorax, broad anteriorly with frontal margin nearly straight; posterior margin narrowly rounded; eyes wanting.

The segments of the thorax are distinct. Ovarian bosses are prominent on the anterior portion of the sublateral margin of the first four segments; the epimera are present as narrow plates lateral to the ovarian bosses. On the last three segments the epimera occupy the whole of the lateral margin.

The segments of the abdomen are distinctly separated on the dorsal side. The lateral margins are narrowly rounded. The terminal segment of the body is long and narrow, reaching beyond the lateral

margins of the fifth segment; it is rounded posteriorly, and with or without a minute excavation.

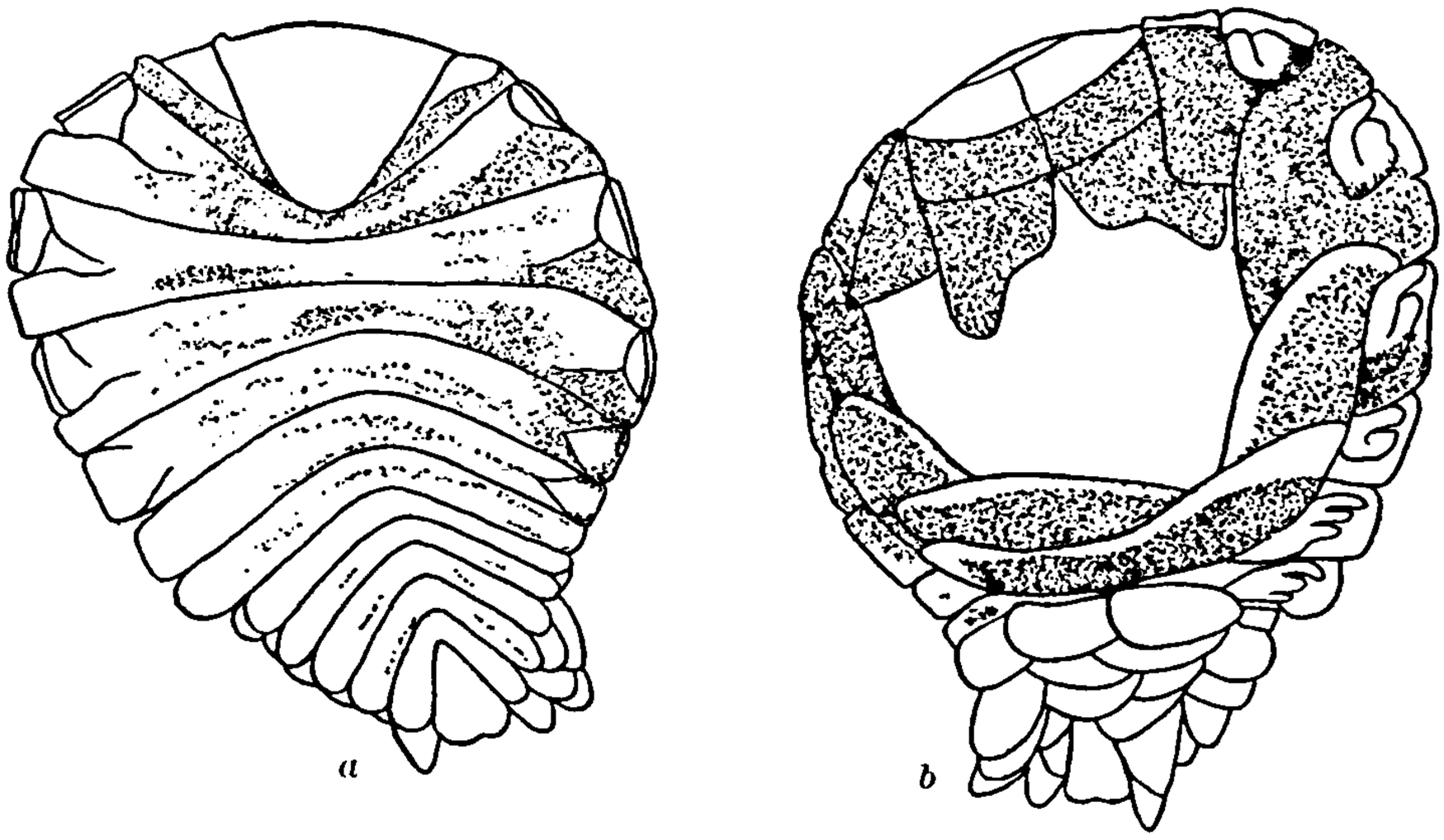


FIG. 602.—PROBOPYRUS FLORIDENSIS. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 12.

The pleopoda consist of five pairs of double-branched lamellar appendages.

The incubatory lamellæ are large, encircling the incubatory pouch, leaving only a small opening into the interior. The first pair of plates have the terminal lobe of the distal segment straight.

All the legs have a well rounded expansion or carina about the middle of the basis.

Male with all the segments of the thorax well defined and widely separated at the sides. Body narrow, elongate, nearly three times as long as wide.

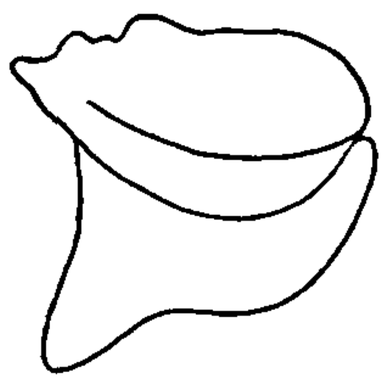


FIG. 603.—PROBOPYRUS FLORIDENSIS. FIRST LAMELLA OF MARSUPIUM. × 10.

The abdomen has all the segments well defined at the sides, but fused in the middle of the dorsal surface. Length almost equal to the breadth. Terminal segment well defined, rounded posteriorly, and extending beyond the lobes of the preceding segment. The lateral margins of all the segments are rounded. Pleopoda are present in the form of pairs of small rounded processes, a pair on each segment of the abdomen. Eyes present.

FIG. 604.—PROBOPYRUS FLORIDENSIS. LEG OF SIXTH PAIR OF ADULT FEMALE. × 39.

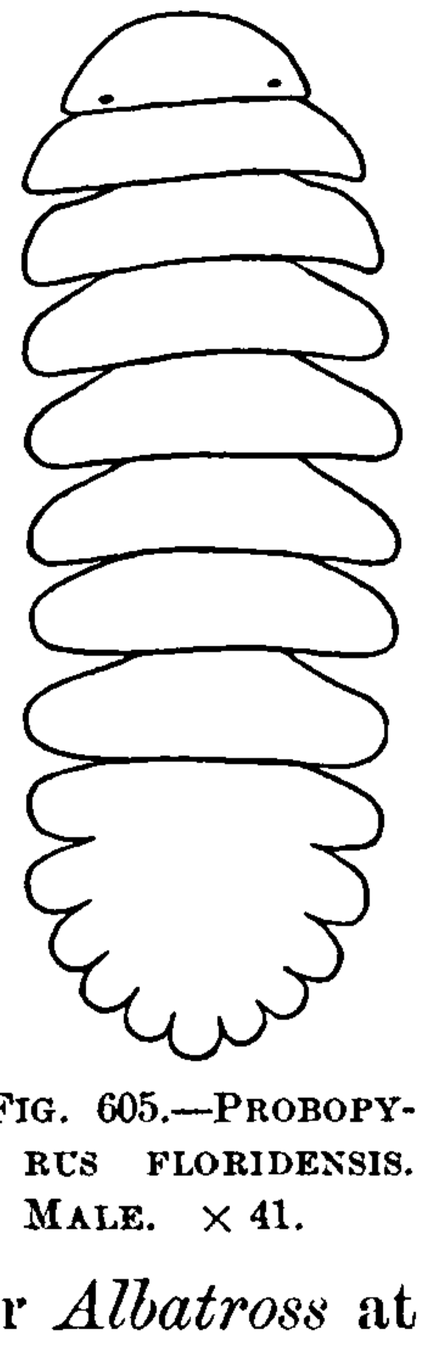


FIG. 605.—PROBOPYRUS FLORIDENSIS. MALE. × 41.

One specimen was collected by Mr. W. C. Kendall at Satsuma Island, above St. Johns River, Florida; parasitic on *Palæmonetes exilipes* Stimpson. Two other specimens were obtained by the U. S. Bureau of Fisheries steamer *Albatross* at Little River, Miama, Florida; parasitic also on *Palæmonetes exilipes* Stimpson.

Type.—Cat. No. 29090, U.S.N.M.

PROBOPYRUS BITHYNIS Richardson.

Probopyrus bithynis RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, pp. 68–70.

Localities.—Mississippi River near the exposition grounds in New Orleans, Louisiana, on *Bithynis ohionis* (Smith); Escondido River, Nicaragua, 50 miles from Bluefields, on *Bithynis acanthurus* (Wiegmann).

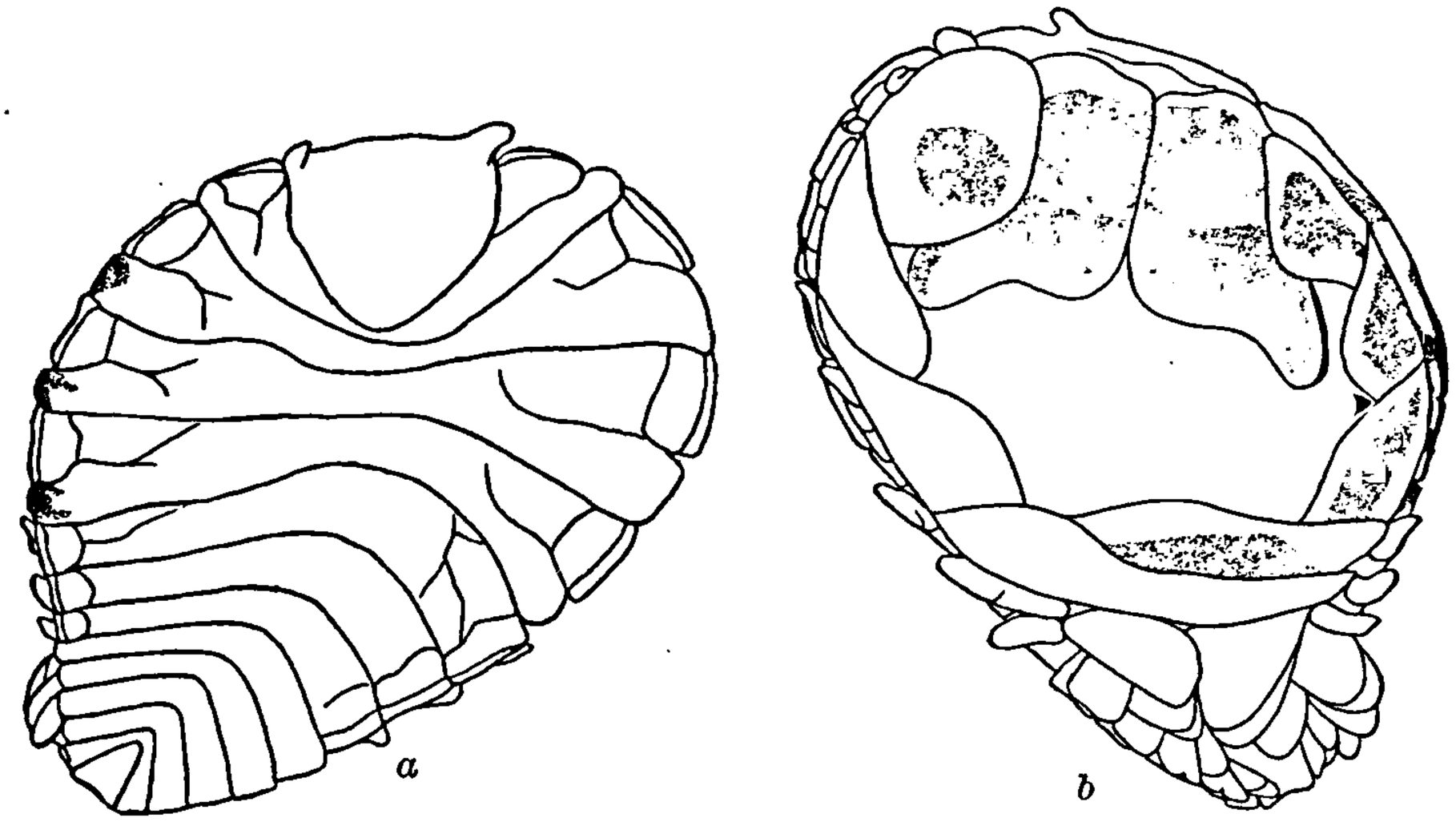


FIG. 606.—PROBOPYRUS BITHYNIS. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 16

Body of female with dorsal surface perfectly white, having only three small patches of black on one side at the post-lateral parts of the second, third, and fourth thoracic segments. Ventral side of the body with the first pair of incubatory lamellæ almost entirely covered with patches of black, and with all the other lamellæ of one side having patches of black, those of the other side being without these patches, with the exception in some specimens of the second lamella. Patches of black also present on the ventral side of the lateral margins of the second, third, and fourth thoracic segments of one side—the same side on which these markings occur on the dorsal surface and to which the incubatory lamellæ, likewise marked with patches, are attached. Legs of both sides white and without any markings.

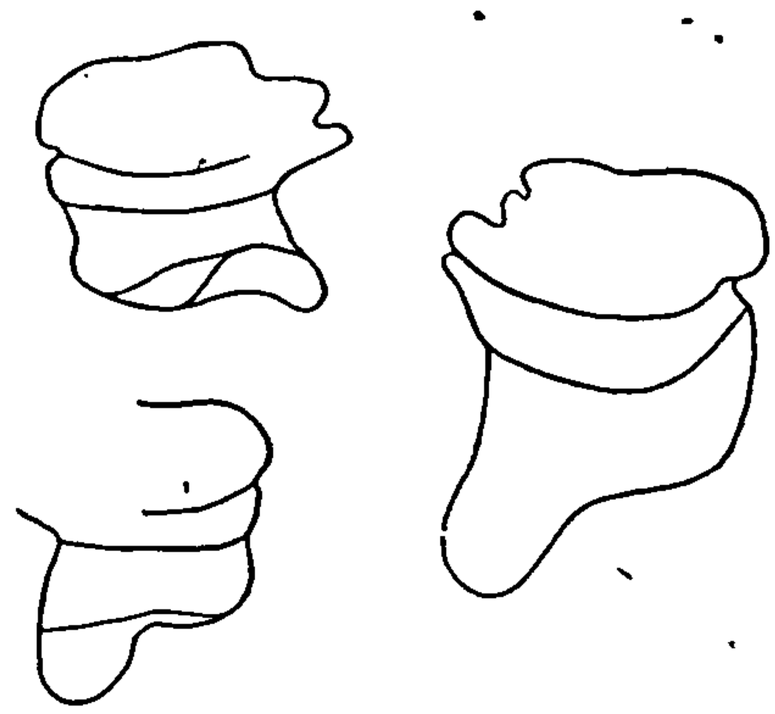


FIG. 607.—PROBOPYRUS BITHYNIS. FIRST LAMELLA OF MARSUPIUM, RIGHT SIDE. × 10.

Head with the antero-lateral corners produced into prominent processes; anterior margin between these processes straight; posterior margin narrowly rounded. Length of head about equal to its breadth. Eyes wanting.

The thoracic segments are distinctly defined. Ovarian bosses are present on all the segments, occupying only the anterior portion of the sublateral margin of the first four segments. The epimera are

evident as narrow pieces lateral to the ovarian bosses on all the segments.

The segments of the abdomen are distinct on the dorsal side. The lateral margins of the first five segments are straight. The sixth or terminal segment is narrow, elongate, and has a slight emargination in the middle of the posterior margin.

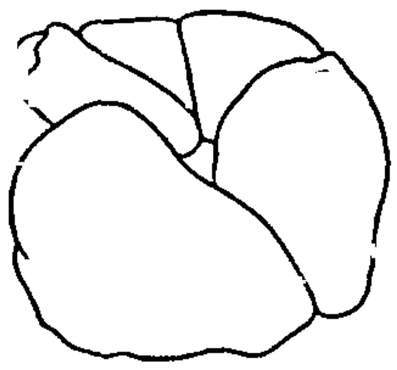


FIG. 608.—PROBOPYRUS BITHYNIS. LEG OF SIXTH PAIR OF ADULT FEMALE. × 39.

The pleopoda are five pairs of double-branched appendages, the inner branches of the first pair being the largest and overlapping in the middle ventral line. The uropoda are wanting.

The first pair of incubatory lamellæ are large and extend about half the length of the ventral side of the thorax. In fact all the lamellæ are quite large, and encompass the marsupium, leaving only a comparatively small opening into the pouch.

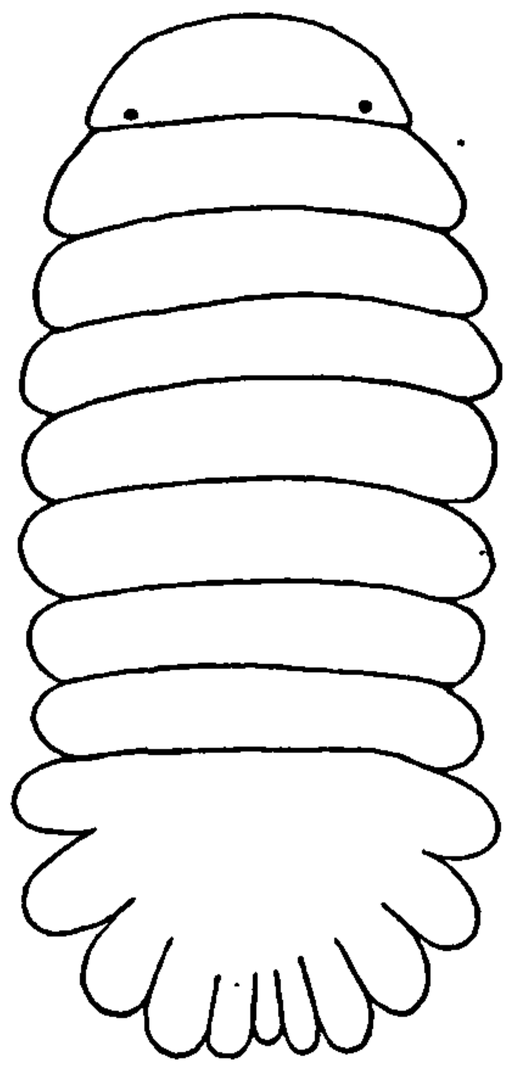


FIG. 609.—PROBOPYRUS BITHYNIS. MALE. × 41.

All the legs have an extremely high expansion or carina on the basis.

The male has the thorax distinctly segmented, the segments not being widely separated at the sides. Body of male short and thickset, being only twice as long as wide.

The abdomen is a little more than one and a half times broader than long. The segments of the abdomen are only indicated at the sides,

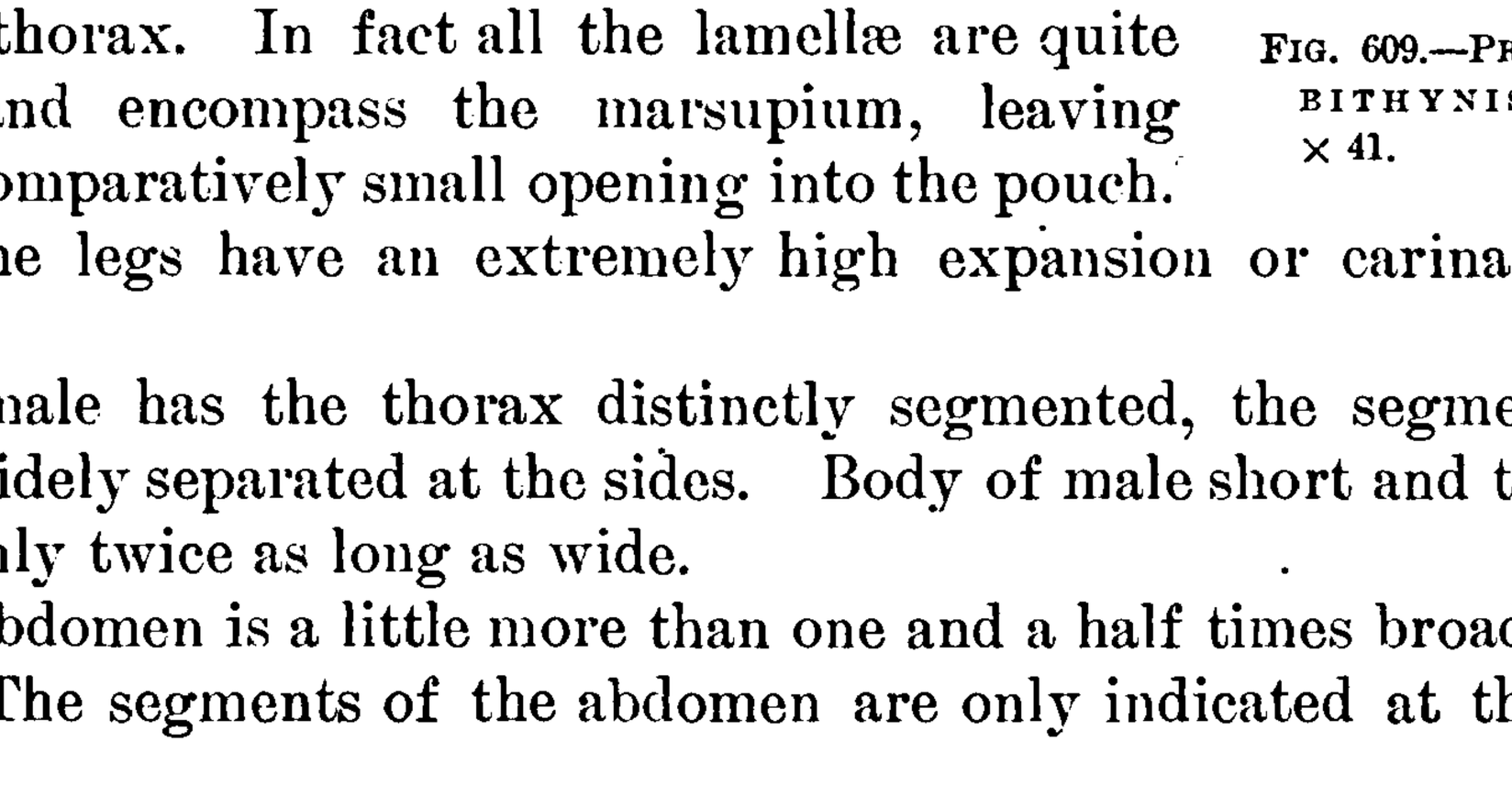


FIG. 610.—PROBOPYRUS BITHYNIS. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 8.

being fused in the middle of the dorsal surface; they gradually decrease in size to the sixth or last, which is a narrow piece situated between the two lobes of the fifth segment and which does not reach

to the extremity of those lobes. Eyes present. Body with markings of brown.

Six specimens of this species were taken by the U. S. Bureau of Fisheries steamer *Albatross* from the Mississippi River near the Exposition grounds in New Orleans, Louisiana. Parasitic on *Bithynis ohionis* (Smith).

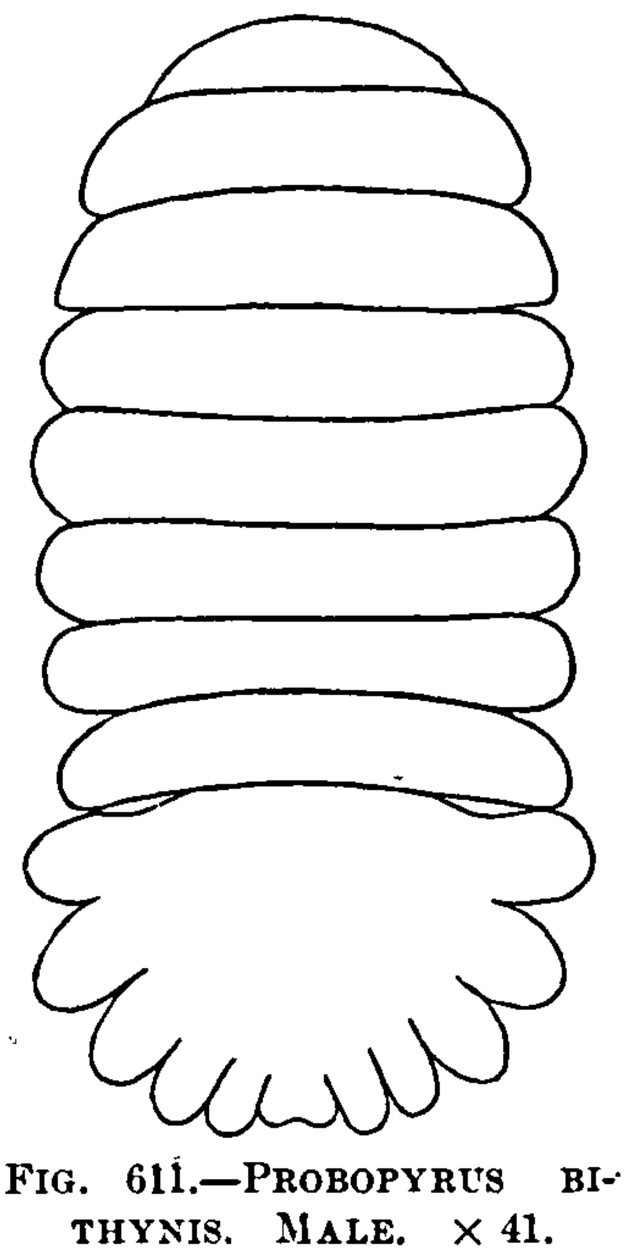


FIG. 611.—PROBOPYRUS BITHYNIS. MALE. × 41.

Type.—Cat. No. 29089, U.S.N.M.

About 6 specimens which should probably be referred to this species were found in Escondido River, Nicaragua, 50 miles from Bluefields, by Dr. C. W. Richmond; they are parasitic in the branchial cavity of *Bithynis acanthurus* (Wiegmann).

They differ from the type as above described in having no antero-lateral processes to the head of the female; in having patches of black on the lateral margins of all the segments of the thorax on one side of the body; and in having sometimes the third and also the fourth lamellæ of the incubatory pouch with patches of black.

In the male the terminal segment has in some specimens a tendency to be bilobed.

PROBOPYRUS ALPHEI Richardson.

Bopyrus sp.? FRITZ MÜLLER, Jenaische Zeitschrift, VI, 1871, p. 68.
Bopyrus alphei GIARD and BONNIER, Bull. Scient., XXII, 1890, p. 369 (nomen nudum).
Bopyrus alphei RICHARDSON, Proc. Wash. Acad. Sci., II, 1900, pp. 158–159.
Gyge sp.? H. V. WILSON, American Naturalist, XXXIV, 1900, p. 353.
Bopyrella alphei BONNIER, Trav. de la Station Zool. de Wimereux, VIII, 1900, p. 352.
Probopyrus alphei RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, pp. 67–68.

Localities.—Beaufort, North Carolina, on *Crangon heterochælis;* mangroves, Rio Parahyba do Norte, Brazil, on *Crangon heterochælis;* Desterro, Brazil, on an undetermined species of *Crangon* (Müller).

The body of the female is broadly oval, its greatest width being equal to its length, broadened anteriorly and narrowed posteriorly. Head widening posteriorly, its antero-lateral angles being produced into lobes, directed upward. Eyes absent. The thoracic segments have their lateral margins somewhat elevated and contiguous. The abdominal segments are not contiguous along the lateral margins, but are separated by broad lateral incisions.

The incubatory lamellæ are very wide apart, surrounding a broad open space, the marsupium, on the ventral side of the body.

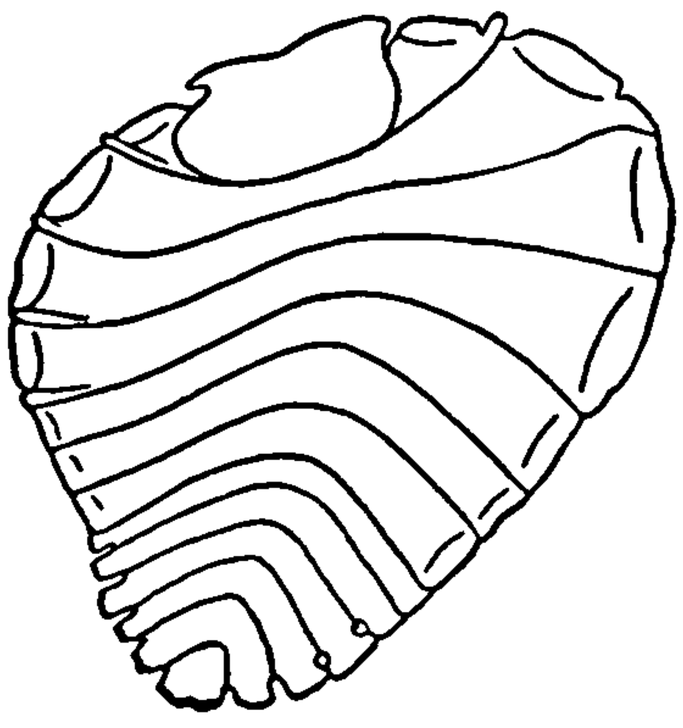


FIG. 612.—PROBOPYRUS ALPHEI. DORSAL VIEW OF FEMALE.

There are five pairs of double-branched pleopoda, lamellar in shape and placed on either side of the median line. Uropoda absent.

Color, white.

Male, oblong oval. Eyes wanting. Thoracic segments well defined. Abdominal segments imperfectly defined, except along the lateral margins. Color white.

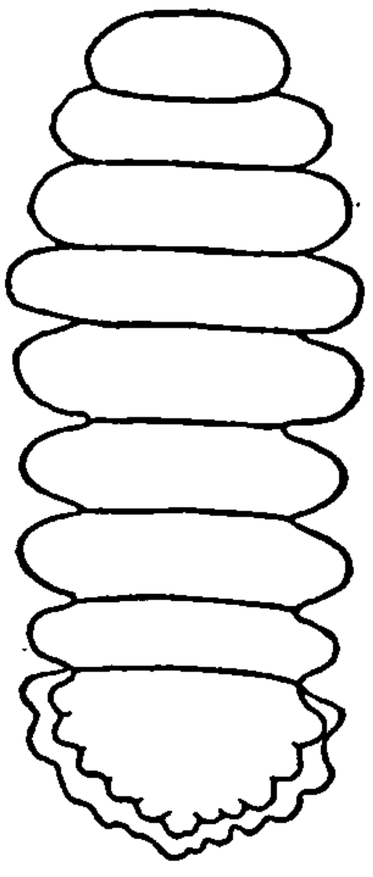


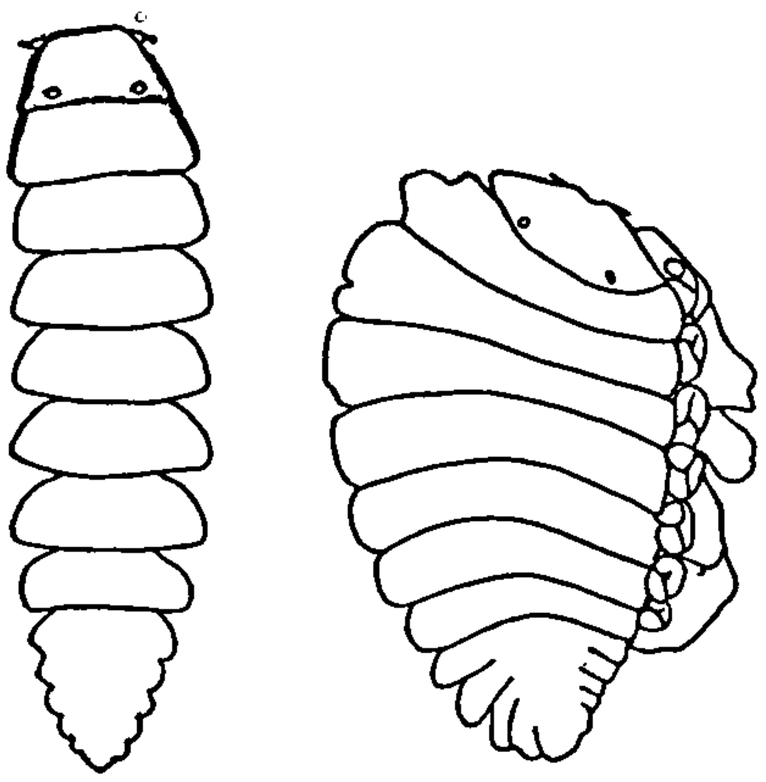
FIG. 613.—PROBOPYRUS ALPHEI. MALE.

Type locality.—Mangroves, Rio Parahyba do Norte, Brazil, in the branchial cavity of *Crangon heterochælis* Say. Cat. No. 23759, U.S.N.M.

PROBOPYRUS LATREUTICOLA (Gissler).

Bopyroides latreuticola GISSLER, American Naturalist, XVI, 1882, pp. 591–594.
Bopyrus latreutes SPENCE BATE, Challenger Report, XXIV, 1888, p. 584.
Bopyrina latreuticola BONNIER, Travaux de la Station Zool. de Wimereux, VIII, 1900, pp. 370–373.
Bopyroides latreuticola RICHARDSON, Trans. Conn. Acad. Sciences, XI, 1902, p. 299; Proc. U. S. Nat. Mus., XXVII, 1904, pp. 65–66.

Localities.—Beaufort, North Carolina, on *Latreutes ensiferus* (Milne Edwards); latitude 28° 17′ 7″ north, longitude 66° 17′ 37″ west; latitude 31° 15′ 42″ north, longitude 67° 39′ 10″ west on *L. ensiferus;* latitude 31° 16′ north, longitude 71° 50′ west on *L. ensiferus;* latitude 27° 38′ north, longitude 76° 23′ 24″ west on *L. ensiferus;* Bahamas, between Nassau and Andros on *L. ensiferus;* off South Carolina, on *L. ensiferus;* Bermudas, on *L. ensiferus.*



a *b*

FIG. 614.—PROBOPYRUS LATREUTICOLA. *a*, MALE. × 51⅓. *b*, FEMALE. × 18⅔.

Body of female ovate, asymmetrical, one and a half times longer than broad, 2 mm.: 3 mm.

Head deeply set in first thoracic segment; with a frontal border, the anterior margin of which is widely rounded, and the lateral angles of which project as triangular lobes at the sides of the head. Eyes distinct and situated just below the frontal border.

