

of the terminal segment; it is truncate at the extremity. The movable outer branch is as wide and as long as the inner branch, and has the outer posterior angle slightly produced and acute, the inner angle being rounded.

The legs are all ambulatory.

CILICÆA SCULPTA (Holmes).

*Dynamene sculpta* HOLMES, Proc. Cal. Acad. Sciences (3), III, No. 11, 1904, pp. 300-302, pl. xxxiv, figs. 1-7.

*Localities*.—San Clemente Island; San Diego, California.

Found in pieces of sponge dredged in shallow water.

“Body increasing slightly in width posteriorly. Head narrowed and scarcely longer than the first segment of the thorax. Eyes oblong,

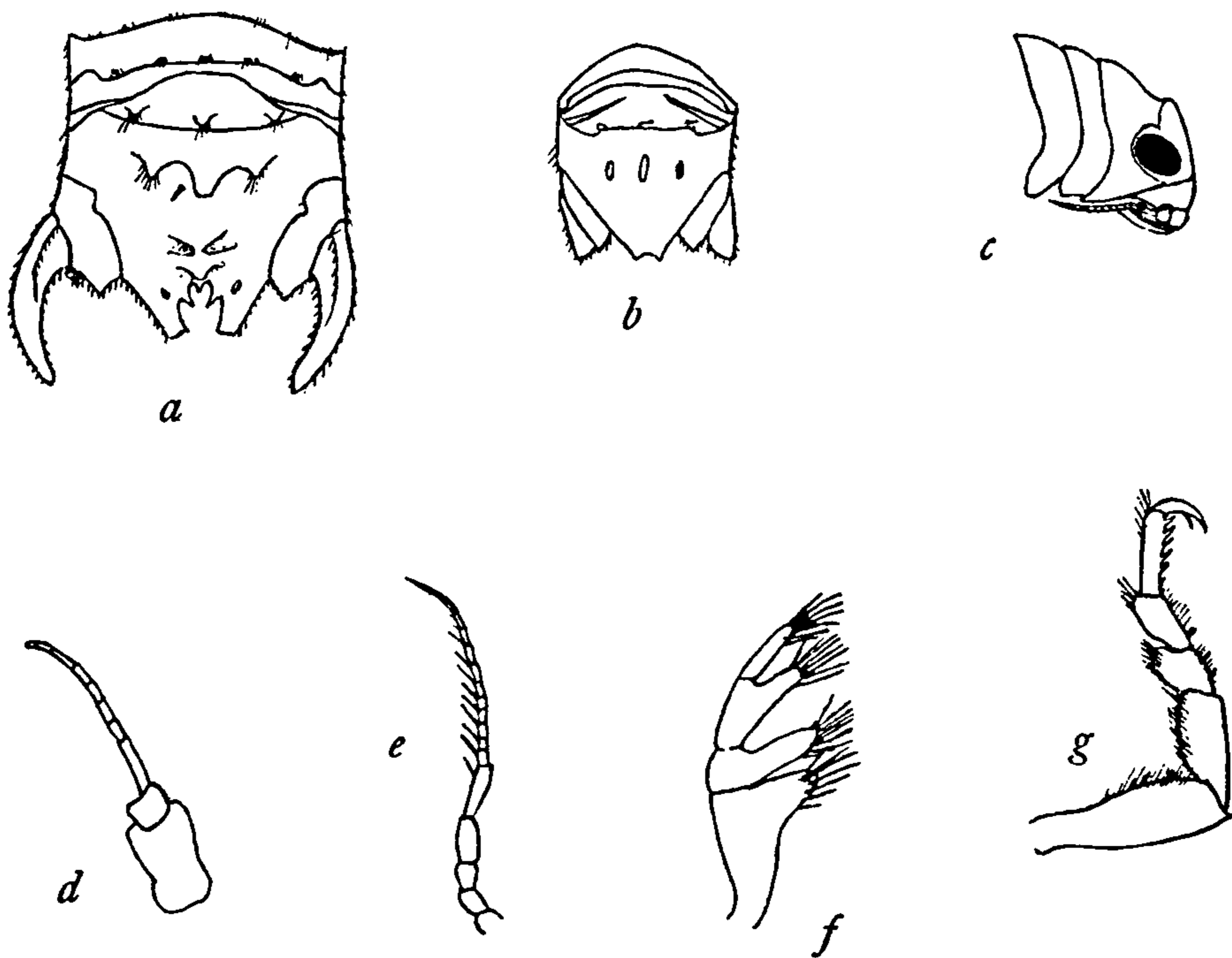


FIG. 349.—CILICÆA SCULPTA (AFTER HOLMES). *a*, ABDOMEN OF MALE. *b*, ABDOMEN OF FEMALE. *c*, HEAD OF MALE (LATERAL VIEW). *d*, FIRST ANTENNA OF MALE. *e*, SECOND ANTENNA OF MALE. *f*, MAXILLIPED OF MALE. *g*, LAST THORACIC LEG OF MALE.

situated on prominent, rounded, lateral lobes. Thoracic segments minutely roughened behind, the lateral angles produced backward into subacute, triangular processes; first segment longer than the succeeding ones, the lower side produced forward into a triangular process extending a little in advance of the eye and backward into a triangular, acute lobe at the postero-inferior angle; last three segments with several small setose prominences on the posterior margin. Abdomen large, with five segments indicated, the anterior segment marked off by a line extending entirely across the upper surface; the three following segments are indicated by two pairs of lines which are visible only at the sides; second segment furnished with three setose tubercles in a transverse row. Caudal shield large and sculptured,

the anterior portion with three tubercles, the middle one rather blunt and a little in advance of the others; a pointed tubercle with two lateral ridges in front of the posterior notch; notch deep, with a small spine at the end, behind which is a pair of larger spines. Inner branch of the uropods flattened and not nearly reaching the tip of the caudal shield, the tip subacute; outer branch very long, narrow, and incurved, extending considerably behind the tip of the caudal shield and directed obliquely upward. First antennæ a little shorter than the second, the first basal joint enlarged, oblong, and emarginate at the distal end at the insertion of the small, subquadrate second joint; flagellum longer than the peduncle and composed of nine to eleven joints. Second antennæ scarcely reaching the middle of the thorax, the peduncle slender, the last two joints much longer than the preceding ones; flagellum a little longer than the peduncle, the joints furnished with short setæ. Thoracic legs increasing slightly in length posteriorly and furnished with short hairs; propodi armed below with spines; dactyls curved and ending in a spine with a strong spine behind the tip.

“The females are smaller than the males; the head, antennæ, mouth parts, thoracic legs, and anterior segments are not distinguishable from those of the male, but the abdomen is markedly different. The caudal shield is relatively smaller and less sculptured; the notch at the extremity is simple and shallow; there are three oblong tubercles on the anterior portion; the three tubercles on the next segment in front are smaller than in the male. The branches of the uropods are flattened and of subequal size; neither extends beyond the tip of the caudal shield.”—HOLMES.<sup>a</sup>

*CILICÆA CARINATA* Richardson.

*Cilicæa carinata* RICHARDSON, American Naturalist, XXXIV, 1900, p. 224; Proc. U. S. Nat. Mus., XXIII, 1901, pp. 535-536.

*Locality*.—Coast of Georgia.

*Depth*.—440 fathoms.

Head with a median projection on the anterior margin, produced forward in the form of a large tubercle. Eyes colorless. First pair of antennæ reach the posterior margin of the head; flagellum eight-jointed. Second pair of antennæ reach the posterior margin of the first thoracic segment.

The segments of the thorax are roughly granulated. A transverse median ridge or elevation appears on each of the segments, giving the dorsum, from a lateral view, a very rugged appearance. The epimera are rough and are drawn out laterally in very acute angles.

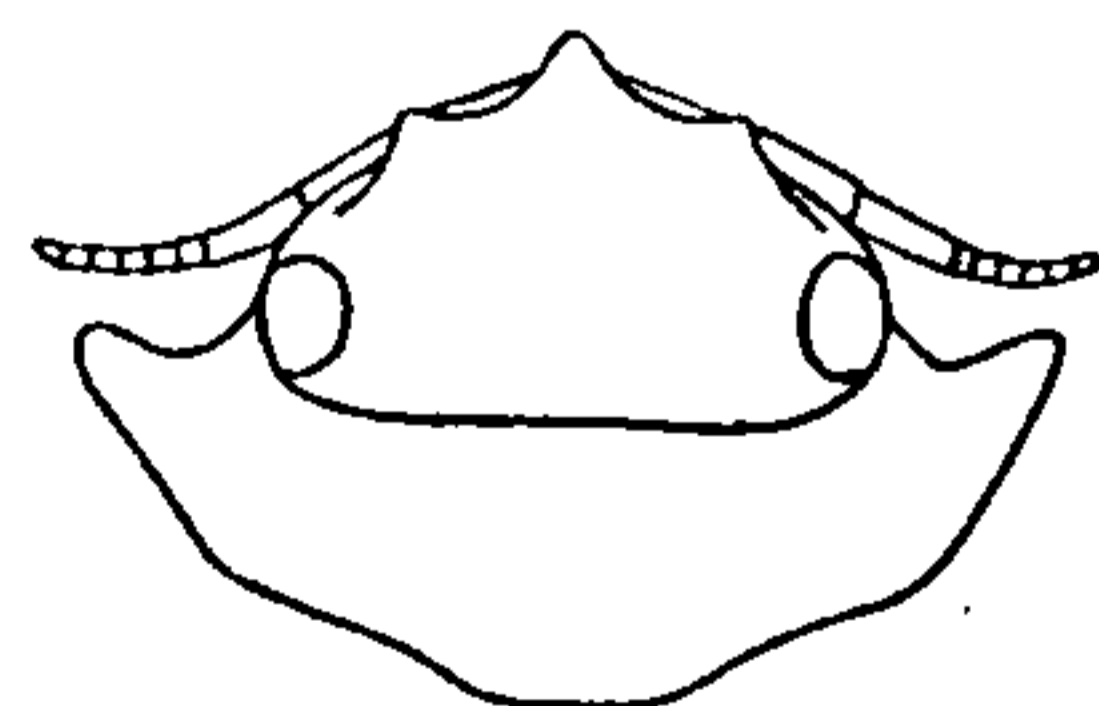


FIG. 350.—*CILICÆA CARINATA*. HEAD.

<sup>a</sup> Proc. Cal. Acad. Sciences (3), III, 1904, pp. 300-301.

The abdomen is composed of two segments, the first segment being formed of several coalesced segments, as indicated by two suture lines. In the center of this segment are two longitudinal ridges, placed obliquely, so as almost to meet anteriorly and to spread apart at the

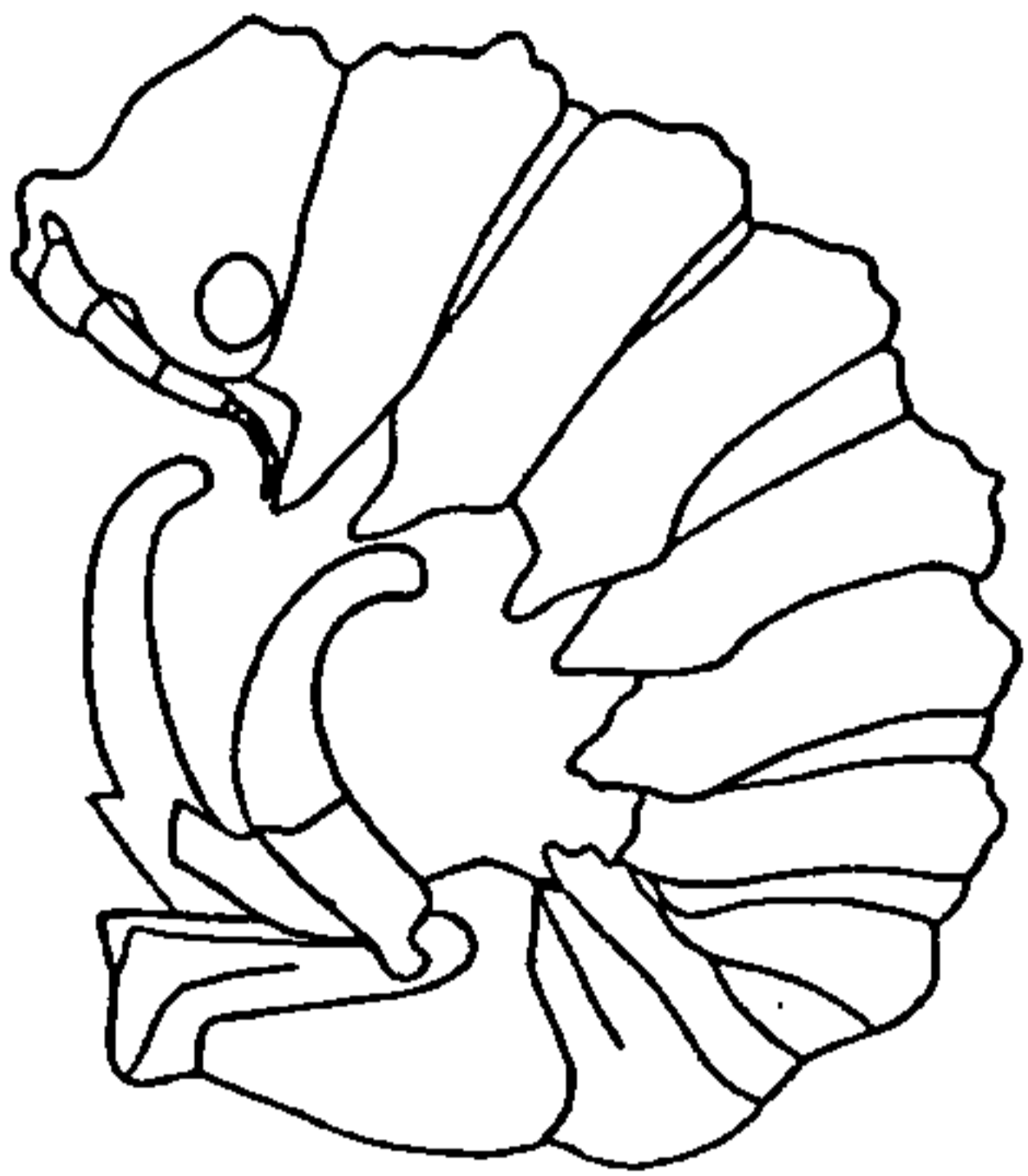


FIG. 351.—*CILICEA CARINATA*.  
LATERAL VIEW.

other extremity. This segment projects down over the last segment at either side. The last segment has a deep excavation at its posterior extremity, around and above which is a carinated ridge extending entirely around the whole of the posterior half of the segment. Two small longitudinal ridges are in the center

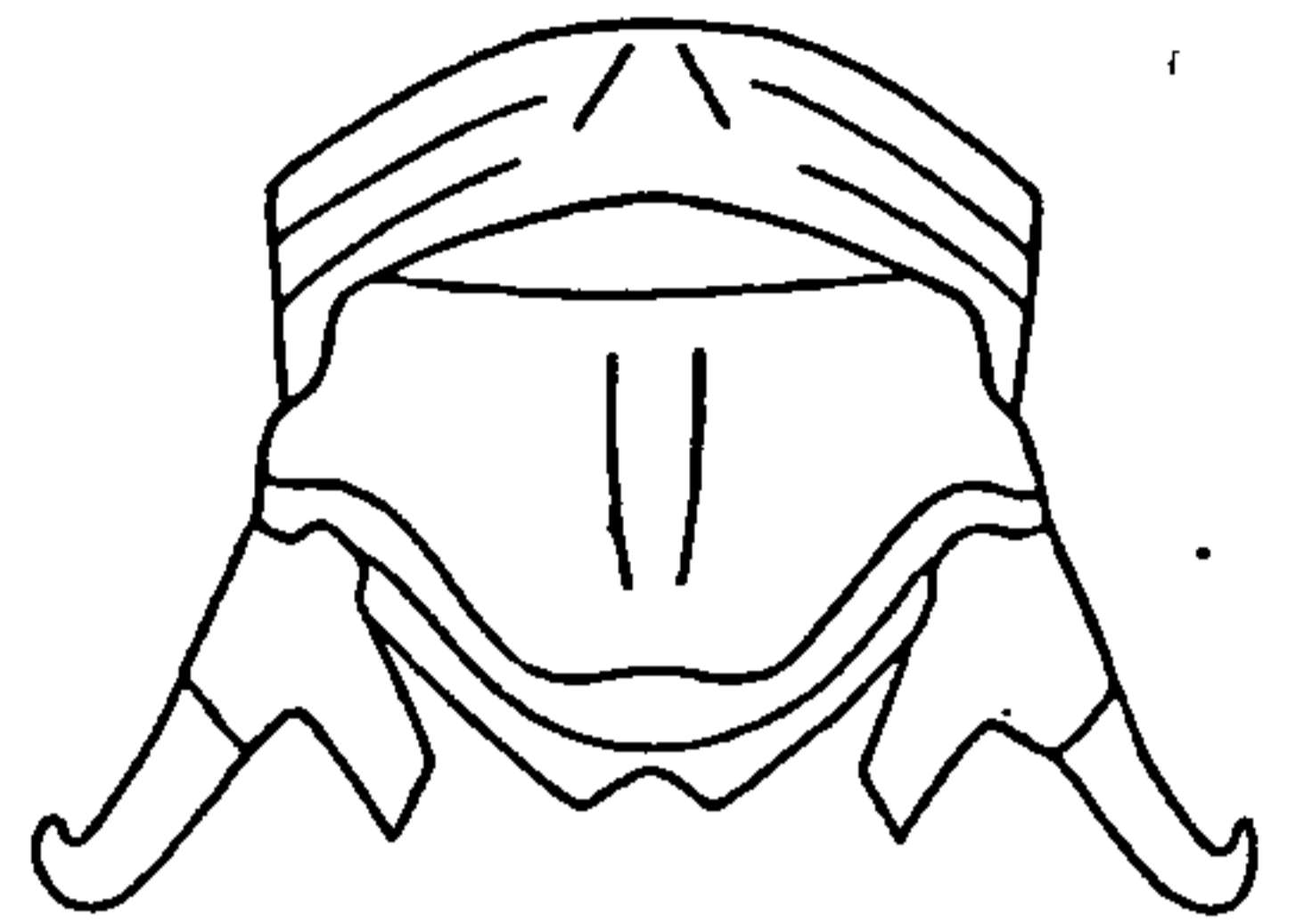


FIG. 352.—*CILICEA CARINATA*.  
ABDOMEN.

of the segment. The inner branch of the uropoda is very short, not reaching the extremity of the abdomen by some distance; it is quadrangular in shape, with sides nearly parallel, and obliquely truncated at the end. The outer branch of the uropoda is long, curved, and pointed at the end, resembling a hook somewhat.

The color is a light yellow. In appearance the little isopod is very rough and rugged looking.

There is but one specimen, which was found off the coast of Georgia.

*Depth.*—440 fathoms.

*Type.*—Cat. No. 23907, U.S.N.M.

## Family XII. SEROLIDÆ.

Body strongly depressed.

Both pairs of antennæ multiarticulate with well-defined peduncle and flagellum. Mandible with palp. Maxillipeds with a triarticulate palp. Head posteriorly fused with first thoracic segment.

Seventh thoracic segment entirely wanting on dorsal side.

Abdomen composed of four segments, three anterior to the large terminal segment.

Uropoda lateral, with both branches free and subequal. First two pairs of legs subchelate in male, second pair smaller than first; only first pair subchelate in female; last pair of legs smaller than any of the preceding pairs.

First three pairs of pleopods natatory; fourth and fifth pairs branchial; outer branch of fourth pair forming an operculum.

Marsupium consists of four pairs of plates.

### 53. Genus *SEROLIS* Leach.

With characters of family.

Only genus known.

## SEROLIS CARINATA Lockington.

*Serolis carinata* LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 36.—  
 RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 842; Ann. Mag. Nat.  
 Hist. (7), IV, 1899, p. 187; American Naturalist, XXXIV, 1900, p. 224.

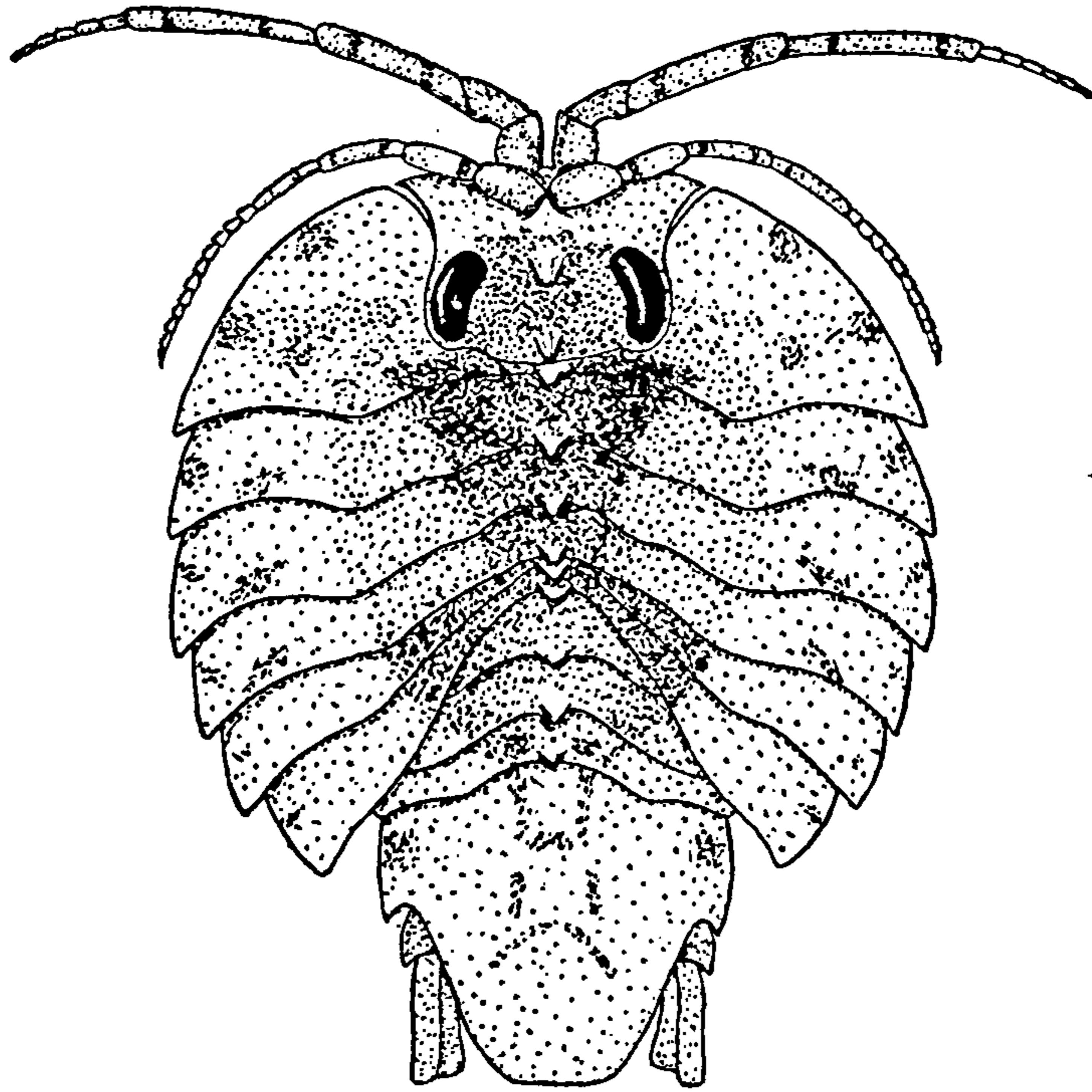


FIG. 353.—SEROLIS CARINATA.  $\times 8\frac{2}{3}$ .

*Locality.*—San Diego, California.

Body almost round, very much flattened, and nearly as broad as long, 5 mm : 6 mm.