On one side of the body the segments of the thorax have the lateral

parts large and expanded. On the shorter side they are less expanded and upcurved, showing the legs. Ovarian bosses are not present on any of the segments. The lateral margins of all the segments of the expanded side are entire with the exception of the second, which has a decided notch separating the anterior two-thirds from the posterior third. The epimera seem to be perfectly coalesced in all the segments with the dorsal part of the segments.

The segments of the abdomen are all fused in the middle of the dorsal surface. On the shorter side of the body there is no indication of the segments, the lateral margin being straight and continuous. On the opposite side, however, five distinct segments are marked off from the terminal lobe by five deep notches. There are five pairs of double-branched pleopoda in the form of small, rounded lamellæ. No uropoda are developed. The five pairs of incubatory lamellæ do not completely inclose the marsupial pouch. The plates are small and bound only the lateral parts of the marsupium. The distal segment of the first pair is posteriorly rounded. There are seven pairs of legs, all equally well developed and having prehensile hands.

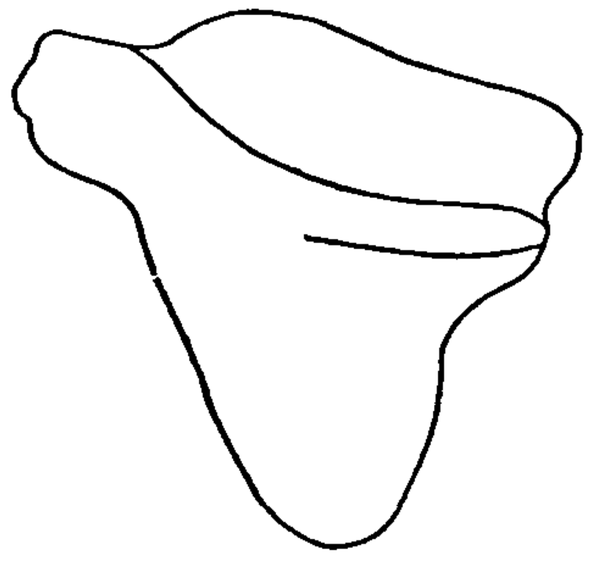
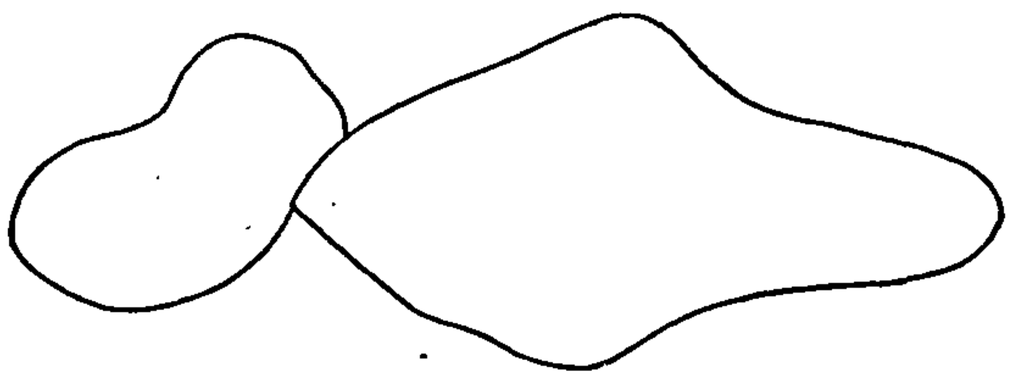
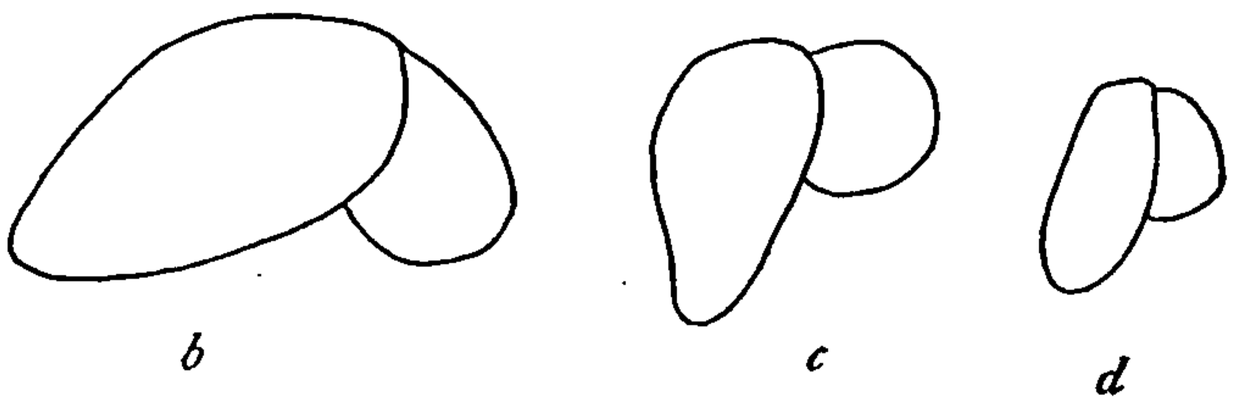


FIG. 615.—PROBOPYRUS LATREUTICOLA. FIRST INCUBATORY LAMELLA. × 51⅓.



a



b *c* *d*

FIG. 616.—PROBOPYRUS LATREUTICOLA. *a*, FIRST PLEOPOD (SHOWING BOTH BRANCHES). × 54⅔. *b*, SECOND PLEOPOD. × 103⅓. *c*, THIRD PLEOPOD. × 103⅓. *d*, FOURTH PLEOPOD. × 103⅓.

The male is oblong-ovate. The anterior margin of the head is widely rounded. Eyes are distinct. The seven segments of the thorax are distinct and have the lateral margins rounded. The segments of the abdomen are fused in the middle, but are all distinctly marked at the sides. Five deep notches separate the first five segments from each other and from the sixth or terminal segment, which has the posterior margin produced in three small lobes, one median and one on either side, all in a transverse line. There are no uropoda nor pleopoda. The abdomen is not abruptly narrower than the thorax.

The specimen described is found parasitic on *Latreutes ensiferus* (Milne Edwards).

95. GENUS BOPYRISCUS, new genus.

Very close to *Probopyrus*.

First four segments of abdomen distinct in female; last two segments fused. Pleopods consist of five pairs of double-branched lamellæ. Uropoda absent. Distal segment of first lamellæ of marsupium produced in a small lobe.

Male with first three segments of abdomen distinct; last three fused in the terminal piece, which is trilobate. Uropoda absent.

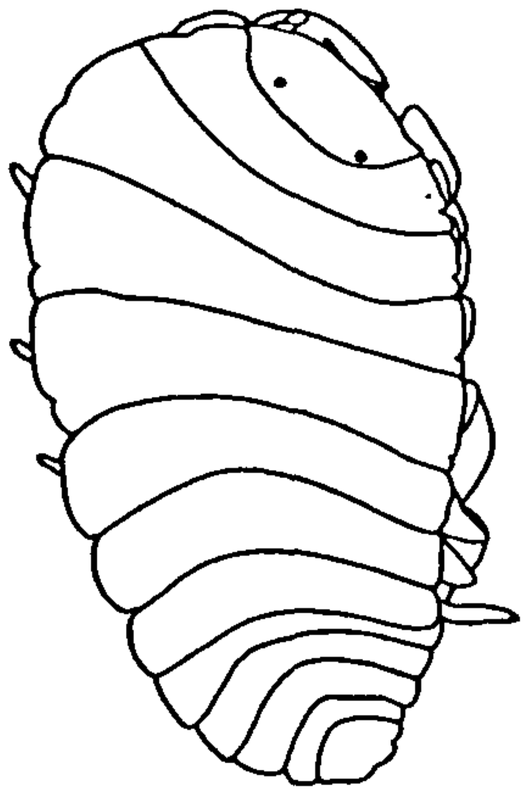


FIG. 617.—BOPYRISCUS CALMANI. *a*, FEMALE. × 11⅜. *b*, FIRST INCUBATORY LAMELLA. × 33.

BOPYRISCUS CALMANI, new species.

Body somewhat asymmetrical, turned more or less to one side, which is shorter than the other side; longer than wide, 5 mm.: 3 mm.

Head deeply set in thorax, wider than long, with the front nearly straight or but slightly rounded, and the antero-lateral angles acute. Eyes are present in the form of black pigment. The first pair of antennæ are small and are composed of three articles. The second pair are also small, and composed of only a few articles.

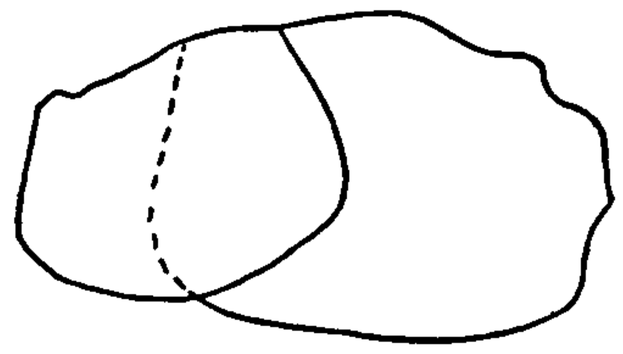


FIG. 618.—BOPYRISCUS CALMANI. FIRST PLEOPOD. FEMALE. × 77½.

The seven segments of the thorax are distinct. The lateral margins of the first four are bilobate; the lateral margins of the last three are straight. Ovarian bosses are faintly indicated on the first four segments where they occupy the anterior part of the lateral margin. Lateral to them are the narrow epimeral plates, which are but faintly indicated.

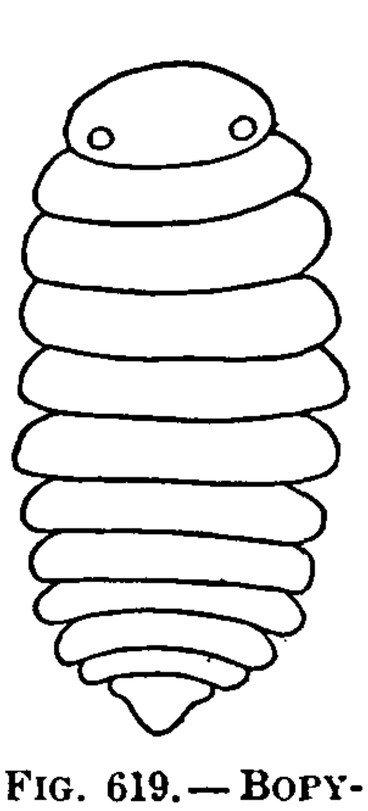


FIG. 619.—BOPYRISCUS CALMANI. MALE. × 39.

The first four segments of the abdomen are distinct, being separated by faint lines; the last two segments are fused, the line separating them being obliterated.

There are no uropoda. The pleopoda consist of five pairs of double-branched, small rounded lamellæ.

There are five pairs of incubatory lamellæ that do not completely inclose the incubatory pouch. The first pair have the distal segment produced at the extremity in a small lobe.

The male has the frontal margin of the head rounded. Eyes distinct, situated near the posterior margin. All seven segments of the thorax distinct. The first three segments of the abdomen are

distinct; the last three are fused in the terminal piece, which is trilobate, a lateral lobe on either side and a larger median posterior lobe.

There are no uropoda. This species is named for Dr. W. T. Calman, the Scotch naturalist.

Only one specimen was collected by the U. S. Bureau of Fisheries steamer *Albatross* at Station 4421, between Santa Barbara and San Nicolas, California.

The type is in the U. S. Nat. Museum. Cat. No. 32073.

96. Genus BOPYRINA Kossmann.

Branchial parasites.

Female with segments of abdomen fused in the middle, more or less defined at the sides; lateral parts or pleural lamellæ not developed.

Pleopoda rudimentary; first four pairs single-branched, simple, last pair wanting. Uropoda wanting.

Male with all the segments of the thorax distinct. Segments of the abdomen fused in the middle, but more or less defined at the sides.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS BOPYRINA.

a. Segments of the abdomen in female defined only on one side of the body. *Bopyrina abbreviata* Richardson

a'. Segments of the abdomen in female distinctly defined on both sides of the abdomen.

b. First incubatory lamellæ with the distal segment produced in a linguiform lobe at the outer posterior extremity ..... *Bopyrina urocaridis* Richardson

b'. First incubatory lamellæ with the distal segment roundly produced at the inner posterior extremity ..... *Bopyrina thorii* Richardson

BOPYRINA ABBREVIATA Richardson.

Bopyrina abbreviata RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, pp. 71–73.

Locality.—Puntarasa, Florida, on *Hippolyte zostericola* (Smith).

Body of adult female very asymmetrical, one side being very much longer than the other. Color entirely white with a few black dots scattered irregularly over the dorsal surface.

Head large, turned to the shorter side; frontal border produced in a rounded lobe in the middle. Antero-lateral angles produced in narrow lobes or processes. Eyes small, distinct.

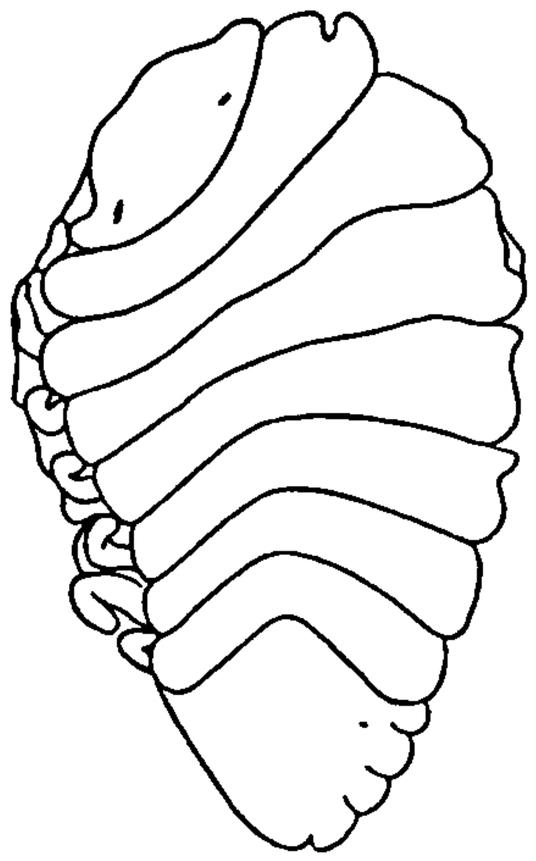


FIG. 620.—BOPYRINA ABBREVIATA. DORSAL VIEW OF FEMALE. × 23.

The segments of the thorax are distinctly defined. The epimera on the longer side of the body are distinct on the first three segments, where they occupy the anterior portion of the lateral margin, but it is impossible to distinguish them on the shorter side. Ovarian bosses are not present on any of the segments. The epimera

of the last four segments are not separated off from the segments; they occupy the entire lateral margin.

The abdominal segments are completely fused in the middle of the abdomen. On the lateral margin of the shorter side of the body there is no indication whatever of the coalesced segments. The first four abdominal segments are represented on the longer side of the body by four rounded lobes. The last two segments are completely fused, and are not indicated on either side.

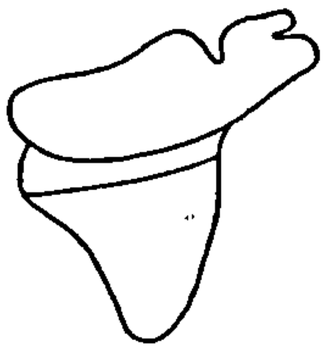


FIG. 621. — BOPYRINA ABBREVIATA. FIRST LAMELLA OF MARSUPIUM. × 27.

The pleopoda, as far as could be discerned, consist of four pairs of single branched lamellæ. Three pairs were distinctly seen; the last pair are very indistinct.

FIG. 622. — BOPYRINA ABBREVIATA. MAXILLIPED. × 41.

The first lamella of the marsupium on the shorter side extends about one-third the length of the body; on the longer side, the first lamella extends to the posterior margin of the second thoracic segment.

Male with head large, rounded in front. Eyes large, irregularly shaped. All seven segments of the thorax distinct. Abdomen narrower than the thorax, and tapering to a narrow extremity. In one specimen all six segments were more or less defined at the sides; in the other specimen only the first three. Length of abdomen about equal to one-third the length of the body.

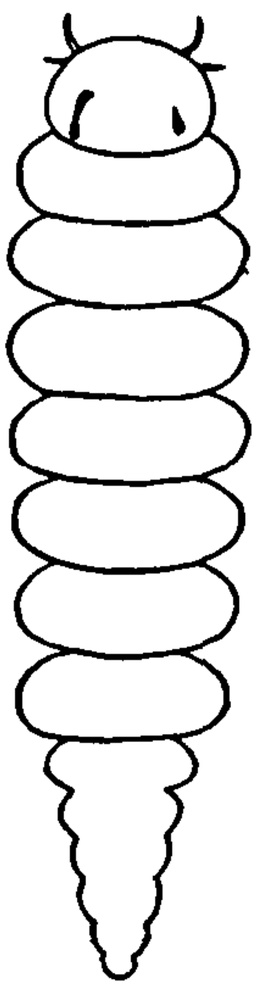


FIG. 623. — BOPYRINA ABBREVIATA. MALE. × 77½.

Color white with markings of black or brown.

Nine specimens were collected by Mr. Henry Hemphill at Puntarasa, Florida, on *Hippolyte zostericola* (Smith).

This species differs from *Bopyrina virbii* (Waltz),[a] in the much smaller first lamellæ in the female, the lamella of the shorter side of the marsupium extending but one-third the length of the body, while in *B. virbii* it extends nearly to the abdomen, that of the longer side reaching only the posterior margin of the second thoracic segment, while in *B. virbii* it extends to the posterior margin of the fourth segment; in not having any indication of segmentation on the shorter side of the abdomen, while in *B. virbii* there is some indication, and in having the abdomen of the male rounded posteriorly with indications of segmentation at the sides more or less during its entire length, while in *B. virbii* the abdomen is truncate posteriorly, with only the first two segments indicated.

The specific name refers to the abbreviated first lamellæ of the marsupium.

Type.—Cat. No. 29097, U.S.N.M.

[a] Kossman, Zeits. f. Wiss. Zool., XXXV, 1881, p. 666–679, pls. XXXIV–XXXV.

BOPYRINA UROCARIDIS Richardson.

Bopyrina urocaridis RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, p. 73.

Localities.—Puntarasa, Florida and west Florida, on *Urocaris longicaudata* Stimpson.

Body of female twice as long as wide.

Head with frontal margin produced in a broadly rounded process. Eyes present about the middle of the head as small black spots.

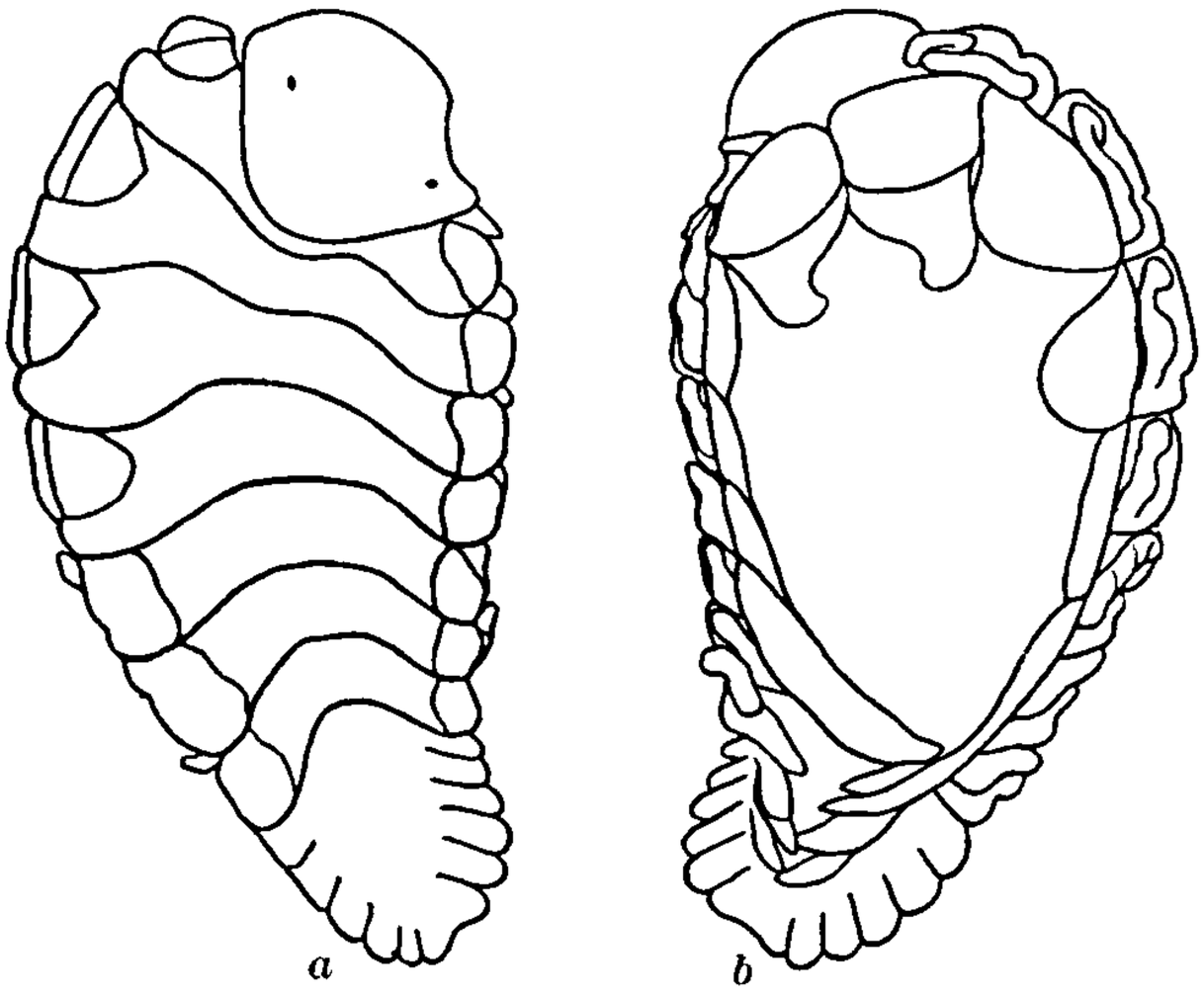


FIG. 624.—BOPYRINA UROCARIDIS. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 23.

The segments of the thorax are distinct. The epimera are marked off by faint lines or impressions. The abdomen is composed of six segments, which are distinct at the sides but fused in the middle. The posterior margin of the terminal segment is broad, with a slight median excavation.

The pleopoda consist of four pairs of single-branched plates or lamellæ, each pair directed toward the median line. There are no uropoda.

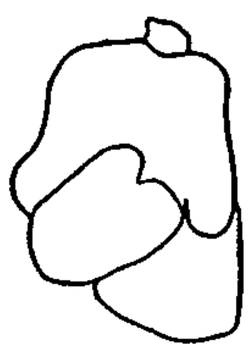


FIG. 625.—BOPYRINA UROCARIDIS. MAXILLIPED. × 39.

The incubatory pouch is a large area on the ventral side of the body, which is not closed over by the incubatory lamellæ. These lamellæ consist of five pairs of plates, the first pair of which have the second segment produced distally in a linguiform process.

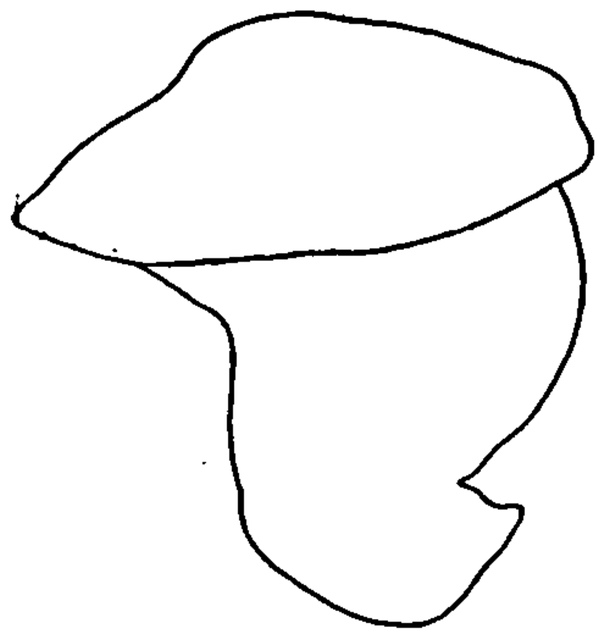


FIG. 626.—BOPYRINA UROCARIDIS. FIRST LAMELLA OF MARSUPIUM, RIGHT SIDE. × 52.

Color uniformly light yellow with small black dots on the incubatory lamellæ.

Male unknown.

Four specimens were found—three at Puntarasa, Florida, collected by Henry Hemphill, and one from west Florida, collected by Mr. J. B. Henderson and Mr. C. T. Simpson, all parasitic on *Urocaris longicaudata* Stimpson.

Type.—Cat. No. 29088, U.S.N.M.

BOPYRINA THORII Richardson.

Bopyrina thorii RICHARDSON, Proc. U. S. Nat. Mus., XXVII, 1904, p. 74.

Locality.—Key West, Florida, on *Thor floridanus* Kingsley.

Body of adult female asymmetrical, turned very much to one side. Color yellow, with a few markings of black on one side of the thorax and in the center of the first three segments of the abdomen.

Head large, with frontal margin produced in a rounded lobe, which is turned upward in the specimen; the antero-lateral angles are produced into small processes. The eyes are black and distinct.

The segments of the thorax are all distinctly separated from each other. The epimera are distinct on the longer side of the body as long, narrow plates on the anterior portion of the lateral margin of the first four segments. Ovarian bosses are not present on any of the segments.

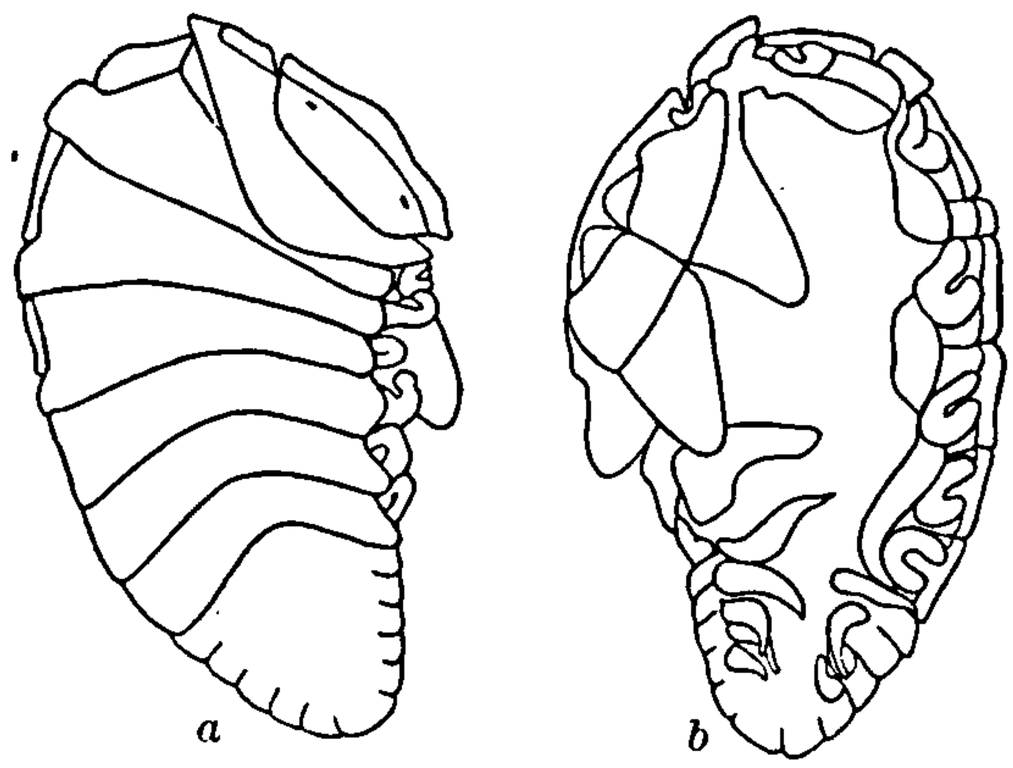


FIG. 627.—BOPYRINA THORII. *a*, DORSAL VIEW OF FEMALE. *b*, VENTRAL VIEW OF SAME. × 15.

The abdomen is composed of six segments, completely fused in the middle, but indicated on both lateral margins. The terminal segment is rounded posteriorly.

There are four pairs of single-branched pleopoda. The marsupium is a large, open area, normally filled with eggs, and inclosed by five pairs of lamellæ. The first lamellæ have the distal lobe rounded. The fifth lamellæ are narrow, elongated plates.

Male unknown.

Only one specimen was obtained by the U. S. Bureau of Fisheries steamer *Albatross* at Key West, Florida. The species is parasitic on *Thor floridanus* Kingsley.

This species differs from the preceding species chiefly in the form of the distal segment of the first lamellæ of the marsupium.

Type.—Cat. No. 29099, U.S.N.M.

97. Genus BOPYROIDES Stimpson.[a]

Body of female broad, flattened, somewhat asymmetrical.

Abdomen distinctly segmented; lateral parts of segments or pleural lamellæ not developed.

Palp of maxillipeds well defined.

Incubatory plates widely separated, not concealing the entire incubatory cavity and not fully covering the eggs; distal segment of first pair not produced posteriorly in a lobe.

[a] See Sars for characters of genus, Crust. of Norway, II, 1899, p. 198.

All seven pairs of legs present. Pleopods wanting and replaced by fleshy ridges. Uropoda wanting. Male with all the segments of the thorax distinct. Segments of abdomen fused. Pleopoda wanting. Uropoda absent.

Branchial parasites.

BOPYROIDES HIPPOLYTES (Krøyer).

Bopyrus hippolytes KRØYER, Kongelige Danske Videnskabenes Selskabs naturvidenskabelige og mathematiske Afhandlinger, VII, 1838, p. 306, (78), pl. IV, fig. 22.—EDWARDS, Hist. Nat. des Crust., III, 1840, p. 283.—KRØYER, Kongelige Danske Videnskabenes Selskabs naturvidenskabelige og mathematiske Afhandlinger, IX, 1842, p. 262; Voy. en Scand., Crust., 1849, pl. XXVIII, fig. 2.—STIMPSON, Proc. Acad. Nat. Sci., Phila., 1863, p. 140.

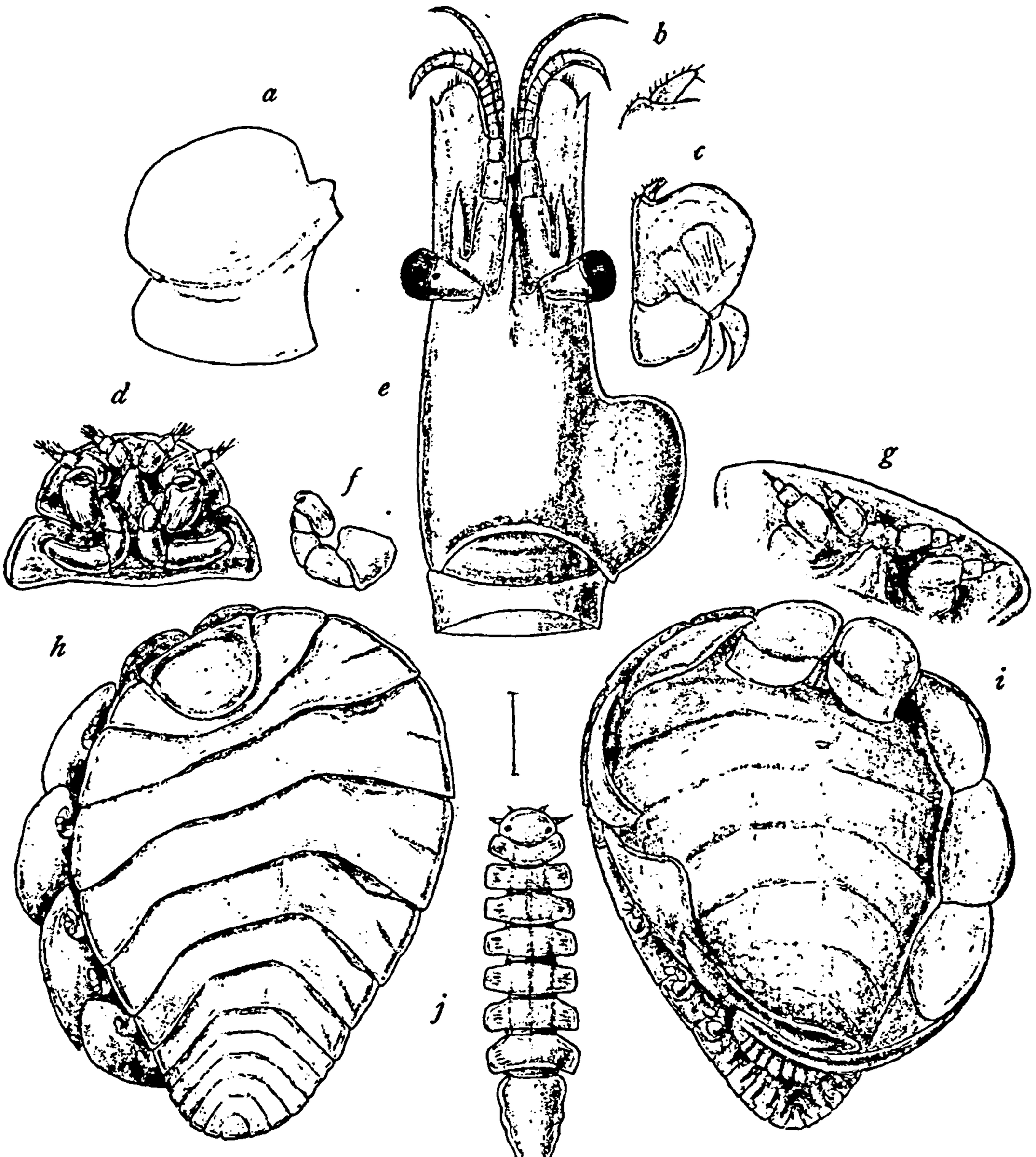


FIG. 628.—BOPYROIDES HIPPOLYTES (AFTER SARS). *a*, FIRST INCUBATORY PLATE. *b*, PALP OF MAXILLIPED. *c*, MAXILLIPED. *d*, HEAD OF MALE (VENTRAL VIEW). *e*, ANTERIOR PART OF SPECIMEN OF SPIRONTOCARIS POLARIS INFESTED WITH THIS PARASITE. *f*, LEG. *g*, ANTERIOR PART OF HEAD OF FEMALE (VENTRAL VIEW). *h*, DORSAL VIEW OF FEMALE. *i*, VENTRAL VIEW OF FEMALE. *j*, DORSAL VIEW OF MALE.