Head about as wide as long and deeply set in the first thoracic segment, with which it is fused posteriorly. The eyes are large, oval,

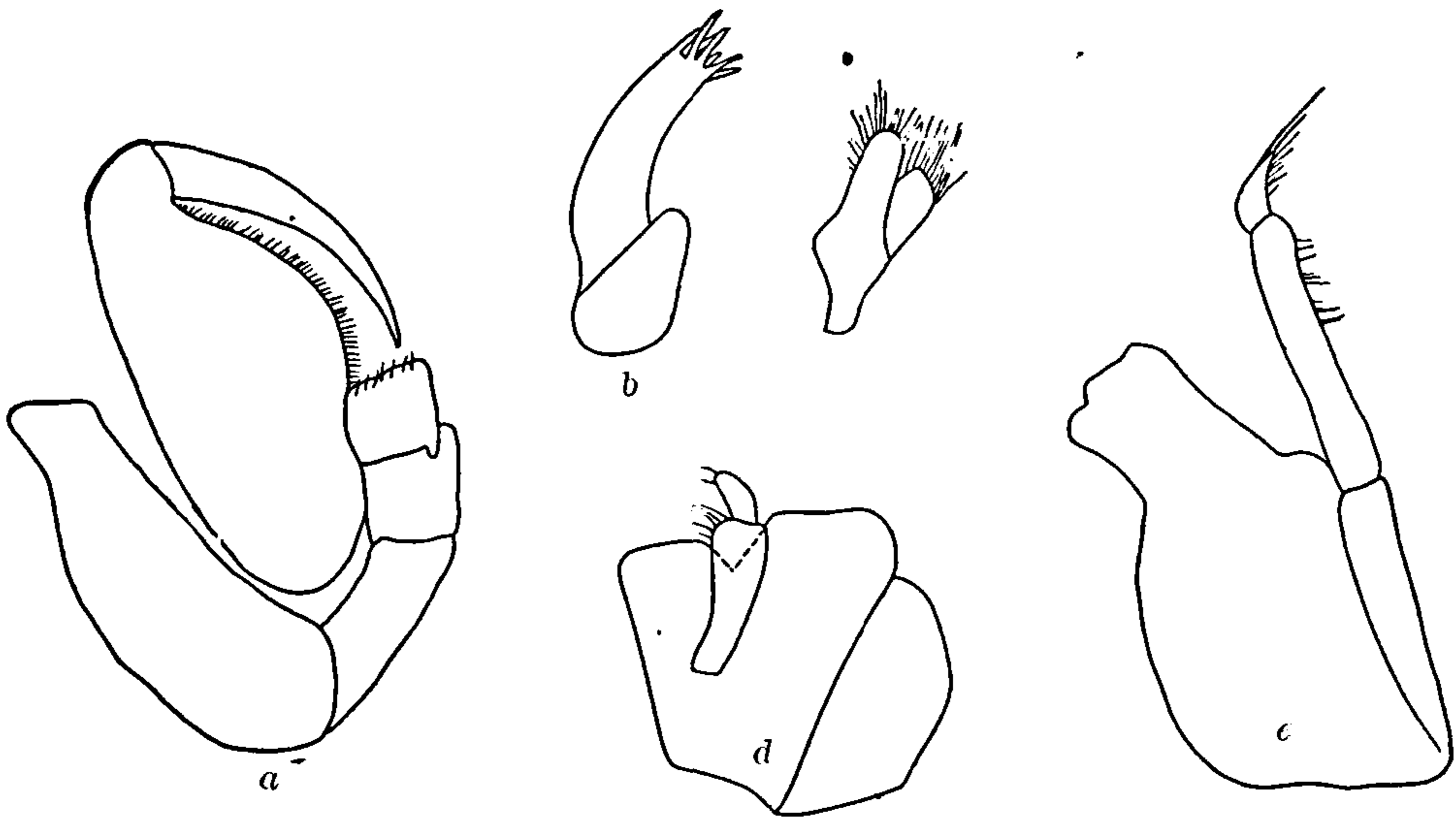


FIG. 354.—SEROLIS CARINATA. *a*, FIRST LEG.  $\times 27$ . *b*, FIRST MAXILLA.  $\times 51\frac{2}{3}$ . *c*, SECOND MAXILLA.  $\times 51\frac{2}{3}$ . *d*, MAXILLIPED.  $\times 51\frac{2}{3}$ . *e*, MANDIBLE.  $\times 51\frac{2}{3}$ .

and composite, and situated in the post-lateral angles of the head. The anterior margin of the head is bisinuate on either side of a small median point. The basal article of the first pair of antennæ is large

and somewhat dilated; the second article is nearly twice as long as the first, and is also somewhat dilated; the third article is as long as the second, but more slender; the fourth article is almost as long as the third. The flagellum is composed of five articles. The first antennæ extend to the posterior margin of the first thoracic segment or to the end of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short and is not visible from a dorsal view; the second article is about twice as long as the first; the antennæ are geniculate between the second and third articles; the third article is about as long as 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 seven articles. The second antennæ extend to the posterior margin of the second thoracic segment. The maxilliped has a palp of three articles. The palp of the mandibles is composed of three articles.

The first segment of the thorax is fused with the posterior portion of the head along the posterior margin. The lateral portions of the segment are widely expanded and surround the head, the antero-lateral angles extending to the anterior margin of the head. The five following segments are free, with the lateral parts widely expanded and subequal. The first segment and the last two (the fifth and sixth) are very much shorter in the median longitudinal line than the intermediate ones. The seventh segment is entirely wanting on the dorsal side. The epimera are not distinct from the segments, but are perfectly coalesced, with no indication of the place of fusion.

The abdomen is composed of four segments, the first three of which are short and subequal in length. The lateral parts of the first two are covered by the widely produced lateral parts of the last thoracic segment. The fourth or terminal segment of the abdomen is large, somewhat triangular in shape, with apex obtusely rounded. A little more than one-third the distance from the base to the apex is a sharp tooth on either side, below which the abdomen becomes more attenuated. The peduncle of the uropoda arises at this point on the ventral side. The peduncle of the uropoda extends to about the middle of the lateral margin of the terminal abdominal segment. The branches are subequal in length and of equal width. They are rounded posteriorly, somewhat crenulate on the lateral margins, and extend a short distance beyond the tip of the terminal segment.

The first pair of legs are subchelate, with propodus greatly dilated. All the other six pairs of legs are ambulatory. In the male the first two pairs of legs are subchelate, the second pair being smaller than the first. There are five pairs of pleopoda, one pair for each of the first three segments; the fourth pair have the outer branch forming an operculum folding over the entire ventral side of the last segment and attached at the anterior end, being free elsewhere; the fifth pair are concealed under the operculum.

## III. IDOTHEOIDEA or VALVIFERA.

Uropoda lateral, valve-like, ventrally placed, closing over the five pairs of branchial pleopoda being attached on the outer margins to the sides of the terminal segment and opening and closing like folding doors. Legs of the first pair not cheliform.

## ANALYTICAL KEY TO THE FAMILIES OF IDOTHEOIDEA.

- a.* Body narrow, elongate, somewhat cylindrical, scarcely depressed. Four anterior pairs of legs unlike the three posterior ones, not ambulatory, nor strictly prehensile, directed forward, slender, ciliated, the first pair very small and closely applied to the mouth parts; last three pairs stouter and ambulatory with terminal joint bifid ..... Family XIII. ARCTURIDÆ
- a'.* Body more or less broad, depressed. Legs usually nearly alike and ambulatory, but first three pairs sometimes pronouncedly subcheliform in structure ..... Family XIV. IDOTHEIDÆ

## Family XIII. ARCTURIDÆ.

Body narrow, elongate, somewhat cylindrical, scarcely depressed. First antennæ with the flagellum uniarticulate. Second antennæ strongly developed, the peduncle having the last two articles very much elongated and geniculate at the articulation of the joints; the flagellum is short. Segments of the abdomen more or less consolidated, the last one being rather large. The four anterior pairs of legs are unlike the three posterior pairs, are neither ambulatory nor strictly prehensile, are directed forward, slender, feeble in structure, ciliated with long delicate hairs, the first pair being very small and applied to the mouth parts. Last three pairs of legs stouter and ambulatory with terminal joint bifid.

Mandibles always without palps.<sup>a</sup>

## ANALYTICAL KEY TO THE GENERA OF THE FAMILY ARCTURIDÆ.

- a.* Fourth segment of thorax greatly longer than any of the others. Marsupium of female consists of two plates affixed to this segment. Genus *Astacilla* Cordiner
- a'.* Fourth segment of thorax not greatly longer than any of the others. Marsupium of female composed of three pairs of plates.
- b.* Abdomen composed of three distinct segments, two short ones anterior to the terminal segment. .... Genus *Arcturus* Latreille
- b'.* Abdomen composed of two distinct segments, one anterior to the terminal segment. .... Genus *Pleuoprion* zur Strassen

## 34. Genus ASTACILLA Cordiner.

Body slender, cylindrical in form, with the fourth segment of the thorax very much elongated. Epimera small but distinct on all the thoracic segments with the exception of the first. Marsupium of female consists of two plates affixed to this segment. Abdomen composed of only two segments, a single short segment anterior to the terminal one, which is conically produced.

<sup>a</sup>See Sars for characters of family, Crust. of Norway, II, 1899, p. 86.

## ANALYTICAL KEY TO THE SPECIES OF THE GENUS ASTACILLA.

- a.* With eyes. Head excavate in front, without rostriform point. Fourth thoracic segment subcylindrical. Terminal abdominal segment with a prominent, subacute tooth on each side above the middle, directed outward and backward; extremity obtuse.....*Astacilla granulata* (G. O. Sars)
- a'.* Without eyes. Head with a rostriform point in front, between the antennulæ. Fourth thoracic segment wider at the anterior end, and tapering to the posterior end. Terminal abdominal segment with a pair of teeth on each side; extremity acute.....*Astacilla cæca* Benedict

## ASTACILLA GRANULATA (G. O. Sars).

*Leachia granulata* G. O. Sars, Arch. Math. Nat., II, 1877, p. 351 (251).

*Astacilla americana* HARGER, Am. Jour. Sci. (3), XV, 1878, p. 374.

*Astacilla granulata* HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 161.—SARS, Norw. North Atlantic Exp., Crust., 1885, p. 107, pl. IX, figs. 27–35.—HARGER, Report U. S. Commissioner of Fish and Fisheries, Pt. 6, 1880, pp. 364–367, pls. VIII–IX, figs. 48–52.—HANSEN, Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1887–88, pp. 189–190.—BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, p. 50.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 230; Proc. U. S. Nat. Mus., XXIII, 1901, p. 550.—NORMAN, Ann. Mag. Nat. Hist. (7), XIV, 1904, p. 448.

*Localities.*—Georges Banks; Banquereau; Miquelon Island, south of Newfoundland; latitude  $69^{\circ} 16'$  north, longitude  $58^{\circ} 8'$  west; latitude  $70^{\circ}$  north, longitude  $58^{\circ} 38'$  west; latitude  $71^{\circ} 10'$  north, longitude  $58^{\circ} 56'$  west; latitude  $72^{\circ} 41'$  north, longitude  $59^{\circ} 50'$  west; also between Norway and Iceland; Grand Banks; latitude  $60^{\circ} 31'$  north, longitude  $9^{\circ} 18'$  west; latitude  $60^{\circ} 21'$  north, longitude  $5^{\circ} 41'$  west.

*Depth.*—7–640 fathoms.

Body narrow, elongate, about six and a half times longer than wide,  $2\frac{1}{2}$  mm. : 16 mm., not including the antennæ.

The head is as wide as long, 2 mm. : 2 mm., with the anterior margin deeply excavate. The eyes are small, round, composite, and situated at the sides of the head, halfway between the anterior and the posterior margins.

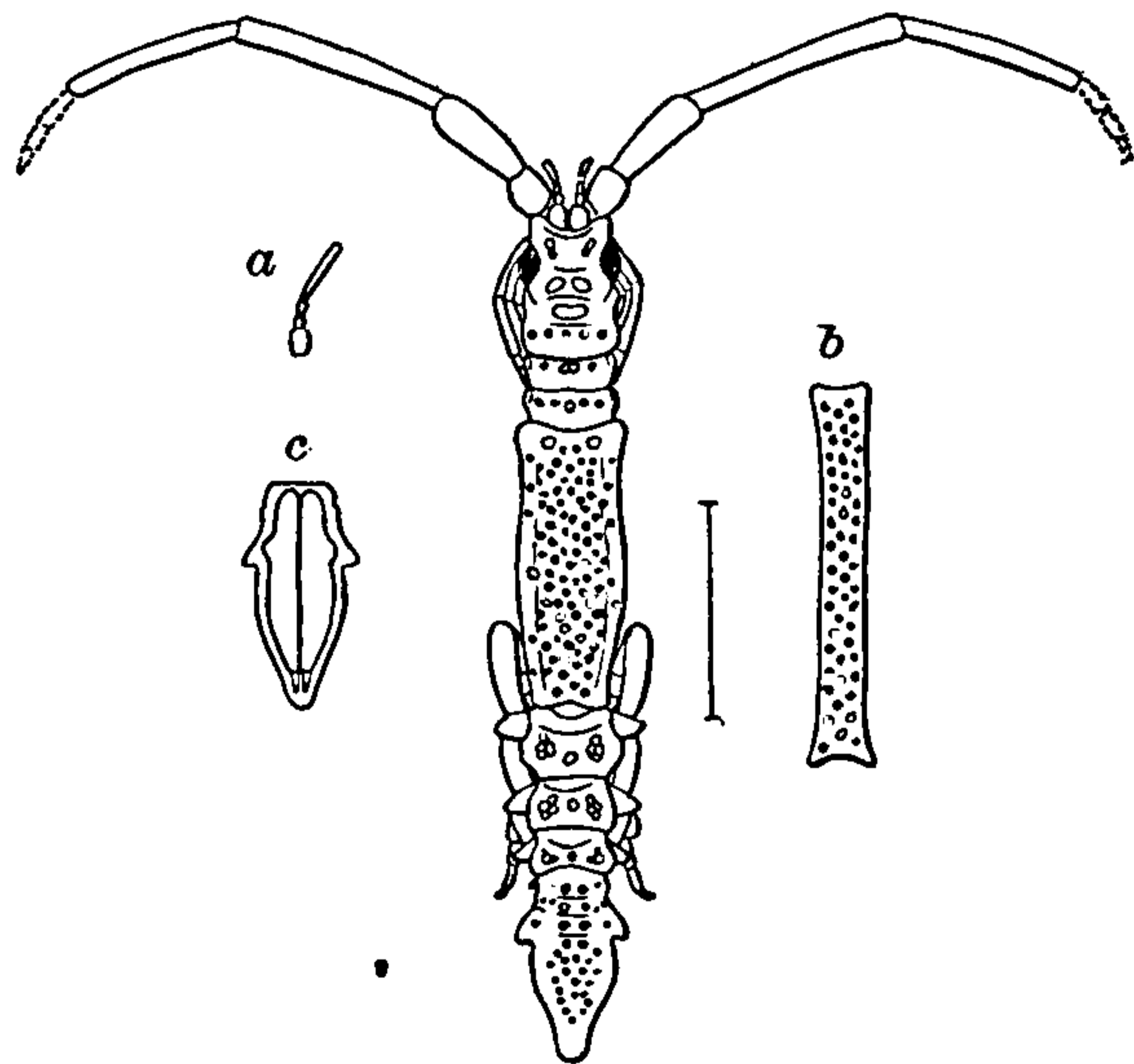


FIG. 355.—ASTACILLA GRANULATA (AFTER HARGER).

*a.* FIRST ANTENNA OF MALE. + 4. *b.* FOURTH THORACIC SEGMENT OF MALE. + 4. *c.* VENTRAL SIDE OF ABDOMEN. × 4.

The first pair of antennæ have the basal article long and somewhat dilated; the two following articles are short and slender, the two together being as long as the first article; the fourth or last article is a little longer than the first. The first antennæ extend to the end of the second article of the peduncle of the second antennæ. The basal

article of the second antennæ is short, and does not extend beyond the antero-lateral angles of the head; the second article extends to the end of the first pair of antennæ; the third article is three times as long as the second article; the fourth is twice as long as the third; the fifth is a little shorter than the fourth. The flagellum is composed of three articles. The second antennæ are not quite as long as the body, being 14 mm. in length. The maxilliped has a palp of five articles. The palp of the mandibles is wanting.

The first segment of the thorax is a little longer than the two following segments, which are subequal. The fourth segment is extremely long, being 6 mm. long, or 1 mm. longer than all the other six segments taken together. This segment is broader anteriorly than the preceding segments; at its posterior extremity it becomes abruptly narrower. The fifth segment is about one-sixth as long as the fourth segment; the sixth segment is about equal in length to the fifth; the seventh is a little shorter than the sixth. The lateral parts of the first segment are broadly expanded and surround the posterior portion of the head, the antero-lateral angles extending as far as the eyes. The epimera are distinctly separated on all the six following segments. On the second and third segment they are small and occupy the whole of the lateral margin. On the fourth segment they occupy the antero-lateral angles. In the last three segments they project at the sides in acutely pointed processes.

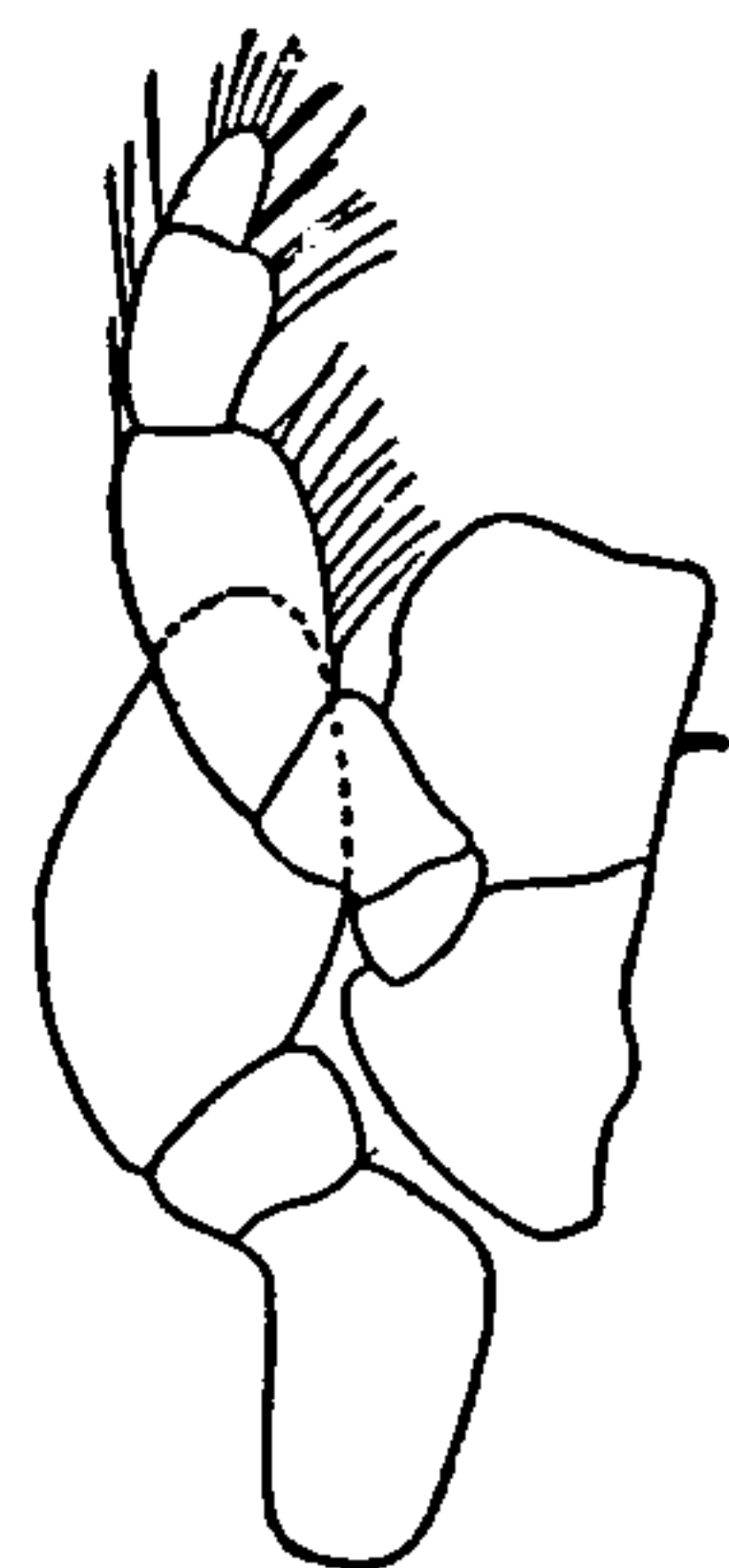


FIG. 356.—ASTACILLA GRANULATA. MAXILLIPED.  $\times 27\frac{1}{2}$ .

The first two segments of the abdomen are short. The terminal segment is long and narrow, about one-fifth the entire length of the body, being 3 mm. long. It is produced to a narrow, obtuse extremity. Near the base there is a transverse depression marked at the sides by an acute process or expansion of the lateral margin.

The first four pairs of legs are slender, directed forward, densely covered with long hairs on the inferior margins of all the articles. The first pair are much shorter than the three following pairs, which are gradually increasingly longer. The last three pairs of legs are ambulatory and gradually decrease in length.

The whole surface of the body is covered with small granulations. On the posterior portion of the dorsal surface of the head are two low tubercles. The three last segments of the thorax have each one low tubercle in the median longitudinal line. The first two segments of the abdomen have each two low tubercles, one on either side of the median longitudinal line. The terminal segment has a double row of six low tubercles in two longitudinal series, one row on either side of the median line.



## ASTACILLA CÆCA Benedict.

*Astacilla cæca* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, p. 51.—RICHARDSON, American Naturalist, XXXIV, 1890, p. 230; Proc. U. S. Nat. Mus., XXIII, 1901, p. 550.

*Locality*.—Latitude  $38^{\circ} 22'$  north, longitude  $70^{\circ} 17' 30''$  west (south of Marthas Vineyard).

*Depth*.—1,825 fathoms.

Body narrow, elongate, five times longer than wide, 2 mm.:  $9\frac{1}{2}$  mm.

Head wider than long, 1 mm.:  $1\frac{1}{2}$  mm., with the anterior margin

deeply excavate between the produced antero-lateral angles, and a small median point within the excavation.

The lateral margin on either side is produced in two acute triangular processes, an anterior and a posterior lobe.

The eyes are wanting. There are two tubercles on the head situated in the median line, one on the

anterior portion and the other on the postcephalic lobe. The first pair of antennæ have the basal article

long and dilated; the second and third articles are subequal in length, slender, and both together about equal

in length to the basal article; the fourth article is one and a half times longer than the third. The first antennæ

extend a little beyond the end of the second article of the peduncle of the second pair of antennæ. The

basal article of the second antennæ is short and inconspicuous in a dorsal view, being covered by the basal

article of the first antennæ; the second article extends

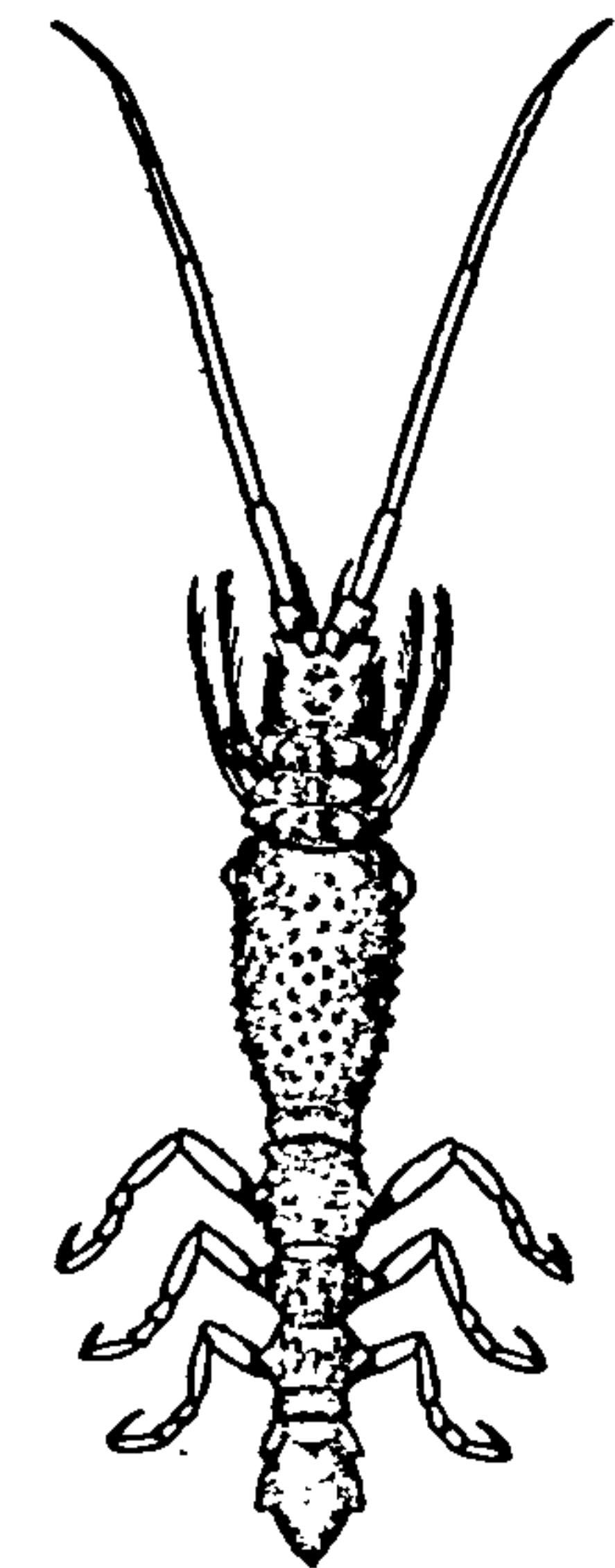


FIG. 357.—ASTACILLA CÆCA (AFTER BENEDICT).

as far as the middle of the fourth article of the first antennæ; the third article is twice as long as the second; the fourth is twice as long as the third; the fifth is a little shorter than the fourth. The flagellum is composed of five articles. The second antennæ are 6 mm. in length.

The first three segments of the thorax are subequal in length; the fourth segment is six times longer than the third, being 3 mm. in length; the fifth, sixth, and seventh segments decrease gradually in length, the fifth segment being about 1 mm. long. There is one median tubercle on each of the thoracic segments; other small tubercles are situated in a transverse line lateral to the median tubercle on the first three segments; the fourth segment is thickly covered with small tubercles over the whole dorsal surface; the fifth segment has a pair of tubercles one above the other on either side of the lateral margin anterior to the epimera; the sixth segment has one tubercle on either side anterior to the epimera. The epimera of the second, third, and fourth segments are small; those of the last three segments are angular and conspicuous. The fourth segment of the thorax is twice

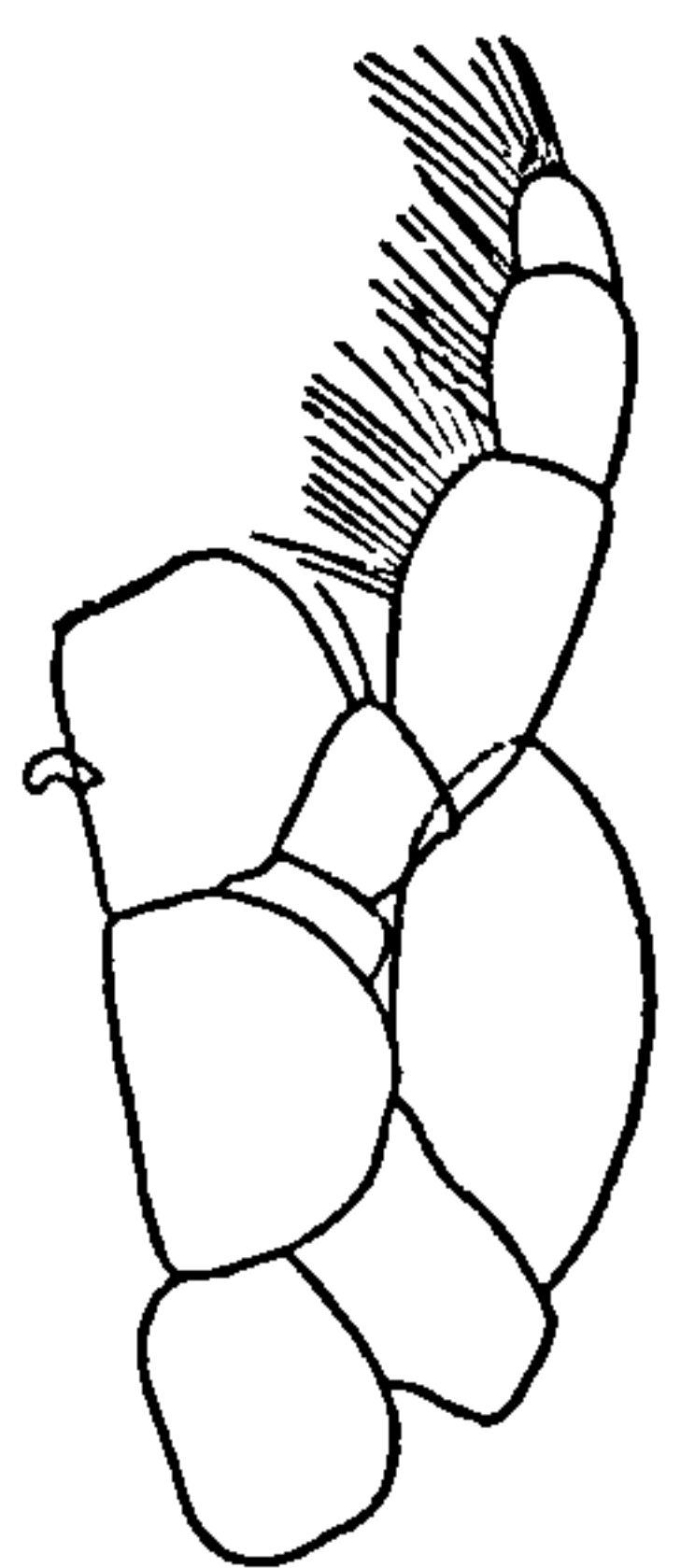


FIG. 358.—ASTACILLA CÆCA. MAXILLIPED.  $\times 39$ .

as wide at its anterior end as it is at its posterior extremity; it measures 2 mm. in width at the anterior portion and only 1 mm. at the posterior end.

The abdomen is composed of two segments, the first one of which is short and narrow. The terminal segment has the lateral margins produced on either side in two angular processes, one at the base of the segment and the other a little below the middle. The segment terminates in an acute point. There is also a median tubercle on each one of the abdominal segments, the tubercle on the terminal segment being situated at the base of the segment.

The marsupial plates are covered with small tubercles.

### 55. Genus ARCTURUS Latreille.

Body slender, somewhat cylindrical in form, with the fourth segment of the thorax not greatly longer than the others. Epimera small but distinct on all the thoracic segments with the exception of the first. Marsupium of female composed of three pairs of plates issuing from the second, third, and fourth segments. Abdomen composed of three segments, two segments anterior to the large terminal one.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS ARCTURUS.

- a. End of terminal segment notched, as seen from above.
  - b. Body smooth and free from spines.....*Arcturus beringanus* Benedict
  - b'. Body spiny.....*Arcturus longispinis* Benedict
- a'. End of terminal abdominal segment without notch.
  - b. Body without spines or tubercles, perfectly smooth and glabrous.
    - Arcturus glaber* Benedict
  - b'. Body with spines or tubercles.
    - c. Terminal segment of abdomen armed with a long median terminal spine, projecting beyond the end of the segment.
    - d. Head with two spines. Second joint of second pair of antennæ armed with one spine at upper end. Thorax with few spines. Surface of terminal abdominal segment smooth.
    - e. Second joint of peduncle of second pair of antennæ without spine at base on outer margin. First pair of antennæ extending one-third the length of the third joint of second pair of antennæ. Dorsal spines wanting on second abdominal segment. Spines wanting on opercular valves. Anterior thoracic appendages furnished with a number of spines on the proximal joints.....*Arcturus purpureus* Beddard
    - e'. Second joint of peduncle of second pair of antennæ with spine at base on outer margin. First pair of antennæ extending two-thirds the length of the third joint of second pair of antennæ. Dorsal spines present on second abdominal segment. Spines present on opercular valves. Anterior thoracic appendages without spines except on penultimate joint.....*Arcturus caribbæus* Richardson
    - d'. Head with eight spines. Second joint of second pair of antennæ armed with three spines at the upper end. Thorax with many spines. Surface of terminal abdominal segment with three rows of spines on dorsal surface. Row of spines on each opercular valve.
      - Arcturus floridanus* Richardson

- c'. Terminal segment of abdomen not armed with a long median terminal spine.  
 d. Four anterior segments of thorax with spines or tubercles. Middle surface of abdomen with prominent spiny projections. With conical lateral projections. Epimera pointed.....*Arcturus baffini* (Sabine)  
 d'. Four anterior segments of thorax without spines or tubercles. Middle surface of abdomen without any indication of prominent spiny projections. Without conical lateral projections. Epimera less pointed.

*Arcturus baffini* var. *tuberosus* Sars

#### ARCTURUS BERINGANUS Benedict.

*Arcturus beringanus* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 46-47.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 854; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 275; American Naturalist, XXXIV, 1900, p. 229.

*Localities.*—Alaska; Bering Sea.

*Depth.*—29-72 fathoms.

Body narrow, elongate, a little more than seven times longer than wide,  $1\frac{1}{2}$  mm.:11 mm., not including the antennæ.

The head is about as wide as long,  $1\frac{1}{2}$  mm.: $1\frac{1}{2}$  mm., with the anterior margin deeply excavate. The eyes are small, round, composite, and situated at the sides of the head about halfway between the anterior and posterior margins. The first pair of antennæ have the basal article long and somewhat dilated; the second is longer than the third, and both together are about equal in length to the first; the fourth is a little longer than the first. The first antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short, and extends as far as the antero-lateral angles of the head, or to the end of the first article of the first pair of antennæ; the second article is longer and extends to the end of the first pair of antennæ; the third article is twice as long as the second; the fourth is twice as long as the third; the fifth is a little shorter than the fourth. The flagellum is composed of four articles, the last article terminating in a spine. The second antennæ are shorter than the body, being only  $7\frac{1}{2}$  mm. in length. The maxilliped has a palp of five articles. The palp of the mandibles is wanting.

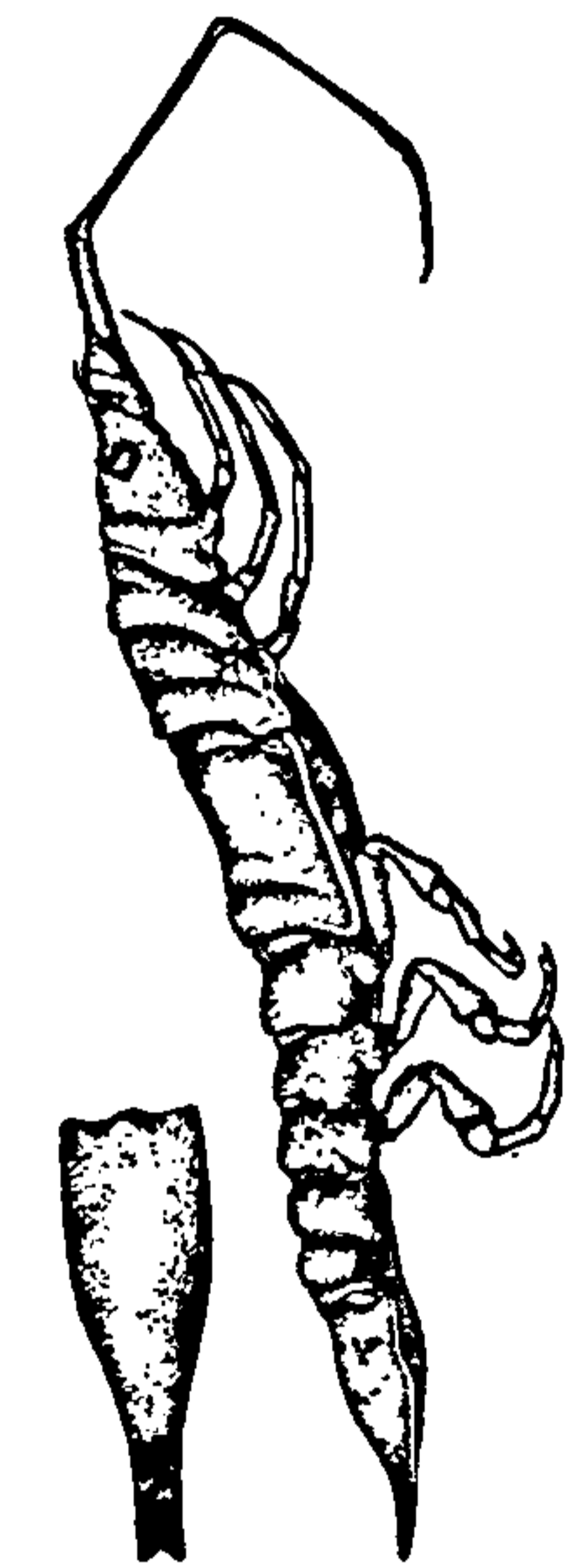


FIG. 359.—ARCTURUS BERINGANUS (AFTER BENEDICT).  $\times 2\frac{1}{2}$ .

The first three segments of the thorax are subequal; the fourth is twice as long as any of the preceding segments; the fifth is half as long as the fourth; the sixth is as long as the fifth; the seventh is a little shorter than the sixth. The first segment has the lateral parts somewhat expanded to surround the posterior portion of the head. The epimera of the second, third, and fourth segments are distinctly separated from the segments, are small and narrow, not visible from a dorsal view, and occupy the antero-lateral angles of the segments. The epimera of the last three segments are also distinctly separated

from the segments, are conspicuous from a dorsal view, and are produced at the sides in processes which are rather blunt at their extremities.

The first two segments of the abdomen are short. The terminal segment is long and produced to an extremity which has a V-shaped excavation. The length of the terminal segment is a little less than one-fourth that of the entire body, being 3 mm. long. Near the base is a transverse depression marked on either side by a blunt expansion of the lateral margin, probably indicative of a coalesced segment. The first four pairs of legs are slender, directed forward, and densely covered with long, slender hairs on the inferior margins of all the articles. The first pair of legs is shorter than the three following pairs. The last three pairs of legs are ambulatory.

#### ARCTURUS LONGISPINUS Benedict.

*Arcturus longispinus* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 44-45.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 854; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 275; American Naturalist, XXXIV, 1900, p. 229.

*Locality.*—Aleutian Islands.

*Depth.*—55 fathoms.

Body narrow, elongate, nearly five times longer than wide, 7 mm.: 35 mm.

Head wider than long, 7 mm. : 4 mm., with the anterior margin deeply excavate between the produced antero-lateral angles. The eyes are small, round, composite, and situated at the sides of the head halfway between the antero-lateral angles and the posterior margin. There are two extremely long spines, 7 mm. in length, situated about the middle of the head between the eyes, one on either side of the median line. The first pair of antennæ have the basal article long and somewhat dilated, about twice as long as wide; the second and third articles are subequal in length, each being half as wide as the basal article and much shorter; the fourth article is about one and a half times longer than the third. The first antennæ extend to the end of the second article of the peduncle of the second antennæ. The basal article of the second antennæ is short; the second article is 3 mm. long; the third is four times as long as the second, or 12 mm. long; the fourth is 17 mm. in length; the fifth is 15 mm. The flagellum is composed of eight articles, the

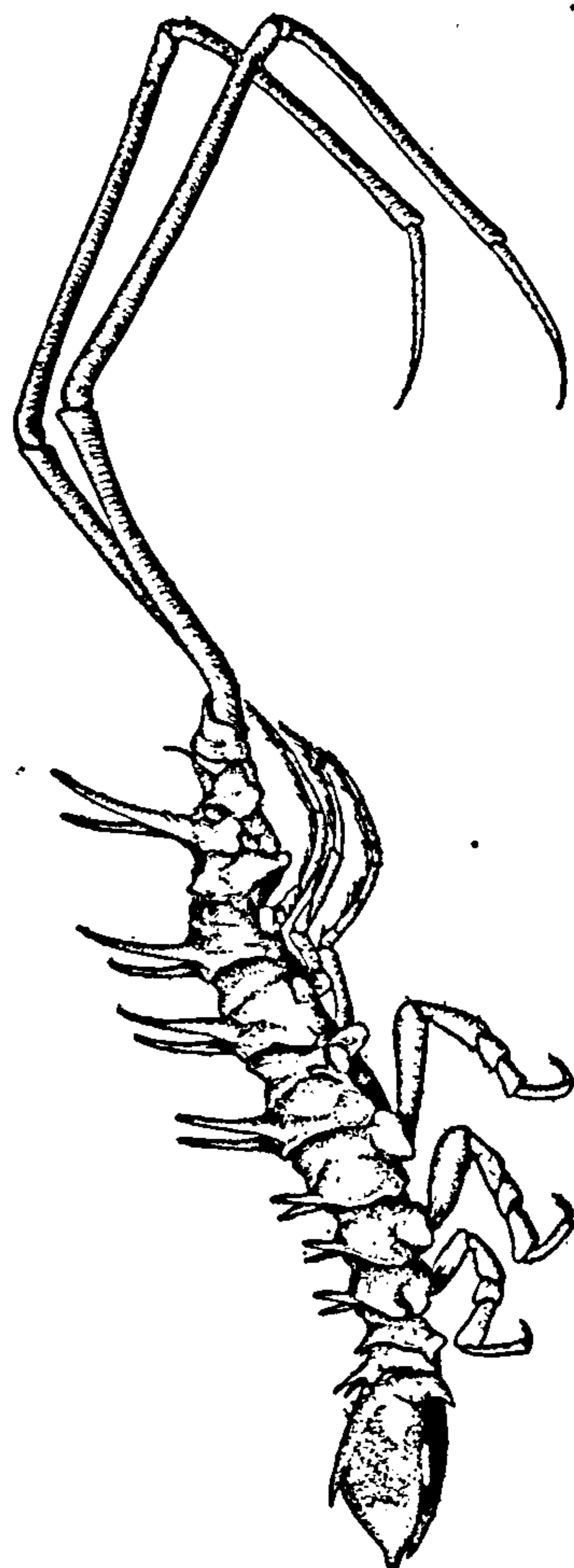


FIG. 360.—ARCTURUS LONGISPINUS (AFTER BENEDICT).  
× 14.

first being many times longer than the second. The second antennæ are 53 mm. in length. The palp of the maxillipeds is composed of five articles.

The first segment of the thorax has two small tubercles or rudiments of spines, one on either side of the median line. The spines of the second, third, and fourth segments are 6 mm. in length, placed one on each side of the median line. The spines of the fifth segment are  $2\frac{1}{2}$  mm. long, one on either side of the median line. The spines of the sixth segment are 2 mm. long, placed one on either side of the median line. The spines of the seventh segment are  $1\frac{1}{2}$  mm. long, situated one on either side of the median line. Epimera are distinct on all but the first segment. They increase in size from those of the second to those of the fifth segment, which are the largest, and then decrease in size; all have the lateral margins rounded. The epimera of the second, third, and fourth segments are concealed in a dorsal view by the large knob-like projections on the lateral margins of the segments.

The abdomen is composed of three segments, the first two of which are short and are armed each with two spines, one on either side of the median line, those of the first segment being rudiments as in the first segment of the thorax, while those of the second segment are 2 mm. long and project backward. The first segment has a triangular expansion on either side of the lateral margin. The second has none. The terminal segment has two backward projecting spines situated on the dorsal surface, one on either side of the median line about the middle of the segment. This segment is very much compressed laterally. It terminates in two short points. The lateral margin has a triangular expansion on either side at the base and a smaller one on either side just below the middle of the segment.

The first four pairs of legs are directed forward and are strongly ciliated. The last three pairs are ambulatory.

#### ARCTURUS GLABER Benedict.

*Arcturus glabrus* BENEDICT, Proc. Biol. Soc. Wash., XII, 1898, p. 46.

*Arcturus glaber* RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 855; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 277; American Naturalist, XXXIV, 1900, p. 230.

*Locality*.—Bering Sea.

*Depth*.—55 fathoms.

Body narrow, elongate, a little over six times as long as broad, 5 mm.: 31 mm. Head wider than long, 3 mm.: 4 mm. The head measures 4 mm. in length from the antero-lateral angles to the posterior margin. The front is deeply excavate between the produced lateral angles. The eyes are small, transversely ovate, composite, and situated at the sides of the head, halfway between the antero-lateral angles and the

posterior margin. The first pair of antennæ have the basal article large and dilated; the second and third articles are subequal and are shorter and smaller than the first; the fourth article is twice as long as either of the two preceding articles. The first antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The first article of the second antennæ is short, not longer than the basal article of the first pair of antennæ; the second article extends to the end of the first antennæ; the third article is three and a half times longer than the second; the fourth is nearly twice as long as the third; the fifth article is nearly as long as the fourth; the flagellum is composed of six articles, the first one of which is about three times longer than the second or following articles. The second antennæ are longer than the body. The palp of the maxillipeds is composed of five articles.

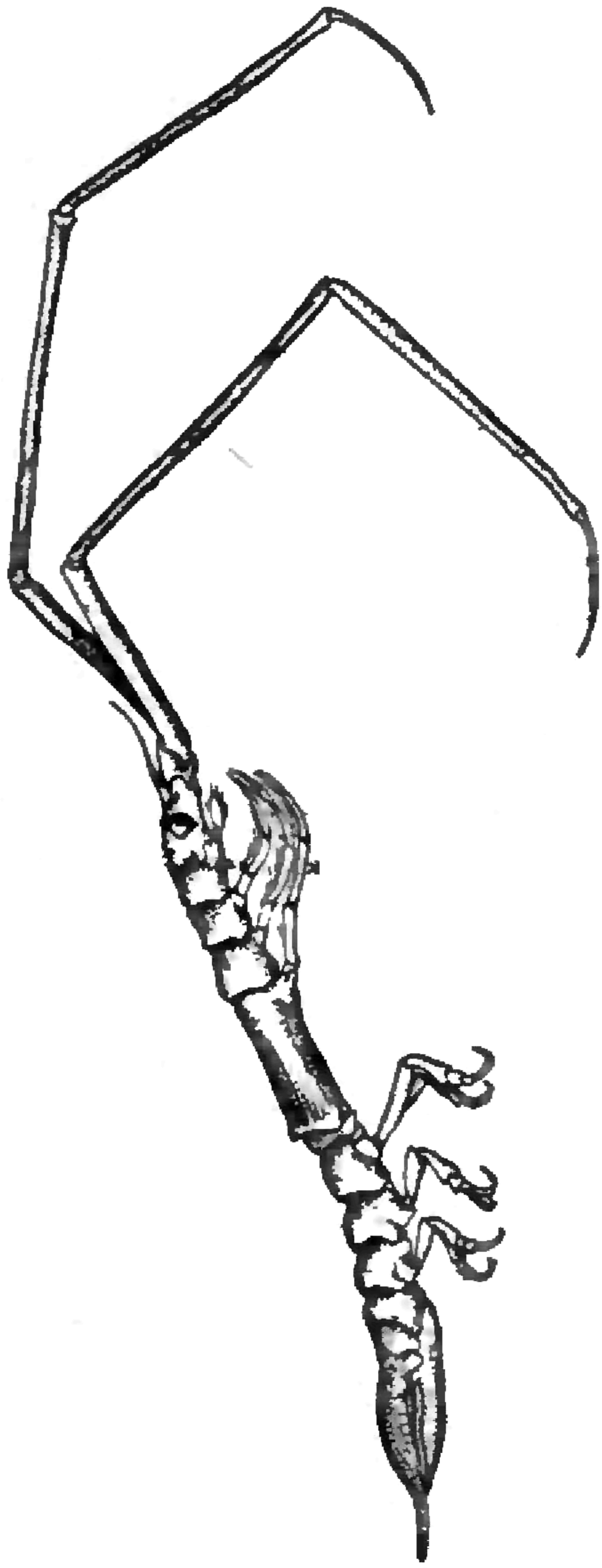


FIG. 361.—ARCTURUS GLABER  
(AFTER BENEDICT).  $\times 1\frac{1}{2}$ .

The first three segments of the thorax are subequal, each being 2 mm. in length. The fourth segment is twice as long as either of the three preceding segments and is 4 mm. in length. The fifth segment is  $2\frac{1}{2}$  mm. long. The sixth and seventh

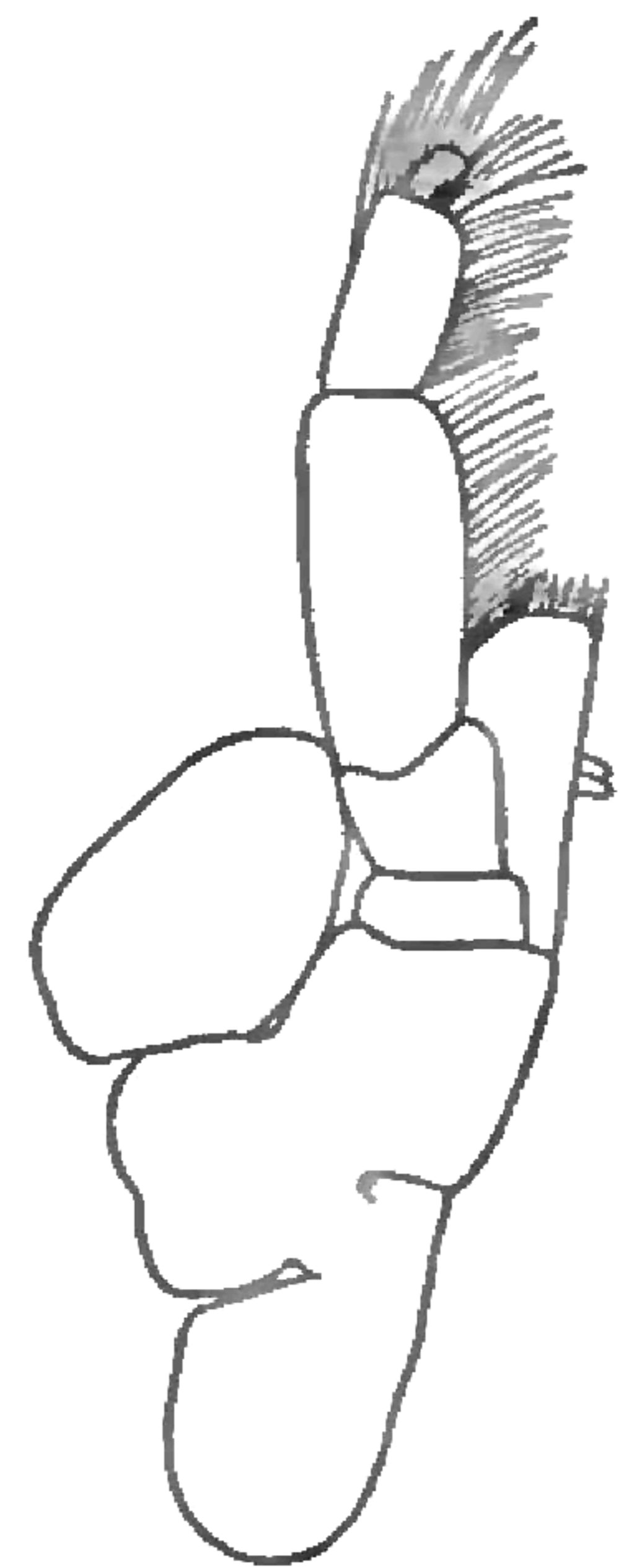


FIG. 362.—ARCTURUS  
GLABER. MAXIL-  
LIPED.  $\times 11\frac{1}{2}$ .

segments are each 2 mm. in length. Epimera are not represented on the first thoracic segment. The epimera of the three following segments are small and occupy the antero-lateral angles. In the last three segments the epimera are large and laterally produced.