Bopyroides acutimarginatus STIMPSON, Proc. Acad. Nat. Sci. Phila., 1864, p. 156.
Gyge hippolytes BATE and WESTWOOD, Brit. Sess. Crust., II, 1868, p. 230.—MIERS, Ann. Mag. Nat. Hist. (4), XIX, 1877, p. 64 (14).—SMITH in HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 157.—HARGER, Rep. U. S. Fish Comm., 1880, Pt. 6, p. 311.—HANSEN, Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn, 1887–88, p. 197.—AXEL OHLIN, Akademisk Afhandling, XXII, 1895, p. 19.

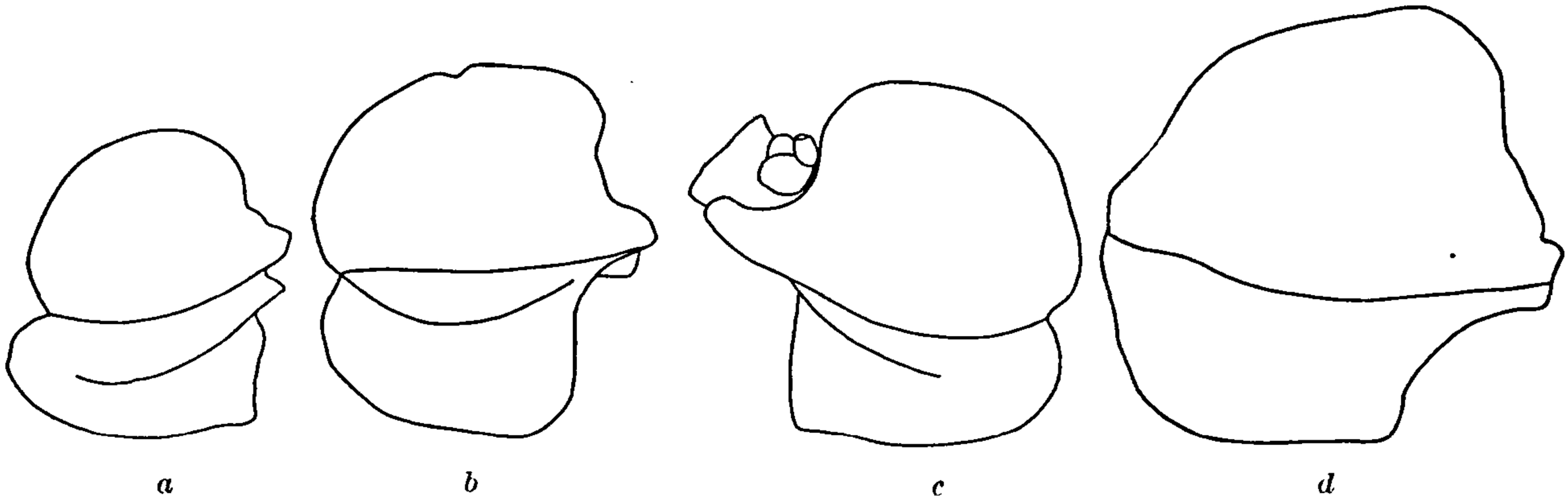


FIG. 629.—BOPYROIDES HIPPOLYTES. FIRST INCUBATORY LAMELLA OF SPECIMENS FOUND ON: *a*, SPIRONTOCARIS LAMELLICORNIA FROM PORT TOWNSEND BAY, WASHINGTON. × 11½. *b*, SPIRONTOCARIS POLARIS FROM ABERDORE CHANNEL. × 15½. *c*, SPIRONTOCARIS POLARIS FROM GRAND MENAN, NEW BRUNSWICK. × 15½. *d*, SPIRONTOCARIS SPINUS FROM OFF NORTH HEAD, AKUTAN PASS, ALASKA. × 77½.

Bopyroides hippolytes G. O. SARS, Crust. of Norway, II, 1899, pp. 199–200, pl. LXXXIV, fig. 2.—BONNIER, Travaux de la Station Zool. de Wimereux, VIII, 1900, pp. 373–375.
Bopyroides sarsi BONNIER, Travaux de la station Zool. de Wimereux, pp. 376–377.
Bopyroides sp. BONNIER, Travaux de la station Zool. de Wimereux, p. 378.
Bopyroides hippolytes RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 578; Bull. U. S. Fish Comm., XXIV, 1905, pp. 218–219.

Localities.—Circumpolar in distribution.

Atlantic coast localities: Massachusetts, Bay of Salem, on *Spirontocaris spinus*, *S. fabricii*, and *S. liljeborgii;* Casco Bay, on *S. polaris*

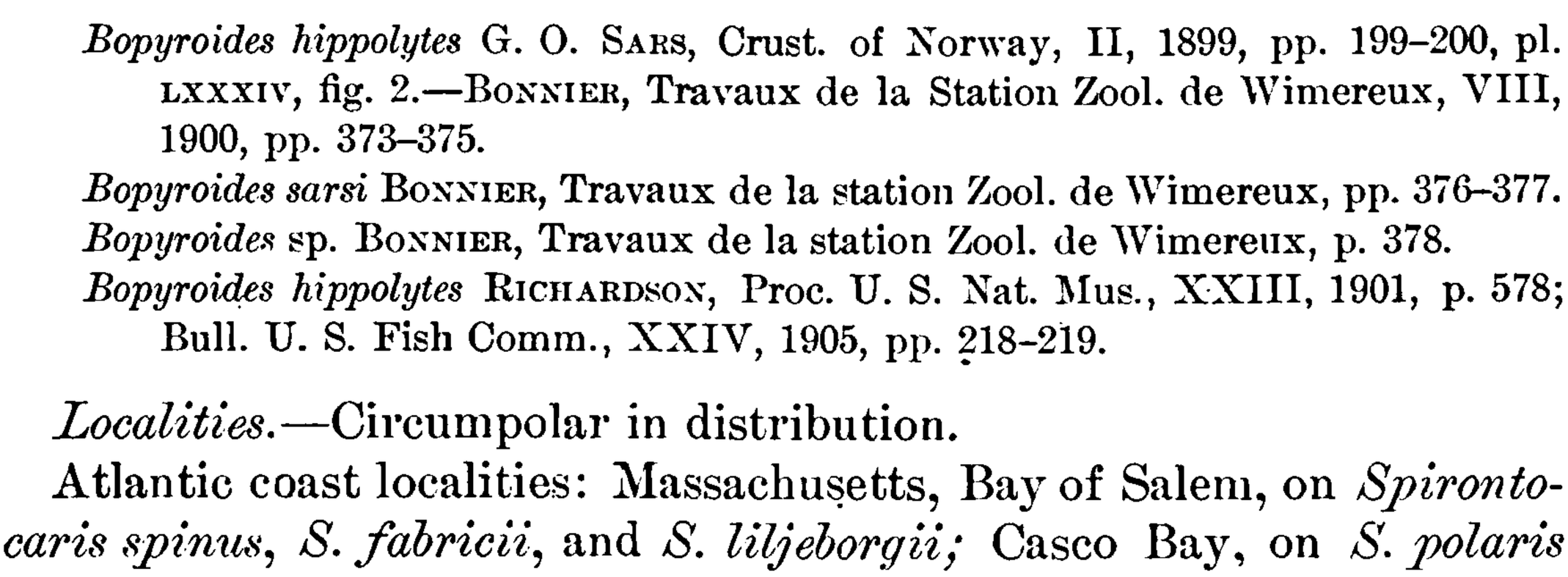


FIG. 630.—BOPYROIDES HIPPOLYTES. FIRST LAMELLA OF MARSUPIUM FROM SPECIMENS FOUND ON: *a*, SPIRONTOCARIS SPINUS FROM EASTPORT, MAINE. × 14½. *b*, SPIRONTOCARIS SPINUS FROM BAY OF ISLANDS, ADAKH, ALASKA. × 23. *c*, SPIRONTOCARIS SECURIFRONS FROM THE HAWAIIAN ISLANDS. *b'*, SPIRONTOCARIS SPINUS FROM BAY OF ISLANDS, ADAKH, ALASKA. × 23.

and *S. pusiola;* Bay of Fundy, on *S. spinus* and *S. pusiola;* Halifax, Nova Scotia; Gulf of Maine, on *S. liljeborgii* and *S. spinus;* Eastport, Maine, on *S. spinus;* off Cape Cod, on *S. liljeborgii;* latitude 73° 48′ north, longitude 80° 30′ west, on *S. polaris;* latitude 72° 33′ north,

longitude 71° 30′ west, on *S. polaris;* latitude 71° 42′ north, longitude 73° west, on *S. polaris;* latitude 66° 33′ north, longitude 61° 50′ west, on *S. polaris;* latitude 64° 56′ north, longitude 66° 18′ west, on *S. polaris.*

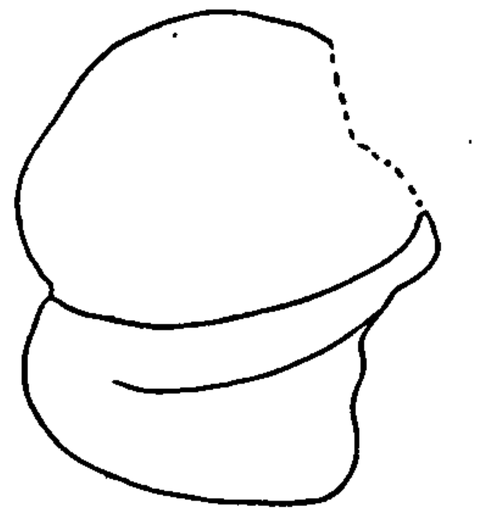


FIG. 631.—BOPYROIDES HIPPOLYTES. FIRST INCUBATORY LAMELLA FROM SPECIMEN FOUND ON SPIRONTOCARIS LILLJEBORGII FROM EASTERN FISHING BANKS (GLOUCESTER FISHERMEN). × 15½.

Pacific coast localities: Straits of Fuca, between Washington and Vancouver Island, on *Spirontocaris suckleyi;* Heceta Bank, Oregon, on *S. bispinosa;* off North Head, Akutan Island, Alaska, on *S. spinus;* Bay of Islands, Adakh, on *S. spinus;* Port Etches, Alaska, on *S. arcuata;* west of Amaknak Island, Unalaska, on *S. arcuata;* Bering Sea, north of Umnak Island, on *Pandalus borealis* Krøyer; off south entrance to Akutan Pass, Alaska, on *Pandalus montagui* Leach; between Bird and Nagai islands, Shumagins, Alaska, on *P. montagui;* Bering Sea, south of Pribilof Islands, on *P. borealis* Krøyer; Straits of Fuca, on *Pandalopsis dispar* Rathbun; Unalaska, and Lituya Bay, Alaska, on *Spirontocaris brevirostris* (Dana); Puget Sound, on *S. brevirostris;* Bering Sea, west of Pribilof

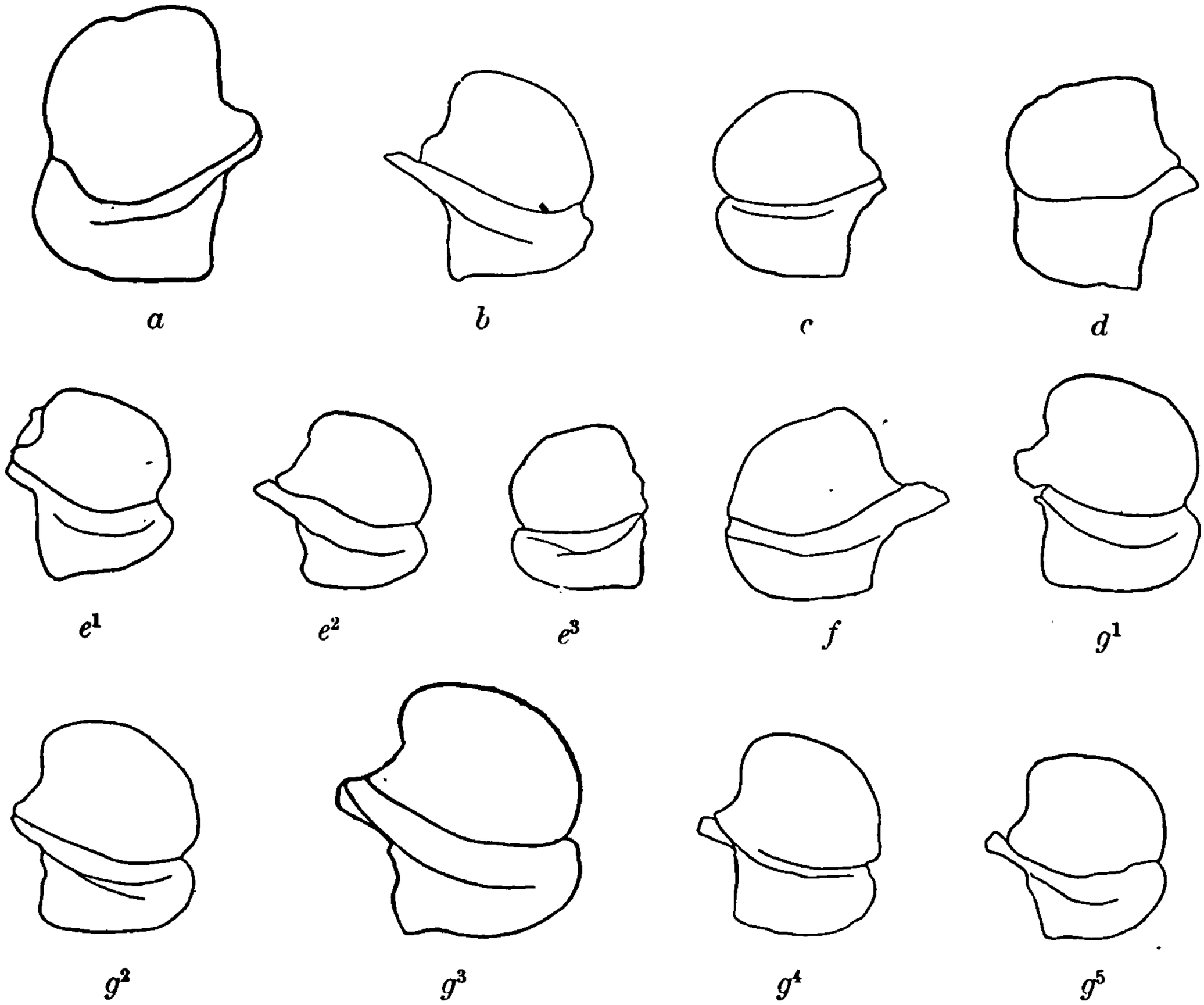
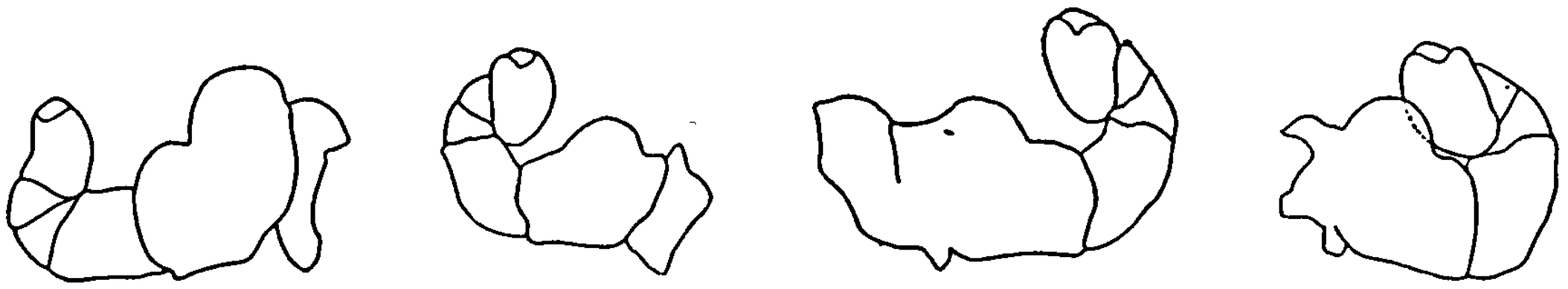


FIG. 632.—BOPYROIDES HIPPOLYTES. FIRST INCUBATORY LAMELLA FROM SPECIMENS FOUND ON: *a*, SPIRONTOCARIS POLARIS FROM WEST OF PRIBILOF ISLANDS. × 14½. *b*, ON SPIRONTOCARIS SUCKLEYI FROM ADMIRALTY INLET, VICINITY OF PORT TOWNSEND. × 5. *c*, ON SPIRONTOCARIS SUCKLEYI FROM AFOGNAK BAY, AFOGNAK ISLAND. × 11½. *d*, ON SPIRONTOCARIS SUCKLEYI FROM ADMIRALTY INLET, VICINITY OF PORT TOWNSEND. × 11½. e^1, e^2, e^3, ON SPIRONTOCARIS SUCKLEYI FROM ALITAK BAY, KADIAK ISLAND. *f*, ON SPIRONTOCARIS HERDMANI FROM QUEEN CHARLOTTE SOUND, OFF FORT RUPERT, VANCOUVER ISLAND, BRITISH COLUMBIA. × 31. g^1, g^2, g^3, g^4, g^5, ON PANDALUS JORDANI FROM QUEEN CHARLOTTE SOUND, OFF FORT RUPERT, VANCOUVER ISLAND, BRITISH COLUMBIA.

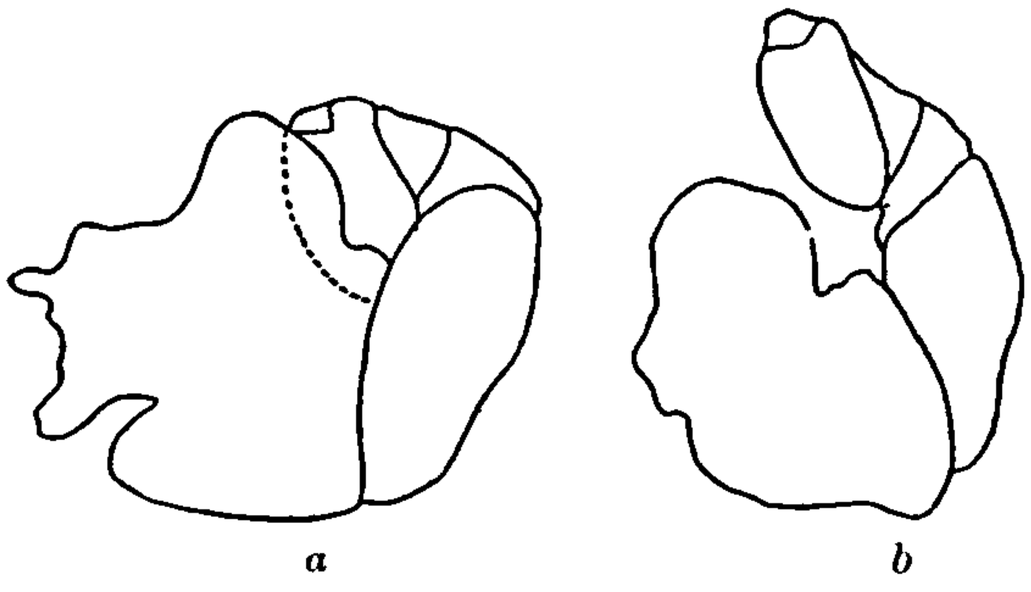
Islands, on *S. polaris* (Sabine); Straits of Fuca, on *S. suckleyi;* Lituya Bay, Alaska, on *S. suckleyi;* Gulf of Georgia, off Nanaimo, Vancouver Island, British Columbia; Queen Charlotte Sound, off Fort Rupert, Vancouver Island, British Columbia, on *Spirontocaris herd-*



a *b* *c* *d*

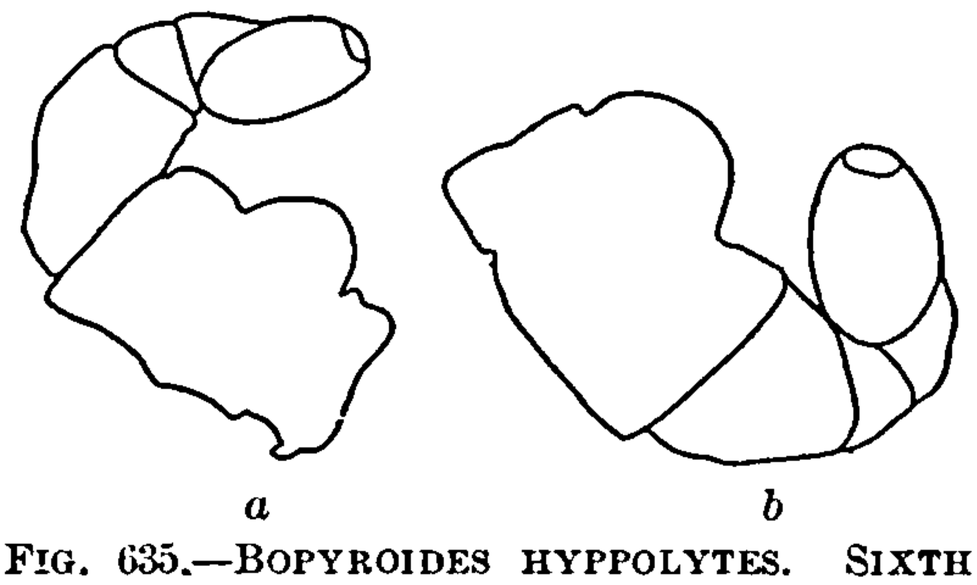
FIG. 633.—BOPYROIDES HIPPOLYTES. SIXTH LEG FROM SPECIMENS FOUND ON: *a*, SPIRONTOCARIS POLARIS FROM ABERDORE CHANNEL. × 27½. *b*, SPIRONTOCARIS SPINUS FROM NORTH HEAD, AKUTAN ISLAND, ALASKA. × 51½. *c*, SPIRONTOCARIS SPINUS FROM BAY OF ISLANDS, ADAKH, ALASKA. × 51½. *d*, SPIRONTOCARIS SPINUS FROM BAY OF ISLANDS, ADAKH, ALASKA. × 51½.

mani Walker; Queen Charlotte Sound, off Fort Rupert, Vancouver Island, British Columbia, on *Pandalus jordani* Rathbun; Admiralty



a *b*

FIG. 634.—BOPYROIDES HIPPOLYTES. SIXTH LEG FROM SPECIMENS FOUND ON: *a*, SPIRONTOCARIS SPINUS FROM EASTPORT, MAINE. × 39. *b*, SPIRONTOCARIS SECURIFRONS FROM BETWEEN HONOLULU AND KAUAI ISLAND, HAWAIIAN ISLANDS. × 39.



a *b*

FIG. 635.—BOPYROIDES HYPPOLYTES. SIXTH LEG OF SPECIMENS FOUND ON: *a*, SPIRONTOCARIS POLARIS FROM GRAND MENAN, NEW BRUNSWICK. × 39. *b*, SPIRONTOCARIS LAMELLICORNIA FROM PORT TOWNSEND. × 39.

Inlet, vicinity of Port Townsend, on *Spirontocaris suckleyi* (Stimpson); Afognak Bay, Afognak Island, Central Alaska, on *Spirontocaris suckleyi* (Stimpson); Alitak Bay, Kadiak Island, Central Alaska, on *Spirontocaris suckleyi* (Stimpson); Julienehaab, on *Spirontocaris fabricii* Krøyer; Sukkertoppen on *Spirontocaris spinus;* latitude 66° 32′ north, longitude 55° 34′ west, on *Spirontocaris spinus;* Ikertokfjord, on *Spirontocaris polaris;* Claushavn, on *Spirontocaris polaris;* Jakobshavn; Upernivik, on *Spirontocaris polaris;* Port Foulke or latitude 78° 17′ north; Grinnell Land, Discovery Bay, or latitude 81° 44′ north, on *Spirontocaris polaris.*

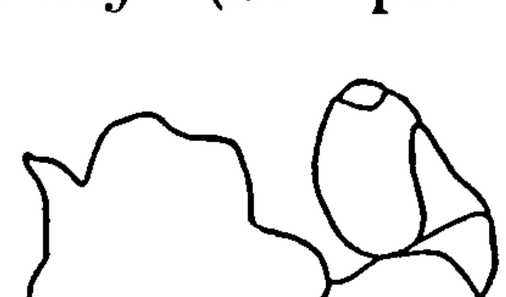


FIG. 636.—BOPYROIDES HIPPOLYTES. SIXTH LEG FROM SPECIMEN FOUND ON SPIRONTOCARIS LILLJEBORGII FROM EASTERN FISHING BANKS (GLOUCESTER FISHERMEN). × 15½.

Also recorded from Greenland, Barents Sea, British Isles, coast of Norway; depth, 5 to 116 fathoms.

B. acutimarginatus Stimpson is undoubtedly identical with *B. hippolytes* (Krøyer), which is circumpolar in distribution, and infests the species and genera quoted above common to both coasts of North America.

Depth.—5 to 70 fathoms.

Body of female oval, somewhat asymmetrical. Length, 8 mm. Width, 7 mm.

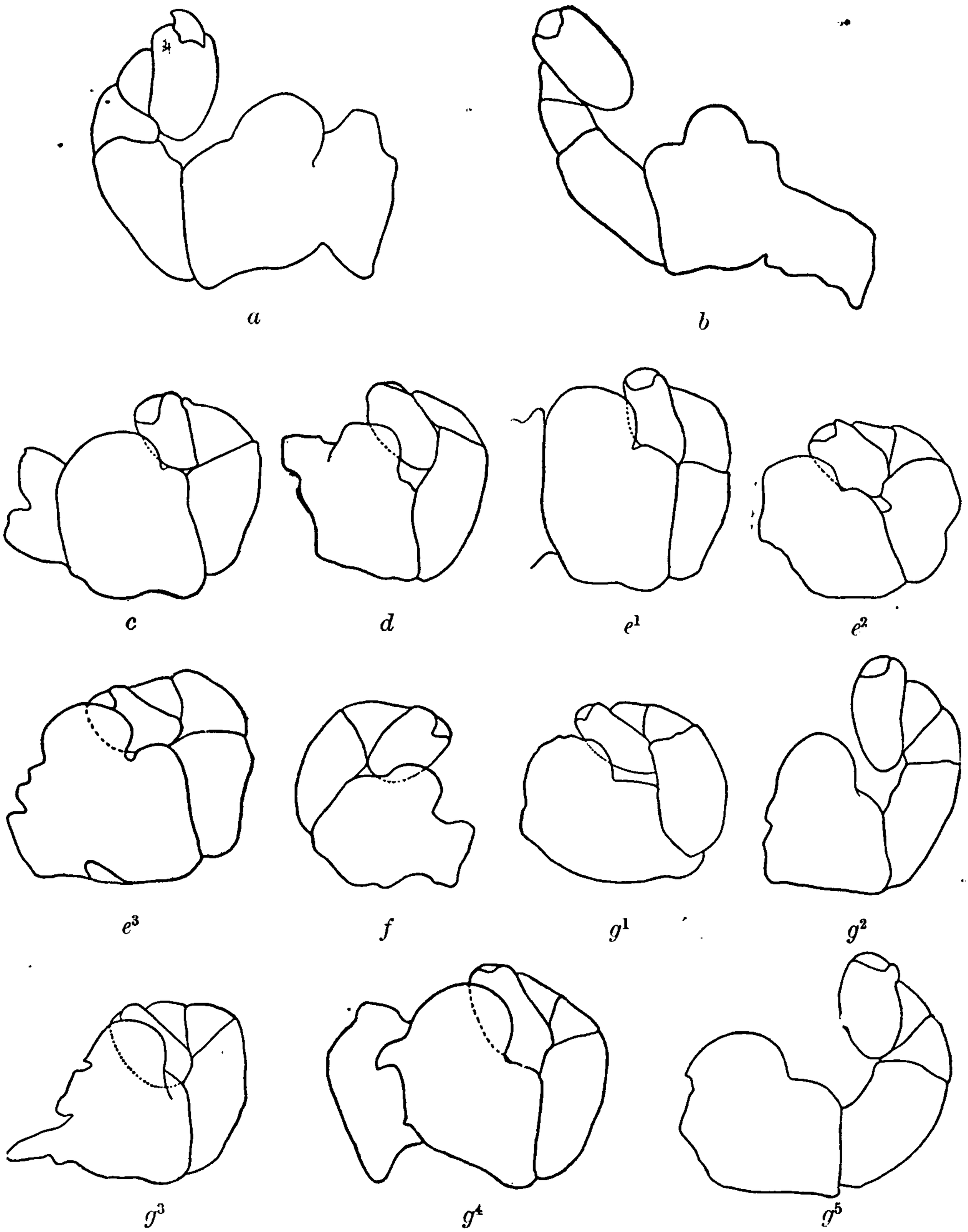


FIG. 637.—BOPYROIDES HIPPOLYTES. SIXTH LEG OF SPECIMENS FOUND ON: *a*, SPIRONTOCARIS POLARIS FROM WEST OF PRIBILOF ISLAND. × 52. *b*, ON SPIRONTOCARIS SUCKLEYI FROM ADMIRALTY INLET, VICINITY OF PORT TOWNSEND. × 41. *c*, ON SPIRONTOCARIS SUCKLEYI FROM AFOGNAK BAY, AFOGNAK ISLAND. × 52. *d*, ON SPIRONTOCARIS SUCKLEYI FROM ADMIRALTY INLET, VICINITY OF PORT TOWNSEND. × 52. e^1, e^2, e^3, ON SPIRONTOCARIS SUCKLEYI FROM ALITAK BAY, KADIAK ISLAND. *f*, ON SPIRONTOCARIS HERDMANI FROM QUEEN CHARLOTTE ISLAND, OFF FORT RUPERT, VANCOUVER ISLAND, BRITISH COLUMBIA. × 77½. g^1, g^2, g^3, g^4, g^5, ON PANDALUS JORDANI FROM QUEEN CHARLOTTE ISLAND, OFF FORT RUPERT, VANCOUVER ISLAND, BRITISH COLUMBIA.

Head a little wider than long, 2 mm.: 2½ mm., with the anterior margin of the frontal border almost straight. The posterior margin is rounded. The frontal border extends laterally on either side of the

head in a small lobe. Eyes absent. The first pair of antennæ are composed of "three" articles. The second pair are composed of "five" articles. Both pairs are small and inconspicuous in a dorsal view.

The seven segments of the thorax are distinct. Ovarian bosses are present on the sub-lateral anterior portion of the lateral margins of the first four segments. The epimera of these segments are very narrow plates, lateral to the ovarian bosses. On the last three segments the epimera are narrow plates occupying the anterior portion of the lateral margin.

All six segments of the abdomen are distinct. The lateral parts of these segments are not produced. The lateral margins are straight. The sixth or terminal segment is very small and posteriorly truncate. There are no uropoda. The pleopoda are represented by fleshy ridges.

There are five pairs of incubatory lamellæ. The distal portion of the first pair has the posterior margin not produced in a lobe.

The seven pairs of legs are small, with prehensile hands and the basis furnished with a high, more or less rounded, carina.

The male is elongate, 3 mm. long and 1 mm. wide. Head with the anterior margin rounded. Eyes distinct. The first pair of antennæ are composed of three articles. The second pair are composed of four articles. All the thoracic segments are distinct, with straight lateral margins. The legs are prehensile. All the segments of the abdomen are coalesced in a single segment which tapers posteriorly to a point. There are no uropoda or pleopoda.

Family XXI. DAJIDÆ.[a]

Body of female symmetrical. Segmentation, when present, only visible in the middle of the dorsal surface.

Palp of maxillipeds wanting.

Incubatory plates small, often reduced in number. Incubatory pouch confined to the lateral parts of the body, one cavity on either side.

Only four or five pairs of legs present, crowded around the oral area.

Pleopoda usually rudimentary or entirely wanting.

Uropoda developed or absent.

Male with the first thorasic segment coalesced with the head.

Parasitic on Schizopoda.

ANALYTICAL KEY TO THE GENERA OF THE FAMILY DAJIDÆ.

a. Body of female distinctly segmented in the dorsal region. Uropoda present. First pair of pleopods well developed; following pairs rudimentary.
Genus *Dajus* Krøyer

a'. Body of female without any trace of segmentation. Uropoda absent. Pleopoda wanting.....Genus *Holophryxus* Richardson

[a] See G. O. Sars for characters of family, Crust. of Norway, II, 1899, p. 221.

98. Genus DAJUS Krøyer.[a]

Female with the head distinct. Middle part of dorsal surface of thorax distinctly segmented.

Abdomen abruptly narrower than the thorax; all six segments distinct.

Uropoda present in the form of two simple lamellæ, close together.

Five pairs of incubatory plates present.

Five pairs of legs present, short and thick, and of similar structure.

First pair of pleopods well developed, consisting of a pair of simple large lamellæ, placed behind the last pair of incubatory plates; following pairs of pleopoda rudimentary.

Male with the segments of the abdomen not distinct. Pleopoda wanting. Uropoda rudimentary, in the form of two small, almost inconspicuous lobes.

DAJUS MYSIDIS Krøyer.

Dajus mysidis KRØYER, Voy. en Scand. Crust., 1849, pl. XXVIII, fig. 1.

Bopyrus mysidium PACKARD, Mem. Bost. Soc. Nat. Hist., I, 1867, p. 295, pl. VIII, fig. 3.

Leptophryxus mysidis BUCHHOLZ, Zweite Deutsche Nordpolfahrt, 1874, p. 288, pl. II, fig. 2.

Dajus mysidis LUTKEN, Crustacea of Greenland, 1875, p. 150.—G. O. SARS, Arch. Math. Nat., II, 1877, p. 354 (254).—SMITH in HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 158.—HARGER, Report U. S. Comm. of Fish and Fisheries, 1880, Pt. 6, p. 312.—HANSEN, Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1887–88, pp. 197–198.—SARS, Crust. of Norway, II, 1899, pp. 223–224, pls. XCIII, XCIV.—AXEL OHLIN, Bihang till k. Sv. Vet.-Akad. Handl., XXVI, Afd. IV, No. 12, 1901, p. 39.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 579.

Localities.—Labrador; Greenland; Kingigtok; Duck Island; Murchison Sound; Claushavn; latitude 73° 48′ north, longitude 80° 30′ west; latitude 72° 33′ north, longitude 71° 30′ west; latitude 71° 57′ north, longitude 73° 56′ west; latitude 66° 33′ north, longitude 61° 50′ west; latitude 64° 56′ north, longitude 66° 18′ west; west coast of Norway; Kara Sea; Sabine Island; Spitzberg; Jan Mayen; Murman coast.