The first two segments of the abdomen are short and subequal. The third or terminal segment is long and tapers to a blunt extremity.

The first four pairs of legs extend forward and are strongly ciliated. The last three pairs are ambulatory.

#### ARCTURUS PURPUREUS Beddard.

*Arcturus purpureus* BEDDARD, Proc. Zool. Soc. London, 1886, p. 109; Report on the Scientific Results of the Exploring Voyage of H. M. S. *Challenger*, Zool., XVII, 1886, pp. 112-113.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 546.

*Locality*.—Off Sombrero Island.

*Depth*.—450 fathoms.

“A single specimen of this species was dredged in the North Atlantic at station 23 from a depth of 450 fathoms.

“I have named it *purpureus* on account of the purplish color which appears to characterize the species and is very distinct in the spirit-preserved specimen.

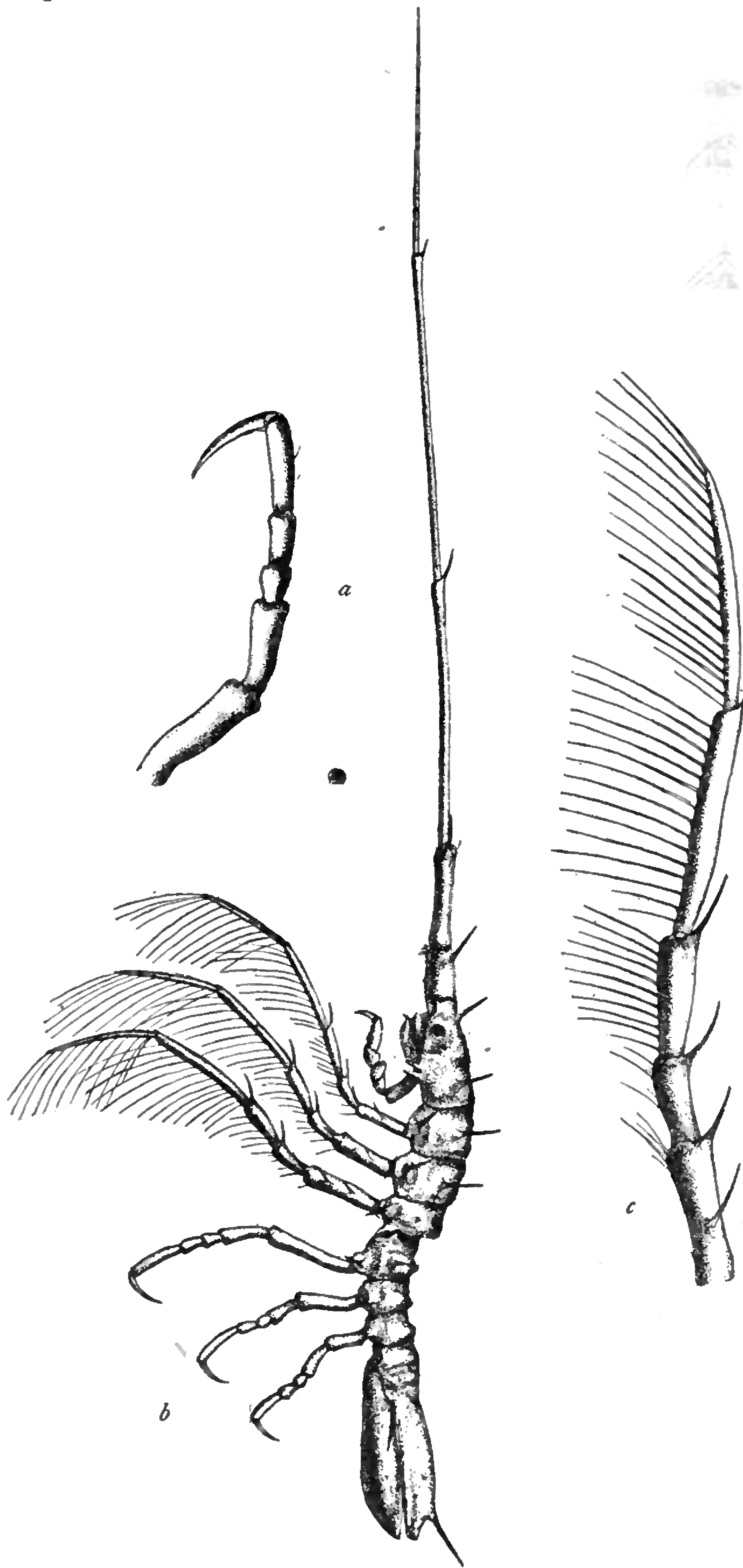


FIG. 363.—ARCTURUS PURPUREUS (AFTER BEDDARD). *a*, ONE OF POSTERIOR THORACIC LEGS.  
*b*, LATERAL VIEW. *c*, ONE OF ANTERIOR THORACIC LEGS.

“It is closely allied to *Arcturus anna* and to *Arcturus cornutus*, but differs sufficiently from both to constitute the type of a new species.

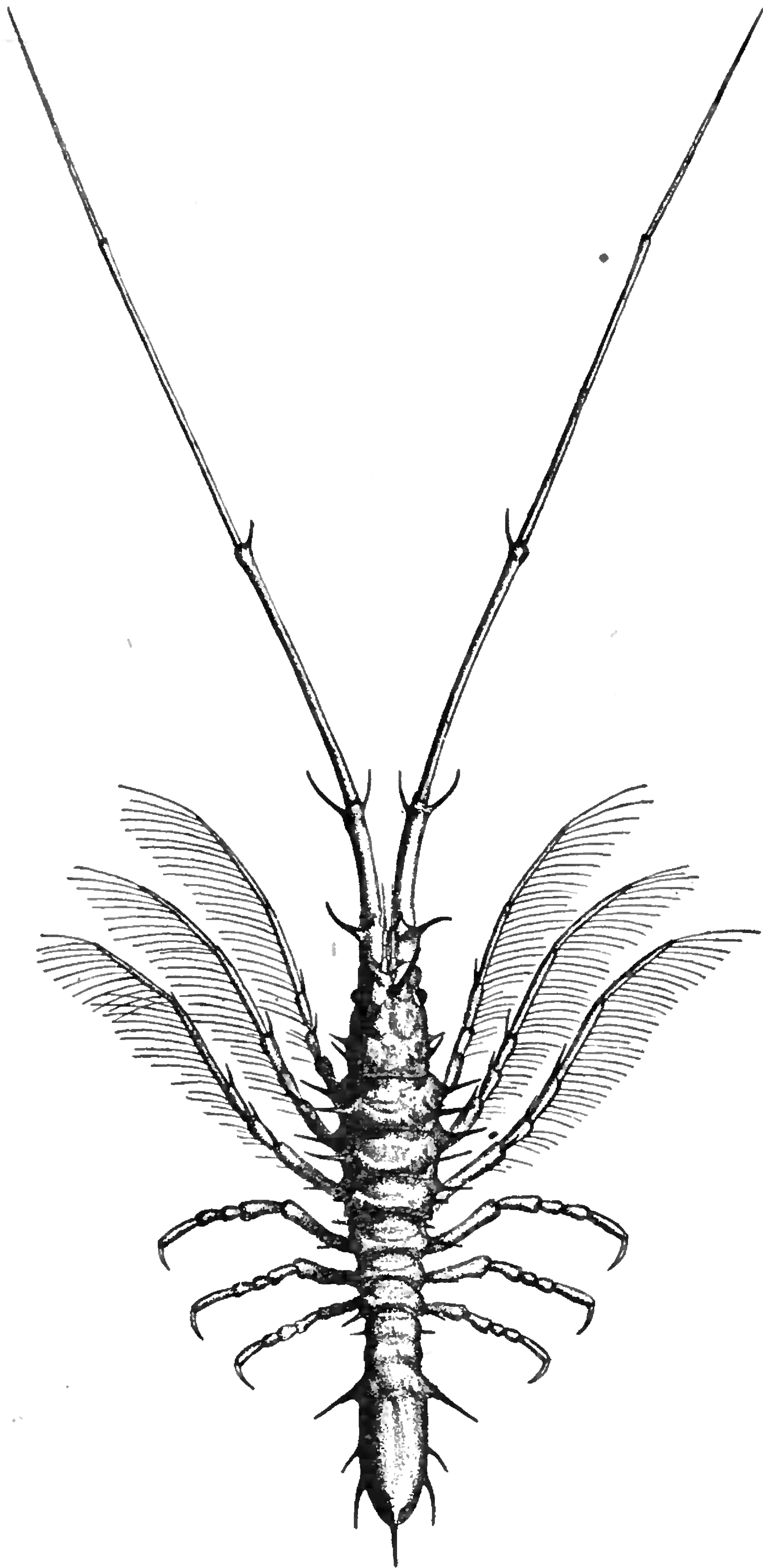


FIG. 364.—ARCTURUS PURPUREUS (AFTER BEDDARD). DORSAL VIEW.

“The extreme length of the specimen, which is a female, is 18 mm., the length of the antennæ 31 mm.



“On the head between the eyes are a pair of long, forwardly curved spines; the hinder portion of the head is occupied by a rounded median convexity; at the antero-lateral margin of the head is a very short, forwardly directed spine, beneath which the margin is excavated by a semicircular notch.

“Of the first four thoracic segments the fourth is rather the shortest: Each of the segments bears an outwardly directed spine on each side of the body, corresponding to the pair on the head and of about equal length; those on the fourth segment, although broken, appeared to have been originally somewhat shorter; close to the lateral margin of each segment, near to its junction with the epimeron, is another long-spine projecting outward and over the epimeron. The first segment differs from the succeeding ones in having no separate epimeron, and its lateral margin has two spines instead of one, of which the anterior is the longer; they are both directed forward as well as outward. The fourth thoracic segment has also a second spine, and its postero-lateral margin inclined downward and backward as well as outward.

“Of the three posterior thoracic segments the first is the largest, the two posterior being equal in size; the epimera of all three segments bears a spine directed outward and at right angles to the longitudinal axis of the body; that of the first of the three segments is considerably the longest; this segment bears also a pair of spines upon the tergum continuous with those on the segments in front, and exactly overlying that on the epimeron.

“The first three segments of the abdomen are separated by distinct sutures; the first and the third of the segments have a pair of long lateral spines; those of the third segment mark the boundary between it and the caudal shield; the first abdominal segment has a pair of short ventral spines placed on either side of the median ventral line, and upon a ridge which forms the posterior margin of the segment; anteriorly the segment is bounded by a similar ridge, but without any distinct spines.

“The caudal shield is oval and convex, with a faintly marked longitudinal carina which terminates in a long spine; the lateral margins of the caudal shield are flattened and form a ridge like the brim of a hat; on either side are two long curved spines situated at equidistant intervals, and corresponding in position to the lateral spines on the last abdominal segment; the lateral ridge does not terminate in a flattened spine on either side, as in so many other species.

“The appendages in many cases bear long spines like those upon the body; the antennæ, which are very long, have a pair of spines upon the distal extremity of each of the joints; the anterior thoracic appendages are furnished with a number of stout spines upon the proximal

joints; the posterior thoracic appendages are smooth and devoid of any such spines.

“The uropoda are covered with numerous minute granulations but bear no spines.”—BEDDARD.<sup>a</sup>

**ARCTURUS CARIBBÆUS** Richardson.

*Arcturus caribbæus* RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, pp. 546-547.

*Locality.*—Near Aves Island, Caribbean Sea.

*Depth.*—683 fathoms.

Head with a deep excavation on the anterior margin, on either side of which the antero-lateral margins are produced, each bearing a short spine at the outer angle. Two long spines are situated on the anterior portion of the head, between the eyes. The first pair of antennæ, consisting of four joints, reach two-thirds of the length of the third joint of the second pair of antennæ. The first joint of the second pair of antennæ is short and unarmed; the second joint is armed with a small spine at the base on the outer margin, and a large spine on the upper lateral margin; the third joint is about three times as long as the second joint, and is armed with two long spines at the upper end; the fourth joint is about twice as long as the third joint, and is armed with a single spine at the upper end; the fifth joint is somewhat longer than the fourth and is unarmed; the flagellum is long and consists of ten joints.

The first, second, third, and fifth thoracic segments have each two long projecting spines, one on either side of the median dorsal line. The fourth, sixth, and seventh segments are without these spines. The first segment has three spines, one large central spine and two small spines on each antero-lateral margin. All the other thoracic segments have one long spine on each lateral margin.

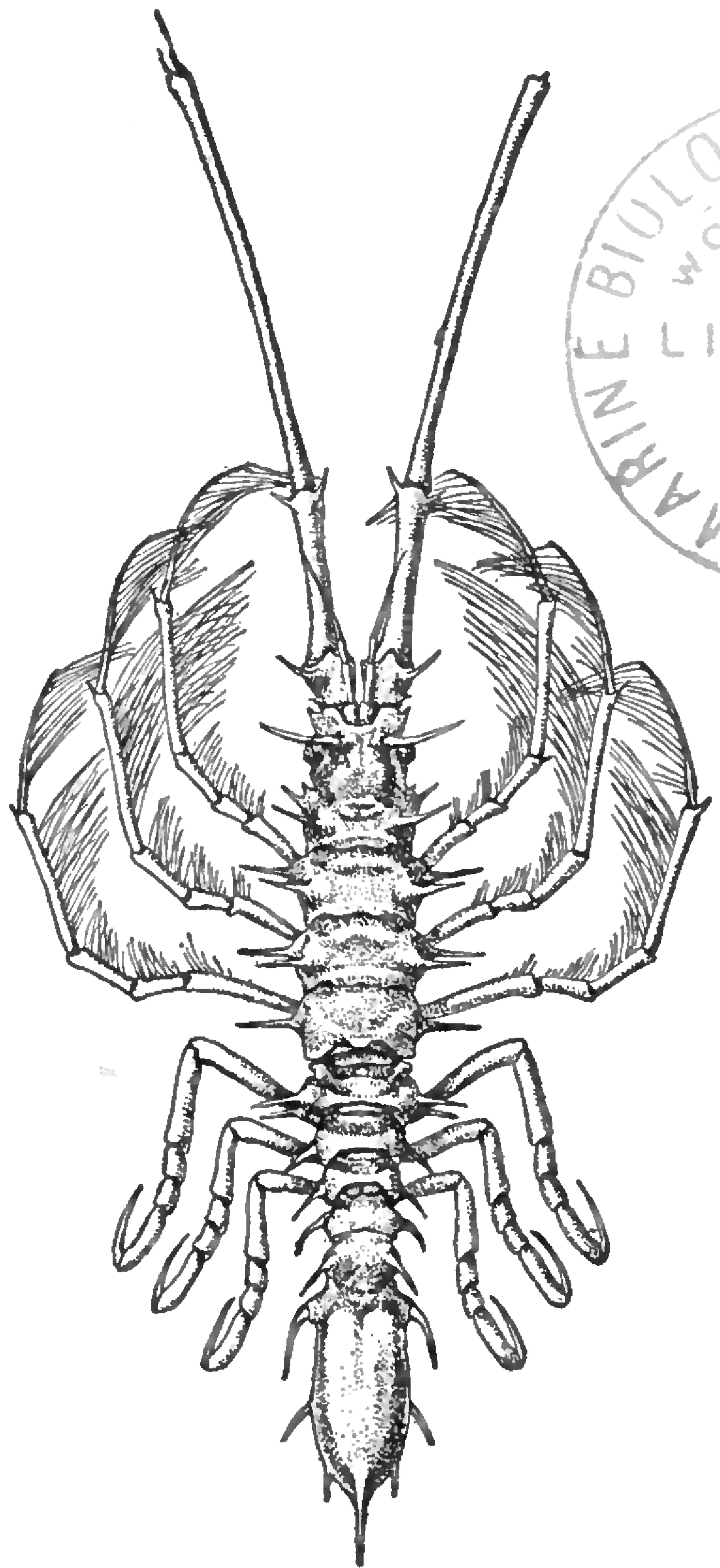


FIG. 365.—ARCTURUS CARIBBÆUS.

<sup>a</sup>Challenger Report, XVII, 1886, pp. 112-113.

The first abdominal segment has one lateral spine on each side; the second segment has two dorsal spines, one on either side of the median line. The terminal segment has one lateral spine on each side near the base. It is rounded in outline posteriorly, with two lateral spines on either side, one a little below the middle and one near the posterior margin of the segment. There is also a large terminal spine on the dorsal surface.

The opercular valves are armed each with a single spine about the center of the valve. The penultimate joint of the second, third, and fourth anterior pairs of legs is armed with a single spine.

One specimen of this species was taken by the U. S. Bureau of Fisheries steamer *Albatross* near Aves Island, Caribbean Sea.

*Type*.—Cat. No. 9113, U.S.N.M. This species closely resembles *Arcturus purpureus* Beddard, differing from that species in having two dorsal spines on the second abdominal segment, spines on the opercular valves and at the base on the outer margin of the second joint of the peduncle of the second pair of antennæ, in wanting spines on the proximal joints of the anterior thoracic appendages, with the exception of the penultimate joint, and in the greater length of the first pair of antennæ.

#### ARCTURUS FLORIDANUS Richardson.

*Arcturus floridanus* RICHARDSON, American Naturalist, XXXIV, 1900, p. 230; Proc. U. S. Nat. Mus., XXIII, 1901, pp. 548-549.

*Locality*.—Fernandina, Florida.

*Depth*.—273 fathoms; 270 fathoms.

Head with deep anterior excavation, on each side of which the lateral margins are produced, bearing each a single spine at the outer angle. On the anterior portion of the head are two long spines situated between the eyes. Two long spines are placed on the posterior portion of the head, between the line of the eyes, on either side of which are two small spines, one near each eye and one on the lateral margin. The first pair of antennæ are short, reaching only half the length of the third joint of the second pair of antennæ. The first joint of the second pair of antennæ is short and unarmed; the second joint has one short spine at the base and three long ones at the upper end; the third joint is nearly three times as long as the second joint, and has two long spines at the upper end; the fourth joint is armed with a single spine; the fifth joint is unarmed; the flagellum is nine-jointed.

The first thoracic segment has two dorsal spines on the anterior part, one on either side of the median line, six spines on the posterior part, three on either side of the median line, and two lateral spines; the second thoracic segment has three spines on the anterior portion, one in the median line and one on either side of it, four spines on

the posterior portion, two on either side of the median line, and three lateral spines; the third thoracic segment has two spines on the anterior portion, one on either side of the median line, four spines on the posterior portion, two on either side of the median line, and four lateral spines; the fourth segment has two spines on the anterior part, one on either side of the median line, four spines on the posterior part, two on either side of the median line, and four lateral spines; the fifth segment has two spines widely separated, one on either side of the median line, and one lateral spine; the sixth and seventh segments have six spines, three on either side of the median line, and one lateral spine.

The first two abdominal segments have each eight small spines, four on either side of the median line. The terminal segment has one median row of spines and a row on either side of this and a lateral row. The median row consists of five small spines and one large terminal spine. The dorsal row on either side of the median row each consists of four spines. The outer marginal lateral rows each consists of three spines, a pair at the base, a pair about the middle, and a pair at the extremity. At the base of the segment is a transverse row of four small spines. The opercular valves have each a longitudinal row of eight spines.

Both the anterior and the posterior pairs of legs are covered with spines, the anterior ones more densely.

Two specimens, one imperfect, were obtained by the U. S. Bureau of Fisheries steamer *Albatross* at Fernandina, Florida.

*Type*.—Cat. No. 11522, U.S.N.M.

#### ARCTURUS BAFFINI (Sabine).

*Idotea baffini* SABINE, Suppl. to App. to Capt. Parry's Voyage, 1824, p. 228, pl. 1, figs. 4-6.

*Arcturus tuberculatus* LATREILLE in Cuvier, Règne Animal, 2d ed., IV, 1829, p. 139.

*Arcturus baffini* WESTWOOD, Trans. Entom. Soc., London, I, 1836, p. 72.—MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 123, pl. xxxi, fig. 1.—G. O. SARS,

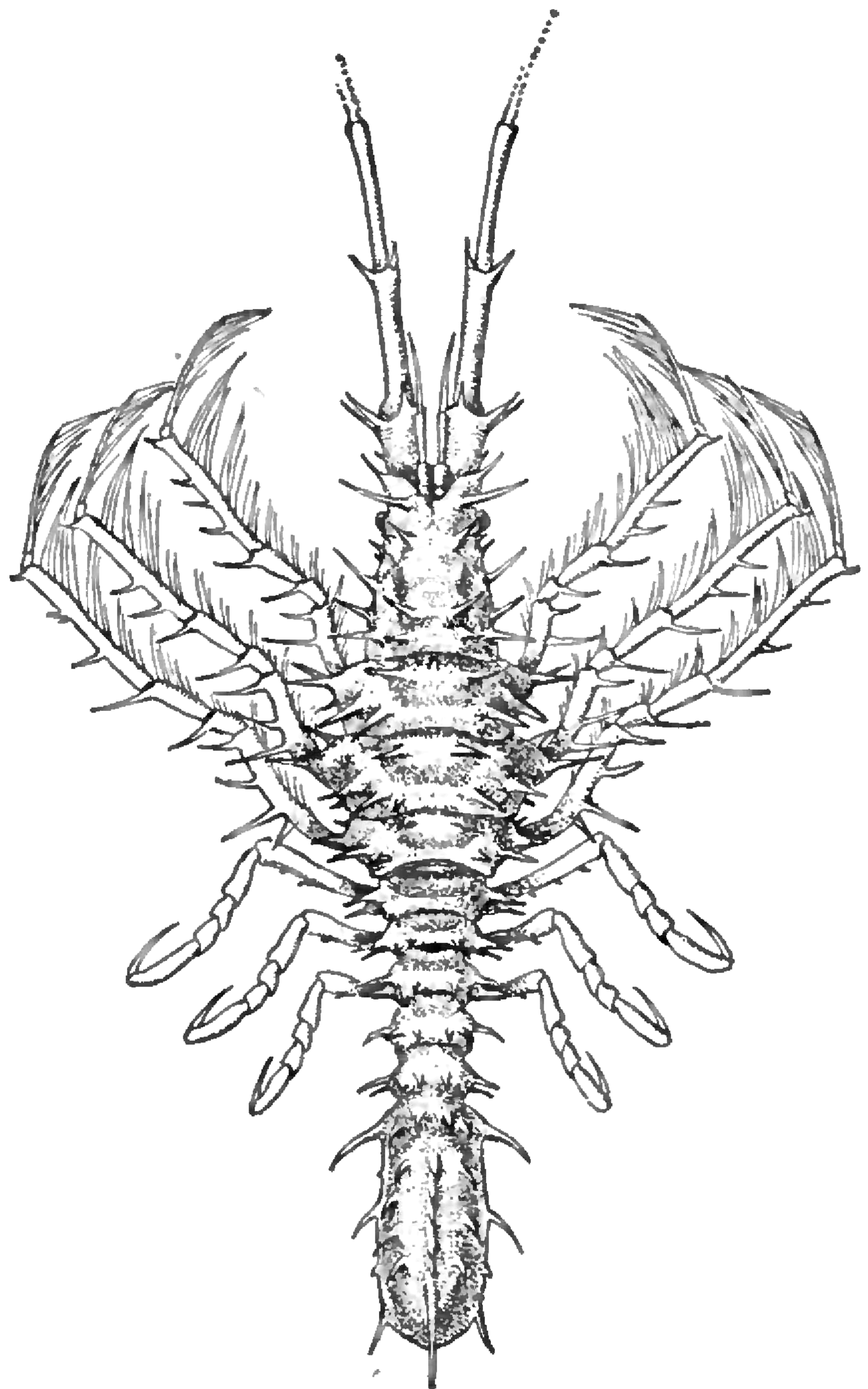


FIG. 366.—ARCTURUS FLORIDANUS.