Depth.—Three to 20 fathoms.

Parasitic on *Mysis oculata* (O. Fabricius).

"Body of fully grown female oval quadrangular in outline, broadest in front and slightly narrowed behind. Cephalon imperfectly defined and curved downward, frontal margin straight. Lateral parts of mesosome greatly swollen and projecting anteriorly in the form of bluntly rounded protuberances extending beyond the limits of the cephalon, median part subdepressed and exhibiting 5 or 6 distinct

[a] See Sars for characters of genus, Crust. of Norway, II, 1899, p. 222.

transversal sutures defining the segments. Metasome rather short and but slightly projecting, being conically tapered; its first segment much larger than the others. Oral area placed wholly in front, comparatively broad, semicircular. Antennulæ very short, 3-articulate; antennæ much more slender and extended laterally, being composed of 8 or 9 articulations successively diminishing in size distally. First

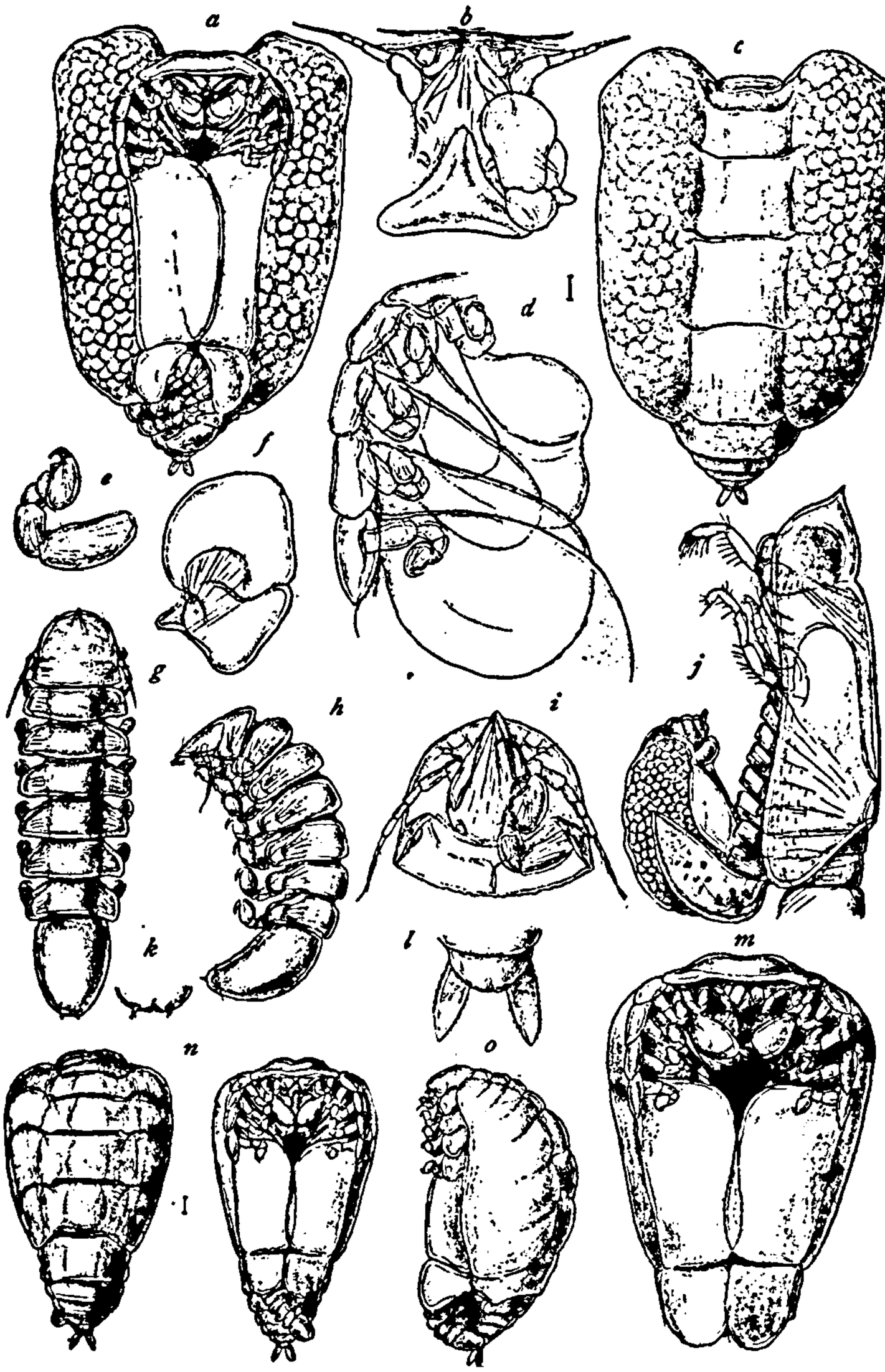


FIG. 638.—DAJUS MYSIDIS (AFTER SARS). *a*, VENTRAL VIEW OF FEMALE (ADULT). *b*, ORAL AREA. *c*, DORSAL VIEW OF ADULT FEMALE. *d*, RIGHT PART OF POST-ORAL AREA WITH CORRESPONDING FIVE LEGS AND INCUBATORY PLATES. *e*, LEG OF MALE. *f*, MAXILLIPED. *g*, MALE (DORSAL VIEW). *h*, LATERAL VIEW OF MALE. *i*, HEAD OF MALE (VENTRAL SIDE). *j*, SPECIMEN OF MYSIS MIXTA INFESTED WITH PARASITE. *k*, UROPODA OF MALE. *l*, UROPODA OF FEMALE. *m*, YOUNG FEMALE (VENTRAL VIEW). *n*, YOUNG FEMALE (DORSAL AND VENTRAL VIEWS). *o*, YOUNG FEMALE (LATERAL VIEW).

pair of incubatory plates larger than the next succeeding ones and divided by a transversal fold into two segments; last pair, extending behind the oral area, rather broadly overlapping each other in the middle. Body of young female narrower, subclavate, with the mesosome more distinctly segmented and the metasome more produced;

that of still younger female oblong, attenuated behind, with the cephalon freely projecting in front, and the coxal plates occupying the side-edges of the mesosome. Body of immature female, immediately after the metamorphosis, somewhat resembling the male in shape, but having only five pairs of legs, and the metasome distinctly segmented. Adult male linear, subcompressed, with the six posterior segments of mesosome very sharply marked off from each other, metasome forming a thickish, undivided piece of oval or elliptical form, carrying at the tip two extremely small appendages (rudiments of uropoda). Color of female along the middle of the dorsal face reddish brown, lateral parts whitish. Length of fully grown female 4 mm., that of male 1 mm."—G. O. Sars.[a]

99. Genus HOLOPHRYXUS Richardson.

Body of female without any trace of segmentation.

Abdomen abruptly narrower than thorax, unsegmented, produced to a tapering extremity. Uropoda absent. Pleopods wanting. Five pairs of legs present, crowded closely around the oral area.

Five pairs of incubatory lamellæ present.

This genus differs from *Dajus* Krøyer in the absence of all appendages to the abdomen of the female and in lacking all trace of segmentation. It differs from *Notophryxus* and *Aspidophryxus* Sars[b] in having all five pairs of incubatory plates, only one pair being present in Sars's genera; in having no trace of segmentation; in the shape of the oral area and the position and form of the abdomen, etc. It differs from *Heterophryxus* Sars[c] in the position of the last pair of legs, which in *Heterophryxus* are rather anomalous in structure, are placed at the posterior extremity of the body and are adapted for clasping. It differs from *Branchiophryxus* Caullery[d] in having five pairs of legs and five pairs of incubatory plates, while in *Branchiophryxus* there are but four pairs of legs and four pairs of incubatory plates. It differs from *Zonophryxus* Richardson[e] in lacking pleopoda, one pair being present in *Zonophryxus;* in the form of the abdomen and in the general shape of the body. It differs from *Prodajus* Bonnier[f] in the form of the abdomen, which is unsegmented and not bifureate.

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[a] Crust. of Norway, II, 1899, pp. 223–224.

[b] Idem, pp. 225–231; Norwegian North-Atlantic Expedition, Crust., I, 1885, pp. 136–139.

[c] Challenger Report, XIII, 1885, Pt. 37, Report on the Schizopoda, pp. 220–221, pl. XXXVIII, figs. 8–14.

[d] Journ. R. Micr. Soc. Lond., 1897, Pt. 3, p. 204; Zool. Anzeiger, XX, 1897, pp. 88–92.

[e] Bull. U. S. Fish Comm., 1903, pp. 51–52.

[f] Comptes Rend. Acad. Sci. Paris, CXXXVI, 1903, pp. 102–103.

HOLOPHRYXUS ALASCENSIS Richardson.

Holophryxus alascensis RICHARDSON, Bull. U. S. Fish Comm., XXIV, 1905, pp. 220–221.

Localities.—Vicinity of Yes Bay, Behm Canal; vicinity of Funter Bay, Lynn Canal.

Depth.—147 to 350 fathoms.

Body of female irregular in outline. Color uniformly light yellow. Head represented by a bilobed prominence anterior to squarish body.

a *b* *c*

FIG. 639.—HOLOPHRYXUS ALASCENSIS. *a*, DORSAL VIEW OF FEMALE. × 3½. *b*, LATERAL VIEW OF FEMALE. × 3½. *c*, VENTRAL VIEW OF FEMALE. × 3½.

Eyes wanting. Dorsal surface of thorax with no trace of segmentation. A few lines only are present, representing creases or folds in the integument and having no relation to suture lines.

The abdomen projects below the thorax, although there is no distinct boundary between these two divisions of the body, as a triangular process without any trace of segmentation and with no appendages.

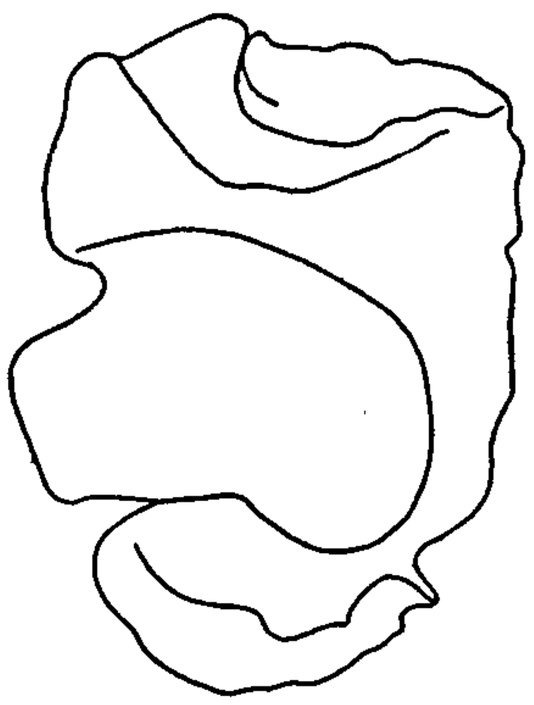

FIG. 640.—HOLOPHRYXUS ALASCENSIS. MAXILLIPED. × 27½.

Uropoda and pleopoda are entirely wanting.

In a lateral view the first five segments of the thorax are represented by the five coxal plates, which bound the oral area, and are not separated by sutures from the dorsal surface of the body. On the ventral side the oral area is bounded anteriorly by the head and laterally by the two divergent rows of coxal plates. The antennæ and antennulæ are quite rudimentary. The antennæ seem to be composed of three joints, the antennulæ of two. There are five pairs of legs, surrounding the oral area, situated just within the two rows of coxal plates. From the bases of these legs five pairs of incubatory plates arise, the last pair overlapping in the middle ventral line.

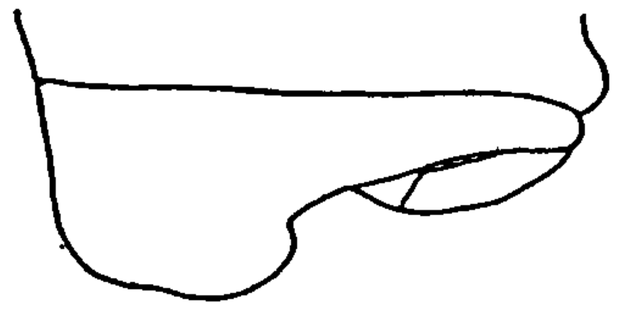

FIG. 641.—HOLOPHRYXUS ALASCENSIS. FIRST INCUBATORY LAMELLA (DISTAL LOBE). × 27½.

No males were found. Three specimens were taken by the U. S.

Bureau of Fisheries steamer *Albatross* at Station 4236, vicinity of Yes Bay, Behm Canal, and Station 4257, vicinity of Funter Bay, Lynn Canal. Depth, 147 to 350 fathoms.

The host is unknown.

The type of the species is in the U. S. National Museum, Cat. No. 29250.

Another specimen has been collected by the U. S. Bureau of Fisheries steamer *Albatross* from southern California.

Family XXII. CRYPTONISCIDÆ.[a]

Body of female forming a sac filled with eggs, with sometimes only slight traces of segmentation. No true legs present, all or most of the appendages of the body lost.

Male not different from female larva of the last larval stage and does not pass beyond this stage. In the last larval stage the first pair of antennæ have two flagella and the basal article is expanded behind, with the expansion generally pectinate. Epimera usually pectinate. First two pairs of legs shorter and thicker than others. Both branches of pleopoda well developed. Outer branch of uropoda generally much shorter than inner branch.

100. Genus CLYPEONISCUS Giard and Bonnier.[b]

Body of adult female flattened, oval, without any traces of segmentation. Lateral parts lobular; anterior and posterior extremities incised. Dorsal surface convex, with an opaque area in front of the middle. Ventral surface flattened with a longitudinal slit leading to the inner cavity, and having on either side a number of small valvular lamellæ. At the base of the posterior incision is a small projection. There is no distinct apparatus for fixing the parasite.

Male short and thick. Basal expansion of the first pair of antennæ broad and pectinate. Epimera distinctly pectinate. Second pair of antennæ short. Uropoda with the outer branch much smaller than the inner.

First larval stage having a broad operculiform plate covering the ventral side of the terminal part of the body. Parasitic in the incubatory pouch of Isopods of the family Idotheidæ.

CLYPEONISCUS MEINERTI Giard and Bonnier.

Clypeoniscus meinerti GIARD and BONNIER, Bull. Scientifique de la France et de la Belgique (4), XXV, 1893, pp. 421–436, 444.

Localities.—Greenland (Godhavn); Nova Zembla (Jugor Schar) (Giard and Bonnier).

Depth.—6 to 10 fathoms.

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[a] For characters of family see Sars, Crust. of Norway, II, 1899, pp. 231–232.

[b] For characters of genus, see Sars, Crust. of Norway, II, 1899, p. 239.

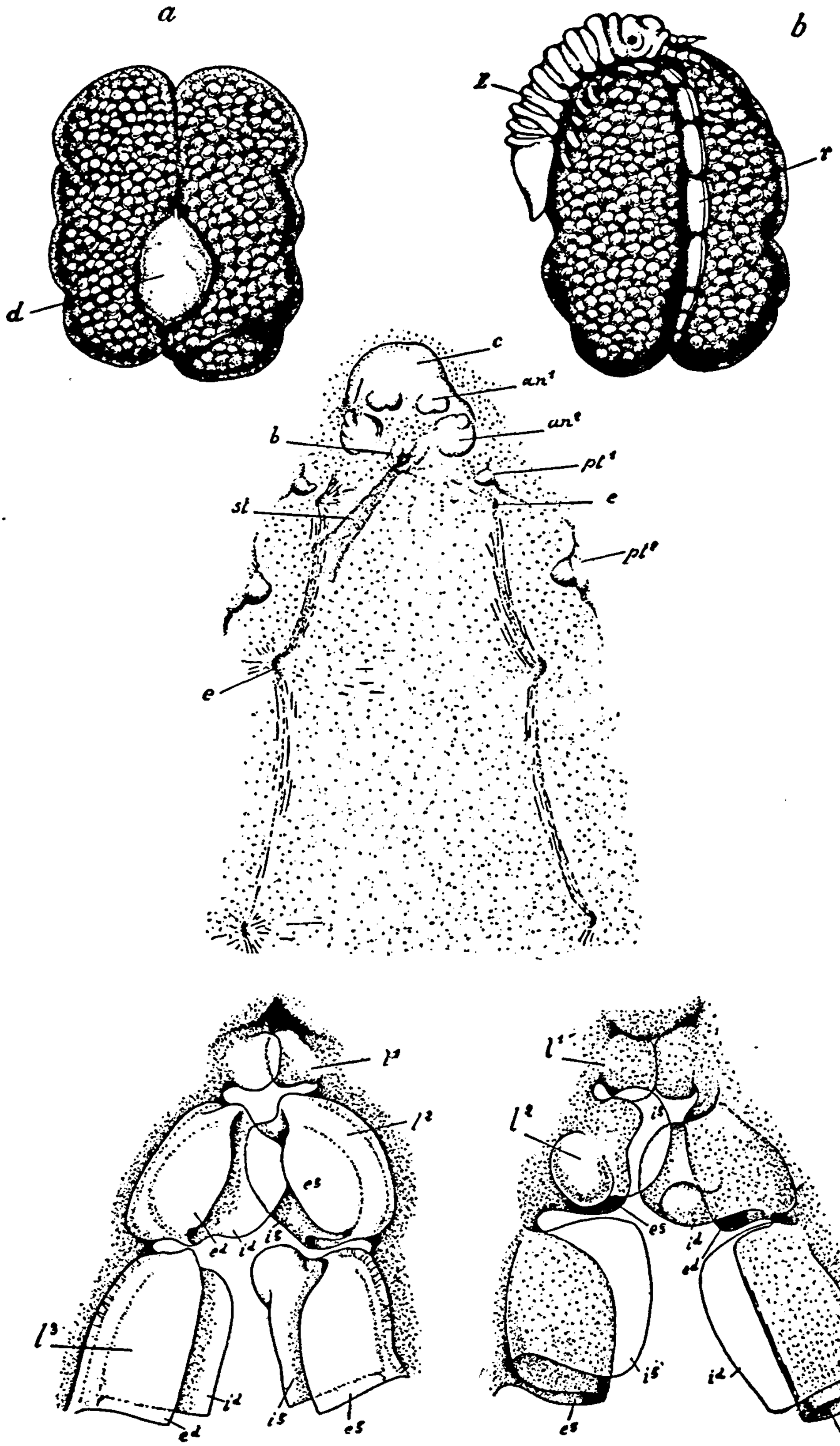

FIG. 642.—CLYPEONISCUS MEINERTI (AFTER GIARD AND BONNIER). *a*, DORSAL VIEW OF ADULT FEMALE. × 16. *b*, VENTRAL VIEW OF SAME. *c*, FEMALE AT A STAGE INTERMEDIATE BETWEEN *a* AND *b*. × 90. *d*, MODE OF OPENING OF INCUBATORY LAMELLÆ BY MARGINAL FOLDS (ADULT FEMALE). × 50. *e*, THE SAME SEEN FROM WITHIN. × 50.

Parasitic in the incubatory pouch of *Synidotea nodulosa* (Krøyer).

When the *Idotea* infested with the parasite is laid on its dorsal side and presents the ventral side to the observer, one separates the five pairs of incubatory lamellæ and perceives, on a level with the second, third, and fourth thoracic segments, a body regularly oval, slightly attenuated at the two extremities of the long axis, and presenting an appearance very indistinctly segmented; it seems completely filled with a compact mass of little grains, yellow in alcohol, which are the eggs distending the incubatory cavity. Toward the middle of the surface, which is not applied to the ventral part of the host, and a little toward the base, one notices the mark of a dead white. If one detaches this oval body and examines the other side, one sees that it is divided longitudinally by a groove, which extends from one extremity to the other. On several individuals one finds, generally toward the extremity the nearest to the head of the host, a very small Isopod, scarcely visible to the naked eye, measuring 0.85 mm., but presenting all the typical characters of the group. This last is the male *Clypeoniscus*, while the oval mass, filling the incubatory cavity of the host, is the female, reduced to a simple incubatory sac filled with embryos.

When the female becomes adult it takes the form figured, representing the dorsal and ventral sides. It is then a globular mass, which appears divided longitudinally by a groove, scarcely visible on the dorsal side and interrupted toward the cephalic region by a white mass, the dorsal organ. This little mass, somewhat thick, the histological composition of which we have not determined because of the state of preservation of the specimen, is all that remains of the visceral part of the female, the ovary, digestive tube, etc. Outside of this there is nothing more than the body wall transformed into an incubatory envelope, preserving nothing to recall the primitive Isopod, neither segmentation nor appendages. However, if one examines the female on the ventral side, considering its position in relation to the host, we see that the dorsal groove continues on this side and assumes an appearance altogether special. Immersed between the lateral masses filled with embryos, it is formed by the superposition of a system of small lamellæ which one can easily enough separate, without tearing, and which permits of emptying the female completely of eggs; it is the opening of the incubatory cavity.

We have represented this system of lamellæ as we have been able to expose it under the microscope, after having removed the dorsal surface of the female. This long opening terminates plainly in two extremities between the anterior and the posterior bosses of the animal, and the way in which the lamellæ which form it lie over each other in regular order is rather complicated. Very small at the two extremities of the opening these lamellæ become larger toward the ventral part; they are ten or eleven pairs in number.

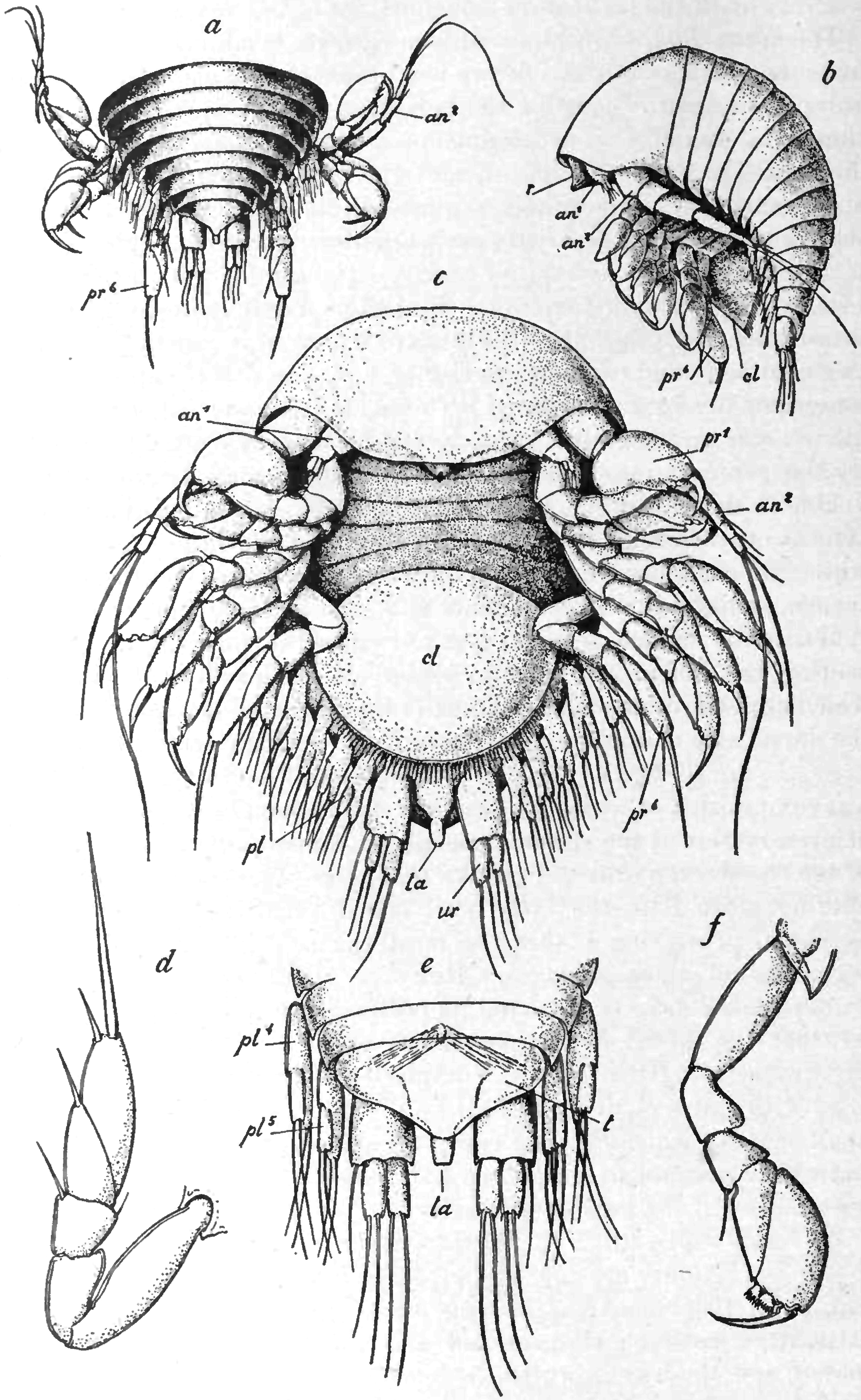

FIG. 643.—CYLPEONISCUS MEINERTI (AFTER GIARD AND BONNIER). *a*, POSTERIOR PART, VIEWED DORSALLY, OF EMBRYO OF FIRST STAGE. × 240. *b*, LATERAL VIEW OF EMBRYO. × 240. *c*, VENTRAL VIEW OF EMBRYO. × 420. *d*, SIXTH LEG. × 580. *e*, POSTERIOR EXTREMITY. × 580. *f*, FIFTH LEG. × 580.

The figures represent the anterior extremity of the opening seen from the exterior and the interior side (the observer being supposed, in the last case, to be within the incubatory cavity). The first pair of lamellæ is simple, semicircular, and one of them covers the other; but the second and third become much more complicated; each is formed of a double fold, presenting in a way two secondary lamellæ united along one of their lateral margins, while the others remain free. They arrange thus between themselves an opening similar to that formed by a sheet of paper folded in two. When the lateral margins of the fissure of the opening of the incubatory cavity are brought together, the inner secondary lamella of the right margin, for example, penetrates into the fissure arranged between the inner secondary lamella of the left side and the outer secondary lamella of the left side, which is itself covered by the external secondary lamella of the right side.

These lamellæ, very thin on their free edges, are a little thicker near their point of attachment and present several little symmetrical swellings. Each pair is separated from the other by an interval which is apparent only when one stretches the walls of the incubatory cavity. When the living female rolls up on herself, all the lamellæ are covered over, not only laterally, but also behind and before in such a way as to close hermetically the cavity where the embryos are inclosed.[a]

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[a] The above is adapted from the following description of Giard and Bonnier's:

Quand, l'Idotée parasitée étendue sur la face dorsale et présentant sa face ventrale à l'observateur, on écarte les cinq paires de lamelles incubatrices, on aperçoit au niveau des 2e, 3e et 4e segments thoraciques un corps régulièrement ovoïde, légèrement atténué aux deux extrémités du grand axe et montrant une apparence très vaguement segmentée; il semble rempli exactement d'une masse compacte de petits grains, jaunâtres dans l'alcohol, qui sont des œufs distendant la cavité incubatrice. Vers le milieu de la surface qui n'est pas appliquée à la partie ventrale de l'hôte, et un peu vers le bas, on remarque une tache d'un blanc mat. Si l'on détache ce corps ovoïde et si l'on examine l'autre face, on voit qu'elle est divisée longitudinalement par un sillon qui s'étend d'une extrémité à l'autre. Sur quelques individus on trouve généralement, vers l'extrémité la plus rapprochée de la tête de l'hôte, un très petit Isopode, à peine visible à l'œil nu, mesurant $0^{mm},85$, mais présentant toutes les particularités typiques du groupe: ce dernier est le mâle *Clypeoniscus*, tandis que la masse ovoïde, remplissant la cavité incubatrice de l'hôte, est la femelle réduite à un simple sac incubateur rempli d'embryons.

Quand la femelle devient adulte, elle prend la forme figurée, représentant les faces dorsale et ventrale. C'est alors une masse globuleuse qui semble divisée longitudinalement par un sillon, peu visible à la face dorsale et interrompu, vers la région céphalique, par une partie blanchâtre que nous appellerons organe dorsal. Cette petite masse, un peu épaissie, et dont nous n'avons pu déterminer la composition histologique, à cause de l'état de conservation de l'animal, est tout ce qui reste de la partie viscérale de la femelle, ovaire, tube digestif, etc. Hors cela, il n'y a plus que la paroi du corp transformée en enveloppe incubatrice, et ne conservant plus rien rappelant l'Isopode primitif, ni segmentation, ni appendices.

Cependant si on considère la femelle par la face que nous appelons ventrale, vu sa position par rapport à l'hôte, nous voyons que le sillon dorsal se continue sur cette face et prend un aspect tout à fait spécial. Enfoncé entre les masses latérales, bourrées

The young stage of the female and the male of *Clypeoniscus hansenî* is described and figured in the above article. Sars suggests that perhaps the two species are identical, the occurrence of both forms only has led the authors (Giard and Bonnier) to regard them as distinct species.

Attached to the ventral side of the abdomen of the Isopod *Pancòlus californiensis* Richardson was a parasite which probably belongs to the family *Cryptoniscidæ*. As, however, there are no males and no immature forms to indicate the relationship of this parasite, I shall not indicate its systematic position at present. In case this should prove to be a new genus of *Cryptoniscidæ*, I might suggest the name *Oosaccus* for its reception.

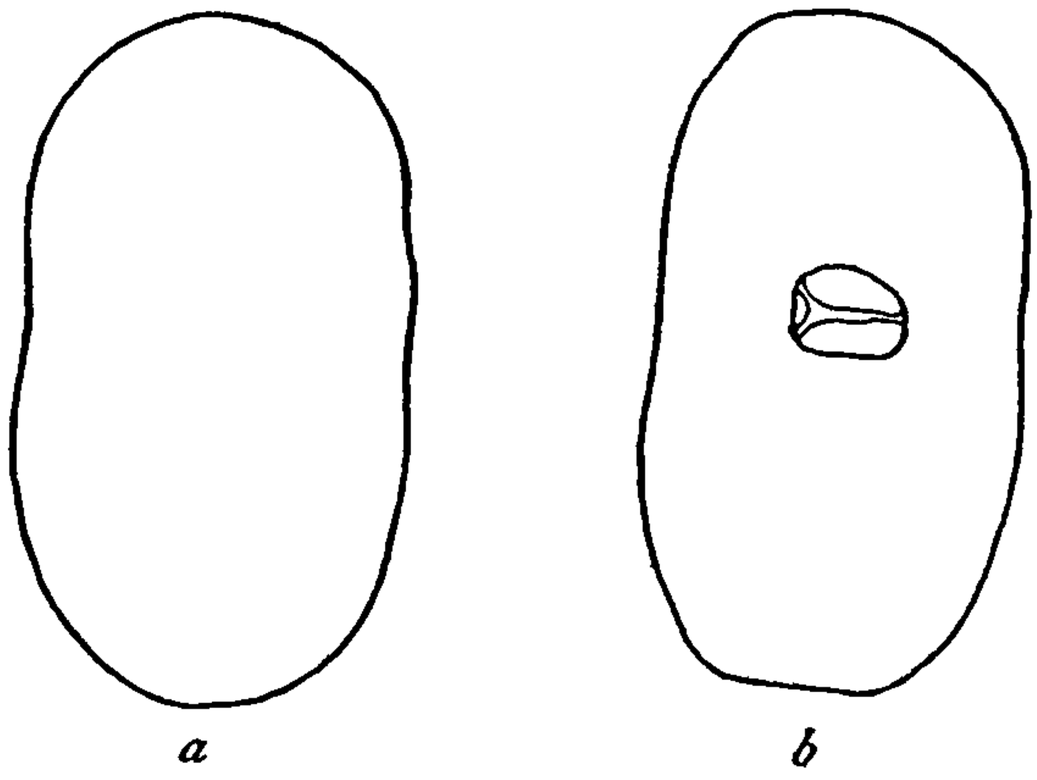

FIG. 644.—OOSACCUS. *a*, DORSAL SIDE OF FEMALE. *b*, VENTRAL SIDE OF SAME.

Body of female ovate, longer than broad, 2 mm.: 3 mm.; perfectly symmetrical, with the anterior and posterior extremities rounded. There is no trace of segmentation, and there are no appendages, the body being simply an oval sac.

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d'embryons, il est formé par la superposition d'un système de petites lamelles qu'on peut assez facilement séparer, sans les déchirer, et qui permettent de vider complétement la femelle de ses embryons: c'est l'ouverture de la cavité incubatrice.

Nous avons représenté ce système de lamelles tel que nous avons pu l'étaler sous le microscope, après avoir enlevé la surface dorsale de la femelle. Cette longue fente se termine nettement aux deux extrémités entre les bosses antérieures et postérieures de l'animal, et la façon dont s'imbriquent les lamelles qui la ferment est assez compliquée. Très petites aux deux extrémités de la fente, ces lamelles deviennent plus grandes vers la partie ventrale; elles sont au nombre de dix ou onze paires.

Les figures représentent l'extrémité antérieure de la fente vue par la partie extérieure et la partie intérieure (l'observateur étant supposé, dans ce dernier cas, dans la cavité incubatrice). La première paire de lamelles est simple, semi-circulaire, et l'une d'elles recouvre l'autre; mais la deuxième et la troisième deviennent bien plus compliqués; chacune d'elles est formée d'un double repli de façon à présenter deux lamelles secondaires soudées par un de leurs bords latéraux, tandis que les autres restent libres; elles ménagent donc entre elles une fente semblable à celle formée par une feuille de papier pliée en deux. Quand les bords latéraux de la fente d'ouverture de la cavité incubatrice sont rapprochés, la lamelle secondaire interne du bord droit, par example, pénètre dans la fente ménagée entre la lamelle secondaire interne du bord gauche, et la lamelle secondaire externe du même bord, qui est elle-même recouverte par la lamelle secondaire externe du bord droit.

Ces lamelles, très minces sur leurs bords libres, sont un peu plus épaisses vers leur point d'attache et présentent quelques petits renflements symétriques. Chaque paire est séparée de l'autre par un intervalle qui n'est sensible que quand on opère une traction sur les parois de la cavité incubatrice. Quand la femelle vivante se ramasse sur elle-même, toutes les lames se recouvrent, non seulement latéralement, mais aussi d'arrière en avant, de façon à clore hermétiquement la cavité où sont incubés les embryons.—GIARD and BONNIER, Bull. scient. de la France et de la Belgique (4), 1893, pp. 422–423, 425–427.

There is no chord of attachment. On the ventral side is a small rounded opening, where the parasite was attached to the host. There seems to be an outer wall and an inner wall. The outer wall is probably attached to the host around the circular opening. The inner wall is guarded by three or four valves. Through the integument of the inner wall can be seen the eggs which completely fill the body cavity. It was found attached to the ventral side of the abdomen of the Isopod *Pancolus californiensis* Richardson, belonging to the family *Tanaidæ*. There are but two specimens, both females, and no males were found.

The types are in the U. S. Nat. Museum, Cat. No. 32111, U.S.N.M.

VI. ONISCOIDEA.[a]

Legs all ambulatory in character. Uropoda terminal, styliform, composed of a peduncle and two branches, the branches being uniarticulate. Pleopoda fitted for air breathing, the outer opercular plate of the first two pairs and sometimes of all five pairs containing air cavities or tracheæ. In the male the inner plate of the second pair and sometimes of the first pair is modified. Abdomen composed of six well-defined segments.

The first pair of antennæ are small, rudimentary, and inconspicuous; they are never composed of more than three articles.

Mandibles strong, without palps. First maxillæ have two masticatory lobes. Second maxillæ with only a very slight indication of a subdivision into lobes.

Marsupial pouch in the female composed of four pairs of plates issuing from the bases of the second, third, fourth, and fifth pairs of legs.

This superfamily includes all the terrestrial Isopods.

ANALYTICAL KEY TO THE FAMILIES OF ONISCOIDEA.

a. Inner antennæ with one to two articles. Pleopoda in four pairs; those of first segment wanting; those of the second, third, fourth, and fifth segments have a single branch, all branchial; the branch of the second segment, however, in the male, is produced on the inside in a long, compressed stylet; uropoda form an inferior operculum.....Family XXIII. TYLIDÆ

a'. Inner antennæ with three articles. Pleopoda in five pairs, all double branched. External branch of all five pairs opercular in character. Internal branch branchial, in the male, however, of the first and second pairs sexual; uropoda not forming an operculum.

b. First maxillæ with inner lobe furnished with from five to fifteen plumose processes.....Family XXIV. EUBELIDÆ

b'. First maxillæ with the inner lobe furnished at the tip with only two or three plumose processes.

c. Buccal mass not very prominent below. First maxillæ have two plumose setæ on the inner plate. Mandibles with molar expansion obsolete, without any triturating surface, it being replaced by brushlike recurved setæ.

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[a] For characters of family see Budde-Lund, Crustacea Isopoda Terrestria, 1885, and Sars, Crustacea of Norway, II, 1899, pp. 153–154.

d. Maxillipeds with terminal joints small and almost rudimentary, hardly longer than masticatory lobe, which is truncate.

e. External antennæ generally long, close together, with antennal openings large. Body as a rule scarcely able to be contracted in a ball. Head less manifestly immersed in first thoracic segment. Lateral parts of the head separated by a vertical marginal and inframarginal line. Clypeus arched. Legs generally long. Uropoda produced, reaching beyond the terminal segment of the abdomen and the preceding segment. Terminal segment narrower than preceding ones and usually conically produced at end .....Family XXV. ONISCIDÆ

e'. External antennæ generally short, with antennal openings small. Body able to be contracted into a ball. Head immersed in first thoracic segment. Lateral parts of the head undifferentiated. Clypeus perpendicular. Legs generally short. Uropoda short, not reaching beyond the terminal segment of the abdomen or the preceding segment. Terminal segment short and broad...Family XXVI. ARMADILLIDIDÆ

d'. Maxillipeds with terminal joints large, lamellar, much longer than masticatory lobe, which is acutely produced...Family XXVII. SCYPHACIDÆ

c'. Buccal mass prominent. First maxillæ have three plumose setæ on the inner plate. Mandibles with molar expansion large and broad, exhibiting a finely fluted triturating surface.

d. Head without any lateral lobes, frontal part rounded. Eyes well developed or wanting. Inner antennæ with last joint very small and without distinctly developed sensory filaments. Second antennæ with flagellum multiarticulate. Posterior maxillæ with two thick, hairy bristles. Maxillipeds with the terminal part distinctly five-articulate, masticatory lobe truncate at tip, epignath short. External sexual appendages in male double. Inner branches of first pair of pleopoda of a similar structure in both sexes, that of second pair in male terminating in long stylet. Both branches of uropoda styliform .....Family XXVIII. LIGYDIDÆ

d'. Head with distinct, though not very large, lateral lobes, front more or less produced. Eyes small or wanting. Inner antennæ with last joint well developed and tipped with a number of delicate sensory filaments. Second antennæ with flagellum not more than six jointed. Posterior maxillæ without any bristles. Maxillipeds with the terminal part generally imperfectly articulated, masticatory lobe terminating in a thin lash, lepignath narrow, linguiform. Sexual appendage of male simple; inner branch of both first and second pairs of pleopoda modified. Uropoda with branches conically tapered.....Family XXIX. TRICHONISCIDÆ

Family XXIII. TYLIDÆ.[a]

Inner lobe of the First maxillæ furnished with three subequal plumose processes.

First pair of antennæ small, composed of one or two articles. Abdomen composed of six distinct segments.

Four pairs of pleopoda present; the first pair of pleopoda are wanting; the pleopoda of the second, third, fourth, and fifth segments have single branches, all branchial; the branch of the second segment, however, in the male is produced on the inside in a long, compressed stylet.

The uropoda form an operculum, with the outer branch very small and situated at the apex.

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[a] See Budde-Lund for characters of family, Crustacea Isopoda Terrestria, 1885, p. 272.

101. Genus TYLOS Latreille.

With characters of family.
Only genus.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS TYLOS.

a. Terminal abdominal segment triangularly produced, with apex rounded. Ventral plates or inferior processes of the fifth abdominal segment meeting in the median ventral line. Color white.....*Tylos niveus* Budde-Lund

a'. Terminal abdominal segment quadrangular; posterior margin straight, not produced. Ventral plates of fifth abdominal segment not meeting in the median ventral line. Color light brown with black spots.

Tylos latreilli Audouin and Savigny

TYLOS NIVEUS Budde-Lund.

Tylos niveus BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 278–279.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 561; Trans. Conn. Acad. Sci., XI, 1902, p. 301.

Localities.—Key West, Florida; Bermudas.

Body oblong-ovate, convex, contractile into a ball, very minutely and densely punctate, and covered with hairs, especially at the sides.

Eyes small, composite, occupying a fourth part of the width of the head; about 30 ocelli.

First pair of antennæ composed of one article, immovable.

Second pair lost in the specimen. Front of head not separated from the epistome; epistomal shield subtetragonal, becoming narrow anteriorly, reflexed; clypeus large, tretragonal, a little impressed transversely.

The first segment of the thorax with the lateral margin deeply sulcate; epimera of the two following segments small, rounded, subtriangular, a little excavate anteriorly.

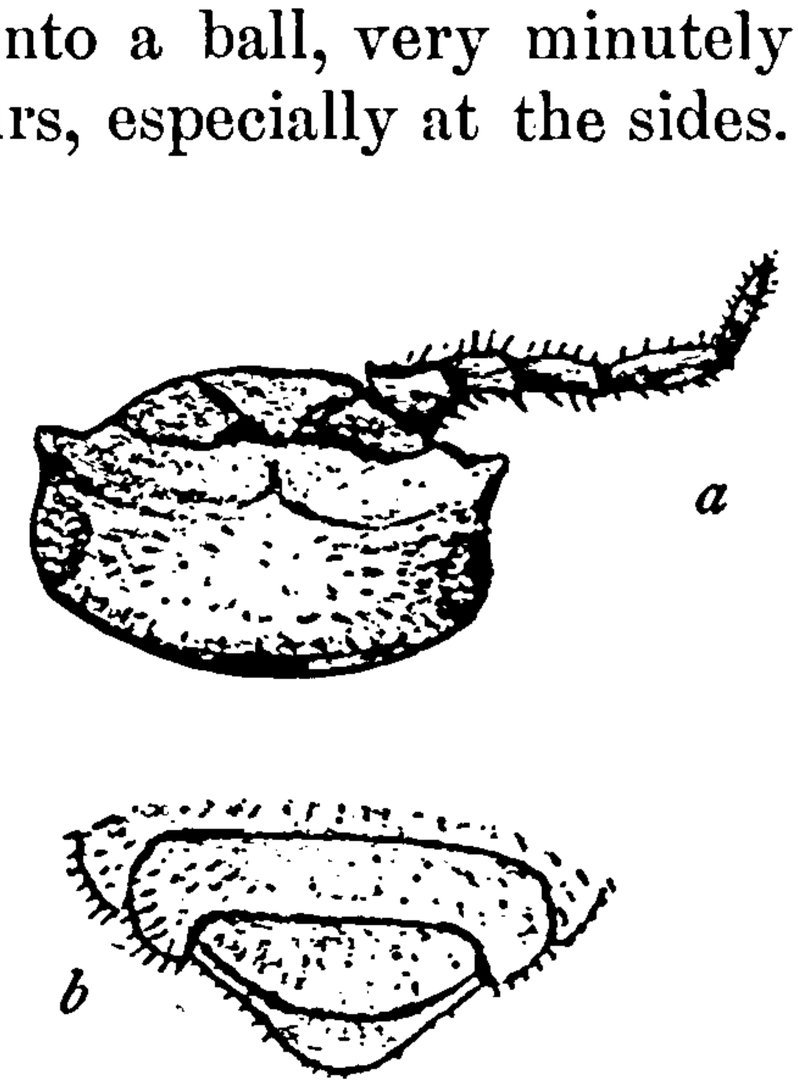

FIG. 645.—TYLOS NIVEUS (AFTER DOLLFUS). *a*, HEAD WITH ANTENNA. *b*, LAST TWO SEGMENTS OF ABDOMEN. (ENLARGED.)

The fifth segment of the abdomen with the inferior processes strong, tetragonal, meeting in the middle; the fourth segment with the processes small, oblong, narrow; the third segment with the epimera minute; the terminal segment convex, extending a little beyond the parallel epimera of the preceding segment. The uropoda form a rounded operculum, becoming narrower anteriorly.

Color white.

Length 13 mm. Width 5.5 mm. Height 3 mm.[a]

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[a] The above description is adapted from the following one of Budde-Lund's:

Oblonge ovalis, convexus, in globum contractilis, minutissime et dense punctatus, præsertim ad latera setigerus.

Oculi minores, compositi vel congregati, quartam partem capitis latitudinis possidentes, corneulæ vel ocelli circiter 30.

Antennæ exteriores ———.

TYLOS LATREILLI Audouin and Savigny.

Tylos latreilli AUDOUIN and SAVIGNY, Descript. de l'Égypte, 1826, pp. 285–287, pl. XIII, fig. 1.

Tylos armadillo LATREILLE, Cuvier, Règne Animal, 2d ed., IV, 1829, p. 142.—GUERIN, Iconogr. Crust., 1829–1843, p. 35, pl. XXXVI, fig. 4.

Tylos latreilli MILNE EDWARDS. Hist. Nat. Crust., III, 1840, p. 188; Règne anim., Crust., 1849, pl. LXX bis., fig. 2.—LUCAS, Expl. d'Alg., I, 1849, p. 73.—HELLER, Verh. Zool.-bot. Ver., Wien, XVI, 1866, p. 732.—MIERS, Proc. Zool. Soc. Lond., 1877, p. 674.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 273–274 (see Budde-Lund for synonymy).—DOLLFUS, Bull. Soc. d'Études Scientifiques de Paris, 12th year, 1890, pl. I, fig. 4.

Tylos armadillo DOLLFUS, Mém. Soc. Zool. de France, 1896, p. 550.

Tylos latreilli RICHARDSON, Trans. Conn. Acad. Sciences, XI, 1902, pp. 300–301, pl. XL, fig. 56.

Localities.—Bermudas; Miami, Florida; Long Bird Island, Bermudas; also Algeria; Tunisie; Odessa.

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

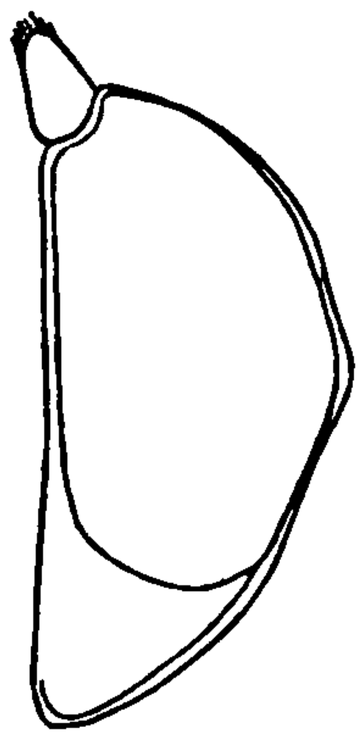

FIG. 646.—TYLOS LATREILLI. OPERCULUM.

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. Second pair of antennæ, with a five-jointed peduncle and a flagellum consisting of four joints, extend to the posterior margin of the second thoracic segment.

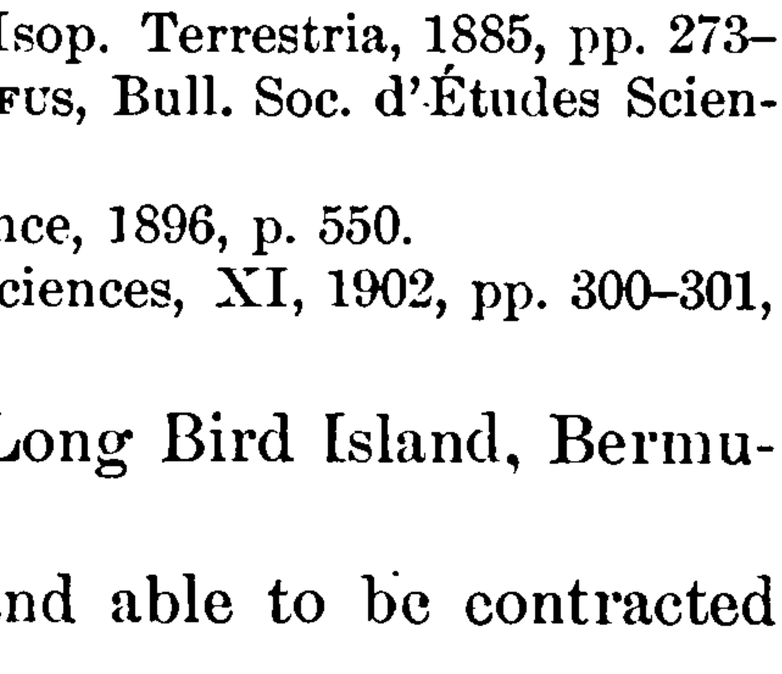

FIG. 647.—TYLOS LATREILLI (AFTER DOLLFUS). *a*, HEAD WITH ANTENNA. *b*, LAST TWO SEGMENTS OF ABDOMEN. (ENLARGED.)

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.

Antennæ interiores uniarticulatæ, immobiles.

Frons ab epistomate non discreta; epistomatis scutellum subtetragonem, ante angustatum, reflexum; clypeus amplus, tetragonus, tranverse paulum impressus.

Trunci annulus primus margine laterali profunde sulcato; epimera annulorum duorum sequentium parva, rotundata, subtriangula, ante paulum excavata.

Caudæ annulus quintus processubus inferioribus validis; tetragonis, medio attingentibus; annulus quartus processubus parvis, oblongis, angustis; annulus tertius epimeris minutis; annulus analis convexus, epimera annuli præanalis parallela satis superans. Pedes anales operculum rotundatum, ante angustatum formantes.

Color albidus.

Longitudo 13 mm. Latitudo 5.5 mm. Altitudo 3 mm.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 278–279.

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 inward toward 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 plates on the ventral side extending from the margin inward 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 Island, Bermudas.

Family XXIV. EUBELIDÆ.[a]

Flagellum of the second antennæ generally more or less obscurely triarticulate, rarely only biarticulate; peduncle with the first article very short, the third article always shorter than the second, the fourth article a little longer than the second, the fifth article always the longest.

Eyes distinct, composed of numerous ocelli.

Head with the epistome forming a continuous frontal marginal line, often effaced in the middle. The antennal foramina are moderately large, the antennal tubercles small, often wanting. Clypeus short, vaulted, lobate at the sides. The pleuræ of the head are fused; the vertical marginal line does not reach the frontal margin; there is no vertical inframarginal line.

The inner lobe of the first or inner maxillæ has numerous plumose processes (5–15); the outer or second maxillæ are wide, obscurely bifid, the exterior lobe much wider and larger than the inner.

The first segment of the thorax has thick epimera, separated from the middle of the segment by a sutural furrow, the lateral margin posteriorly cleft, rarely entire. The anterior articulating part of all the segments (2–7) manifestly separated from the posterior part. The marsupium is present.

The terminal abdominal segment is triangularly or even quadrangularly produced, not extending or extending very little beyond the epimera of the preceding segment. The outer branch of the first or generally of all the pleopoda furnished with tracheæ. Uropoda short, not extending or extending very little beyond the terminal segment of the abdomen. Peduncle large, wide. Outer branch small or minute.

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[a] See Budde-Lund for characters of family, A revision of Crustacéa Isopoda Terrestria, 1899, Pt. 1, Eubelum, pp. 2–3.

102. Genus ETHELUM Budde-Lund.[a]

Antennæ with the flagellum composed of two articles. Inner lobe of the first or inner maxillæ furnished with four plumose processes.

First segment of the thorax with the epimeron thick, separated above from the middle of the segment by a longitudinal furrow, lateral margin not excavate, posteriorly cleft. The second segment of the thorax with the epimera entire.

Outer branches of all the pleopoda furnished with tracheæ.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS ETHELUM.

a. Surface of body smooth, with the side parts of the thoracic segments (two to seven) and the abdominal segments not bent downward.

b. Prosepistoma plain. Coxopodite of the second segment of the thorax forming a nearly inconspicuous ridge before the leg. Caudal segment triangular; apex pointed. Inner branch of the uropoda extends beyond the apex of the caudal segment.....*Ethelum modestum* (Dollfus)

b′. Prosepistoma with a shield-like convexity. Coxopodite of the second segment of the thorax hardly visible, only a very small dentiform process before the leg. Caudal segment flat, with rounded apex. Inner branch of the uropoda reaches two-thirds the length of the caudal segment.

Ethelum americanum (Dollfus)

a′. Surface of body slightly granulated, with the side parts of the thoracic segments (two to seven) and the abdominal segments bent downward. Caudal segment with blunt rounded apex. Inner branch of the uropoda reaches two-thirds the length of the caudal segment.....*Ethelum reflexum* (Dollfus)

ETHELUM MODESTUM (Dollfus).

Mesarmadillo modestus Dollfus, Proc. Zool. Soc. London, 1896, p. 397.—Richardson, Proc. U. S. Nat. Mus., XXIII, 1901, p. 573.

Ethelum modestum Budde-Lund, A Revision of "Crustacea Isopoda Terrestria," 1899, p. 25; Ent. Meddel. (2), I, Pt. 2, 1899, p. 91.

Locality.—St. Vincent, West Indies. Dry forest, leeward, under a log, 800 feet.

"Body rather convex and narrow, smooth. Prosepistoma plain, continuous with the forehead in the middle, and separated from it on both sides by a transverse, incomplete, preocular cut. Eyes moderate; ocelli about 16. Antennæ short, flagellum very small, first joint three times shorter than the second. Pereion: first segment with the antero-median tubercle hardly perceivable; coxopodites distinct on the entire length of the edge of the segment, with the hind part diverging and covered by the posterior angle of the segment. Coxopodite of the second segment forming a nearly inconspicuous ridge before the leg. Pleon, telson: pleotelson triangular; sides feebly curved; apex pointed.

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[a] See Budde-Lund for characters of genus, A revision of Crustacea Isopoda Terrestria, 1899, Pt. 1, Eubelum, p. 24.

Uropoda: basis with a large oblong processus; endopodites extending beyond the apex of the pleotelson; exopodites small, placed at the top

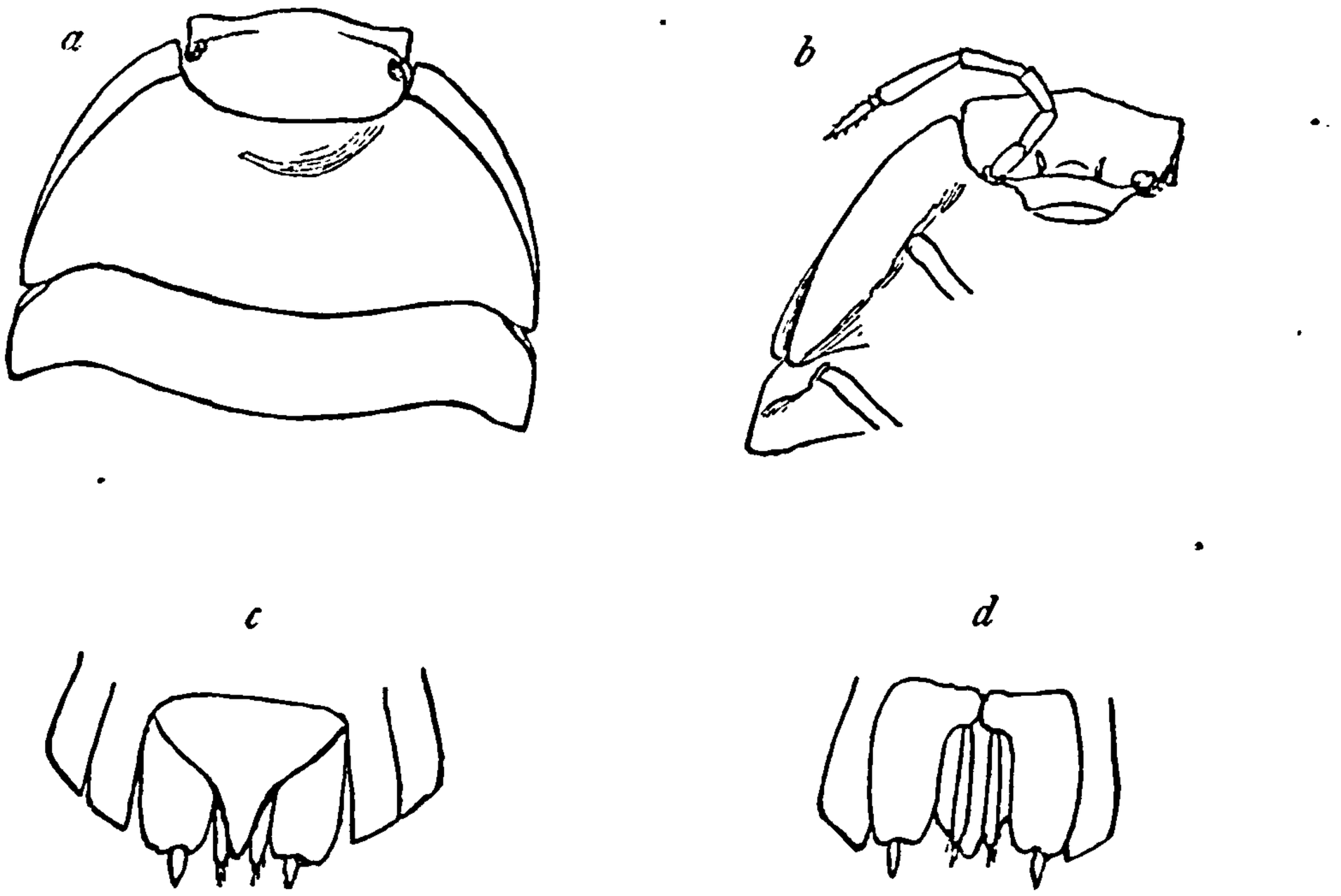

FIG. 648.—ETHELUM MODESTUM (AFTER DOLLFUS). *a*, HEAD AND FIRST TWO SEGMENTS OF THORAX (UPPER SIDE). *b*, THE SAME (UNDERSIDE). *c*, FIFTH AND SIXTH SEGMENTS OF ABDOMEN AND UROPODA (UPPER SIDE). *d*, THE SAME (UNDERSIDE).

of the basal processus. Color: gray or reddish, with small light lineolæ on the pereion; uropoda light. Dimensions: 6 by 2½ mm."—DOLLFUS.[a]

ETHELUM AMERICANUM (Dollfus).

Mesarmadillo americanus DOLLFUS, Proc. Zool. Soc. London, 1896, pp. 397–398.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 573.

Ethelum americanum BUDDE-LUND, A Revision of "Crustacea Isopoda Terrestria," 1899, p. 24; Ent. Meddel. (2), I, Pt. 2, 1899, p. 90.

Locality.—St. Vincent, West Indies. Sugar-cane field, under decaying cane-leaves. Leeward, lowland near sea, under stones; under old boards, 250 feet; under rubbish, shady place.

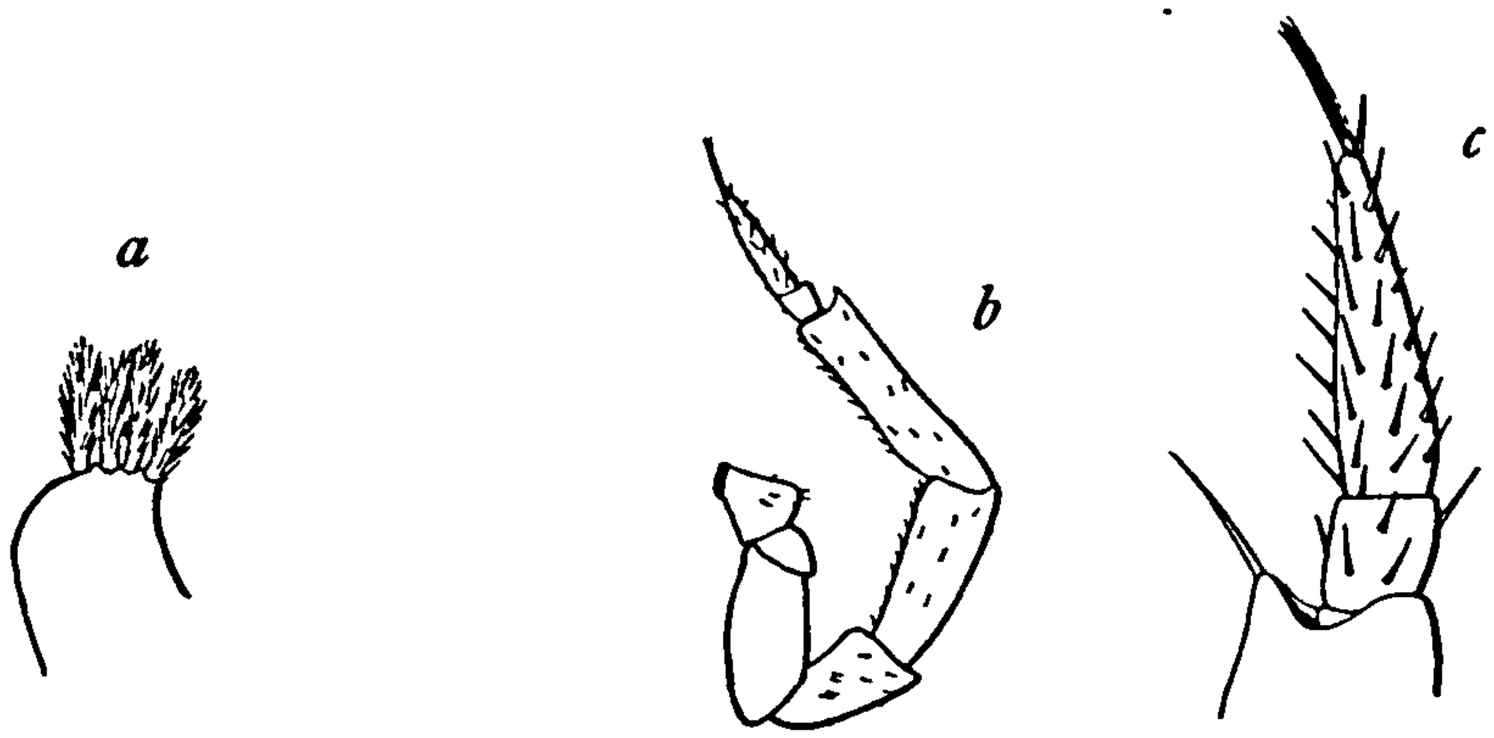

FIG. 649.—ETHELUM AMERICANUM (AFTER BUDDE-LUND). *a*, APEX OF INNER LACINIA OF FIRST RIGHT MAXILLA. × 130. *b*, LEFT ANTENNA. × 25. *c*, FLAGELLUM OF LEFT ANTENNA. × 70.

[a] Proc. Zool. Soc. London, 1896, p. 397.

"Body convex, rather narrow, smooth. Cephalon: prosepistoma with a small shield-like convexity; the prosepistoma is continuous with the forehead in the middle and separated from it on both sides by a transverse, incomplete, preocular cut. Eyes moderate; ocelli about 12. Antennæ short; flagellum small, first joint three times shorter than the second. Pereion: first segment with the antero-median tubercle hardly perceivable; coxopodites distinct on the entire length of the edge of the segment (upper side), forming a thick border, slightly crossed by the posterior angle of the segment. Coxopodite of the sec-

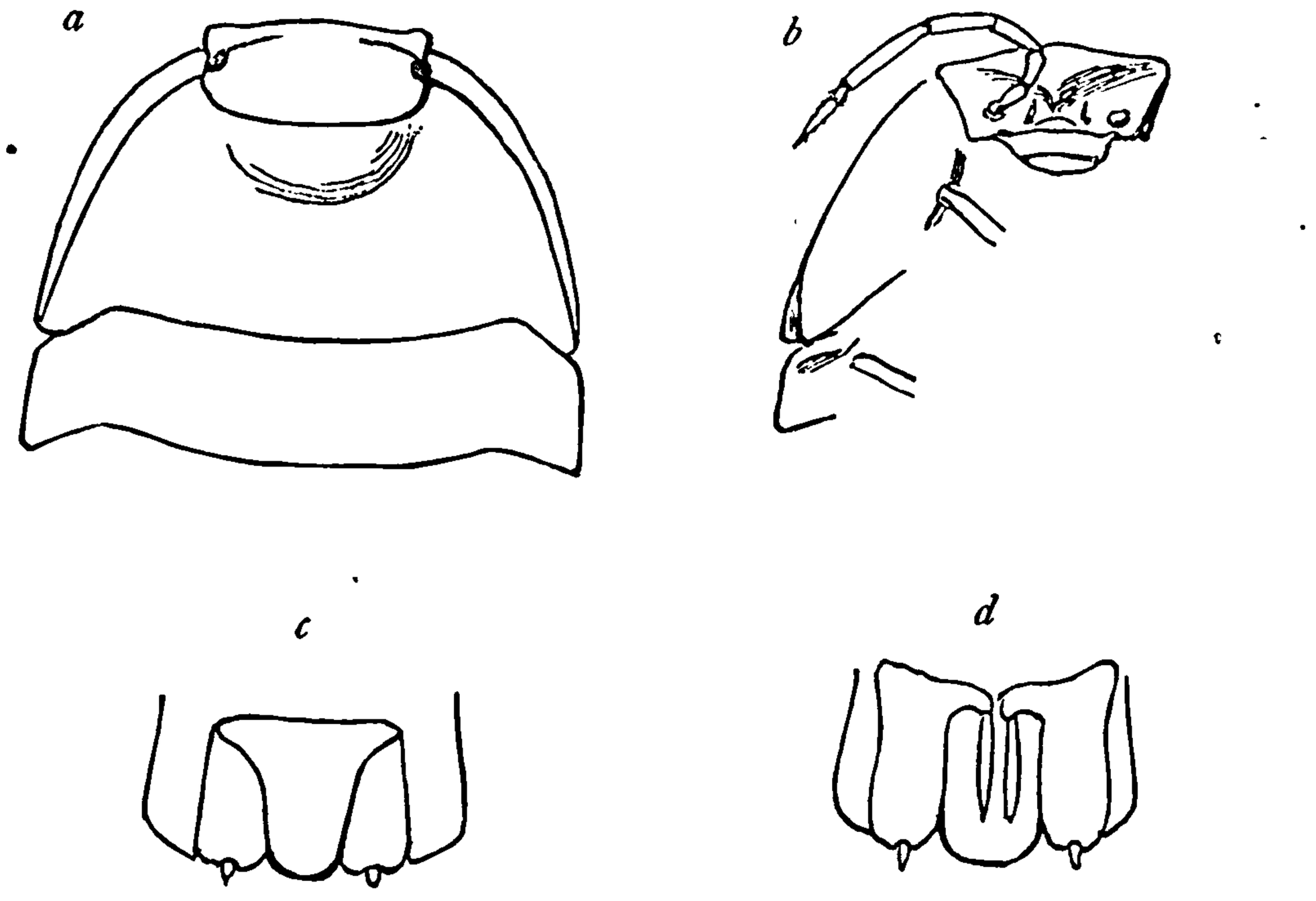

FIG. 650.—ETHELUM AMERICANUM (AFTER DOLLFUS). *a*, HEAD AND FIRST TWO SEGMENTS OF THORAX (UPPER SIDE). *b*, THE SAME (UNDERSIDE). *c*, FIFTH AND SIXTH SEGMENTS OF ABDOMEN (UPPER SIDE). *d*, THE SAME (UNDERSIDE).

ond segment hardly visible as a very small dentiform processus before the legs. Pleon, telson: pleotelson flat, with curved sides and rounded apex. Uropoda: basis with a large, oblong processus, extending between the lateral part of the fifth segment of the pleon and the pleotelson; endopodite reaching to two-thirds the length of the pleotelson; exopodite minute, placed at the top of the basal processus. Color: brownish, with small light lineolæ on the pereion; flagellum white; uropoda reddish. Dimensions: 6 by 2¼ mm."—DOLLFUS.[a]

ETHELUM REFLEXUM (Dollfus).

Mesarmadillo reflexus DOLLFUS, Proc. Zool. Soc. London, 1896, pp. 398–399.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 573.

Ethelum reflexum BUDDE-LUND, A Revision of "Crustacea Isopoda Terrestria," 1899, pp. 25–26; Ent. Meddel. (2), I, Pt. 2, 1899, pp. 91–92.

Locality.—St. Vincent, West Indies. Open, swampy land, under rubbish.

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[a] Proc. Zool. Soc. London, 1896, pp. 397–398.