Den Norske Nordhavs Expedition, Zool., Crust., I, 1885, p. 97, pl. IX, figs. 1-21.—BEDDARD, Report on the Scientific Results of the Exploring Voyage of H. M. S. Challenger, Zool., XVII, 1886, pl. XX, fig. 12.—HANSEN, Vid. Medd. naturh. Foren. i Kjøbh., 1887-88, pp. 188-189.—AXEL OHLIN, Akademisk Afhandling, XXII, 1895, pp. 15-18.—BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, p. 43.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 230; Proc. U. S. Nat. Mus., XXIII, 1901, p. 549.—ORTMANN, Proc. Phila. Acad. Nat. Sci., 1901, pp. 156-157.—NORMAN, Ann. Mag. Nat. Hist. (7), XIV, 1904, pp. 444-445.

*Localities.*—Latitude  $65^{\circ} 35'$  north, longitude  $54^{\circ} 50'$  west; latitude  $66^{\circ} 32'$  north, longitude  $55^{\circ} 34'$  west; latitude  $43^{\circ} 55'$  north, longitude  $49^{\circ} 8'$  west; Granville Bay; Cape Alexander; Elsmere Land and Greenland; Union Bay, Beechy Island; latitude  $67^{\circ} 59'$  north, longitude  $56^{\circ} 33'$  west; latitude  $68^{\circ} 9'$  north, longitude  $56^{\circ} 32'$  west; latitude  $70^{\circ} 29'$  north, longitude  $55^{\circ} 40'$  west; latitude  $71^{\circ} 10'$  north, longitude  $58^{\circ} 56'$  west; latitude  $78^{\circ} 24'$  north, longitude  $74^{\circ}$  west; Inglefield Gulf; Murchison Sound; Cape Faraday; latitude  $60^{\circ} 21'$  north, longitude  $5^{\circ} 41'$  west; Baffin Bay; near Cape York; Grinnell Land; Franklin Pierce Bay, or latitude  $79^{\circ} 29'$  north; Cape Napoleon, or latitude  $79^{\circ} 38'$  north; Dobbin Bay, or latitude  $79^{\circ} 40'$  north; Floeberg Beech, or latitude  $82^{\circ} 27'$  north; Barden Bay; Olriks Bay; Robertson Bay; Faroe Channel; latitude  $72^{\circ} 38'$  north, longitude  $77^{\circ} 10'$  west; latitude  $72^{\circ} 8'$  north, longitude  $74^{\circ} 20'$  west.

*Depth.*—5-150 fathoms.

Body narrow, elongate, nearly seven times longer than wide, 6 mm.: 40 mm.

Head as wide as long, 5 mm.: 5 mm., with the anterior margin deeply excavate. The eyes are small, composite, about twice as wide as long, and situated at the sides of the head, about halfway between the anterior and the posterior margins. There are two large spines on the posterior half of the head, one on either side of the median line. The basal article of the first pair of antennæ is long and somewhat dilated; it is as long as the two following articles, which are subequal, taken together; the fourth article is about one and a half times longer than the first article. The first pair of antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The second pair of antennæ have the basal article short and not reaching beyond the antero-lateral angles of the head on the dorsal side; the second article extends to the end of the first pair of antennæ; the third article is about three times as long as the second article; the fourth is one and a half times longer than the third; the fifth is as long as the fourth. The flagellum is composed of ten articles, the last article terminating in a spine. The second antennæ are longer than the body, being 50 mm. in length. The maxillipeds have a palp of five articles. The palp of the mandibles is absent.

The first three segments of the thorax are equal in length; the fourth is twice as long as either one of the preceding segments; the fifth is

also half as long as the fourth; the sixth and seventh are slightly shorter than the fifth. There are two long spines on each one of the thoracic segments, one on each side of the median longitudinal line. The lateral parts of the first segments are broadly expanded and surround the posterior portion of the head at the sides. The epimera of the second, third, and fourth segments are small, but distinctly separated from the segments; they occupy the antero-lateral angles of

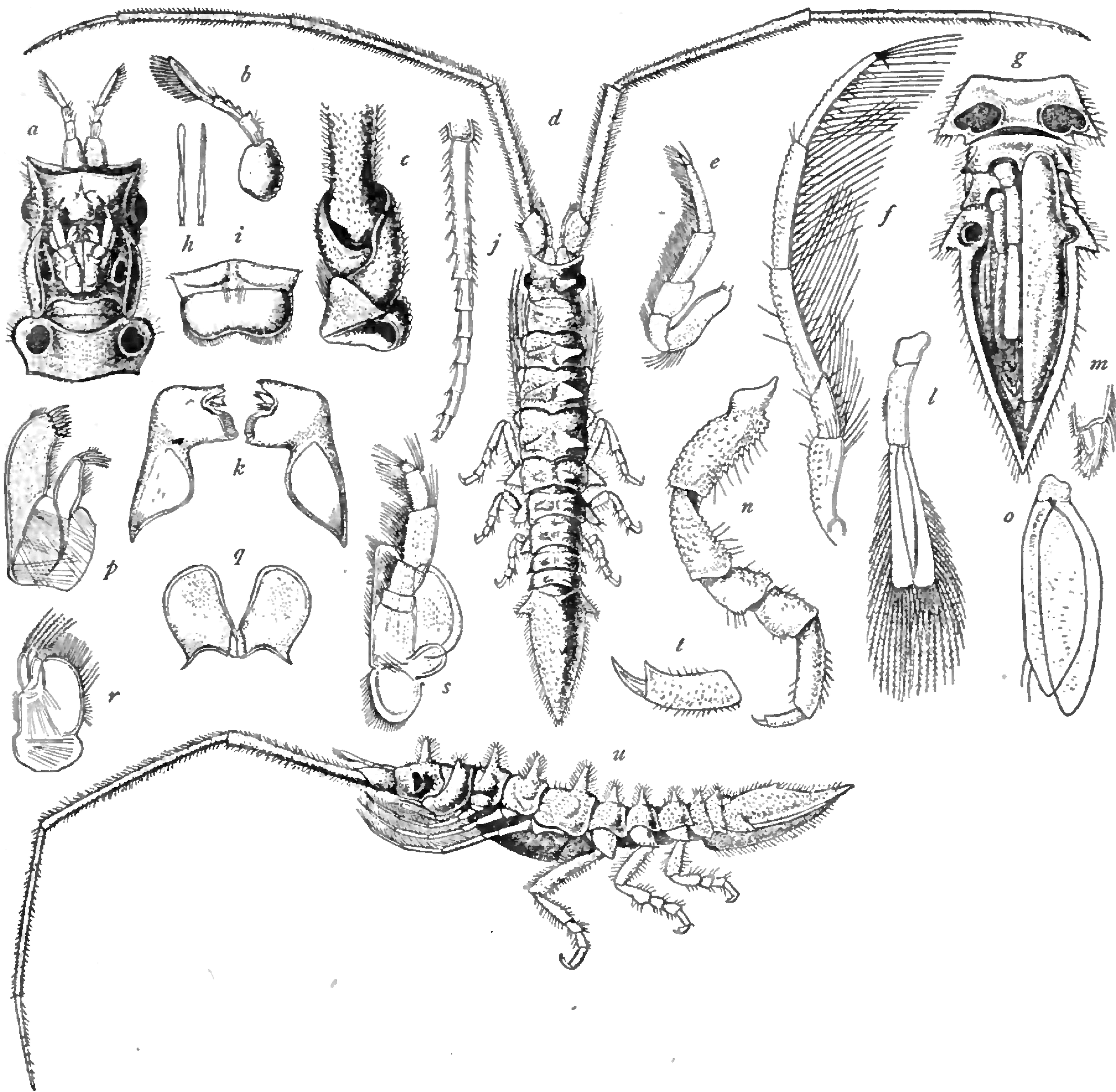


FIG. 367.—*ARCTURUS BAFFINI* (AFTER G. O. SARS). *a*, ANTERIOR PART OF BODY, WITH FIRST PAIR OF ANTENNA AND ORAL APPENDAGES VIEWED FROM BELOW. *b*, FIRST ANTENNA. *c*, BASE OF SECOND ANTENNA. *d*, ADULT FEMALE, FROM ABOVE. *e*, FIRST LEG. *f*, SECOND LEG. *g*, POSTERIOR PART OF BODY, VIEWED FROM BELOW (ONE OF OPERCULAR VALVES REMOVED). *h*, TWO SENSORY APPENDICES OF FIRST ANTENNA. *i*, LABRUM. *j*, FLAGELLUM OF SECOND ANTENNA. *k*, MANDIBLES. *l*, ONE OF ANTERIOR PLEOPODS. *m*, TERMINAL BRANCHES OF OPERCULAR VALVE (INNER SIDE). *n*, SEVENTH LEG. *o*, ONE OF POSTERIOR PLEOPODS. *p*, FIRST MAXILLA. *q*, LABIUM. *r*, SECOND MAXILLA. *s*, MAXILLIPED. *t*, TERMINAL CLAW OF SEVENTH LEG. *u*, LATERAL VIEW.

the segments and are not visible in a dorsal view. The epimera of the last three segments are large and also distinctly separated; they project at the sides of the segments, being produced in long, acute processes, and are conspicuous from a dorsal view.

The first two segments of the abdomen are short, and each is provided with two dorsal spines, one on either side of the median longi-

tudinal line. The first segment also has the sides produced in acute processes, one on either side, not separated from the segment and simulating the epimera of the last three thoracic segments. The last or terminal segment is very long, 11 mm., about one-fourth the entire length of the body. At the base on either side, the lateral margin is produced in a long, acute process. Halfway between the base and the apex of the segment, on the dorsal surface, are two tubercles, one on either side of the median longitudinal line. The apex of the segment is acutely pointed.

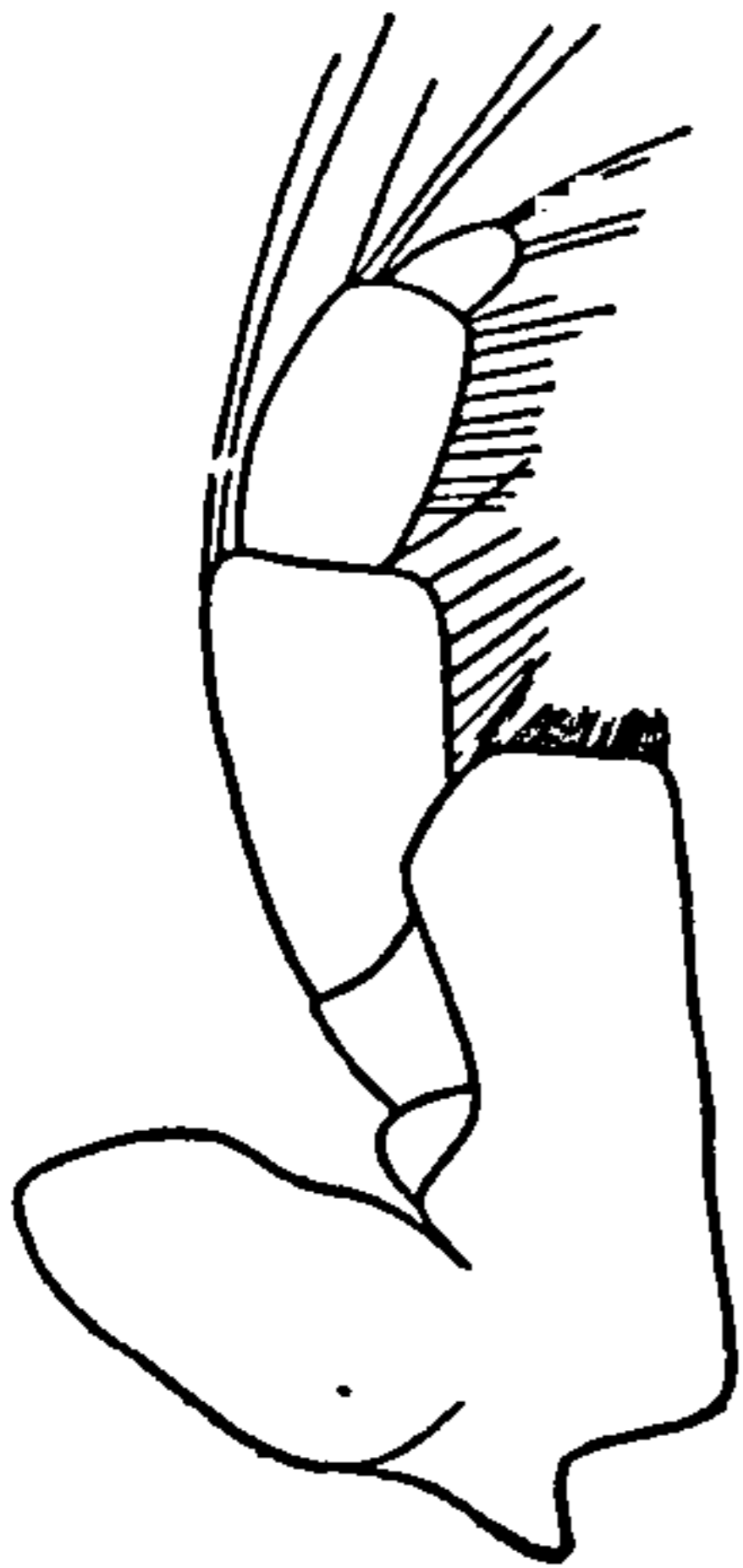


FIG. 368.—ARCTURUS  
BAFFINI. MAXIL-  
LIPED.  $\times 15\frac{1}{2}$ .

The first four pairs of legs are slender, directed forward, and thickly furnished with long slender hairs on the inferior margins of all the articles. The terminal article is minute; the three preceding articles are long and slender. The first pair of legs are much shorter than the three following pairs. The last three pairs of legs are stout and ambulatory in character. The entire surface of the body, the antennæ, legs, etc., is densely granular.

#### ARCTURUS BAFFINI var. TUBEROSUS Sars.

*Arcturus tuberosus* Sars, Archiv Math. og Naturvid., 1877, p. 350.

*Arcturus baffini* var. *feildeni* Miers, Ann. Mag. Nat. Hist. (4), XIX, 1877, p. 64, pl. III, fig. 1.

*Arcturus tuberosus* Sars, Norwegian North Atlantic Expedition, Crustacea, 1885, p. 102, pl. IX, fig. 22.

*Arcturus feildeni* Benedict, Proc. Biol. Soc. Washington, XII, 1898, p. 44.—  
Richardson, American Naturalist, XXXIV, 1900, p. 230; Proc. U. S. Nat. Mus., XXIII, 1901, p. 549.

*Arcturus baffini* Ortmann, Proc. Acad. Nat. Sci. Phila., 1901, pp. 156–157.

*Arcturus baffini* var. *tuberosus* Norman,<sup>a</sup> Ann. Mag. Nat. Hist. (7), XIV, 1904, p. 445.

*Localities*.—Camp Clay, Cape Sabine; Davis Straits; off Churchill, Hudson Bay; Granville Bay; Elsmere Land or Greenland.

*Depth*.—20–30 fathoms—clay bottom; small stones and gravel.

Body narrow, elongate, a little over eight times longer than wide, 4 mm.: 35 mm., not including the antennæ.

The head is as wide as long, 4 mm.: 4 mm., with the anterior margin deeply excavate. The eyes are small, wider than long, composite, and situated at the sides of the head about halfway between the anterior and the posterior margins. The first pair of antennæ have the basal article long and somewhat dilated; the second and third articles are subequal, and the two together are equal in length to the basal

<sup>a</sup> Norman proposes a third variety, *A. baffini* var. *intermedia*, in which the tubercles on the first four segments of the thorax and the elevation on the head are greatly reduced in size, but on the fifth and succeeding segments they are as well represented as in the typical form.

article; the fourth article is one and a half times longer than the first article. The first antennæ extend to the end of the second article of the peduncle of the second antennæ. The basal article of the second antennæ is short, and, on the dorsal side, does not extend beyond the antero-lateral angles of the head; the second article extends to the end of the first pair of antennæ; the third article is nearly three times as long as the second; the fourth and fifth are subequal, and each is one and a half times longer than the third. The flagellum is composed of ten articles, the last article terminating in a short spine. The second antennæ are a little longer than the body, being 37 mm. in length. The maxilliped has a palp of five articles. The palp of the mandibles is wanting.

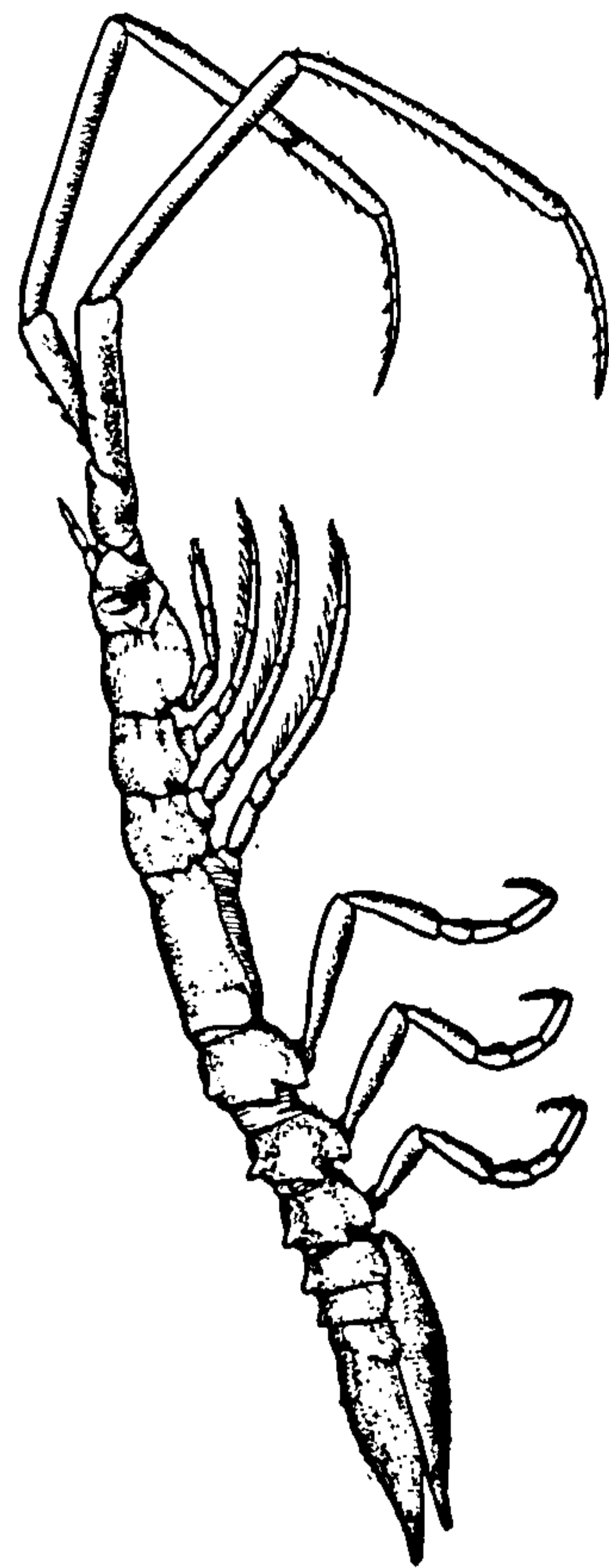


FIG. 369.—ARCTURUS BAFFINI  
VAR. TUBEROSUS (AFTER  
BENEDICT).  $\times 1\frac{1}{2}$ .

The first three segments of the thorax are subequal; the fourth is twice as long as any of the preceding ones; the fifth is about half as long as the fourth; the sixth and seventh are a little shorter than the fifth. The last three segments are each furnished with two low tubercles, one on either side of the median longitudinal line. The lateral parts of the first segment are expanded and surround the posterior portion of the head. The epimera on the second, third, and fourth segments are small, narrow plates, distinctly separated from the segments and placed on the antero-lateral angles; they are not visible in a dorsal view. The epimera of the last three segments are distinctly separated from the segments and are visible in a dorsal view; they are large, broad plates with the exterior angles bluntly rounded.

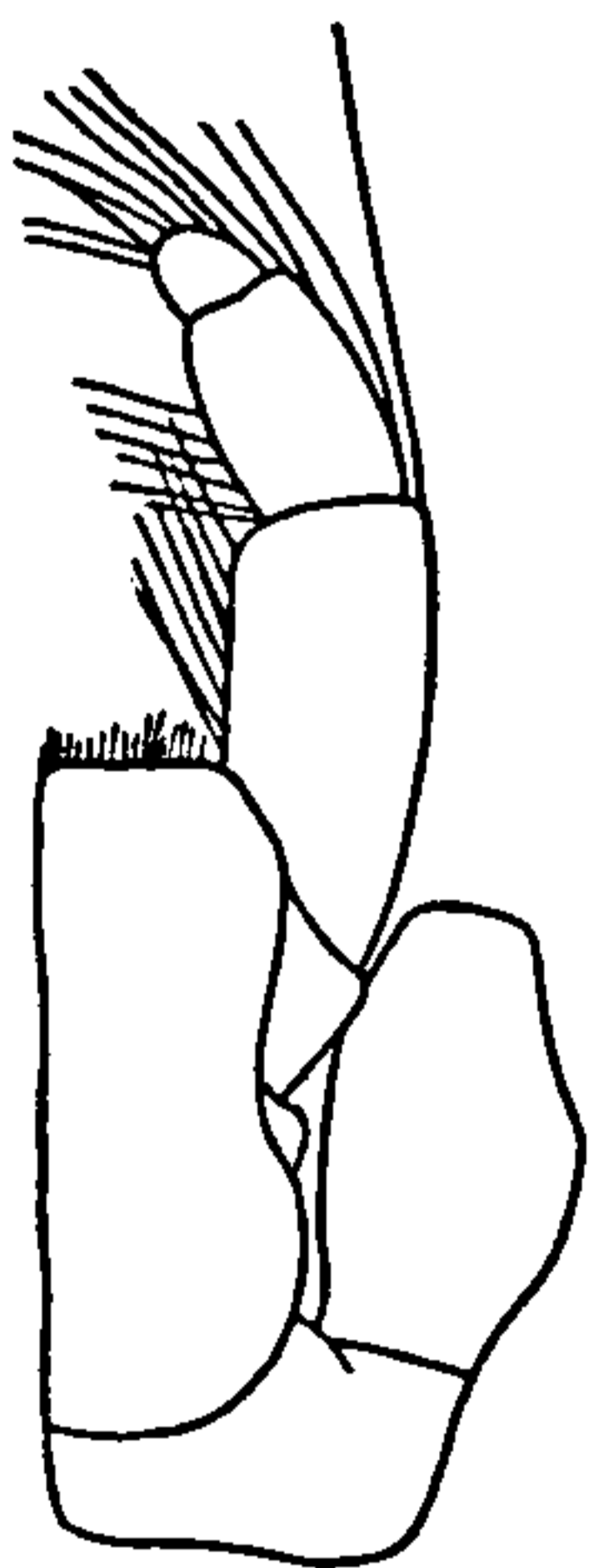


FIG. 370.—ARCTURUS  
BAFFINI VAR. TUBEROSUS.  
MAXILLIPED.  
 $\times 15\frac{1}{2}$ .

The first two segments of the abdomen are short, and each is provided with two low tubercles, one on either side of the median longitudinal line. The terminal segment is long, and produced to an extremity which is somewhat acute. About the middle of the segment, on the dorsal surface, are two low longitudinal ridges, one on either side of the median line. There is also at the base of the segment a blunt projection, almost inconspicuous, on either side of the lateral margin.

The first four pairs of legs are slender, directed forward, and densely covered with long, slender hairs on the inferior margins of all the articles. The first pair are much shorter than the three following



pairs. The last article in all four pairs is very minute; the three preceding articles are long and narrow. The last three pairs of legs are ambulatory.

Ortmann<sup>a</sup> says of this form: "Very young individuals are always without spines, and thus young individuals always belong to the var. *feildeni* (*tuberosus*), although their mother, to whose antennæ they cling, may be a true *baffini*. In larger individuals the spines are developed in a different degree, and there are all intermediate stages between the strongly spinous *A. baffini* and the almost smooth *A. feildeni* (*tuberosus*)."

### 36. Genus PLEUOPRION zur Strassen.<sup>b</sup>

Body with the fourth segment of the thorax not greatly longer than the others. Marsupium as in the genus *Arcturus*. Abdomen composed of only two segments, one segment anterior to the large terminal segment. The head is united at least dorsally with the first thoracic segment. The epimera are not distinct.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS PLEUOPRION.

- a.* Head with three spines on the anterior part in front of the eyes. Third article of the peduncle of the second antennæ not longer than the second article and armed with two spines. Four spines present on posterior portion of head. Two spines present, one on either side of the median line just below the constriction in the fourth thoracic segment. Two longitudinal rows of spines, one on either side of the median line on the terminal abdominal segment. One spine present on basal joint of legs.....*Pleuoprion murdochi* (Benedict)
- a'.* Head with a single spine on the anterior part. Third article of peduncle of second antennæ twice as long as the second article and unarmed. Two spines present on posterior portion of head. Spines absent just below the constriction in the fourth thoracic segment. Longitudinal rows of spines on last abdominal segment absent. Two spines present on coxal joint of legs.  
*Pleuoprion intermedium* (Richardson)

#### PLEUOPRION MURDOCHI (Benedict).

*Arcturus murdochi* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 49-50.—  
RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 855; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 277; American Naturalist, XXXIV, 1900, p. 230.

*Locality.*—Point Franklin, Alaska.

Body narrow, elongate, a little more than three times longer than wide, 3½ mm.: 12 mm.

Head wider than long, 1½ mm.: 3 mm., with the front deeply excavate between the lateral angles. The eyes are small, round, composite, and situated at the sides of the head halfway between the antero-lateral angles and the posterior margin. Just back of the anterior margin of the head are three spines in a transverse row, one median and one on

<sup>a</sup> Proc. Acad. Nat. Sciences, Phila., 1901, pp. 156-157.

<sup>b</sup> Zool. Anzeiger, XXV, 1902, pp. 682-689; XXVI, 1903, p. 31.

either side of the median spine, all three lying between the eyes. The median spine is a little anterior to the other two. On the posterior portion of the head are eight spines in a transverse row, four on either side of the median line. Four of these spines lie between the eyes, one behind each eye, and one lateral to each eye. There is also a spine on each of the antero-lateral projections. The first pair of antennæ have the basal article large and dilated; the second article is almost as long as the first, but much more slender; the third is half as long as the second; the fourth is twice as long as the third. The first pair of antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short, and does not extend beyond the basal article of the first pair of antennæ; the second article is armed with three spines, and extends to the end of the first pair of antennæ; the third article is one and a half times longer than the second, and is armed with two spines; the fourth is two and a half times longer than the third, and is unarmed; the fifth is twice as long as the third, and is unarmed. The flagellum is composed of three articles, the first of which is twice as long as the second; the terminal one is one-third as long as the second. The maxillipeds have a palp of five articles.



FIG. 371.—PLEUROPRION MURDOCHI (AFTER BENEDICT).  $\times 3\frac{1}{4}$ .

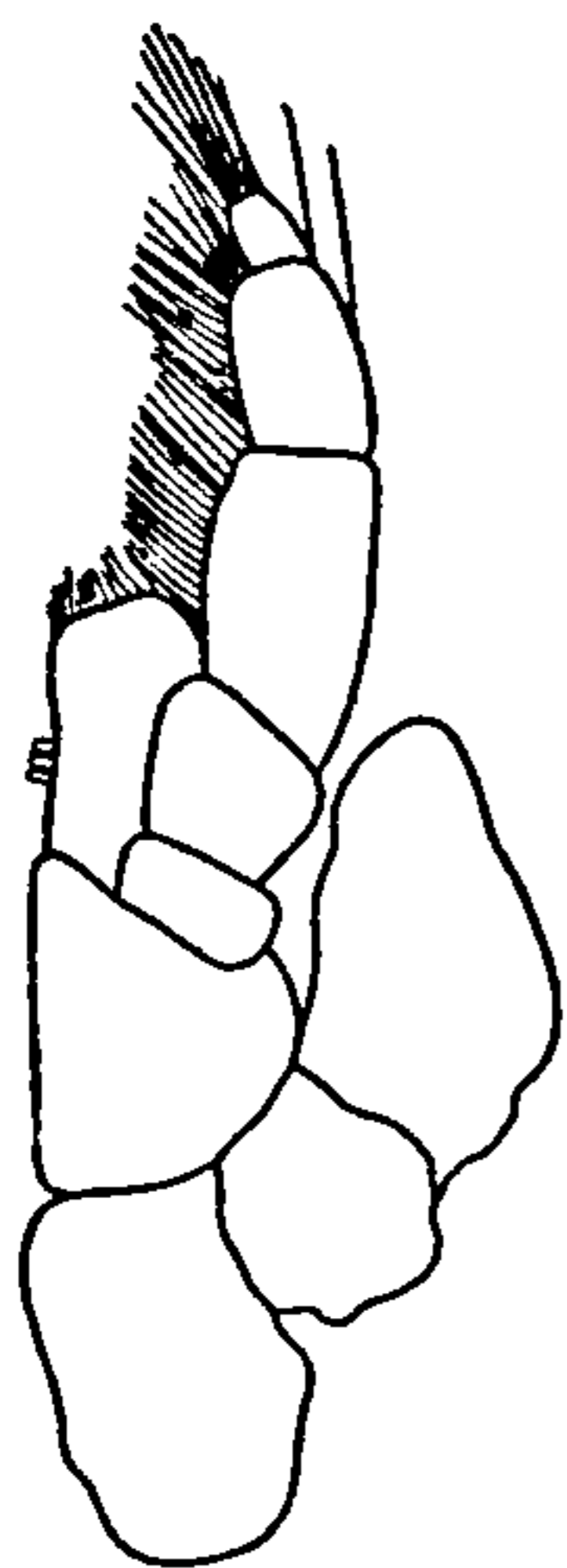


FIG. 372.—PLEUROPRION MURDOCHI. MAXILLIPED.  $\times 27\frac{1}{4}$ .

The first segment of the thorax has eight spines in a transverse row, four on either side of the median line. The second segment has six spines in a transverse row, three on either side of the median line. The third segment has eight spines in a transverse row, four on either side of the median line, and an additional spine on either side anterior to the most lateral one. The fourth segment has two transverse rows of spines, with a constriction between the two rows. The first row has ten spines in a transverse series, five on either side of the median line, with three additional smaller spines, one anterior and one posterior to the most lateral spine, and one anterior to the spine next to the most lateral one; the second row has six spines in a transverse series, three on either side of the median line, with an additional smaller spine posterior to and between the two most lateral spines; there are also two spines anterior to the two median spines and back of the constriction, one on either side of the

median line. The fifth segment has eighteen spines, nine on either side of the median line; they are arranged one on either side of the median line, two in longitudinal series lateral to these, and two other longitudinal series of three each, lateral to the others. The sixth segment has a transverse row of eight spines, four on either side of the median line, with a smaller spine anterior to each one of the larger spines with the exception of the two median ones. The seventh segment has eight spines in a transverse row, four on either side of the median line, with a smaller spine on either side anterior to the most lateral one.

The abdomen is composed of two segments. The first segment has two longitudinal rows of three spines in each row, one on either side of the median line. Lateral to these are two spines on either side in transverse series. The terminal segment has two longitudinal rows of four spines in each row, one on either side of the median line; lateral to each row is another small spine; the lateral margins of the segment are produced on either side in two downward-projecting spines; it terminates posteriorly in two long spines, one on either side of the median line; at the base of the segment, between the longitudinal row and the first laterally projecting spine is a smaller spine, one on either side.

The basis of all the legs is furnished with a small spine.

#### PLEUROPRION INTERMEDIUM (Richardson).

*Arcturus intermedius* RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, pp. 854-855; Ann. Mag. Nat. Hist., (7), IV, 1899, pp. 275-277; American Naturalist, XXXIV, 1900, p. 230.

*Locality*.—Kyska Harbor, Aleutian Islands.

*Depth*.—10 fathoms.

Head with a deep excavation on its anterior margin, the antero-lateral angles being produced in a double process, the inner one rounded, the outer one acutely pointed. Near the anterior margin in the median line is one large spine. Just back of the eyes and between them are two long spines. The lateral margins of the head are produced in two small angulations with a rounded sinus between, posterior to the double antero-lateral process. On the post-lateral margin on either side of the head is a small spine.

The first pair of antennæ are small and short, not reaching to the end of the second joint of the second pair of antennæ. The first joint of the second pair of antennæ is visible and unarmed; the second joint is armed with three spines; the third joint is unarmed, and is about twice as long as the second joint; the fourth and fifth joints are about equal in length and each is about twice as long as the third; the flagellum consists of three joints.

The first, second, and third thoracic segments have a transverse row of six large spines, three on either side of the median longitu-

dinal line, the two center ones being the longest, although all are very long. The fourth segment is twice as long as any of the other segments, and has a transverse constriction on the posterior half of the segment. On the anterior portion are six spines, three on either side of the median line, the four outer ones being in a straight line, the inner two below this line. On the posterior portion are six spines also, three on either side of the median line. The fifth thoracic segment has twelve spines, six on either side of the median line. The sixth segment has ten spines, five on either side. The seventh and last segment has eight spines, four on either side.

The abdomen is composed of two segments. The first is short, with twelve spines, six on either side of the median line, the four inner ones being arranged in two longitudinal series, the two upper ones being small, the two lower ones very long. The terminal segment has the upper surface smooth. This segment terminates in two long divergent spines. There is a single spine on the lateral margin on either side about the middle of the segment, and another near the base of

the segment. The three anterior pairs of legs have each two spines on the coxal joint and one spine on the basis. The body increases in width from the first to the fourth segment, and then decreases in width from the fourth to the terminal segment.

One specimen from Kyska Harbor, Aleutian Islands, 10 fathoms, collected by Dr. W. H. Dall.

*Type*.—Cat. No. 22581, U.S.N.M.

This species differs from *P. murdochi* in the absence of spines on the third joint of the second pair of antennæ; in the greater length of this joint in relation to the preceding joint; in the greater length of the two following joints; in the presence of a single spine on the anterior part of the head, while in *P. murdochi* there are three, and of two spines on the posterior part, while in *P. murdochi* there are four; in the absence of two small spines just below the constriction in the fourth segment; in the absence of the row of spines on the terminal segment of the body; and in the presence of two spines on the coxal joint and one on

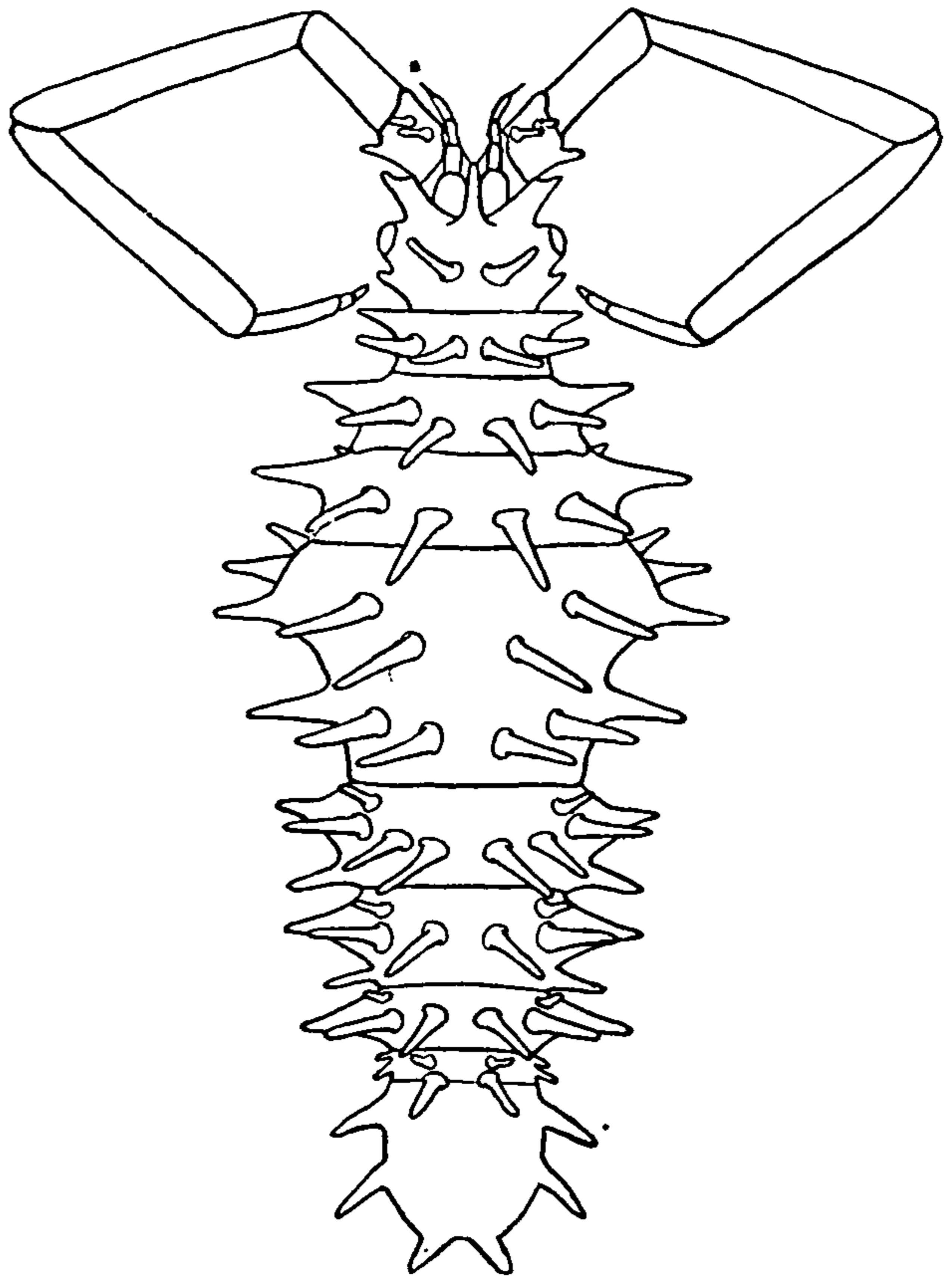


FIG. 373.—PLEUROPRION INTERMEDIUM.  $\times 10$ .

the basal joint of the legs, while in *P. murdochi* there is but one spine on the basal joint.

This species is also distinguished from *P. hystrix*<sup>a</sup> in the presence of a single median spine on the anterior part of the head, while in *P. hystrix* there are two, one on either side of the median line and widely separated; in the presence of two spines on the posterior part of the head, while in *P. hystrix* there are four; in the absence of the double row of spines on the terminal segment of the body; and in the absence of the spine at the articulation of the third joint of the second pair of antennæ.

#### Family XIV. IDOTHEIDÆ.<sup>b</sup>

Body more or less broad, depressed. First pair of antennæ with the flagellum uniarticulate. Second pair of antennæ with the flagellum uniarticulate or multi-articulate. Mandibles without palps.

Segments of thorax of uniform length and appearance. Epimera sometimes distinct and sometimes coalesced with the segments.

Abdomen with some or all of the segments fused to form the large terminal segment.

Legs usually nearly alike and ambulatory, but sometimes the three anterior pairs are pronouncedly subcheliform in structure.

Incubatory pouch normal.

##### ANALYTICAL KEY TO THE GENERA OF THE FAMILY IDOTHEIDÆ.

- a. Sides of head emarginate or cleft and laterally produced beyond the eyes, which are dorsally situated. First three pairs of legs with the sixth article or propodus dilated and forming, with the reflexible dactylus, a subchelate hand.
  - b. Palp of maxillipeds composed of five articles. Inner branch of uropoda minute. Species large.....Genus *Mesidotea*, new genus
  - b'. Palp of maxillipeds composed of three articles. Inner branch of uropoda half as long as outer branch. Species small.....Genus *Chiridotea* Harger
- a'. Sides of head in a dorsal view entire and not laterally produced. Eyes lateral. Legs all nearly alike, with the sixth article or propodus not expanded or but little expanded; seventh article prehensile.
  - b. Flagellum of second pair of antennæ well developed and multi-articulate.
    - c. Abdomen (including the terminal segment) consisting of three segments with lateral sutures of another partly coalesced segment. Epimera of all the segments, from the second to the seventh, inclusive, well developed and distinct from the segments.
      - d. Palp of maxillipeds with four articles.....Genus *Idothea* Fabricius
      - d'. Palp of maxillipeds with five articles.....Genus *Pentidotea*, new genus
    - c'. Abdomen consisting of one segment, with lateral sutures of another partly coalesced segment.
      - d. Palp of maxillipeds with three articles. All the epimera coalesced and perfectly united with the segments.....Genus *Synidotea* Harger

<sup>a</sup> *Arcturus hystrix* Sars.

<sup>b</sup> See Sars for characters of family, Crust. of Norway, II, 1899, pp. 78-79.

*d'*. Palp of maxillipeds with four articles. Epimera of second, third, and fourth segments coalesced and perfectly united with the segments; those of the fifth, sixth, and seventh segments distinct and well developed.

Genus *Colidotea* Richardson

*b'*. Flagellum of second pair of antennæ not multi-articulate.

*c*. Second pair of antennæ shorter than the first pair. Flagellum rudimentary. Epimera of all the segments united with the segments. Abdomen composed of a single segment, with lateral incisions near the base. Maxillipeds with a palp of three articles.....Genus *Edotea* Guérin-Méneville

*c'*. Second pair of antennæ much longer than the first pair. Palp of maxillipeds usually composed of four articles.

*d*. Abdomen consisting of a single segment. Flagellum of second antennæ consolidated to form a single clavate article.

*e*. Epimera of all the segments united with the segments except the last two, which are well developed and distinct. Lateral sutures at base of abdomen indicate another partly coalesced segment.

Genus *Eusymmerus* Richardson

*e'*. Epimera distinct on all the segments of the thorax, including the first. No lateral sutures at base of abdomen....Genus *Erichsonella* Benedict

*d'*. Abdomen consisting of more than one segment. Flagellum of second pair of antennæ consolidated to form a single article or composed of only two or three articles.....Genus *Cleantis* Dana

57. Genus MESIDOTEA, new genus.<sup>a</sup>

Palp of maxillipeds composed of five articles. Sides of head cleft. Eyes dorsally situated. Second pair of antennæ with a multi-articulate flagellum. Epimera of all the segments of the thorax, with the exception of the first, distinctly separated from the segments.

Abdomen composed of four segments, with suture lines at the base of the fourth or terminal segment indicating another partly coalesced segment. First three pairs of legs prehensile, with propodus dilated and dactylus reflexed. Last four pairs of legs ambulatory.

Inner branch of uropoda minute.

Species large.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS MESIDOTEA.

*a*. Articles of the peduncle of the second antennæ not dilated; flagellum composed of from eight to fourteen articles. Antero-lateral cervical lobes prominent. Eyes present.....*Mesidotea entomon* (Linnaeus)

*a'*. Articles of the peduncle of the second antennæ greatly dilated; flagellum composed of from seven to eight articles. Antero-lateral cervical lobes not prominent. Eyes absent.....*Mesidotea sabini* (Krøyer)

<sup>a</sup> This genus is proposed for the two forms, *entomon* and *sabini*, which have been heretofore referred to the genus *Glyptonotus* Eights, and more recently to the genus *Chiridotea* Harger. The genus *Mesidotea* differs from the genus *Glyptonotus* in having the epimera of all the segments of the thorax, with the exception of the first, distinctly separated from the dorsal portion of the segments. In *Glyptonotus* the epimera are separated on the last three segments only. The new genus differs from both *Chiridotea* Harger and *Glyptonotus* Eights in having the palp of the maxillipeds composed of five articles instead of three.

MESIDOTEA ENTOMON (Linnæus).<sup>a</sup>

- Oniscus entomon* LINNÆUS, Syst. Nat., 12th ed., I, Pt. 2, 1767, p. 1060.—PALLAS, Spicil. Zool., IX, 1772, p. 64, pl. v, figs. 1-6.
- Squilla entomon* DE GEER, Mém. pour servir à l'Hist. des Insectes, VII, 1778, p. 514, pl. XXXII, figs. 1-10.
- Asellus entomon* OLIVIER, Encycl. Méth., IV, 1789, p. 253.
- (?) *Cymothoa entomon* FABRICIUS, Ent. Syst., II, 1798, p. 505.
- Idotea entomon* BOSCH, Hist. Nat. des Crust., II, 1802, p. 178.—LATREILLE, Hist. Nat. Crust. et Ins., VI, 1803-4, p. 361; VII, pl. LVIII, figs. 2-3.—(?) LAMARCK, Hist. des Anim. sans Vert., 1st ed., V, 1818, p. 159.—RATHKE, Neuste Schriften der naturf. Gesellsch. in Danzig, I, 1820, p. 109, pl. IV.—(?) DESMAREST, Consid. Crust., 1825, p. 289.—KRØYER, Vid. Selsk. Skrift., VII, 1838, p. 323.—MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 128.—KRØYER, Nat. Tidsskr., II, 1846-49, p. 402.—WHITE, List Cr. Brit. Mus., 1847, p. 93.—BRANDT, Crust. in Middendorf's Sibirische Reise, II, 1851, p. 145.
- (?) *Saduria entomon* ADAMS in WHITE, Sutherland's Voy. Baffin's Bay, Appendix, 1852, p. 207.
- Idotea longicauda* LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 45.
- Idotea entomon* MEINERT, Nat. Tidsskr. (3), XI, 1877, p. 84.—BRANDT, Comptes Rendus, 1880, p. 713; Ann. Mag. Nat. Hist., VI, 1880, p. 98.
- Glyptonotus entomon* MIERS, Trans. Linn. Soc. London, XVI, 1883, pp. 12-13, pl. I, figs. 1-2. (See Miers for further synonymy.)—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 843; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 262.

*Localities.*—Circumpolar; west coast of North America to Pacific Grove, California; Stockholm's skårgård (J. Lindahl); Kielerbucht, Germany; Nakvak, Labrador; Kara Sea.

Found on beach; 5-8 fathoms in sand and gravel; 15 fathoms.

Body ovate, broad anteriorly, and tapering to a narrow pointed extremity; about two and a half times longer than broad, 7 mm.:17 mm. Length of abdomen nearly equal to half the length of entire body, 8 mm.:17 mm.

Lateral margins of head cleft, with the two lobes about equal in size, the anterior one more rounded in outline, the posterior one more acute; the posterior lobe is not produced at the sides beyond the anterior one. The front of the head is deeply excavate between the anterolateral lobes, and there is a small median excavation. The eyes are distinct, small and round, compound in structure, dorsally placed at the base of the lateral cleft. The first antennæ have the basal article enlarged, about twice as wide as the second article and very little longer; the third article is one and a half times longer than the second; the fourth article is just a little longer than the third. The first antennæ extend to the middle of the fourth article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is almost inconspicuous; the second, third, and fourth articles are all short, about equal in length, although the second is nearly twice as wide as the two

<sup>a</sup>The description is from a small specimen. In the adult the flagellum consists of more joints.

following, being as wide as the basal article; the fifth article is one and a half times longer than any of the three preceding ones. The

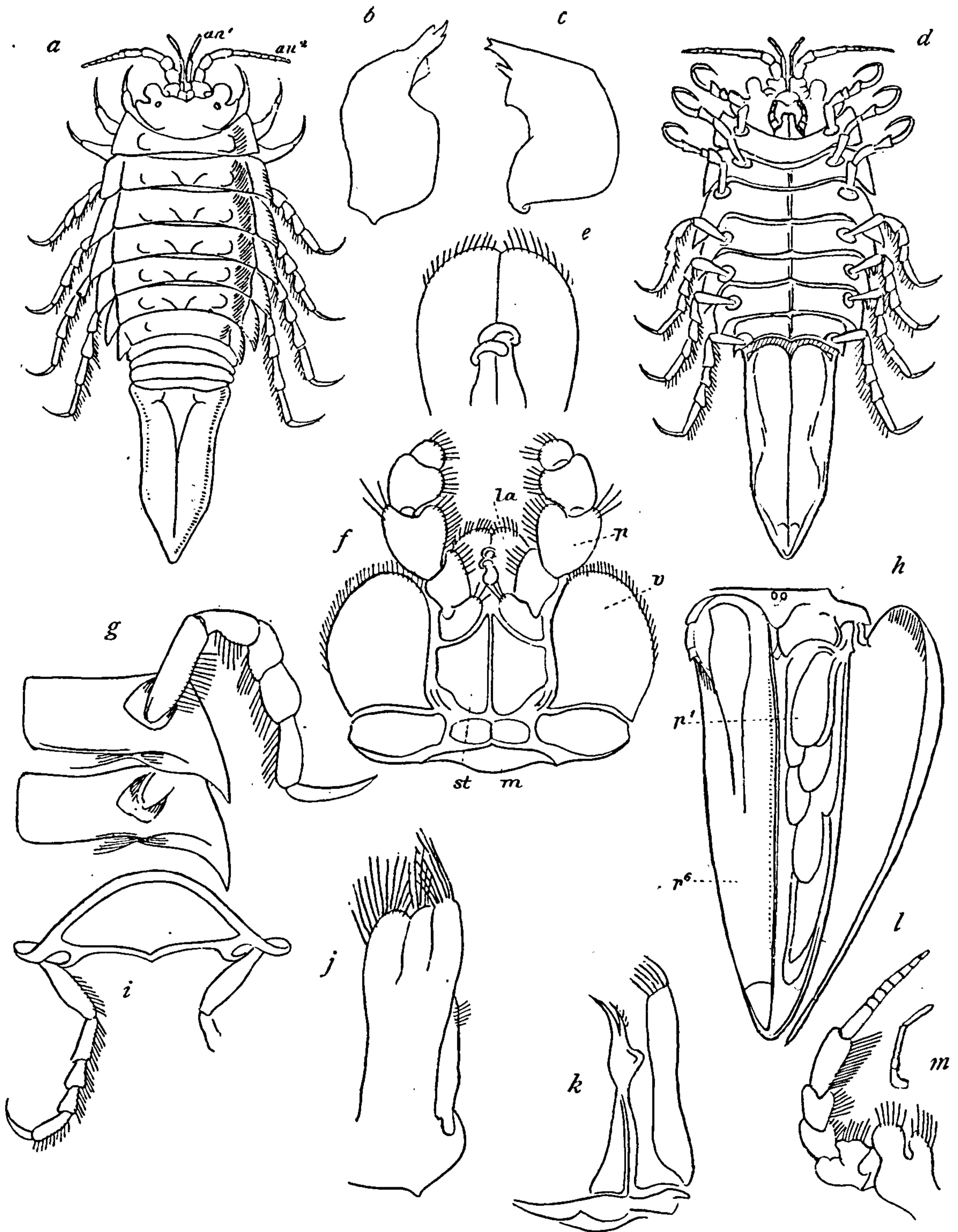


FIG. 374.—MESIDOTEA ENTOMON (AFTER GERSTÄCKER). *a*, DORSAL VIEW.  $\times 1\frac{1}{2}$ . *b*, MANDIBLE. *c*, MANDIBLE. *d*, VENTRAL VIEW.  $\times 1\frac{1}{2}$ . *e*, LABIUM. *f*, MAXILLIPEDS. *g*, HALF OF TWO THORACIC SEGMENTS ABOUT THE MIDDLE, WITH ONE LEG. *h*, ABDOMEN (VENTRAL SIDE). *i*, CROSS SECTION OF A THORACIC SEGMENT ABOUT THE MIDDLE. *j*, SECOND MAXILLA. *k*, FIRST MAXILLA. *l*, SECOND ANTENNA. *m*, FIRST ANTENNA.

flagellum is composed of five articles, the first one being nearly three times as long as any of those following. The maxillipeds have a palp of five articles.