"Body slightly granulated, very convex, and narrowed backward, the side parts of the pereion (segments 2–7) and of the pleon tending downward. Cephalon: prosepistoma with a shield-like triangular convexity; the prosepistoma is continuous with the forehead in the middle and separated from it on both sides by a transverse, incomplete, preocular cut. Eyes moderate; ocelli about 12. Antennæ short; flagellum small, first joint four times shorter than the second. Pereion: first segment with the antero-median tubercle hardly perceivable; coxopodites distinct on the entire length of the edge of the segment.

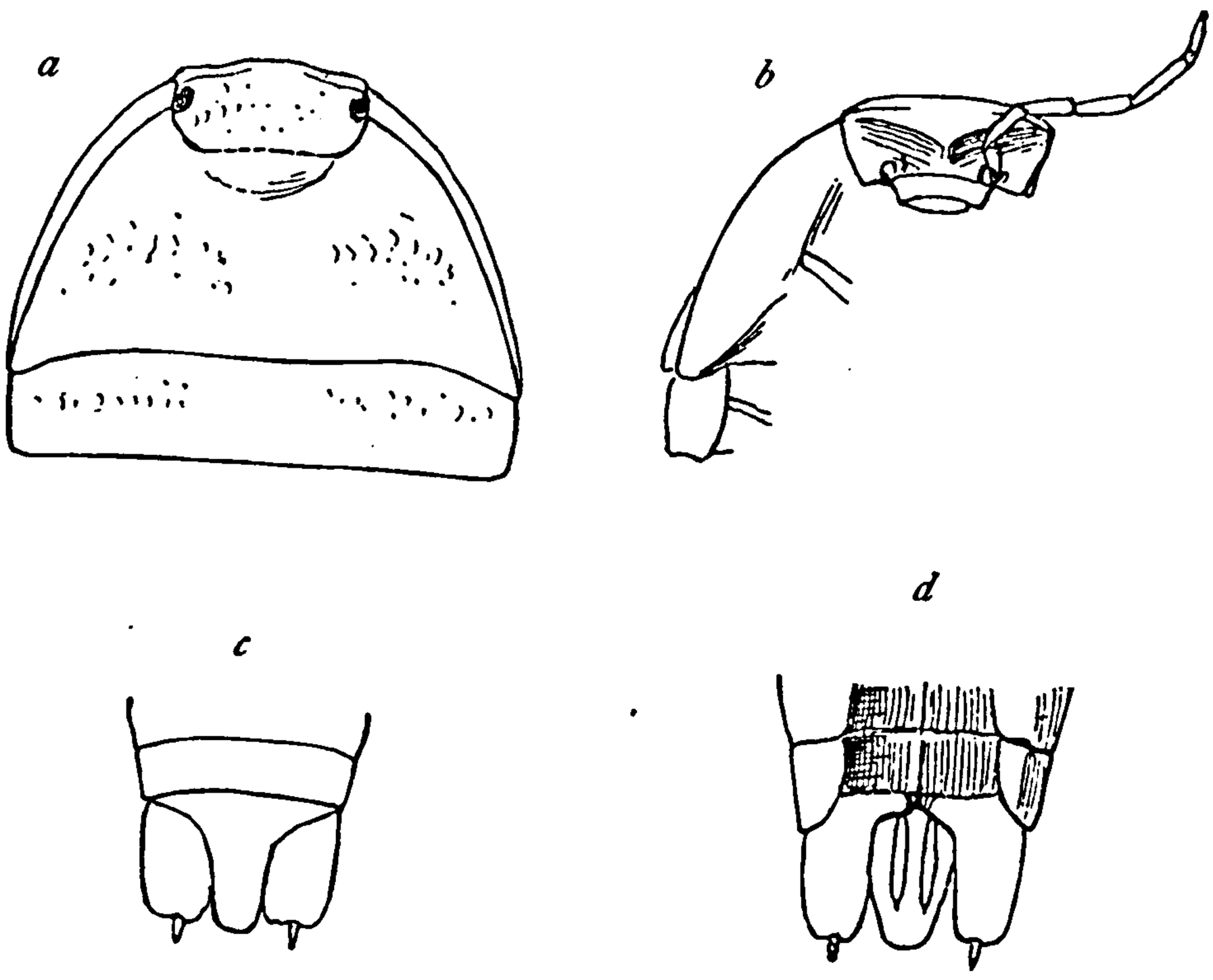

FIG. 651.—ETHELUM REFLEXUM (AFTER DOLLFUS). *a*, HEAD AND FIRST TWO SEGMENTS OF THORAX (UPPER SIDE). *b*, THE SAME (UNDERSIDE). *c*, FIFTH AND SIXTH SEGMENTS OF ABDOMEN AND UROPODA (UPPER SIDE). *d*, THE SAME (UNDERSIDE).

Coxopodite of the second segment hidden under the bent side part of the segment. Pleon, telson: the lateral parts being nearly folded underneath, the hind edge of segments (3–5) seems straight from a dorsal view. Pleotelson flat, with curved sides and a blunt, rather rounded apex. Uropoda: basis with a large oblong processus; endopodite reaching to two-thirds the length of the pleotelson; exopodite small, placed at the top of the basal processus. Color: dark brown, flagellum whitish. Dimensions: 5 by 2 mm. (much decreasing backward."—DOLLFUS.[a]

[a] Proc. Zool. Soc. London, 1896, pp. 398–399.

Family XXV. ONISCIDÆ.[a]

Body oval or oblong, rather convex, very little or scarcely contractile, very rarely convex; with difficulty contractile into a ball.

Second pair of antennæ generally long, with the flagellum composed of only a few articles. Antennal foramina large. Pleural parts of the head distinctly separated by a vertical marginal line and an infra-marginal line. Cypeus arched. Eyes generally well developed, compound. Molar expansion of mandibles obsolete, without any triturating surface, it being replaced by brush-like setæ. First maxillæ with the outer lobe tipped with spines, the inner lobe furnished with two plumose processes. Second maxillæ bilobate at the tip. Maxillipeds with palp composed of three articles and but little longer than masticatory lobe; masticatory lobe truncate at tip; epignath large.

There are six thoracic segments in the young before they are hatched.

The legs are generally long. The uropoda are produced, always extending beyond the terminal segment and the preceding segment.

First and second pairs of pleopoda modified in the male, the inner branch of the second pair terminating in a slender stylet.

ANALYTICAL KEY TO THE GENERA OF THE FAMILY ONISCIDÆ.[b]

a. Flagellum of second antennæ composed of less than four articles.
  b. External opercular ramus of the abdominal appendages containing no special respiratory organ. Flagellum of external antennæ triarticulate.
    c. Epimera of thoracic segments large, with all the posterior angles acute. Abdomen not abruptly narrower than thorax. First two abdominal segments very short, three following ones large, with large acute epimera.
      d. Front of head produced at the middle and at the sides in tubercles; lateral tubercles horn-like.....Genus *Alloniscus* Dana
      d'. Front and sides of head not produced in tubercles. With or without lateral lobes.
        e. Surface of body smooth.....Genus *Lyprobius* Budde-Lund
        e'. Surface of body granulated or tuberculate.
          f. Terminal segment of body short, widely rounded posteriorly. Basal article of uropoda broadly expanded inside. Inner branches contiguous along their inner lateral margins..Genus *Synuropus* Richardson
          f'. Terminal segment of body conically produced. Basal joint of uropoda oblong.....Genus *Oniscus* Linnæus
    c'. Epimera of thoracic segments small. Abdomen abruptly narrower than thorax; first two segments generally equal in length to those following; epimera very small, but manifest.....Genus *Philoscia* Latreille
  b'. External opercular ramus of the first and second pairs of abdominal appendages furnished with tracheæ. Flagellum of external antennæ biarticulate.
    c. Second maxilla not larger than first maxilla, and bilobed at the tip.

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[a] See Budde-Lund for characters of family, Crustacea Isopoda Terrestria, 1885, p. 75, and G. O. Sars, Crustacea of Norway, II, 1899, pp. 169–170.

[b] The genus *Acanthoniscus* (White) Kinihan is not included in the key.

d. Abdomen not abruptly narrower than thorax. Epimera of abdominal segments large.

e. Body very convex, capable of being rolled up into a perfect ball. Articles of flagellum of external antennæ subequal. External branches of the uropoda equal in both sexes. External opercular ramus of all the abdominal appendages furnished with tracheæ.....Genus *Cylisticus* Schnitzler

e′. Body more or less depressed, scarcely contractile. Articles of flagellum of external antennæ with the first article generally longer than the second, often subequal, or even a little shorter. External opercular ramus of the first and second pairs of abdominal appendages furnished with tracheæ.

f. Second antennæ long; first article of the flagellum generally longer than the second. Outer branch of the uropoda flattened, and longer in male than in female .....Genus *Porcellio* Latreille

f′. Second antennæ short; flagellum with first article much shorter than second. Outer branch of the uropoda conical, and not longer in male than in female .....Genus *Leptotrichus* Budde-Lund

d′. Abdomen abruptly narrower than thorax. Epimera of abdominal segments small.

e. First article of flagellum of external antennæ generally longer than second. Last abdominal segment reaches sufficiently beyond the epimera of the preceding segment. External opercular ramus of the first and second pairs of abdominal appendages, rarely of the third or of all the pairs, furnished with tracheæ.....Genus *Metoponorthus* Budde-Lund

e′. Flagellum of external antennæ with the first article shorter than the second. Last abdominal segment reaches much beyond the epimera of the preceding segment. External opercular ramus of the first and second pairs of abdominal appendages furnished with tracheæ.

Genus *Rhyscotus* Budde-Lund

c′. Second maxilla more than twice as large as first maxilla and not bilobed at the tip .....Genus *Hypergnathus*, new genus

a′. Flagellum of second antennæ composed of four articles.

Genus *Actoniscus* Harger

103. Genus ALLONISCUS Dana.[a]

Body rather convex, very little or scarcely at all contractile.

Front of head produced in the middle and at the sides into tubercles, the lateral tubercles being prominent and horn-like. Epistome swollen within between the antennæ, and slightly carinated. Flagellum of second pair of antennæ composed of three articles. Frontal marginal line wanting, vertical marginal line passing through the pleuræ of the head behind the eyes.

Epimeral parts of the thoracic segments small, not much expanded.

Abdomen not abruptly narrower than the thorax, with the pleural lamellæ of the third, fourth, and fifth segments large.

Legs very spinulose.

[a] See Budde-Lund for characters of genus, Crust. Isop. Terrestria, 1885, p. 224.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS ALLONISCUS.

a. Surface of body very densely granulated. Epimera with the anterior angles serrate ..... *Alloniscus mirabilis* (Stuxberg)

a'. Surface of body punctate. Epimera with the anterior angles not serrate.

b. Lateral processes of the head large, prominent.

Alloniscus cornutus Budde-Lund

b'. Lateral processes of the head small, scarcely prominent.

Alloniscus perconvexus Dana

ALLONISCUS MIRABILIS (Stuxberg).

Rhinoryctes mirabilis STUXBERG, Öfvers. Vet. Akad. Forhandl., 1875, No. 2, p. 51.

Alloniscus mirabilis BUDDE-LUND, Crust. Isop. Terrestria, 1885, p. 229.

Rhinoryctes mirabilis UNDERWOOD, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 363.

Alloniscus mirabilis RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 864; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 332; American Naturalist, XXXIV, 1900, p. 305.

Locality.—California.

Body oval, twice as long as wide, convex, very densely granulated; epimera serrate on the margins. Second pair of antennæ much shorter than the width of the body (85:100); the fifth article of the peduncle very long, not very much curved, equal in length to the three articulate flagellum; the articles of the flagellum equal to each other in length or the middle one sometimes smallest.

Eyes prominent, subcircular, with numerous ocelli.

The frontal median lobe large, produced, obtuse, extended upward, equal to a fourth part of the width of the head; lateral lobes produced, conical, anteriorly rounded, equal to the eyes in length.

All the segments of the thorax with the posterior margin sinuated in the middle. Epimera moderately large, with the anterior angles gradually more rounded posteriorly, serrate, the posterior angles roundly acuminate not very much directed backward.

Abdomen subcircular, a little wider than long, all the segments equal in length, the epimera of the first and second segments vanishing, those of the third, fourth, and fifth segments large, directed backward, rounded on the exterior margin, serrate, almost straight on the inner margin. The last segment is triangular, twice as wide as long, with the posterior margins straight, roundly acuminate, rather convex above and sometimes furnished with a longitudinal furrow not at all deep. The uropoda have the basal article almost as wide as long, depressed, with the post-lateral margin very little elevated, circularly rounded, serrate, the outer branch a little flattened, subconical, with the exterior margin straight, the inner margin convex, extending not much beyond the inner branch in length, which extends very little beyond the last segment of the abdomen.

Color of the dorsal surface reddish or dark gray, the frontal lobes, especially the middle one, and a longitudinal band on the thorax darker and covered with very numerous paler oblong spots.[a]

ALLONISCUS CORNUTUS Budde-Lund.

Alloniscus cornutus Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 228–229.—Richardson, Proc. U. S. Nat. Mus., XXI, 1899, p. 864; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 332; American Naturalist, XXXIV, 1900, p. 305.

Locality.—California.

Body short, oval, subconvex, obscurely but densely roughened and thickly punctate and setigerous. Second pair of antennæ shorter than half the length of the body (7:17); flagellum shorter than the fifth article of the peduncle; the second article of the flagellum shortest, the first equal in length to the third.

Antero-lateral processes large, narrow, prominent, subconical; front in the middle very much swollen.

The first three segments of the thorax have the posterior margin on both sides slightly sinuated; all the following segments have the posterior margin in the middle rather sinuated posteriorly.

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[a] The above description is adapted from the following one of Stuxberg's:

Rhinoryctes ovalis, longitudine duplo majore quam latitudine, convexus, densissime granulatus, epimeris margine serratis.

Antennæ exteriores corporis latitudine multo breviores (=85:100); pedunculi articulus quintus longissimus, parum curvatus, longitudine flagellum 3 : articulatum æquans; flagelli articuli inter se eadem longitudine vel medius interdum minimus.

Oculi, ocellis congregatis, prominentes, subcirculares.

Lobus frontalis medius magnus, productus, obtusus, sursum porrectus, quartam partem latitudinis capitis æquans; lobi laterales producti, conici, antice rotundati, longitudine oculos æquantes.

Trunci segmenta omnia margine postico medio sinuata. Epimera mediocria, angulis anticis post sensim magis rotundatis, serratis, angulis posticis parum retroversis, rotundate-acuminatis.

Cauda subcircularis, latitudine paullo majore quam longitudine, omnium segmentorum longitudine æquali, epimeris segmentorum primi et secundi evanescentibus, tertii, quarti, quinti maximis, retroversis, margine exteriore rotundatis, serratis, interiore fere rectis. Segmentum ultimum trigonum, duplo latius quam longius, marginibus posticis rectis, rotundate-acuminatum, supra convexiusculum et interdum fovea longitudinali haud profunda instructum.

Pedum ultimi paris articulus basalis fere æque latus ac longus, depressus, margine postico-laterali parum elevato, circulariter rotundato, serrato, appendix exterior paullum complanata, subconica, margine exteriore recto, interiore convexo, longitudine appendicem interiorem haud multo superans, quæ ultimum caudæ segmentum parum excedit.

Color dorsi rufo-vel fusco-griseus, lobis frontalibus, præsertim medio, vittaque trunci longitudinali nigrioribus, maculis oblongis numerosissimis pallidioribus inspersis.

Longitudo, 10 mm.; latitudo, 4.5–5 mm.; altitudo, 2.3–2.5 mm.—Stuxberg, Øfvers. Vet. Akad. Forhandl., 1875, No. 2, p. 51.

The first two segments of the abdomen scarcely shorter than the other segments; the epimera of the third, fourth, and fifth segments strong, subtetragonal.

The terminal abdominal segment is triangular, short, hardly twice as wide as long, rather convex above.

The basal article of the uropoda is very wide, depressed; the outer branch is carinated, with the apex rounded; the inner branch is inserted at the inner angle of the basal article. Color grayish, pale on the sides. Length, 8.5 mm.; width, 5 mm.; height, 2 mm.[a]

ALLONISCUS PERCONVEXUS Dana.

Alloniscus perconvexus DANA, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 176.—STIMPSON, Bost. Jour. Nat. Hist., VI, 1857, p. 506.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, p. 225.—UNDERWOOD, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 360.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 864; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 332; American Naturalist, XXXIV, 1900, p. 305.

Localities.—California; Pacific Grove; Santa Barbara; Monterey Bay; Tillamook Head, Oregon. Dug at mean-tide mark from sandy shore.

Body ovate, very convex, not quite twice as long as broad, 9 mm.: 16 mm.

Head twice as wide as long, 2 mm.: 4 mm., with the antero-lateral angles produced on either side into an acute process, "horn-like," situated just in front of the eye, and the front produced in the middle in a large, widely rounded median lobe, extending as far as the lateral process. The eyes are small, oblong, composite, and situated in the antero-lateral angles of the head close to the lateral margins. The first pair of antennæ are rudimentary and inconspicuous. They are composed of three small articles. The second pair of antennæ have

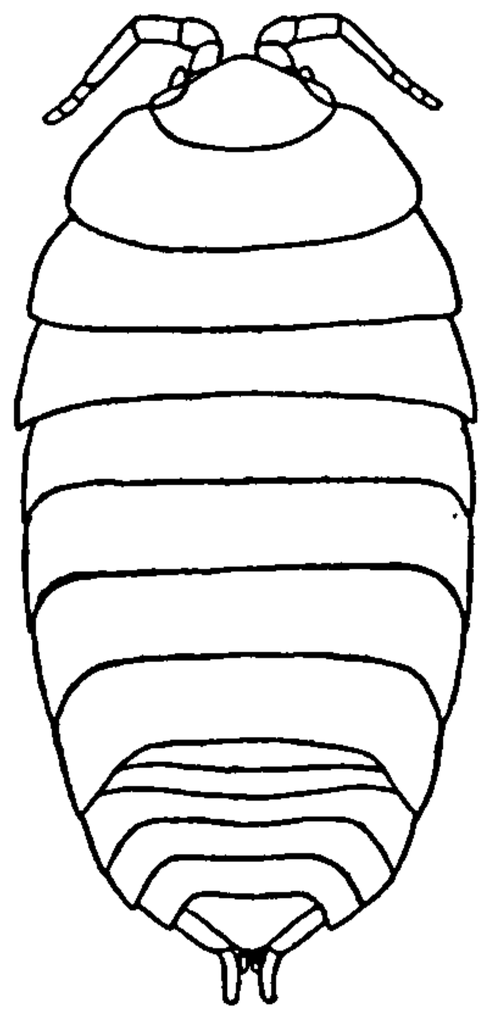

FIG. 652.—ALLONISCUS PERCONVEXUS.

[a] The above description is adapted from the following one of Budde-Lund's:

Breviter ovalis, subconvexus, obscure sed dense squamatus et punctis setigeris crebratus. Antennæ exteriores corpore dimidio breviores (7:17); flagellum scapi articulo quinto brevius; flagelli articulus secundus brevissimus, primus tertio æqualis.

Processus frontales laterales majores, angustiores, prominentes, subconici; frons media valde tumosa.

Trunci annuli tres priores margine posteriore utrinque leviter sinuato; annuli sequentes omnes margine posteriore medio post magis sinuato.

Caudæ annuli duo priores ceteris annulis vix breviores; epimera annuli 3–4–5 valida, subtetragona. Annulus analis, triangulus, brevis, ægre duplo latior quam longior, supra convexiusculus.

Articulus basalis pedum analium perlatus, depressus; extus carinatus, apice rotundato; ramus interior angulo interiori articuli basalis insertus.

Color griseus, in lateribus dilutior.

Longitudo, 8.5 mm.; latitudo, 5 mm.; altitudo. 2 mm.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 228–229.

the basal article short; the second is about twice as long as the first; the third and fourth are subequal and each is a little longer than the second; the fifth is one and a half times as long as the fourth. The flagellum is composed of three subequal articles. The antennæ are covered with small spines. The maxillipeds have a palp of three articles. The palp of the mandibles is wanting.

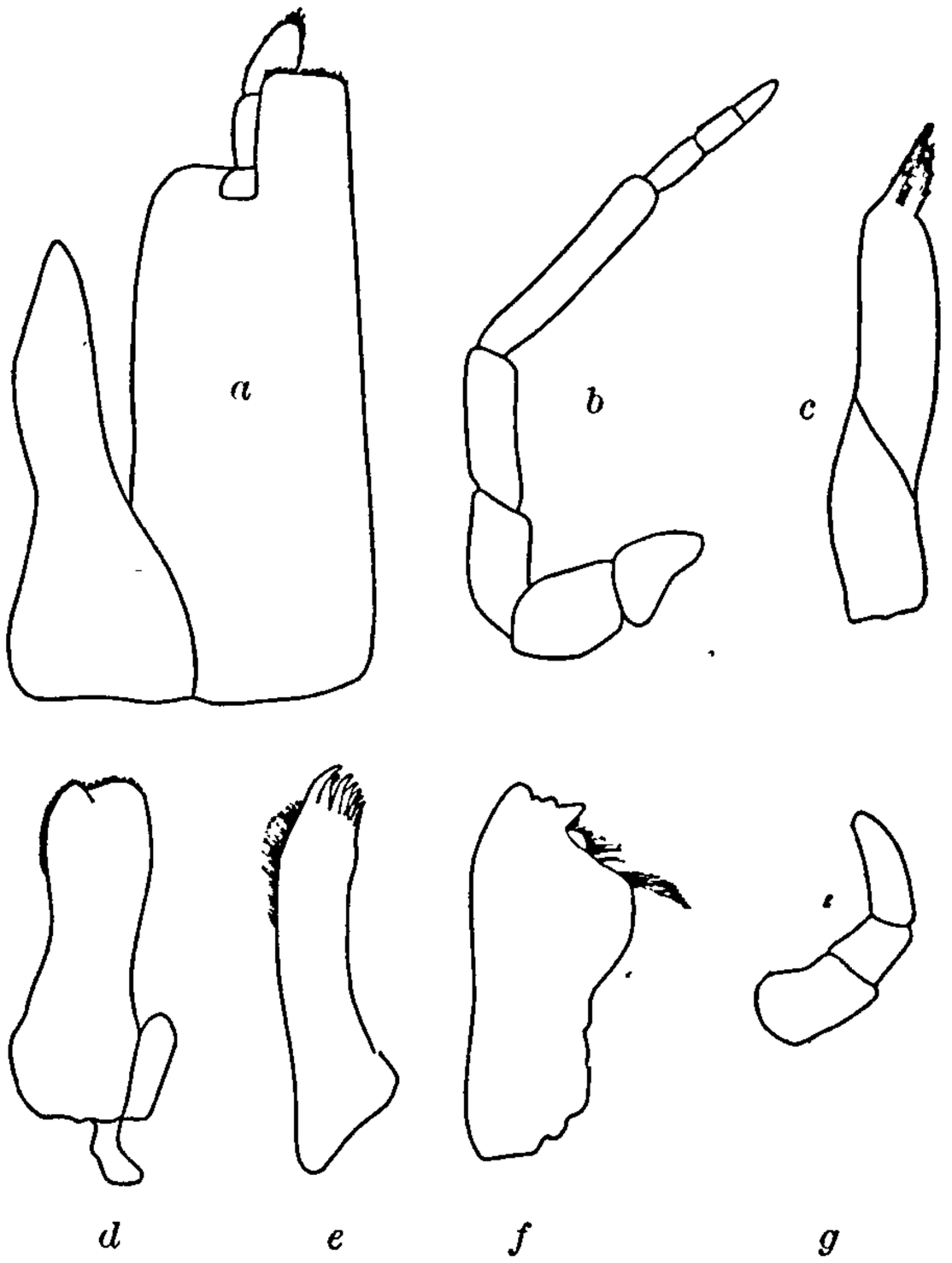

FIG. 653.—ALLONISCUS PERCONVEXUS. *a*, MAXILLIPED. ×20½. *b*, SECOND ANTENNA. ×11¼. *c*, FIRST MAXILLA (INNER LOBE). ×39. *d*, SECOND MAXILLA. ×20½. *e*, FIRST MAXILLA (OUTER LOBE). ×20½. *f*, MANDIBLE. ×20½. *g*, FIRST ANTENNA. ×39.

The first segment of the thorax is 2 mm. in length and is a little longer than any of the others, which are subequal and each is about 1½ mm. long. The lateral margins of all the segments are straight and contiguous. On the first four segments the epimera are indicated by a distinct longitudinal suture, which on the first segment is confined to the posterior half of the segment, but in the three following segments extends the entire length of the segment. There are no suture lines on the last three segments.

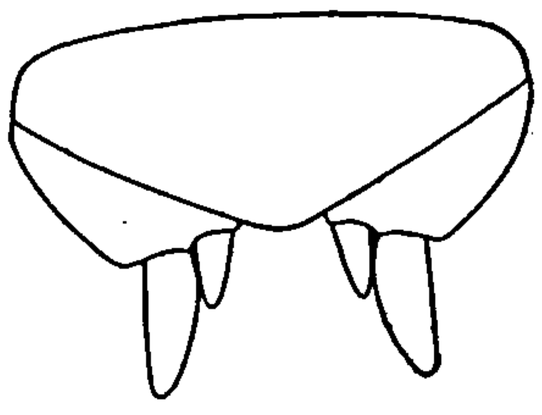

FIG. 654.—ALLONISCUS PERCONVEXUS. TERMINAL SEGMENT OF ABDOMEN WITH UROPODA. ×11¼.

The abdomen is as wide as the thorax. The first two segments have the lateral parts covered by the seventh thoracic segment. The sixth or terminal segment is triangular in shape and is twice as wide as long, being 3 mm. wide at the base and 1½ mm. long. The uropoda extend 1 mm. beyond the extremity of the abdomen. The peduncle does not extend beyond the abdomen. The inner branch extends only to the middle of the outer branch and is more slender.

All the legs are ambulatory and covered with stiff hairs.

104. Genus LYPROBIUS Budde-Lund.[a]

Body not convex, scarcely contractile. Head produced into lobes at the side; front not produced in the middle, marginate. Epimera of the third, fourth, and fifth segments of the abdomen large.

Peduncle of the uropoda short and wide, with the outer side sulcate.

Epimera of the thoracic segments moderately large; those of the first three segments with the posterior angles roundly obtuse, those of the fourth segment with the posterior angles straight, and those of the three posterior segments with the posterior angles acute.

Body setigerous, scarcely granulated.

Flagellum of second antennæ composed of three articles.

LYPROBIUS PUSILLUS Budde-Lund.

Lyprobius pusillus Budde-Lund, Crust. Isop. Terrestria, 1885, p. 230.—Richardson, Proc. U. S. Nat. Mus., XXI, 1899, p. 864; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 333; American Naturalist, XXXIV, 1900, p. 305.

Locality.—California.

Body oval, rather convex, smooth, punctate, very minutely setigerous, especially so posteriorly.

Second pair of antennæ a little shorter than half the length of the body; first article of the flagellum equal in length to the third, almost half as long as the second.

Antero-lateral lobes small, rounded. Front, with the median marginal line entire, a little arched and produced.

The terminal segment of the abdomen is triangulate in the middle, produced, and extends a little beyond the epimera of the fifth abdominal segment; terminal segment a little excavate above.

Color uniformly brown, transparent on the margins, white.

Length 5 mm. Width 2.5 mm. Height 1.2 mm.[b]

105. Genus SYNUROPUS Richardson.

Body oval, not contractile into a ball, with the segments laterally expanded, as in *Oniscus*.

Head with lateral and frontal lobes. Second pair of antennæ long, with flagellum composed of three articles.

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[a] For characters of genus see Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 229–230.

[b] The above description is adapted from the following one of Budde-Lund's:

Ovalis, convexiusculus, sublævis, punctatus, minutissime præsertim post setiger.

Antennæ exteriores corpore dimidio paulo breviores; flagelli articulus primus tertio æqualis, secundo fere duplo brevior.

Lobi frontales laterales parvi, rotundati. Frons media linea marginali integra paulum curvate producta.

Caudæ annulus analis medio triangulo, producto, epimera annuli præanalis paulum superante, supra paulum excavatus.

Color uniformis brunneus, in marginibus perlucens, albidus.

Longitudo 5 mm., latitudo 2, 5 mm., altitudo 1, 2 mm.—Budde-Lund, Crust. Isop. Terrestria, 1885, p. 230.

Abdomen not narrower than thorax; pleural lamellæ large.

Terminal segment of body much broader than long, widely rounded posteriorly, not conically produced as in *Oniscus*. Basal joint of the uropoda large, broadly expanded inside, not oblong as in *Oniscus;* inner branches close together, their internal lateral margins contiguous. Inner branch inserted but little or scarcely at all in advance of the outer branch, situated close to the inner post-lateral angle of the peduncle. Outer branch somewhat longer than inner branch.

SYNUROPUS GRANULATUS Richardson.

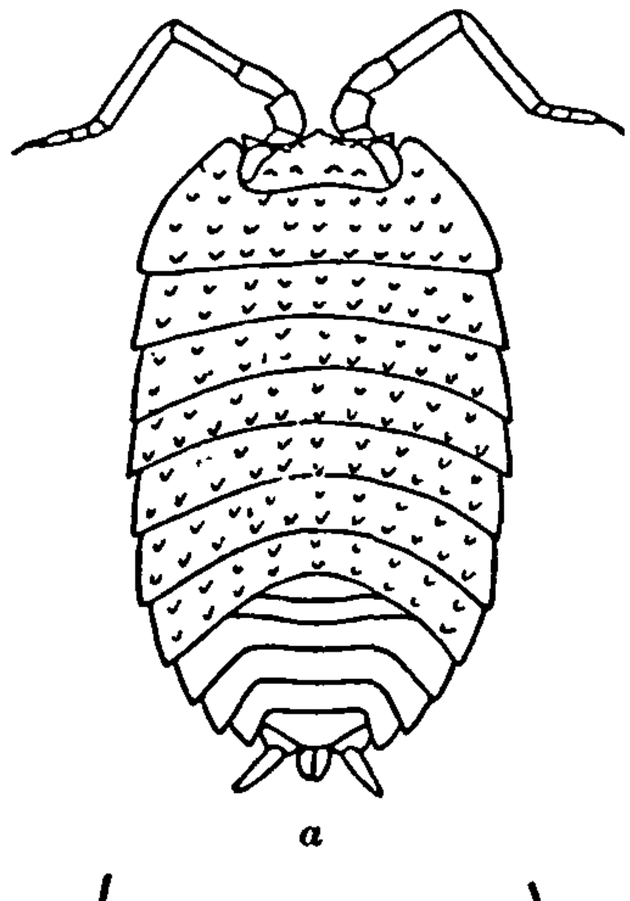
Synuropus granulatus RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, pp. 563–564.

Locality.—El Yunque, Porto Rico, at an altitude of 2,800 feet.

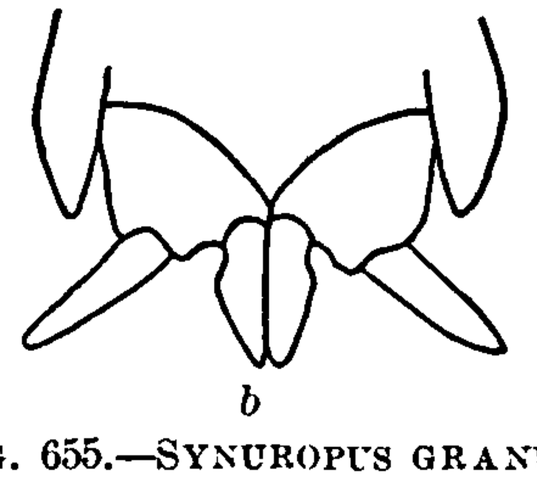
Body oval, not able to be contracted into a ball, with the lateral parts of the segments expanded.

Entire surface of body covered with small tubercles.

Head deeply set in the first thoracic segment, the rounded anterior angulations of which reach the antero-lateral angles of the head. The anterior margin of the head is produced in an obtusely pointed median lobe. The lateral lobes are very acute. The antennæ are geniculate at the articulation of the fourth and fifth peduncular joints; the flagellum consists of three joints.



a



b

FIG. 655.—SYNUROPUS GRANULATUS. *a*, DORSAL VIEW. *b*, UROPODA.

The first thoracic segment is longest; the others are subequal. The abdomen is not narrower than the thorax. The first two segments have their lateral margins concealed. The three following have their lateral margins broadly expanded. The terminal segment is twice as broad as long, with the posterior margin broadly rounded. The basal joints of the uropoda are large, being partly covered by the terminal segment of the body. The outer branch is styliform and extends its entire length beyond the terminal abdominal segment. The inner branches are situated close together in such a way that the inner lateral margins are contiguous throughout their length.

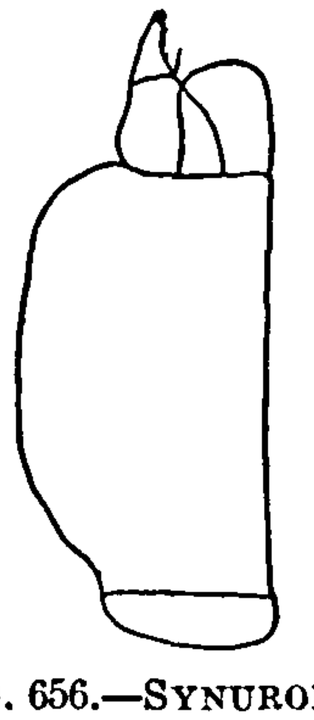


FIG. 656.—SYNUROPUS GRANULATUS. MAXILLIPED.

The legs are ambulatory, similar, and subequal.

Color brown, mottled with black.

One specimen was collected by Dr. L. Stejneger at El Yunque, Porto Rico, at an altitude of 2,800 feet.

Type.—Cat. No. 23912, U.S.N.M.

106. Genus ONISCUS Linnæus.[a]

Body broad, depressed, very little or scarcely contractile. Surface of body granulated or tuberculate. Head with well-defined lateral lobes; front marginate, not produced in the middle. Abdomen not abruptly narrower than thorax; third, fourth, and fifth segments with epimera large, acute, and produced backward. Terminal segment greatly produced. Eyes large, lateral. Second pair of antennæ long; flagellum composed of three articles.

Opercular plates of the pleopoda without tracheæ.

Uropoda produced, with the inner branch inserted far in front of the outer, near the inner antero-lateral angle of the peduncle.

Lateral parts of the thoracic segments expanded; posterior angles of all the epimera acute.