The segments of the thorax are subequal, the first and the last being a little shorter than any of the intermediate ones. The epimera are distinct on all the segments, from the second to the seventh, inclusive, and occupy the entire lateral margin. Those of the last five segments

are greatly produced posteriorly in extremely long; acutely pointed processes,

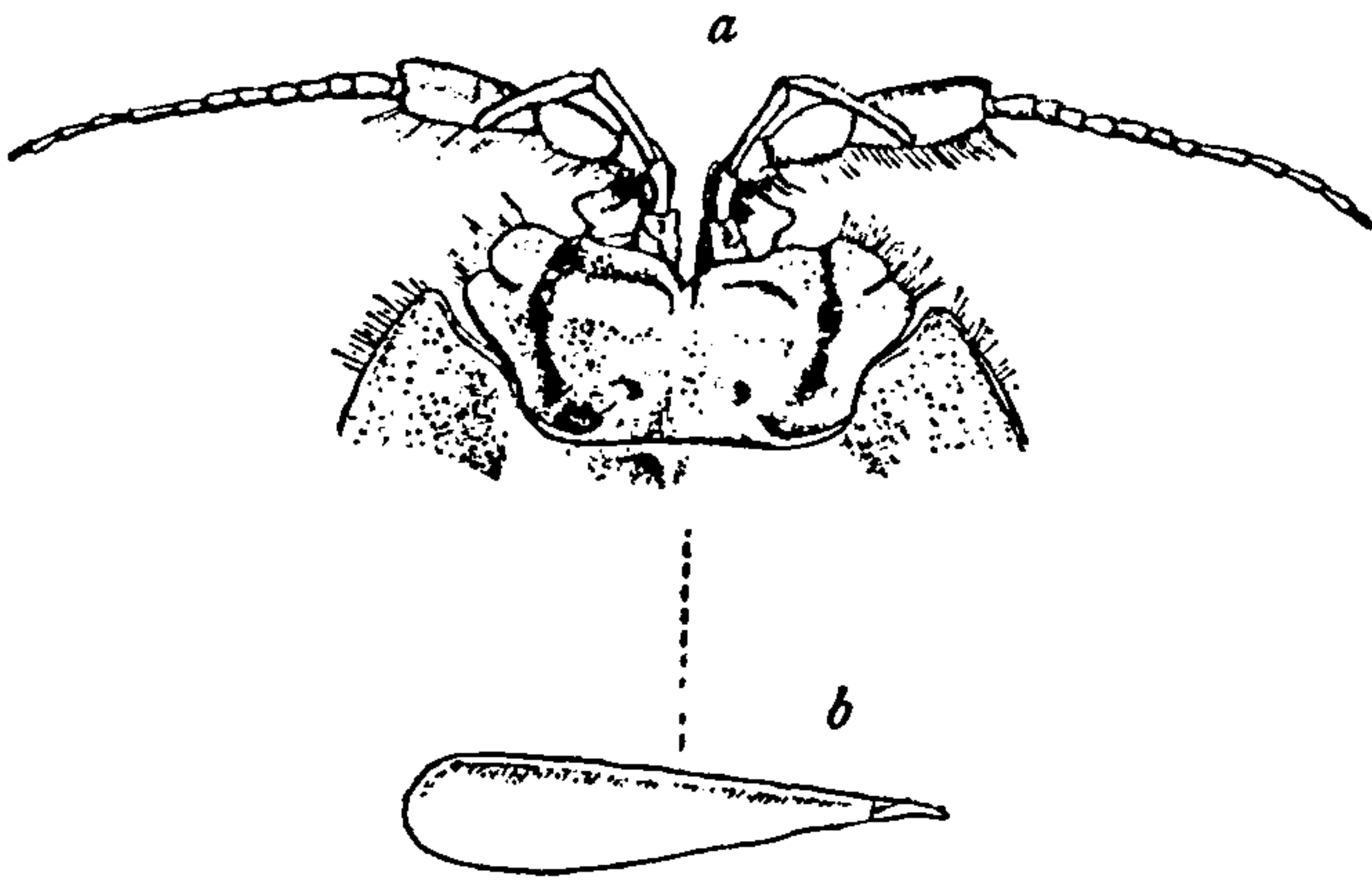


FIG. 375.—MESIDOTEA ENTOMON (AFTER MIERS). *a*, HEAD WITH BOTH ANTENNÆ.  $\times \frac{7}{8}$ . *b*, OPERCULAR VALVE (INNER SIDE).  $\times \frac{8}{9}$ .

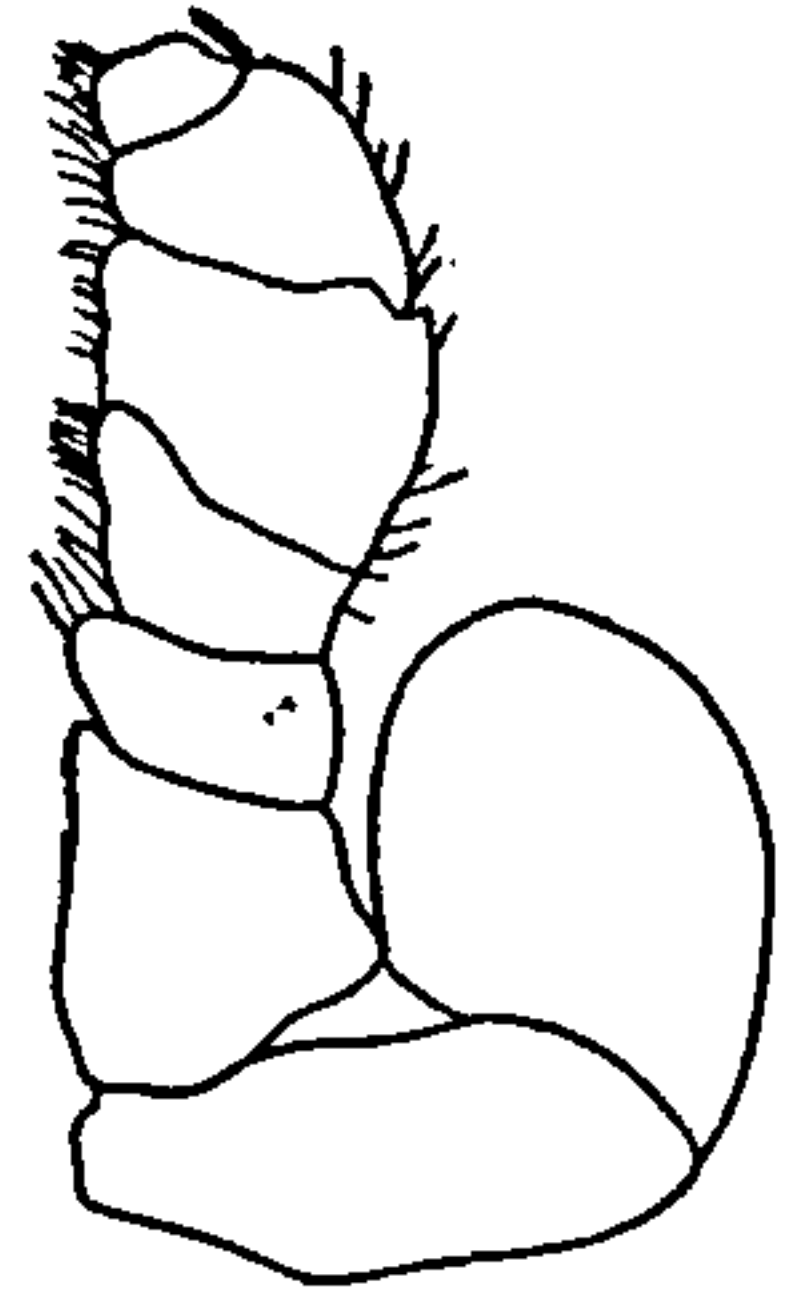


FIG. 376.—MESIDOTEA ENTOMON. MAXILLIPED.  $\times 20\frac{1}{2}$ .

increasing in length to the sixth segment; the epimeron of the seventh segment is only about half as long as that of the sixth.

The first three pairs of legs are subchelate, with propodus dilated, and dactylus reflexed. The inferior margin of the propodus is armed with long and short spines. The last four pairs of legs are ambulatory.

The abdomen is composed of five segments, four short ones, followed by a long terminal segment, partly coalesced with the last short segment. The sides of the terminal segment converge to a narrow pointed extremity, with indications of lateral angles about two-thirds the distance from the base to the extremity of the segment. The opercular valves are in two parts, a large upper portion and a very small terminal portion. Within the valves on the underside is a small lobe attached to the terminal division and representing the inner branch of the modified uropoda.

#### MESIDOTEA SABINI (Krøyer.)

*Idotea sabini* KRØYER, Nat. Tidsskr. (2), II, 1846-49, p. 401.—REINHARDT, Natur. Bidrag til en Beskrivelse af Grønland, 1857, p. 34.—LÜTKEN, List of Crust. of Greenland in Arctic Manual, 1875, p. 149.—SARS, Arch. f. Math. og Naturvidensk., II, 1877, p. 350.

*Glyptonotus sabini* MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 15-17, pl. 1, figs. 3-5.—HANSEN, Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn, 1887-88, p. 187.—AXEL OHLIN, Akademisk Afhandling, XXII, 1895, pp. 13-14.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 844; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 263.

*Chiridotea sabini* STEBBING, Ann. Mag. Nat. Hist. (7), V, 1900, p. 14.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 226; Proc. U. S. Nat. Mus., XXIII, 1901, p. 538.

*Localities.*—Davis Straits; Repulse Bay, North America; Cape Dudley Digges; Cape Faraday; latitude  $73^{\circ} 43'$  north, longitude  $78^{\circ} 48'$  west; latitude  $71^{\circ} 31'$  north, longitude  $49^{\circ} 12'$  east; latitude  $77^{\circ} 14'$  north, longitude  $38^{\circ} 26'$  east; latitude  $71^{\circ} 57'$  north, longitude  $73^{\circ} 56'$  west; latitude  $71^{\circ} 42'$  north, longitude  $73^{\circ}$  west; latitude  $66^{\circ} 33'$  north, longitude  $61^{\circ} 50'$  west; Julianehaab and Ivsugigsok, Greenland; Cape Smyth, Alaska; Point Barrow, Alaska; Ooglaamie, Alaska; Kara Sea; circumpolar.

*Depth.*—Surface to 76 fathoms, in mud on beach.

Body narrow, elongate, broad anteriorly and tapering gradually from the

middle of the body to the long, pointed terminal segment. Length of body almost four times its greatest breadth, 11 mm. : 40 mm. Length of abdomen almost half the length of entire body, 19 mm. : 40 mm. These measurements are from a small specimen.

Head with the lateral margins cleft, the posterior lobe being much the larger and produced some little distance beyond the anterior lobe. Front deeply excavate between the lateral lobes, with a small median

excavation also. Eyes absent. First pair of antennæ with the basal article large, triangular in shape, the broad posterior extremity tapering to a narrow apex at the anterior end; the second article is short, about half as long as the basal article; the third is twice as long as the second; the fourth is a little longer than the third. The first antennæ extend to the third peduncular article of the second pair of antennæ. The basal article of the second antennæ is short, not reaching beyond the antero-lateral angles; the second article has the exterior margin produced in a rounded expansion, and is twice as long as the basal article; the third article is only half as long as the second; the fourth

is a little longer than the third, and has a large, round expanded process on the inferior margin and a small expansion on the exterior margin; the fifth article is about twice as long as the third, and is broadly expanded. The flagellum consists of six articles. The second pair of antennæ extend to the middle of the first thoracic segment. The maxilliped has a palp of five articles.

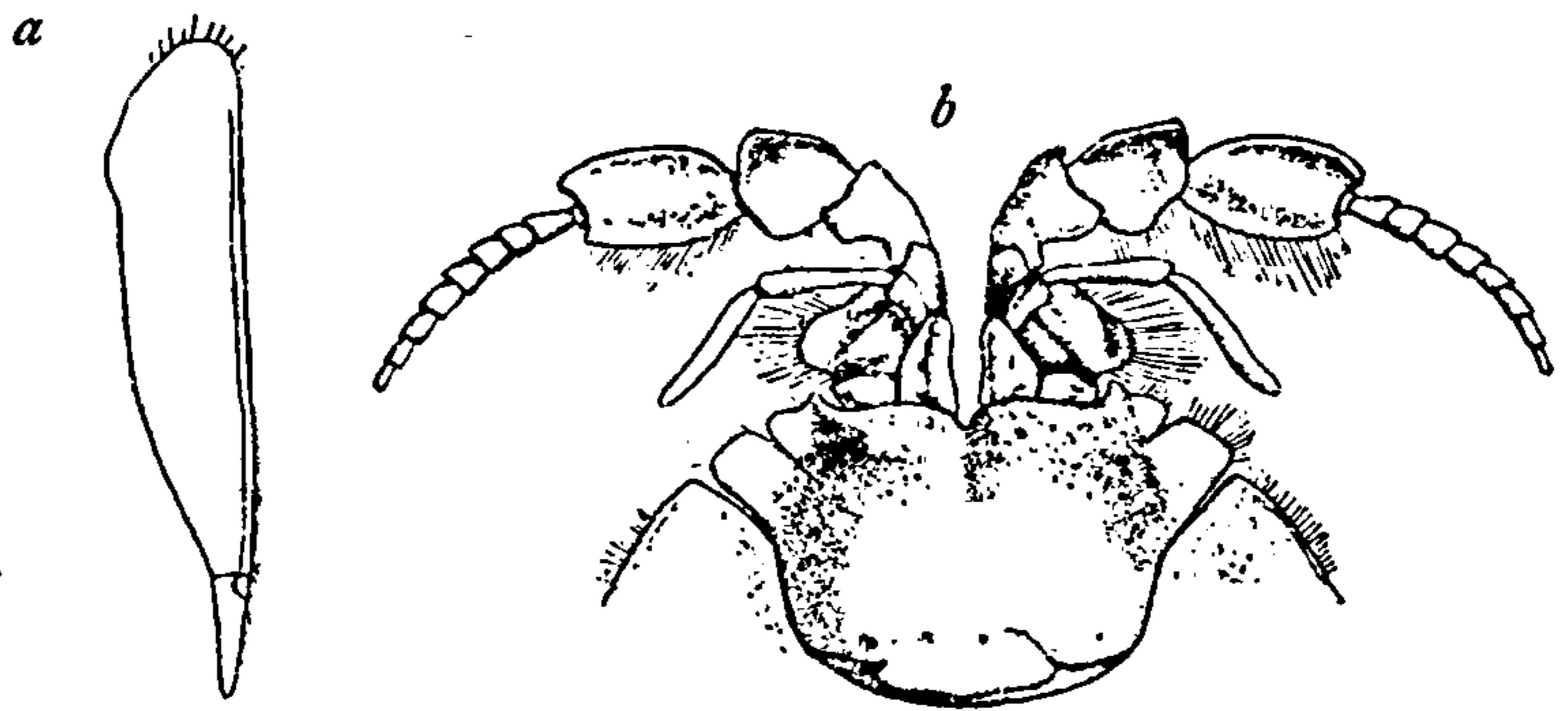


FIG. 377.—MESIDOTIA SABINI (AFTER MIERS). *a*, OPERCULAR VALVE (INNER SIDE).  $\times \frac{2}{3}$ . *b*, HEAD WITH BOTH PAIRS OF ANTENNAE.  $\times \frac{1}{6}$ .

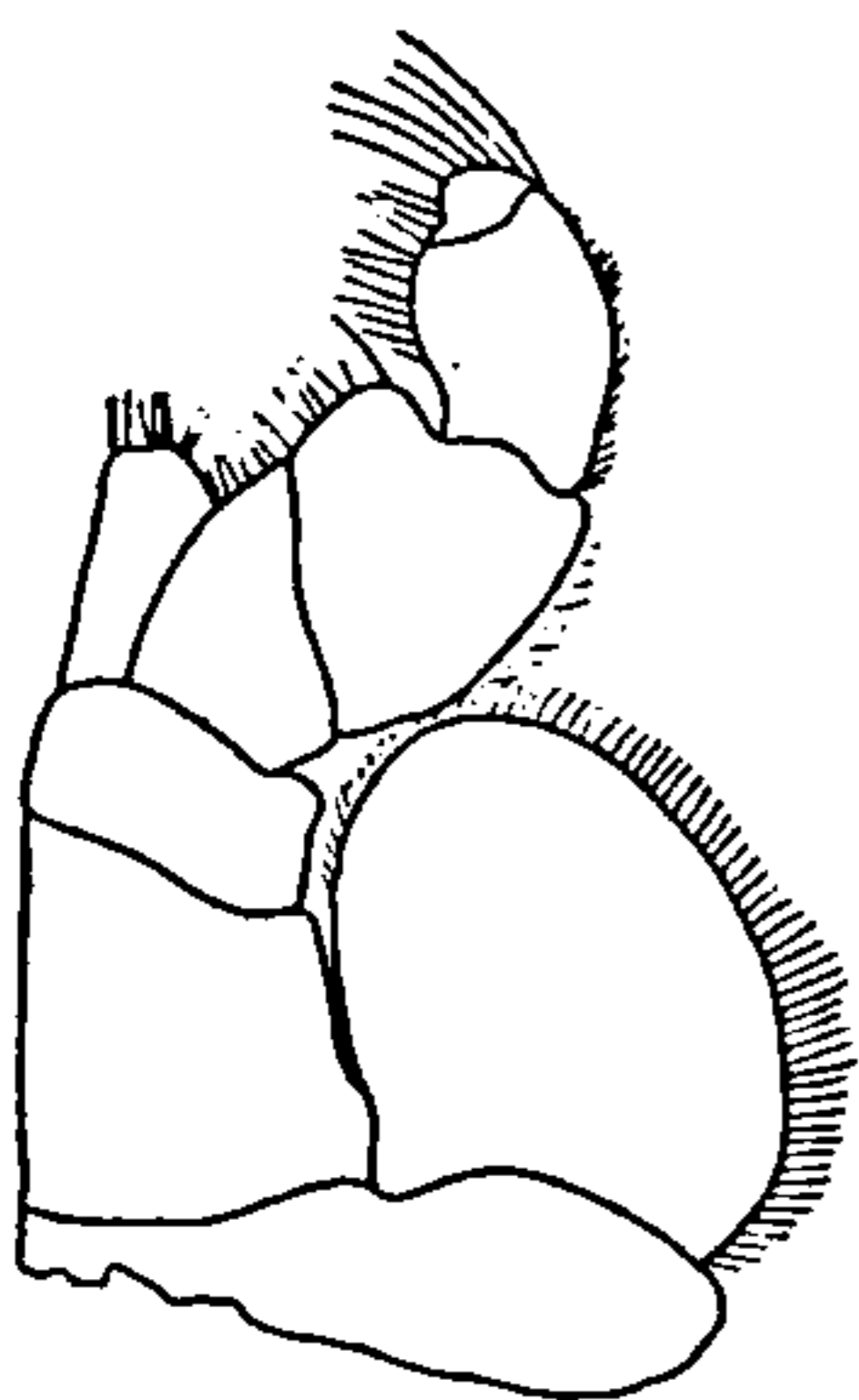


FIG. 378.—MESIDOTIA SABINI. MAXILLIPED.  $\times 11\frac{1}{2}$ .

The segments of the thorax are about equal in length. The epimera of all the segments from the second to the seventh, inclusive, are distinct and occupy the whole of the lateral margin; they are large plates which in the last four segments are produced into very long, acutely pointed extremities.

The first three pairs of legs are subchelate, with propodus expanded and dactylus reflexed. The last four pairs of legs are ambulatory. The inferior margin of the propodus in the first three pairs of legs is armed with numerous long spines alternating with several short ones.

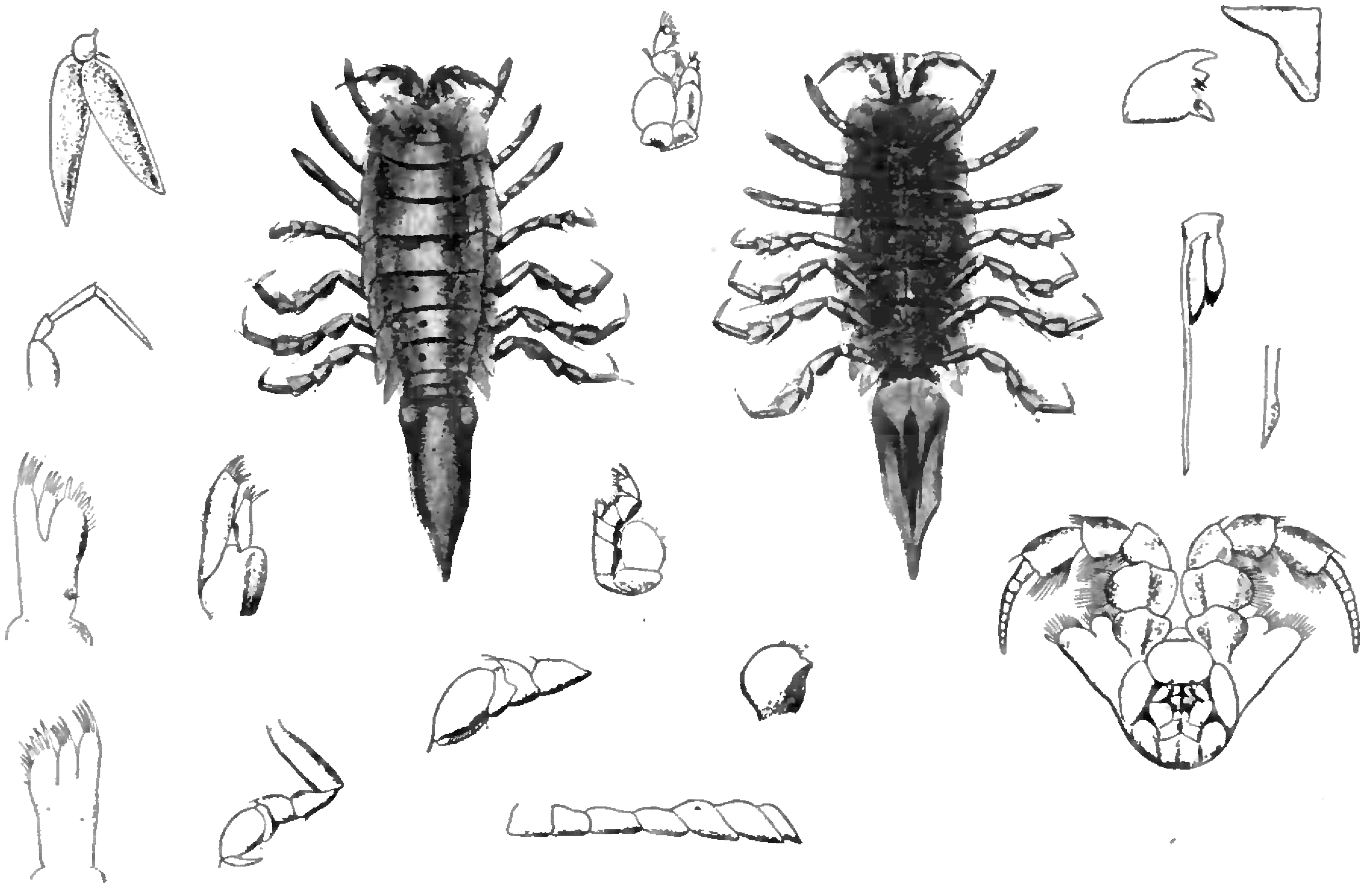


FIG. 379.—MESIDOTIA SABINI (AFTER KRØYER). SHOWING DETAILED PARTS.