ONISCUS ASELLUS Linnæus.

Oniscus asellus Linnæus, Fauna Suecica, 2d ed., 1761, p. 500.
Oniscus murarius Cuvier, Jour. Hist. Nat., II, 1792, p. 23, pl. xxvi, figs. 11–13.
Oniscus affinis Say, Journ. Acad. Nat. Sci. Phil., I, 1818, pp. 430–431.
Oniscus vicarius Stuxberg, Öfvers. Svenska Vet. Akad., Forh., 1872, Pt. 9, p. 3; 1875, Pt. 2, p. 50.
Oniscus asellus Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 202–204.
Oniscus affinis Underwood, Bull. Ill. State Lab. Nat Hist., II, 1886, p. 361.
Oniscus vicarius Underwood, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 361.
Oniscus asellus Sars, Crust. Norway, II, 1899, pp. 171–172.—Richardson, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901. pp. 562–563.
Oniscus affinis Richardson, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901, p. 563.
Oniscus asellus Stoller, 54th report New York State Museum, 1902, p. 213.—Paulmier, Bull. New York State Museum, 1905, pp. 180–181.

Localities.—Greenland; North America, at Woods Hole, Massachusetts; Salem, and Beverly, Massachusetts; New York City; Schenectady, New York; Rock Island, Illinois; Providence, Rhode Island; Syracuse, New York; Freeport, Maine; Pennsylvania; also Sweden; Denmark; Germany; Newfoundland; Canada, near Niagara; Holland; Great Britain; France; Spain; Italy; Azores; Iceland; coast of Norway; "Ashensee Tyrol" 950 meters alt. (Dr. Stejneger).

Found under dead logs, dead leaves, and stones; common in hothouses.

Specimens identified by Dr. Joseph Leidy as *Oniscus affinis* Say and sent to me by Doctor Calvert of the University of Pennsylvania,

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[a] See Budde-Lund for characters of genus, Crustacea Isopoda Terrestria, 1885, p. 202, and Sars, Crustacea of Norway, II, 1899, pp. 170–171.

do not differ from specimens of *Oniscus asellus* in the U. S. National Museum collection.

Body oblong-ovate, about one and a half times longer than wide, 10 mm. : 16 mm.

Head wider than long, 2 mm. : 3 mm., with the frontal margin slightly convex and pronounced antero-lateral lobes, narrow and elongated, almost 1 mm. in length and rounded anteriorly. The eyes are

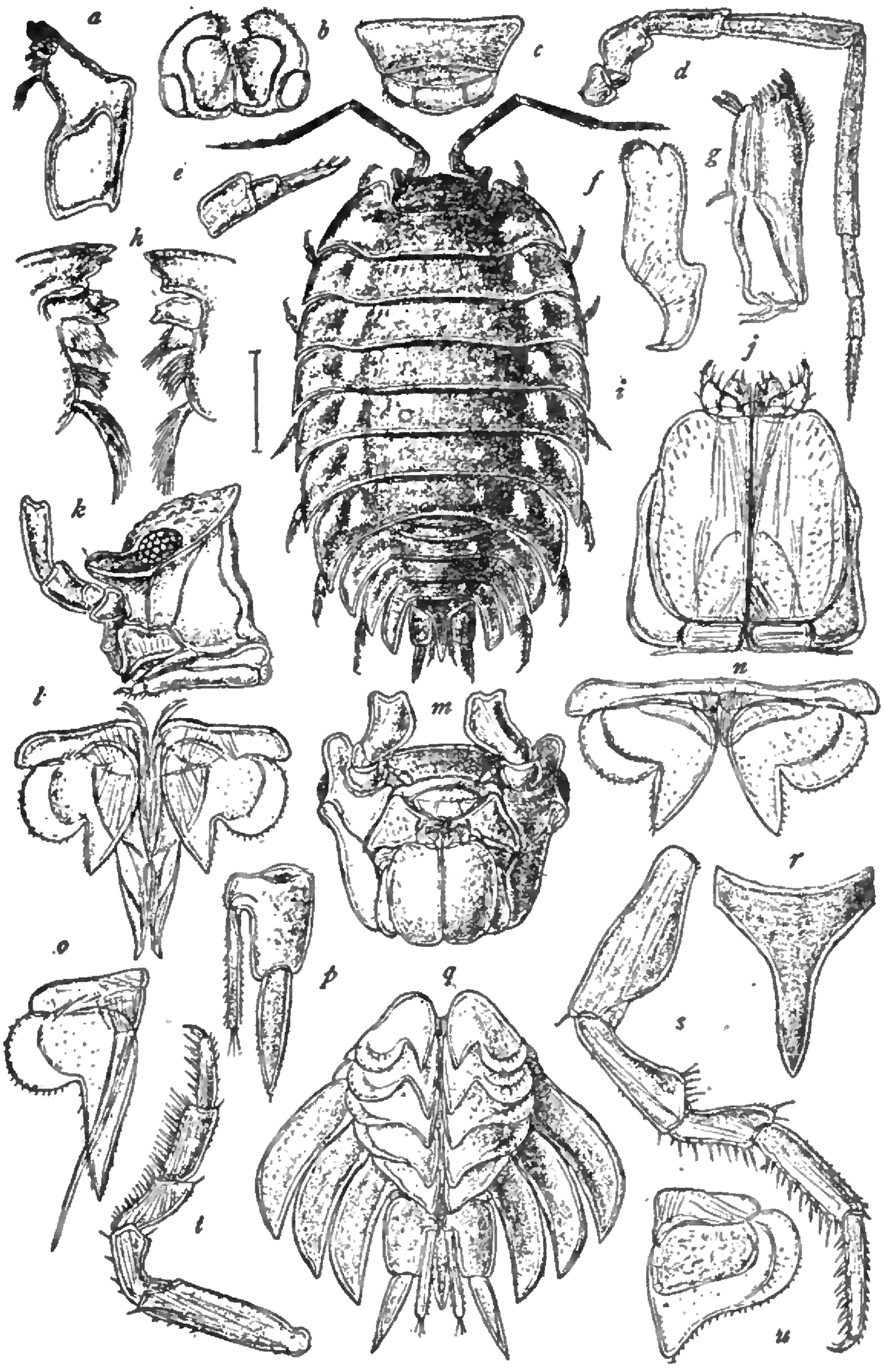

FIG. 657.—ONISCUS ASELLUS (AFTER SARS). *a*, MANDIBLE. *b*, POSTERIOR LIP. *c*, ANTERIOR LIP. *d*, SECOND ANTENNA. *e*, FIRST ANTENNA. *f*, SECOND MAXILLA. *g*, FIRST MAXILLA. *h*, MANDIBLES. *i*, DORSAL VIEW OF BODY. *j*, MAXILLIPEDS. *k*, HEAD (LATERAL VIEW). *l*, FIRST PLEOPODS OF MALE. *m*, HEAD (VENTRAL VIEW). *n*, FIRST PLEOPODS OF FEMALE. *o*, SECOND PLEOPOD OF MALE. *p*, UROPOD. *q*, ABDOMEN (VENTRAL VIEW). *r*, LAST SEGMENT OF ABDOMEN. *s*, SEVENTH LEG. *t*, FIRST LEG. *u*, THIRD PLEOPOD OF FEMALE.

small, composite, and situated at the sides of the head, at the base of the antero-lateral lobes. The first pair of antennæ are small and inconspicuous and are composed of two articles. The second antennæ have the basal article short; the second article is twice as long as the first; the third is equal in length to the second; the fourth is nearly twice as long as the third; the fifth is one and a half times as long as the fourth.

The flagellum is composed of three articles. When retracted the second antennæ extend to the posterior margin of the third thoracic segment.

The segments of the thorax are subequal in length. The first segment has the antero-lateral angles produced to surround the head, and they extend almost to the extremity of the antero-lateral lobes of the head. The lateral parts of all the segments are expanded, but there is no indication of epimera on any of the segments. The lateral margins are straight.

The segments of the abdomen are all distinct, the first two being somewhat shorter. The lateral parts of the first two are entirely concealed by the seventh thoracic segment. The lateral parts of the third, fourth, and fifth segments are expanded and produced so as to continue the oval outline of the body; those of the fifth segment extend posteriorly as far as the extremity of the sixth or terminal segment. The terminal segment is triangular, with the apex produced in a long process, 2 mm. in length and pointed posteriorly. The basal article or peduncle of the uropoda extends to the middle of the produced portion of the terminal abdominal segment. The inner branch extends to the extremity of the process of the terminal segment and is concealed by it except at the lower portion. The outer branch is 2 mm. long and extends the length of 1 mm. beyond the terminal abdominal segment.

The legs are all ambulatory in character.

In color, the dorsal portion of the body is a dark brown. There is a longitudinal row of light yellow spots on either side of the thorax, about the place of union of the epimera with the segments. The lateral margins of the body are also light yellow. The dorsal portion of the body is slightly granular.

107. Genus PHILOSCIA Latreille.[a]

Body oval, slightly convex, very little or scarcely at all contractile.

Head rounded in front, without lateral lobes. Second pair of antennæ long; flagellum composed of three articles. Frontal marginal line very often wanting in the middle, bent downward on either side, surrounding the epistome and extending to the vertical marginal line back of the eyes.

Abdomen abruptly narrower than thorax; lateral parts of the third, fourth, and fifth segments very small, appressed; terminal segment not much produced.

Opercular plates of the pleopoda without tracheæ. Uropoda with the inner branch not attached far in front of the outer branch.

Lateral parts of the thorax but slightly expanded.

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[a] For characters of genus see Budde-Lund, Crust. Isop. Terrestria, 1885, p. 207, and Sars, Crust. of Norway, II, 1899, pp. 172–173.

ANALYTICAL KEY[a] TO THE SPECIES OF THE GENUS PHILOSCIA.

a. Surface of body smooth, without spines.
b. Terminal segment of body broadly rounded posteriorly.
Philoscia richmondi Richardson
b'. Terminal segment of body posteriorly triangular, with apex more or less produced.
c. Second antennæ short, shorter than half the length of the body.
d. Front of head indistinctly trilobate ..... *Philoscia culebræ* Moore
d'. Front of head straight or very slightly arched.
e. Body striped with two broad dorsal bands ..... *Philoscia vittata* Say
e'. Body violet, covered with white spots, the margins of the segments being white ..... *Philoscia brevicornis* Budde-Lund
c'. Second antennæ very long, much longer than half the length of the body.
Philoscia bermudensis Dahl
a'. Surface of body covered with numerous spines ..... *Philoscia spinosa* Say

PHILOSCIA RICHMONDI Richardson.

Philoscia richmondi RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, pp. 564–565.

Locality.—El Yunque, Porto Rico, at an altitude of 2,800 feet.

Body oval; surface smooth. Head not set in the first thoracic segment, evenly rounded, with no lateral or frontal lobes. Eyes large, well developed, lateral. Antennæ equal to half the length of the body; flagellum composed of three joints.

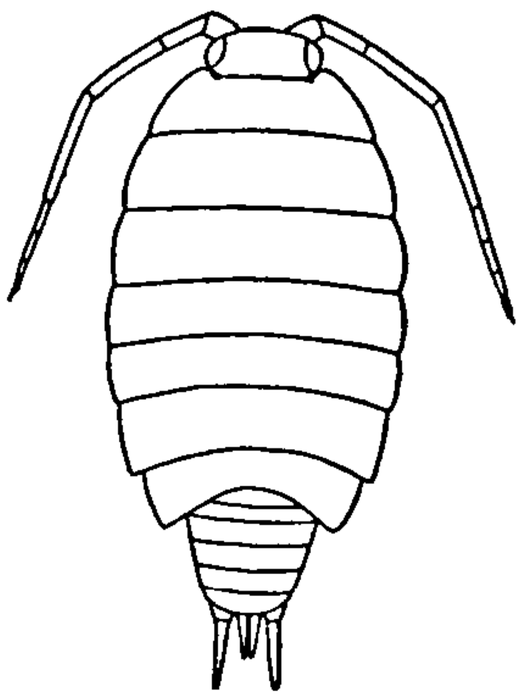

FIG. 658.—PHILOSCIA RICHMONDI.

Segments of thorax subequal.

Abdomen abrubtly narrower than thorax, with the lateral processes of the segments not projecting. Terminal segment equal in length to the preceding segment, much broader than long, and with the posterior margin broadly rounded. The basal joint of the uropoda projects beyond the terminal segment of the body. The inner branch extends to the middle of the outer branch.

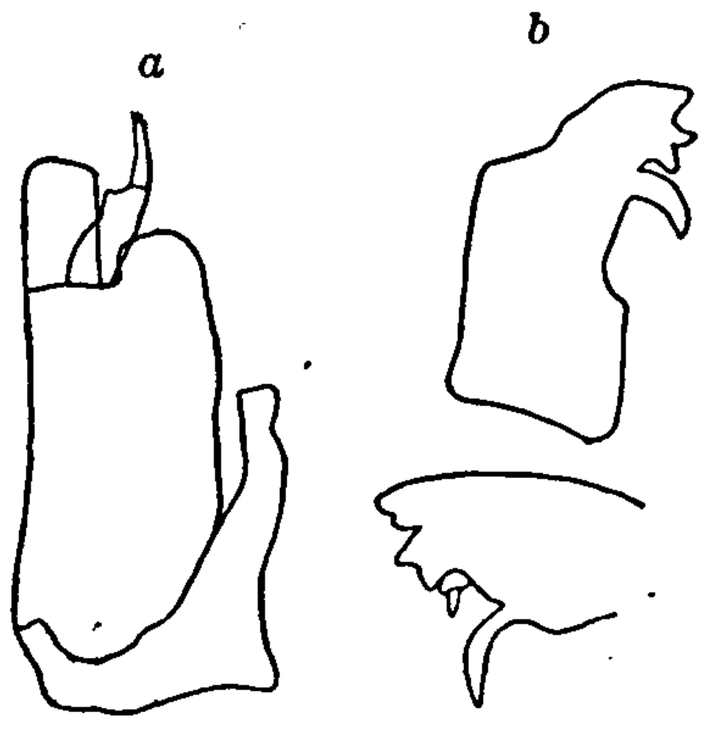

FIG. 659.—PHILOSCIA RICHMONDI. *a*, MAXILLIPED. *b*, MANDIBLE.

Legs gradually increasing in length.

Color, mottled brown and yellow.

A number of specimens were collected by Dr. C. W. Richmond and Dr. L. Stejneger at El Yunque, Porto Rico, at an altitude of 2,800 feet. Named for Dr. C. W. Richmond, of the U. S. National Museum.

Type.—Cat. No. 23913, U.S.N.M.

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[a] The description of *Philoscia nigricans* Budde-Lund does not give sufficient characters to place it in the key.

PHILOSCIA CULEBRÆ Moore.

Philoscia culebræ MOORE, Bull. U. S. Fish Commission, XX, Pt. 2, 1902, p. 176, pl. XI, figs. 13–17.

Locality.—Culebra, Porto Rico, from drift on shore.

"Body elongate-oval, about 2.5 times as long as broad; head about twice as broad as long, front somewhat recurved between sides and middle, producing the appearance of a small lobe in front of each eye, sides and posterior margin rounded; first segment of thorax longest, its anterior and posterior margins strongly curved, anterior angle rounded and projecting somewhat beyond sides of head; next six segments subequal in length, second, third, and fourth widest, the last three successively narrower; posterior angles of last four segments produced, successively increasing in length, that of last reaching almost to posterior border of third abdominal segment; abdomen almost as long as last three segments of thorax, gradually decreasing in width posteriorly; segments subequal in length, the sides of the first more or less concealed by the lateral angle of the last thoracic segment; telson short, hardly longer than other segments, produced to a blunt point in median line posteriorly.

"Eyes moderate (for the genus); first antennæ minute, second antennæ when laid against sides of body extending to about end of second thoracic segment, spinulose; peduncle, five-jointed; first joint, short; second and third, equal; fourth, longer; fifth, longest, equal to third and fourth combined; flagellum three-jointed, about equal to last joint of peduncle. Mandible with narrow four or five dentate tip, at the base of which are two plumulose setæ, and lower down a brush of fine setæ; no palp. First maxillæ with inner plate furnished with several small spines; outer plate with many.

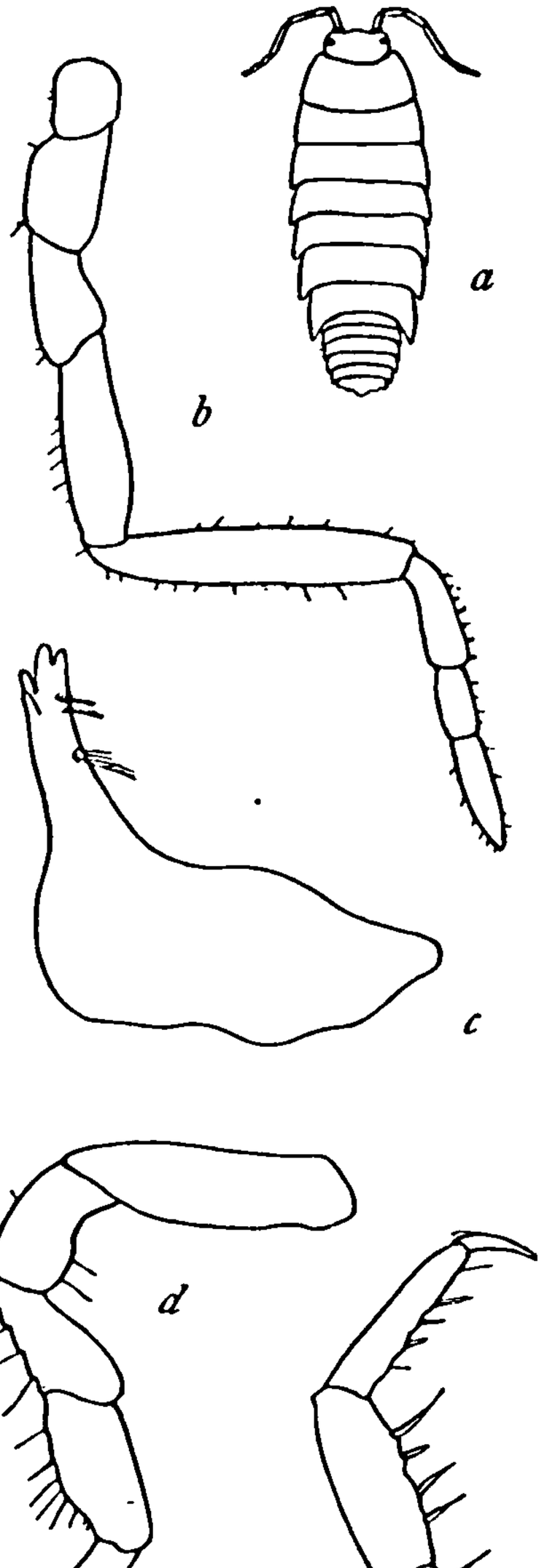

FIG. 660.—PHILOSCIA CULEBRÆ (AFTER MOORE). *a*, DORSAL VIEW. *b*, SECOND ANTENNA. *c*, MANDIBLE. *d*, FIRST LEG. *e*, FOURTH LEG.

"The legs increase slightly in length from before backward and are furnished with long acute spines. The uropods are broken off.

"From Culebra. Two specimens, under drift on shore, 4.2 by 1.6 mm."—MOORE.[a]

PHILOSCIA VITTATA Say.

Philoscia vittata SAY, Jour. Acad. Nat. Sci. Phila., I, 1818, p. 429.—DE KAY, Zool. New York, Crust., 1844, p. 50.—WHITE, List Crust. Brit. Museum, 1847, p. 99.—HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, 1873, Pt. 1, p. 569 (275); Proc. U. S. Nat. Mus., II, 1879, p. 157; Report U. S. Commissioner of Fish and Fisheries, 1880, Pt. 6, pp. 306–307, pl. I, fig. 1.—UNDERWOOD, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 361.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901, p. 565.—PAULMIER, Bull. New York State Museum, 1905, p. 181.

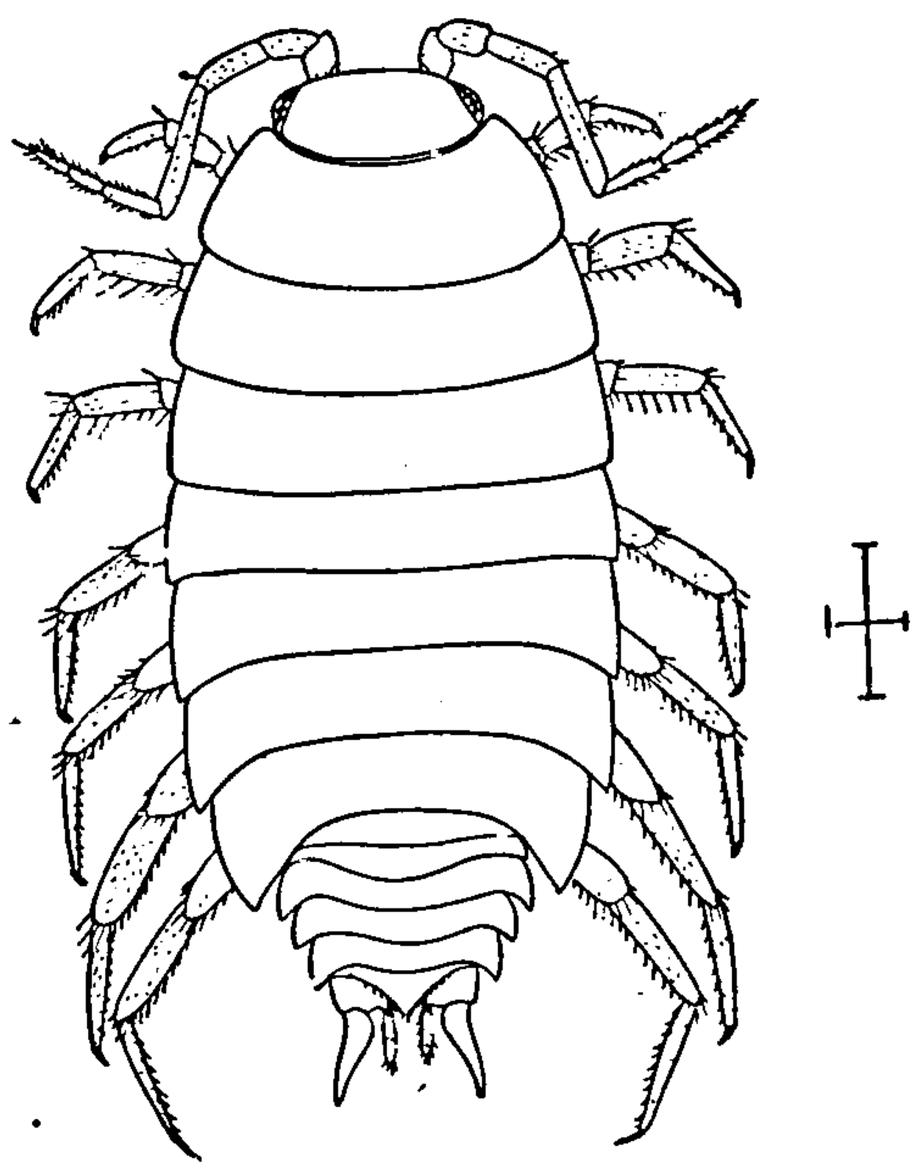

FIG. 661.—PHILOSCIA VITTATA (AFTER HARGER). × 6.

Localities.—Great Egg Harbor, New Jersey, to Barnstable, Massachusetts; Salem, Massachusetts; Freeport, Long Island. Found under stones, wood, etc., in moist places; under rubbish along the shore; underside of boards above high water.

Body oblong-ovate, a little more than twice as long as wide, 3 mm.: 6½ mm.

Head wider than long, 1 mm.: 1½ mm., with the anterior margin rounded and not produced into a lobe. The antero-lateral angles of the head are rounded and not produced into lobes. The eyes are small,

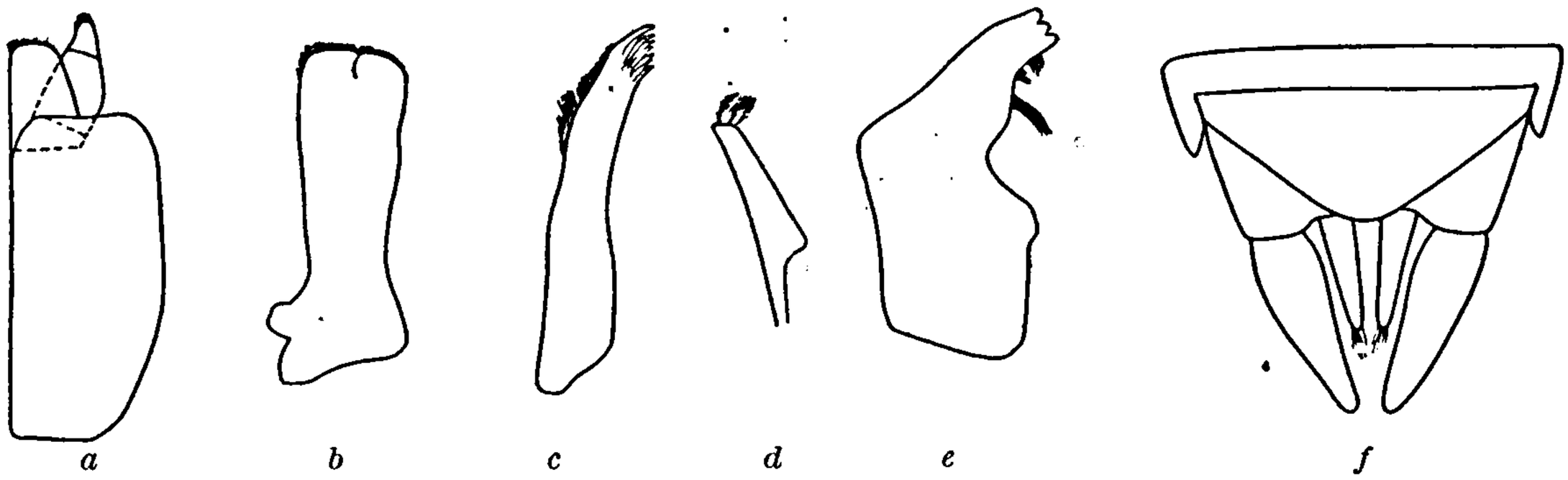

FIG. 662.—PHILOSCIA VITTATA. *a*, MAXILLIPED. *b*, SECOND MAXILLA. *c*, FIRST MAXILLA (OUTER LOBE). *d*, FIRST MAXILLA (INNER LOBE). *e*, MANDIBLE. *f*, TERMINAL SEGMENT OF ABDOMEN, WITH UROPODA.

round, and composite, and situated in the antero-lateral angles of the head. The first pair of antennæ are small, rudimentary, and incon-

[a] Bull. U. S. Fish Comm., XX, Pt. 2, 1902, p. 176.

spicuous. The first article of the second antennæ is short; the second and third are subequal and each is more than twice as long as the first; the fourth is nearly twice as long as either of the two preceding; the fifth is one and a half times longer than the fourth. The flagellum is composed of three nearly subequal articles, the third being a little longer than the second. The second antennæ extend to the posterior margin of the third thoracic segment. The maxilliped has a palp of three articles. The palp of the mandibles is wanting.

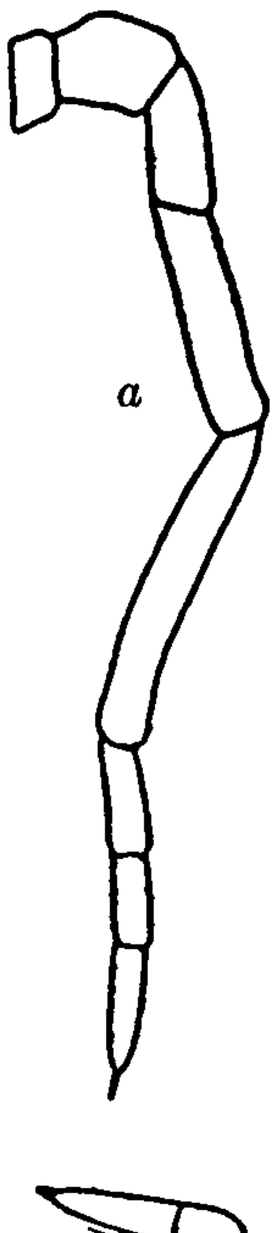

FIG. 663.—PHILOSCIA VITTATA. *a*, SECOND ANTENNA. ×27⅓. *b*, UROPOD. 51⅔.

The segments of the thorax are subequal, the first segment being, perhaps, a little longer than any of the others. There are no epimera separated off on any of the segments.

The abdomen is abruptly narrower than the thorax. The first two segments are covered at the sides by the seventh thoracic segment. The lateral parts of the segments are not developed. The sixth, or terminal segment, is triangular in shape, with the apex not produced but rounded. The peduncle of the uropoda extends to the extremity of the abdomen. The inner branch extends half a millimeter beyond the terminal abdominal segment. The outer branch is not half a millimeter longer than the inner branch.

All the legs are ambulatory.

Color brown, with lateral margins light and a narrow longitudinal light area or band in the middle of the dorsal surface, separating the two wide dark bands.

PHILOSCIA BREVICORNIS Budde-Lund.

Philoscia brevicornis BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 218–219.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901, p. 565.

Locality.—Biloxi, Mississippi.

Body oblong-oval, subconvex, smooth, slightly covered with a few dots.

Second pair of antennæ shorter than half the length of the body; articles of the flagellum short, subequal.

Frontal margin produced a little in the form of an arch in the middle, almost entirely inconspicuous; epistome subconvex in the middle.

Abdomen scarcely abruptly narrower than the thorax. The terminal segment short, almost triangular, with sides slightly incurved, and apex obtusely rounded; sulcate above.

The color varies in the two specimens, being a very light or a very

dark violet, covered with white spots, with the margins white. Legs all yellow, or covered with black dots.

Length 11 mm.; width 5 mm.; height 2.5 mm.[a]

PHILOSCIA BERMUDENSIS Dahl.

Philoscia bermudensis DAHL, Plankton Expedition, I, 1892, Pt. 1, p. 111, pl. III, figs. 2, 4, 5, 7, 8, 10, 13.

Locality.—Bermudas.

This species is not described, but well figured and compared with

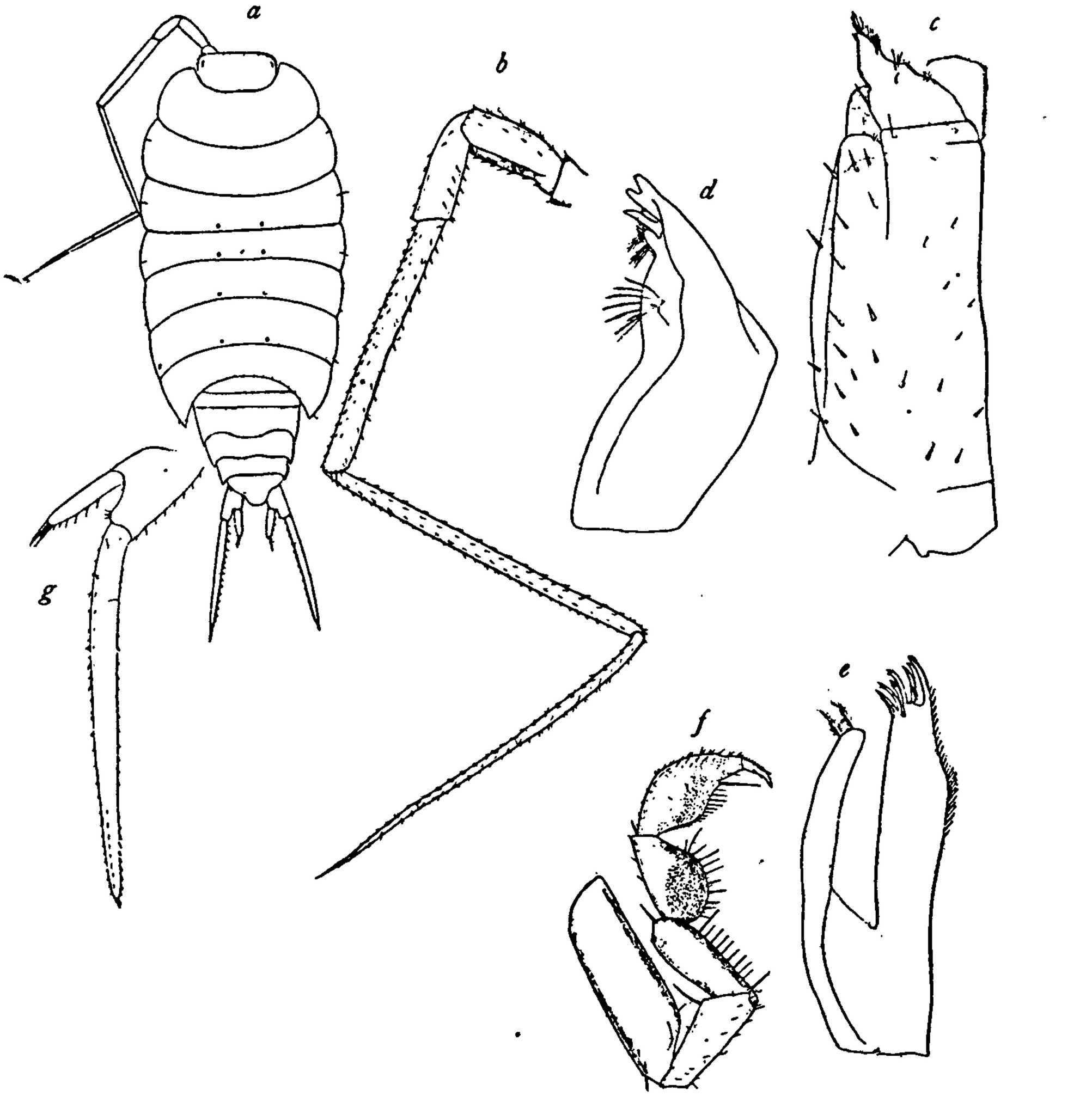

FIG. 664.—PHILOSCIA BERMUDENSIS (AFTER DAHL). *a*, GENERAL FIGURE. × 5. *b*, SECOND ANTENNA. × 16. *c*, MAXILLIPED. × 40. *d*, MANDIBLE. × 40. *e*, FIRST MAXILLA. × 40. *f*, FIRST LEG. × 16. *g*, UROPOD. × 16.

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[a] The above description is adapted from the following one of Budde-Lund's:

Oblonge ovalis, subconvexa, nitida, tenuiter et sparse punctata.

Antennæ exteriores corporis dimidio breviores; flagelli articuli breves, subæquales.

Linea marginalis frontalis medio paulum arcuate producta, fere omnino obliterata; epistoma medio subconvexum.

Cauda trunco vix abrupte angustior. Annulus analis brevis, fere triangulus, lateribus leviter incurvis, apice rotundato obtuso, supra sulcatus.

Color variat in duobus speciminibus dilutior vel obscurior violaceus, maculis albidis conspersis, in marginibus late albidus. Pedes toti flavi, vel punctis nigrescentibus conspersis.

Longitudo, 11 mm.; latitudo, 5 mm.; altitudo, 2.5 mm.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 218–219.

Philoscia couchi Kinahan, from which it is said to differ (1) in having the second antennæ longer and more slender; (2) in having the uropoda longer and more slender, and (3) in having for eyes small spots of pigment with slight rudiments of ocelli, while in *P. couchi* the eyes seem to have entirely disappeared. Dahl likewise points out that these differences also exist between *Ligia baudiniana* (*hirtitarsis*) and *Ligia oceanica*. He considers that in both cases the *Philoscia* form has arisen independently from the *Ligia* form.

PHILOSCIA SPINOSA Say.

Philoscia spinosa SAY, Jour. Acad. Nat. Sci. Phila., I, 1818, pp. 429–430.—UNDERWOOD, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 361.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901, p. 565.

Locality.—Savannah, Georgia.

"Brown, oblong-oval, with numerous spines above; feet armed with short setæ beneath.

"Inhabits Georgia.

"Cabinet of the academy.

"Body brown, elongate-oval, armed with numerous spine-like tubercles; sixth and seventh segments produced on each side behind, acute, the latter attaining the base of the fifth succeeding joint; abdominal and caudal segments somewhat glabrous, terminal segment surpassing the first joint of the lateral styles; antennæ rough and subspinose before, terminal joint glabrous, pale; feet beneath armed with short distant setæ.

"Length nearly one-fifth of an inch.

"Under stones, old wood, etc., in moist situations near Savannah, Georgia."—SAY.[a]

PHILOSCIA NIGRICANS Budde-Lund.

Philoscia nigricans BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 210–211.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 305; Proc. U. S. Nat. Mus., XXIII, 1901, p. 565.

Locality.—Biloxi, Mississippi.

Body oblong-oval, rather convex, smooth, slightly covered with a few dots.

Second pair of antennæ lost in the specimen.

Frontal margin straight; epistome with a median transverse line.

Abdomen abruptly narrower than the thorax; epimera distant. The last segment of the abdomen short, subtriangular, with the sides straight or slightly incurved; apex obtuse, sulcate above.

[a] Jour. Acad. Nat. Sci. Phila., I, 1818, pp. 429–430.

Color dark brown, covered with numerous white spots or little stripes. Legs yellow, with the coxæ spotted with black.

Length, 9 mm.; width, 4 mm.; height, 1.6 mm.[a]

108. Genus CYLISTICUS Schnitzler.[b]

Body oblong, very convex, contractile into a ball.

Head with lateral lobes distinct; median lobe small; front of head marginate. Eyes distinct, lateral. Second pair of antennæ long; flagellum composed of two subequal articles.

Lateral parts of the thoracic segments large.

Abdomen not abruptly narrower than thorax; lateral parts of third, fourth, and fifth segments well developed; terminal segment conically produced.

Opercular plates of all the pleopods furnished with tracheæ.

Inner branch of the uropoda inserted far in front of the outer branch, near the inner antero-lateral angle of the peduncle.

CYLISTICUS CONVEXUS (De Geer).

Oniscus convexus De Geer, Mém. des Insectes, VII, 1778, p. 553, pl. xxxv, fig. 11.

Porcellio spinifrons Brandt, Bull. de la Soc. Imp. d. Naturalistes de Moscou, VI, 1833, p. 15.

Porcellio lævis Koch, Deutschlands Crustaceen, 1835–1844, p. 6.

Porcellio armadilloides Lereboullet, Mém. de la Soc. du Muséum d'Histoire Nat. de Strasbourg, IV, 1853, p. 65, pl. I, fig. 18; pl. III, figs. 88–94.

Cylisticus lævis Schnitzler, De Oniscineis agri Bonnensis, 1853, p. 25.

Porcellio armadilloides Kinahan, Nat. Hist. Rev., IV, 1857, p. 279.

Porcellio convexus Johnson, Academisk Afhandling, Upsala, 1858, p. 32.

Porcellio armadilloides Bate and Westwood, Brit. Sessile-eyed Crust., II, 1868, p. 485.

Porcellio convexus Budde-Lund, Nat. Tidsskr. (3), VII, 1870–71, p. 240.—Stuxberg, Öfvers. af Kgl. Vetenskaps Akad. Förh., 1875, p. 60.

Cylisticus convexus Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 77–79. (See Budde-Lund for further synonymy.)—G. O. Sars, Crust. of Norway, II, 1899, p. 186, pls. xi, xii.—Richardson, Amer. Nat., XXXIV, 1900, p. 303; Proc. U. S. Nat. Mus., XXIII, 1901, pp. 565–566.—Stoller, 54th Report New York State Museum, 1902, p. 213.—Paulmier, Bull. New York State Museum, 1905, pp. 181–182.

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[a] The above description is adapted from the following one of Budde-Lund's:

Oblonge ovalis, convexiuscula, nitida, tenuiter et sparse punctata.

Antennæ exteriores . . .

Linea marginalis frontalis recta; epistoma medio linea transversa.

Cauda trunco abrupte angustior; epimera subdistantia. Annulus analis brevis, subtriangulus, lateribus subrectis vel leviter incurvis, apice obtuso, supra sulcatus.

Color ex nigro brunneus, maculis vel striolis numerosis albidis conspersus. Pedes flavi, coxis nigromaculatis.

Longitudo, 9 mm.; latitudo, 4 mm.; altitudo, 1.6 mm.—Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 210–211.

[b] For characters of genus see Budde-Lund, Crust. Isop. Terrestria, 1885, p. 77, and Sars, Crust. of Norway, II, 1899, p. 185.

Localities.—Westwood, Hamilton County, Ohio; "Old Mill," Devils Backbone, Hamilton County, Ohio; Miami Grove, Ohio; Piseco, New York; Rock Island, Illinois; Springfield, Ohio; Columbus, Ohio; Clifton, Cincinnati, Ohio; Washington, District of Columbia; New York City; Norwich, New York; Warwick, Massachusetts; Kelley's Island, Lake Erie; Syracuse, New York; Las Vegas Hot Springs, New Mexico;

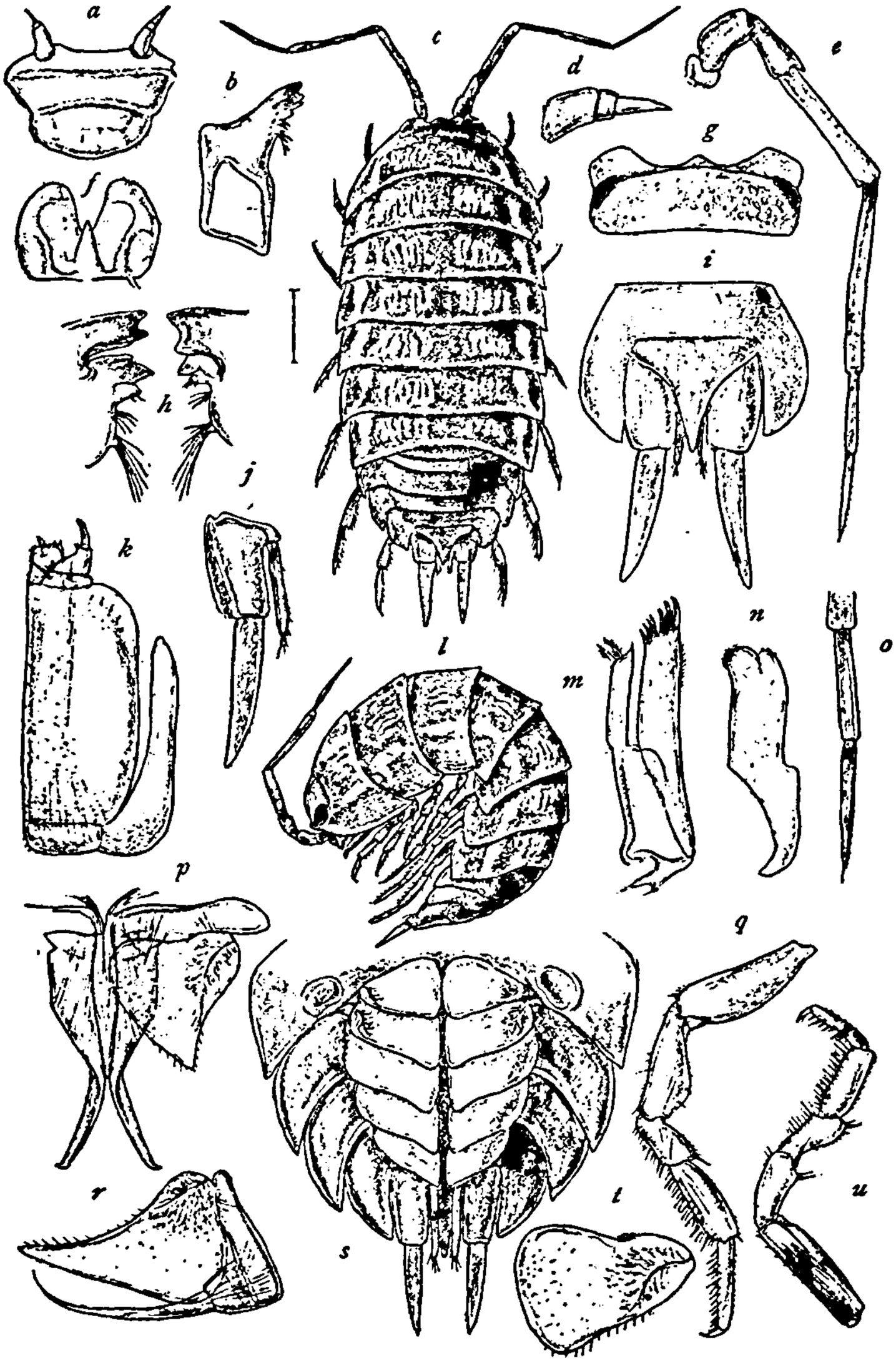

FIG. 665.—CYLISTICUS CONVEXUS (AFTER SARS). *a*, ANTERIOR LIP. *b*, MANDIBLE. *c*, DORSAL VIEW OF MALE. *d*, FIRST ANTENNA. *e*, SECOND ANTENNA. *f*, POSTERIOR LIP. *g*, HEAD (DORSAL VIEW). *h*, MANDIBLES. *i*, LAST TWO SEGMENTS OF ABDOMEN AND UROPODA. *j*, UROPOD. *k*, MAXILLIPEDS. *l*, LATERAL VIEW OF MALE. *m*, FIRST MAXILLA. *n*, SECOND MAXILLA. *o*, FLAGELLUM OF SECOND ANTENNA. *p*, FIRST PLEOPOD OF MALE. *q*, SEVENTH LEG. *r*, SECOND PLEOPOD OF MALE. *s*, ABDOMEN (VENTRAL VIEW). *t*, FIRST PLEOPOD OF FEMALE. *u*, FIRST LEG.

Saginaw, Michigan; also Sweden; Denmark; British Isles; Germany; Bohemia; Holland; Belgium; France; Turkey; and coast of Norway.

Found under bricks and boards; in woods, under logs; along roads, under stones; in wood sheds.

Body oblong-ovate, contractile into a ball, a little more than twice as long as wide, 5½ mm. : 12½ mm.

Head about twice as wide as long, 1½ mm. : 3 mm., with the anterior

margin produced in three lobes, the median lobe being small and triangular with apex acute, the lateral lobes being large and widely rounded. The eyes are small and composite and situated at the base of the antero-lateral lobes. The first pair of antennæ are small and inconspicuous. The second pair have the first article short; the second is twice as long as the first; the third is equal in length to the second; the fourth is twice as long as the third; the fifth is one and a half times longer than the fourth. The flagellum is composed of two subequal articles. The second antennæ extend to the posterior margin of the fourth thoracic segment.

The segments of the thorax are about equal in length. The epimera are not distinct from the segments. The lateral margins are straight. The antero-lateral angles of the first segment are produced forward to surround the head, and they extend to the base of the antero-lateral lobes of the head; the post-lateral angles of the first segment are produced backward in acute processes.

All six segments of the abdomen are distinct. The first two have the lateral parts covered by the seventh thoracic segment. The third, fourth, and fifth segments have the lateral parts produced to continue the oval outline of the body. The sixth or terminal segment is triangular with the apex produced in a long acutely terminating process. This segment is 2 mm. wide at the base and 2 mm. long to the end of the apical process. The basal article or peduncle of the uropoda extends just a little beyond the middle of the apical process of the terminal abdominal segment. The inner branch is 1 mm. long, and extends to the tip of the terminal abdominal segment. The outer branch is 1 mm. in length and extends a little more than half its length beyond the extremity of the abdomen.

All the legs are ambulatory in character.

In color it is a light brown with a longitudinal row of yellow spots on either side at the place of union of the epimera with the segments. Between the median line and the longitudinal rows are markings of yellow wavy lines.

109. Genus PORCELLIO Latreille.[a]

Body oval, more or less depressed, very little contractile. Lateral parts of the thorax expanded.

Head with the antero-lateral lobes well developed; median frontal lobe more or less prominent. Front of head marginate. Eyes generally well developed, dorsally placed. Second pair of antennæ long; flagellum composed of two articles, the first usually longer than the second, often equally long or even a little shorter.

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[a] See Budde-Lund for characters of genus, Crust. Isop. Terrestria, 1885, pp. 82–83, and Sars, Crust. of Norway, II, 1899, p. 176.

Abdomen not abruptly narrower than thorax; lateral parts of third, fourth, and fifth segments well developed; terminal segment conically produced.

Opercular plates of the first two pairs of pleopoda and sometimes of all five pairs furnished with tracheæ. Inner branch of the uropoda inserted far in front of the outer branch near the inner antero-lateral angle of the peduncle.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS PORCELLIO.

a. Surface of body smooth or minutely granular.
  b. Second pair of antennæ long, equal to half the length of the body. Flagellum with the first article not shorter than the second.
    c. Articles of flagellum subequal. Middle frontal lobe of head rounded; lateral lobes roundly truncate. Color, dark grayish red with numerous pale, irregular oblong spots intermixed, arranged in two wide series separated by a small interval ..... *Porcellio formosus* Stuxberg.
    c'. First article of flagellum of second antennæ longer than the second. Middle frontal lobe of head acutely produced; lateral lobes rounded. Color, dark gray, with two longitudinal bands of a lighter color in wavy stripes, one on either side of the median line ..... *Porcellio lævis* Latreille.
  b'. Second pair of antennæ short, equal to one-third the length of the body; flagellum with the first article one-third shorter than the second.
Porcellio parvicornis Richardson.
a'. Surface of body roughly granulate or tuberculate.
  b. Inner face of the mandibles with four to five penicils. Body with spots.
    c. Third joint of peduncle of second pair of antennæ furnished with a small apical tooth. Frontal lateral lobes of moderate size. Color varying from gray to black, with three longitudinal lines of white spots. Flagellum with joints subequal, or first shorter than second..... *Porcellio rathkei* Brandt
    c'. Second joint of peduncle of second pair of antennæ furnished with a large apical tooth. Frontal lateral lobes large. Color, yellow; body spotted with black; spots arranged in longitudinal lines. Flagellum with first joint a little longer than second joint..... *Porcellio spinicornis* Say
  b'. Inner face of right mandible with four to five penicils, of left mandible with seven to eight penicils. Frontal lateral lobes of head large, oblique. Body without spots..... *Porcellio scaber* Latreille

PORCELLIO FORMOSUS Stuxberg.

Porcellio formosus Stuxberg, Øfvers. Vet. Akad. Forh., 1875, No. 2, p. 57.—Budde-Lund, Crust. Isop. Terrestria, 1885, p. 141.—Underwood, Bull. Ill. State Lab. Nat. Hist., II, 1886, p. 362.—Richardson, Proc. U. S. Nat. Mus., XXI, 1899, p. 862; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 329; American Naturalist, XXXIV, 1900, p. 304.

Localities.—San Francisco and San Pedro, California.

Body ovate, almost half as wide as long, convex, smooth, shining.

Second pair of antennæ equal in length to the width of the body; the first article of the peduncle is half as long as the second, the fourth has a longitudinal excavation, deep on the outside, light above, the fifth is the longest, longer than the preceding by a third part, not much longer than the flagellum, straight, the proximal part incon-

spicuously, the distal part lightly channeled; the articles of the flagellum subequal. Eyes oval, prominent, with numerous ocelli.

The median frontal lobe is a little produced, rounded, the lateral lobes drawn out, equal in length to the width of the face or to the eyes, anteriorly roundly truncate, provided behind with a deep semilunar excavation.

The first three segments of the thorax with the posterior margin straight, the posterior angles of the epimera straight, the fourth segment with the posterior angles of the epimera straight, those of the fifth, sixth, and seventh segments more and more bent backward, but not very acuminate.

The abdomen is semicircular, about a fifth part wider than long, the epimera of the third, fourth and fifth segments moderately large, bent backward, curved on the inner margin, twice as long as wide and a little acuminate. The last segment is triangular, almost as wide as long, deeply sinuated on the posterior margins, the apex wide, roundly acuminate, with a deep and wide longitudinal excavation above. The basal article of the uropoda seen from below is as wide as long, convex above; the outer branch is subdepressed, lanceolate, with the inner margin straight, the outer margin curved, its greatest width equal to a fourth part of the length; the inner branch is slender and a third part shorter than the outer branch. The color of the dorsal surface is a dark grayish red with numerous pale, irregular, oblong spots intermixed arranged in two wide series separated by a small interval. The abdomen is generally of one color, with the last segment bi- or tri-punctate at the base.

It varies in having a longitudinal band of grayish white and a lateral series of large spots of the same color.

Length 13 mm., width 6 mm.; length of the second antennæ 6 mm.[a]

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[a] The above description is adapted from the following one of Stuxberg's:

Porcellio ovalis, latitudine dimidiam longitudinem prope assequente (latitud. ad longitud. =45 : 100), convexus, sublævis, subnitidus.

Antennæ exteriores latitudinem corporis longitudine æquantes; pedunculi articulus primus secundo duplo brevior, quartus extra profundius, supra levius longitudinaliter sulcatus, quintus longissimus, præcedente tertia parte, flagello haud multo longior, rectus, parte proximali inconspicue, distali levius canaliculata; flagelli articuli inter se eadem longitudine. Oculi, ocellis congregatis prominentes, ovales.

Lobus frontalis medius paullum productus, rotundatus, laterales evoluti, longitudine altitudine faciei vel oculis æquales, antice truncato-rotundati, pone excavatione semilunari profundiore præditi.

Trunci segmenta tria priora margine postico recto, epimerorum angulis posticis rectis, quartum subrectis, quintum, sextum, septimum magis magisque retroflexis, sed non multum acuminatis.

Cauda subcircularis, latitudine quinta circiter parte majore quam longitudine, epimeris segmentorum tertii, quarti, quinti mediocribus, retroversis, margine interiore curvatis, duplo longioribus quam latioribus, paullum acuminatis. Segmentum ultimum trigonum, prope æque longum ac latum, marginibus posticis profunde sinuatum, apice lato, rotundate acuminato, supra late et profunde longitudinaliter exca-

PORCELLIO LÆVIS Latreille.

Porcellio lævis LATREILLE, Hist. Nat. des Crust. et Insectes, VII, 1804, p. 46; Genera Crustaceorum et Insectorum, I, 1806, p. 71.—LEACH, Edinb. Encycl., VII, 1813–14, p. 406; Trans. Linn. Soc. London, XI, 1815, p. 375.
Oniscus lævis LAMARCK, Hist. Nat. des animaux sans Vertèbres, V, 1818, p. 154.
Porcellio degeerii AUDOUIN and SAVIGNY, Descript. de l'Egypte, 1826, p. 289, pl. XIII, fig. 5.
Porcellio eucercus BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 177.—MILNE EDWARDS, Hist. Nat. des Crust., III, 1840, p. 168.
Porcellio syriacus BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.—MILNE EDWARDS, Hist. Nat. des Crust., III, 1840, p. 170.
Porcellio cinerascens BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.
Porcellio dubius BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.—MILNE EDWARDS, Hist. Nat. des Crust., III, 1840, p. 170.
Porcellio poeyi GUÉRIN, Comptes Rendus, 1837, p. 132.
Porcellio lævis MILNE EDWARDS, Hist. Nat. des Crust., III, 1840, p. 169.
Porcellio urbicus KOCH, Deutsch. Crust., 1835–1844, p. 36.
Porcellio ovatus ZADDACH, Synops. Crust Pruss. prodromus, 1844, p. 13.
Porcellio degeerii LUCAS, Expl. d'Alg., I, 1849, pp. 69, 139.
Porcellio lævis LEREBOULLET, Mém. de la Soc. de Strasbourg, IV, 1853, p. 45, pl. I, fig. 7; pl. III, figs. 55–60.
Porcellio cubensis SAUSSURE, Mém. Soc. phys. Genève, XIV, 1858, p. 477, pl. v, fig. 35.
Porcellio sumichrasti SAUSSURE, Mém. Soc. phys. Genève, XIV, 1858, p. 478, pl. v, fig. 36.
Porcellio cotillæ SAUSSURE, Mém. Soc. phys. Genève, XIV, 1858, p. 478, pl. v, fig. 37.
Porcellio mexicanus SAUSSURE, Mém. Soc. phys. Genève, XIV, 1858, p. 479, pl. v, figs. 39, 40.
Porcellio aztecus SAUSSURE, Mém. Soc. phys. Genève, XIV, 1858, p. 479, pl. v, fig. 38.
Porcellio lævis BUDDE-LUND, Nat. Tidsskrift., 3d ser., VII, 1870, p. 236.
Porcellio aztecus MIERS, Proc. Zool. Soc. Lond., 1877, p. 669.
Porcellio lævis BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 138–141 (see Budde-Lund for further synonymy); Entom. Meddelel., IV, 1893-94, p. 118.—SARS, Crust. of Norway, II, 1899, pp. 181–182, pl. LXXIX, fig. 2.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, pp. 862–863; Amer. Nat., XXXIV, 1900, p. 304; Proc. U. S. Nat. Mus., XXI, 1901, pp. 566–569.

Localities.—Oakland, California; Cincinnati, Ohio; Raymond, California; San Francisco Bay, California; San Antonio, Texas; St. Marys, Georgia; New Providence, Bahamas; Washington, District of Columbia; Hamilton, Bermudas; Colfax, California; Las Cruces, New Mexico; Unalaska; Key West, Florida; Monterey Bay, California;

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vato. Pedum ultimi paris articulus basalis infra visus eadem latitudine ac longitudine, supra convexus; appendix exterior subdepressa, lanceolata, margine interiore subrecto, exteriore curvato, latitudine maxima quartam longitudinis partem æquante; appendix interior teres, exteriore tertia parte brevior.

Color dorsi ex rufo fusco-griseus, immixtis maculis pallidioribus oblongis irregularibus numerosis, in duas series latas parvo intervallo distantes digestis. Cauda plerumque unicolor segmento ultimo ad basin bi- (vel tri-) punctato.

Variat vitta longitudinali albo-grisea serieque macularum majorum ejusdem coloris laterali.

Longitudo 13 mm., latitudo 6 mm.; longitudo antennarum exteriorum 6 mm.—STUXBERG, Øfvers. Vet. Akad. Forh., 1875, No. 2, p. 57.

Esenada, Lower California; Mesilla Park, New Mexico; Phoenix, Arizona; Las Vegas, New Mexico; Cabãnas, Cuba; warm spring, a few miles west of Socorro, New Mexico; Azores; Galapagos Islands; Alabaster Cave, Eldorado County, California; Alvarez, Mexico, at an altitude of 8,000 feet; Oahu, Hawaiian Islands; Honolulu, Hawaiian Islands; Carácas, Venezuela; world-wide in distribution.

This species is said to be injurious to various plants in Fort Worth, Texas; found at roots of sugar beets; under stones; in cellars. It has also been found dead near poisoned cotton, showing that it feeds on the growing cotton plants.

Body oblong-ovate, almost twice as long as wide, 8 mm. : 15 mm.

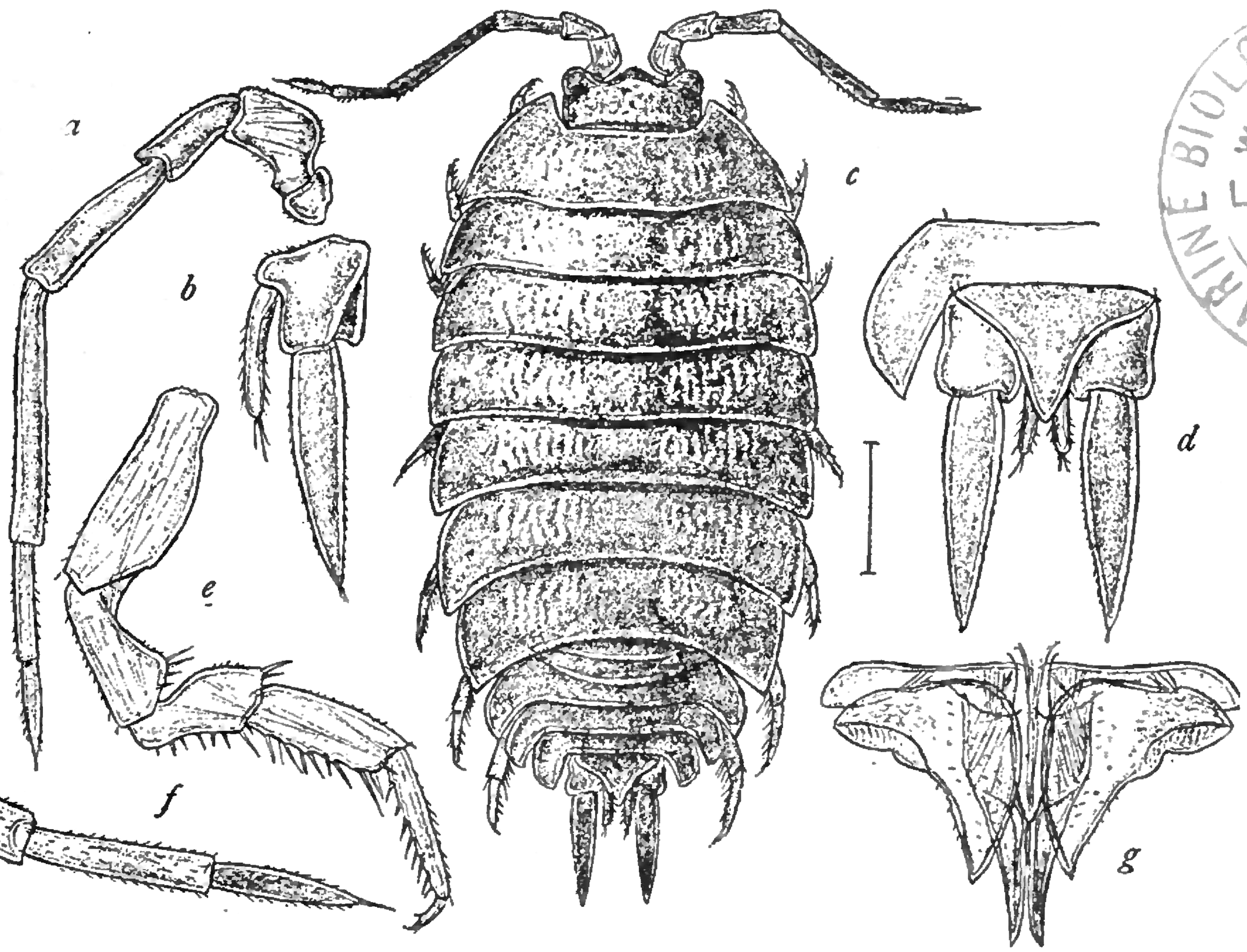

FIG. 666.—PORCELLIO LÆVIS (AFTER SARS). *a*, SECOND ANTENNA. *b*, UROPOD. *c*, ADULT MALE. *d*, LAST TWO SEGMENTS OF ABDOMEN AMD UROPODS. *e*, SEVENTH LEG. *f*, FLAGELLUM. *g*, FIRST PLEOPODS OF MALE.

Head wider than long, 2 mm. : 3½ mm., with the anterior margin produced in three lobes, the median lobe being triangulate, the lateral lobes rounded and larger than the median lobe. The eyes are small, composite, and situated at the base of the antero-lateral lobes. The first pair of antennæ are small and inconspicuous, and are composed of two articles. The second pair of antennæ have the first article short; the second article is one and a half times longer than the first; the third is as long as the second; the fourth is nearly twice as long as the third; the fifth is one and a half times as long as the fourth. The flagellum is composed of two articles, the first of which is a little longer

than the second. The second pair of antennæ extend to the middle of the third thoracic segment.

The segments of the thorax are subequal, the first one having the antero-lateral angles produced so as to surround the head and extending as far as the base of the antero-lateral lobes. The epimera are perfectly united with the segments.

All six segments of the abdomen are distinct, the first two having the lateral parts concealed by the seventh thoracic segment. The lateral parts of the third, fourth, and fifth segments are produced to continue the oval outline of the body. The sixth, or terminal, segment is 2½ mm. wide at the base, is triangulate, with apex produced in a long, narrow process. The sixth segment is 2 mm. long from the base to the extremity. There is a shallow groove extending the length of the produced apex of the terminal segment. The basal article or peduncle of the uropoda extends to the tip of the posterior angles of the lateral parts of the fifth abdominal segment. The inner branch is 1½ mm. long, and is partly concealed dorsally by the apical process of the terminal abdominal segment, but extends half its length beyond this process. The outer branch is 2½ mm. long, and extends almost its entire length beyond the extremity of the terminal abdominal segment.

The legs are all ambulatory in character and spinulose.

In color it is a dark gray, with two longitudinal bands of a lighter color in wavy stripes, one on either side of the median line.

PORCELLIO PARVICORNIS Richardson.

Porcellio parvicornis RICHARDSON, Trans. Conn. Acad. Sciences, XI, 1902, p. 302, pl. XL, fig. 57.

Locality.—Bermudas.

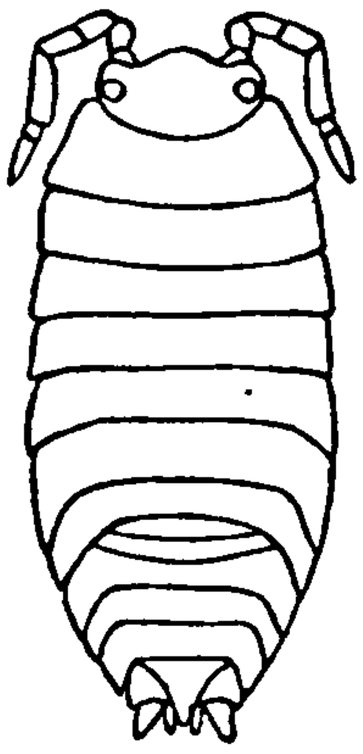

FIG. 667.—PORCELLIO PARVICORNIS.

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 the lateral lobes of the 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 outline 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 the inner branch.

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

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

PORCELLIO RATHKEI Brandt.

Porcellio rathkei Brandt, Bull. de la soc. Imp. d. Naturalistes de Moscou, VI, 1833, p. 15.—Milne Edwards, Hist. Nat. des Crust., III, 1840, p. 170.

Porcellio ferrugineus Brandt, Bull. de la soc. Imp. d. Naturalistes de Moscou, VI, 1833, p. 16.—Milne Edwards, Hist. Nat. des Crust., III, 1840, p. 170.

Porcellio trilineatus Koch, Deutschl. Crust., 1835–1844, p. 34.

Porcellio trivittatus Lereboullet, Mém. de la Soc. de muséum nat. de Strasbourg, IV, 1853, p. 54, pl. I, figs. 13, 14; pl. III, figs. 66–70.

Porcellio tetramoerus Schnitzler, De Oniscineis agri. Bonnensis, 1853, p. 24.

Porcellio striatus Schnitzler, De Oniscineis agri. Bonnensis, 1853, p. 24.

Porcellio trilineatus Sill, Verhandl. u. Mittheilungen des Siebenbürgischen Vereins für Naturwissenschaften zu Hermannstadt, XIII, 1862, p. 26.

Porcellio trivittatus Johnson, Academisk Afhandling, Upsala, 1858, p. 25.

Porcellio trilineatus Budde-Lund, Nat. Tidsskr. (3), VII, 1870, p. 239.—Stuxberg, Öfvers. af Kgl. Vetenskaps Akad. Forh., 1875, p. 59.

Porcellio rathkei Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 85–87. (See Budde-Lund for synonymy).—Sars, Crust. of Norway, II, 1899, pp. 180–181, pl. LXXIX, fig. 1.—Richardson, Amer. Nat., XXXIV, 1900, p. 304; Proc. U. S. Nat. Mus., XXIII, 1900, p. 567.—Paulmier, Bull. New York State Museum, 1905, pp. 182–183.

Localities.—Springfield, Ohio; Lockland, Ohio; Columbus, Ohio; Clifton, Cincinnati, Ohio; Chaumont, New York; Syracuse, New York; St. Marys, Georgia; Salem and Beverly, Massachusetts; Lake Champlain; New York City; Lawrence, Massachusetts; Washington, District of Columbia; Saginaw, Michigan; Freeport, Maine; Victoria, Texas; Providence, Rhode Island; also Europe.

Found in woodsheds, greenhouses, on rotten logs, under brick and boards, under logs, at river bottom.

Body oblong-ovate, a little more than twice as long as wide, 5 mm.: 10½ mm.

Head about twice as wide as long, 1 mm.: 2 mm., with the anterior margin produced in three lobes, the median one being less produced than the lateral lobes and all having rounded extremities. The eyes are small, composite, and situated at the base of the antero-lateral lobes. The first pair of antennæ are small and inconspicuous and are composed of only two articles. The second pair of antennæ have the first article short; the second about one and a half times as long as the first; the third equal in length to the second; the fourth twice as long as the third; the fifth one and a half times as long as the fourth. The flagellum is composed of two subequal articles. The second antennæ extend to the posterior margin of the third thoracic segment.