The abdomen is composed of five segments, four short ones followed by a very long terminal one partly coalesced with the last short segment. The terminal segment tapers to an extremely long, pointed extremity. About halfway from the base to the end of this segment is a slight indication of an angle on either side, possibly rudiments of lateral angles. The opercular valves are each in two parts, a large basal part and a short, narrow, pointed terminal part, the exterior branch; the inner branch is seen on the underside as a small oval lobe at the base on the exterior side of the other branch.

#### 58. Genus CHIRIDOTEA Harger.

Palp of maxillipeds composed of three articles. Sides of head cleft. Eyes dorsally situated. Second antennæ with a multi-articulate flagellum. Epimera of all the segments of the thorax with the exception of the first distinctly separated from the segments. Abdomen com-

posed of four segments with lateral sutures at the base of the fourth, or terminal segment, indicating another partly coalesced segment. First three pairs of legs prehensile, with propodus dilated and dactylus reflexed. Last four pairs of legs ambulatory.

Inner branch of uropoda half as long as inner branch.

Species small.

ANALYTICAL KEY TO THE SPECIES OF THE GENUS CHIRIDOTEA.

- a. First pair of antennæ extend beyond the peduncle of the second antennæ. Second antennæ short, extending only to the anterior margin of the first thoracic segment. Front of head not excavate between the antero-lateral lobes, but slightly excavate in the middle of the anterior margin.... *Chiridotea cæca* (Say)
- b. First pair of antennæ extend to the middle of the fifth article of the peduncle of the second antennæ. Second antennæ long, extending to the posterior margin of the sixth thoracic segment. Front of head deeply excavate between the antero-lateral angles..... *Chiridotea tuftsii* (Stimpson)

CHIRIDOTEA CÆCA (Say).

*Idotea cæca* SAY, Jour. Acad. Nat. Sci. Phila., I, 1818, p. 424.—MILNE EDWARDS, Hist. Nat. des Crust., III, 1840, p. 131.—GUÉRIN, Iconog., Crust., 1843, p. 35.—HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, Pt. 1, 1873, p. 569 (275), pl. v, fig. 22.

*Chiridotea cæca* HARGER, Am. Jour. Sci., XV, 1878, p. 374; Proc. U. S. Nat. Mus., II, 1879, p. 159; Report U. S. Commissioner of Fish and Fisheries, Pt. 6, 1880, pp. 338-340, pl. iv, figs. 16-19.

*Glyptonotus cæcus* MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 17-18.

*Chiridotea cæca* RICHARDSON, American Naturalist, XXXIV, 1900, p. 226; Proc. U. S. Nat. Mus., XXIII, 1901, p. 539.

*Localities*.—Florida; New Haven, Connecticut; Woods Hole, Massachusetts; Tarpaulin Cove, Naushon; S. W. end of Campobello, New Brunswick; Cohasset, Massachusetts; Long Island Sound; Vineyard Sound; Nantucket, Provincetown, Nahant, Massachusetts; Halifax, Nova Scotia; New England coast.

*Depth*.—Surface; low water; shore; swimming in fish weir; sand.

Body ovate, broad and short, tapering to a pointed extremity; twice as long as broad, 4 mm. : 8 mm. Length of abdomen, one-half the length of entire body, 4 mm. : 8 mm.

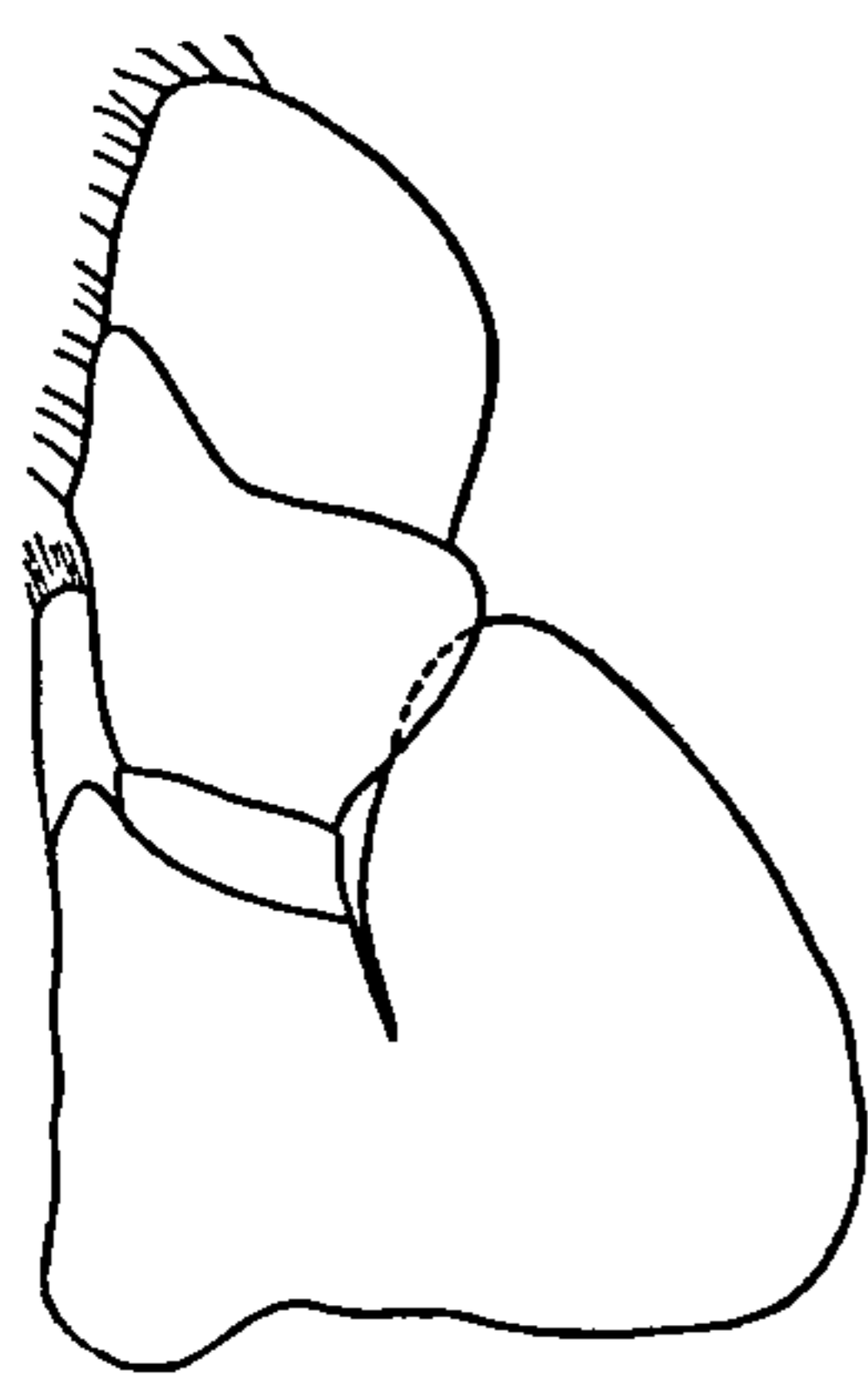


FIG. 381.—CHIRIDOTEA CÆCA. MAXILLIPED.  $\times 51\frac{1}{2}$ .

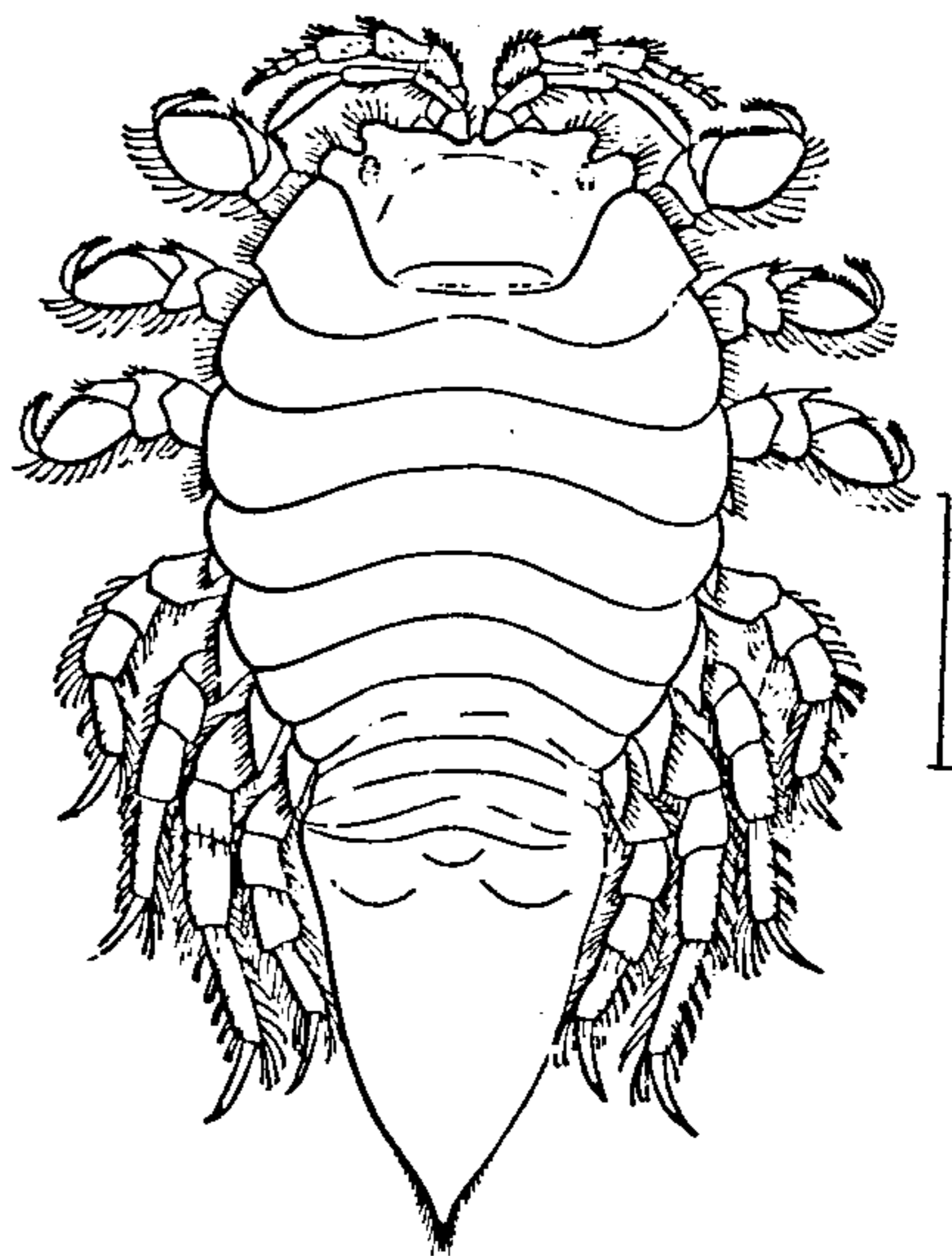


FIG. 380.—CHIRIDOTEA CÆCA (AFTER HARGER).

The lateral margins of the head are cleft, the anterior lobe being smaller than the posterior, which projects at the sides beyond the anterior one. The front of the head is not excavate between the antero-lateral lobes, but on the contrary is expanded beyond them. There is a pronounced median excavation, in the center of which is a median point. The eyes are small, round, compound in structure, dorsally placed at the base of the post-lateral lobe. The first antennæ have the basal article very short and not dilated; second article a little longer than the first; third and fourth equal in length and each about twice as long as the first. The first antennæ extend a little beyond the end of the peduncle of the second antennæ. The basal article of the second antennæ is inconspicuous from a dorsal view; the second, third, and fourth articles are subequal; the fifth is a little longer than the fourth. The flagellum consists of five articles. When retracted, the second antennæ reach the anterior margin of the first thoracic segment. The maxillipeds have a palp of three articles.

The segments of the thorax are equal in length. The epimera are separated dorsally from the first three segments, but are not acutely produced posteriorly. The epimera of the last four segments are also distinct, and are produced into acutely pointed processes.

The first three pairs of legs are subchelate, with propodus expanded, the dactylus short and reflexed. The last four pairs of legs are ambulatory. All the legs are thickly beset with spines and hairs along the free margins.

The abdomen is composed of four segments, three short ones followed by a long-pointed terminal one, with lateral sutures of another partly coalesced segment. The apex of the terminal segment is acute and its lateral margins near the extremity are denticulate. The sides of the abdomen taper gradually to about the middle and then converge more rapidly to the apex, forming slight angles on either side halfway from the base to the apex.

The opercular valves are in two parts, the small terminal part representing the outer branch of the uropoda. The inner branch is represented on the under side attached to the basal portion on the exterior side.

#### CHIRIDOTEA TUFTSII (Stimpson).

*Idotea tuftsii* STIMPSON, Smithsonian Contributions to Knowledge, VI, 1853, p. 39.—HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, Pt. 1, 1873, p. 340 (46); p. 569 (275).—VERRILL, Proc. Amer. Assoc., 1874, p. 362.

*Chiridotea tuftsii* HARGER, Am. Jour. Sci., XV, 1878, p. 374; Proc. U. S. Nat. Mus., II, 1879, p. 159; Report U. S. Commissioner of Fish and Fisheries, Pt. 6, 1880, pp. 340-341, pls. iv, figs. 20-23.

*Glyptonotus tuftsii* MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 18-19.

*Chiridotea tuftsii* RICHARDSON, American Naturalist, XXXIV, 1900, p. 226; Proc. U. S. Nat. Mus., XXIII, 1901, p. 539.

*Localities.*—Bay of Fundy; Long Island Sound; Massachusetts Bay; Casco Bay, Maine; Princes Cove, Eastport; Halifax, Nova Scotia; near Halfing Rock, channel outside Bakers Island.

*Depth.*—Surface to 25 fathoms, in fine sand.

Body ovate, less than twice as long as wide,  $3\frac{1}{2}$  mm.: 6 mm.

Head twice as wide as long, 1 mm.: 2 mm., with the front deeply excavate between the antero-lateral angles, and produced in a small median point.

The sides of the head, where the lateral margin is free, are cleft, the posterior lobe formed by the cleft margin being produced laterally beyond the anterior lobe. The posterior portion of the head is deeply set in the first thoracic segment. The eyes are small, round, composite, and situated just within the cleft on the lateral margin. The first pair of antennæ have the basal article large and somewhat dilated; the second article is one and a half times longer than the first; the third is one and a half

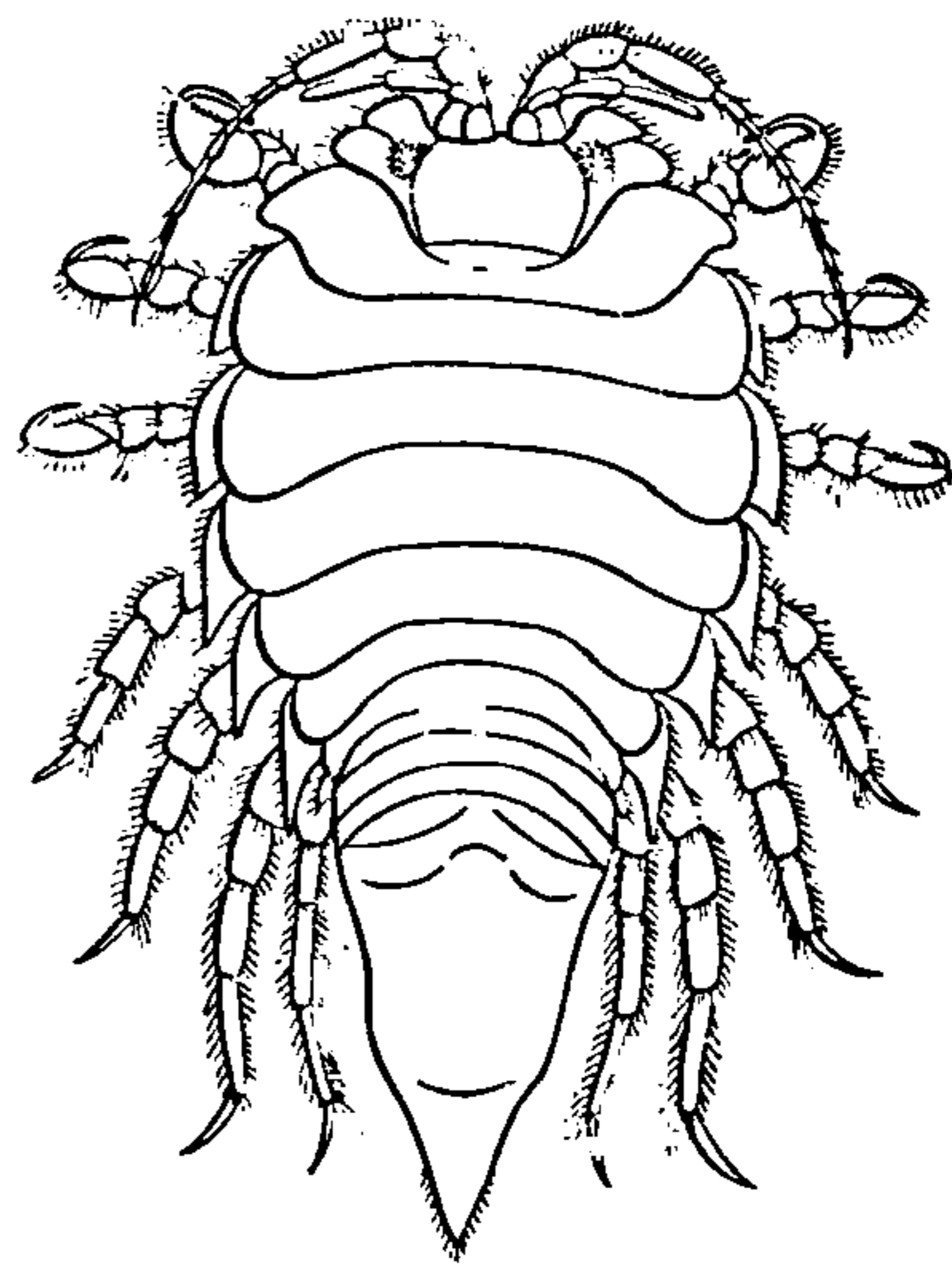


FIG. 382.—CHIRIDOTEA TUFTSII  
(AFTER HARGER).

times longer than the second; the fourth is as long as the third. The first antennæ extend to the middle of the fifth article of the peduncle of the second pair of antennæ. The second antennæ have the basal article short, and concealed in a dorsal view; the second article is twice as long as the first; the third is a little shorter than the second; the fourth is about as long as the second; the fifth is as long as the third and fourth taken together. The flagellum is composed of 11 or 12 articles in one specimen, of 14 in another specimen, and extends to the posterior margin of the sixth thoracic segment. The palp of the maxillipeds is composed of three articles.

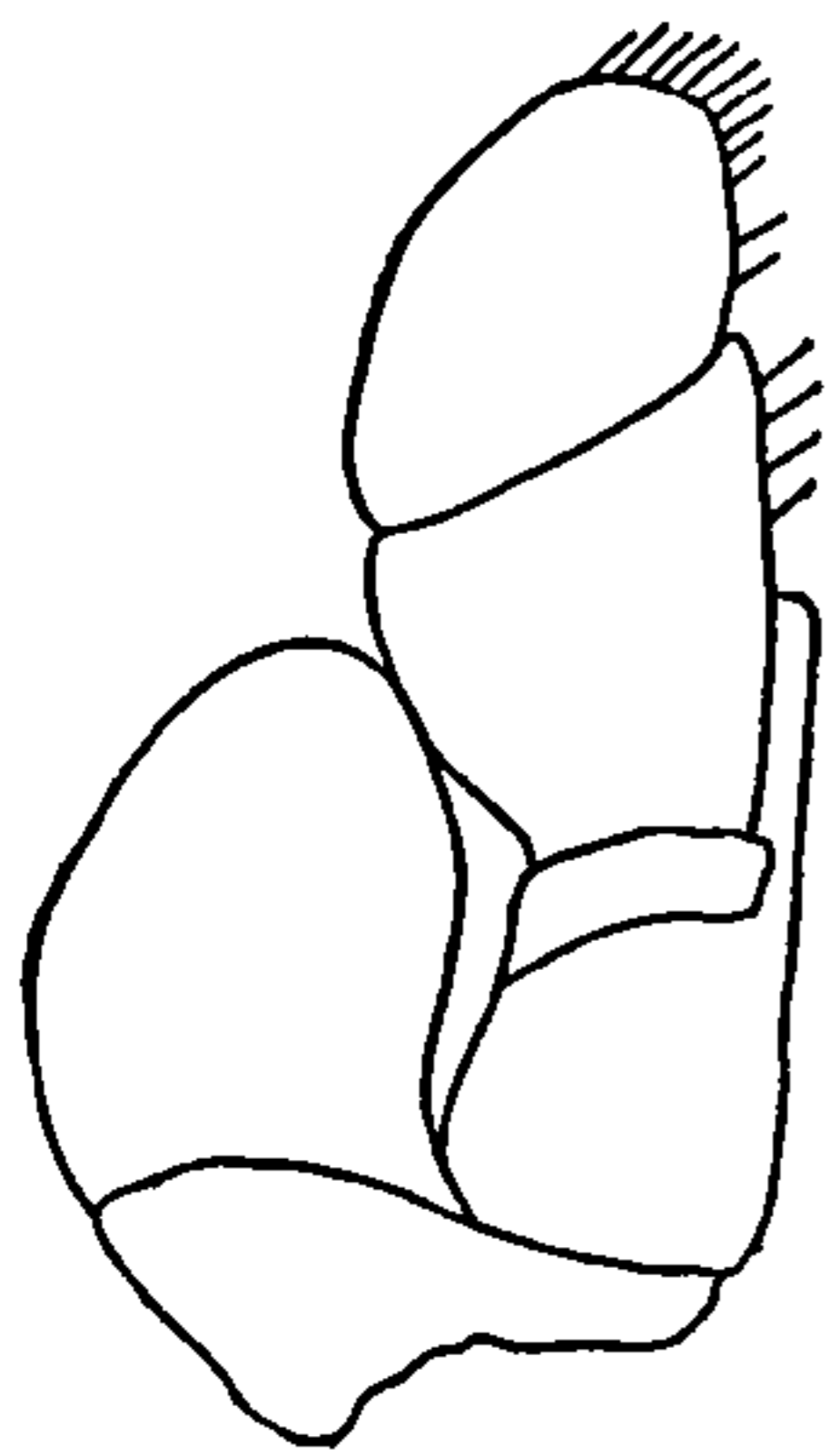


FIG. 383.—CHIRIDOTEA  
TUFTSII. MAXILLIPED.  
× 51 $\frac{1}{2}$ .

The first segment of the thorax has the antero-lateral parts produced forward to surround the posterior half of the head. The epimera are distinctly separated in all the segments, with the exception of the first, and are wide plates, with the outer post-lateral angles of the last four acutely produced.

The abdomen is composed of four distinct segments, the fourth or terminal segment being  $2\frac{1}{2}$  mm. in length and one-half mm. wide at the base, and having lateral sutures, indicative of another partly coalesced segment. It is acutely produced at its posterior extremity.

The first three pairs of legs are prehensile, the last four pairs ambulatory.

## 59. Genus IDOTHEA Fabricius 1799.

Flagellum of second antennæ multi-articulate. Maxillipeds with a palp composed of four articles. Epimera of all the segments of the thorax, with the exception of the first, distinctly separated from the segments. Abdomen composed of three segments, with a suture line on either side at the base of the terminal segment, indicating another partly coalesced segment.

## ANALYTICAL KEY TO THE SPECIES OF THE GENUS IDOTHEA.

- a. Body slender, linear, filiform.
- b. Terminal segment of body truncate at its posterior extremity; post-lateral angles not prominent.....*Idothea gracillima* (Dana)
- b'. Terminal segment of body not truncate at its extremity; post-lateral angles prominent.
- c. Post-lateral angles of terminal segment prominent and separated by a notch from the triangular middle portion.
- d. Terminal segment with middle portion obtuse and produced at the apex in a small point. Lateral angles obtuse.....*Idothea urotoma* Stimpson
- d'. Terminal segment with middle portion of posterior extremity very acutely produced. Lateral angles acute.....*Idothea fewkesi*, new species
- c'. Post-lateral angles not separated by a notch from the subtriangular middle portion, which does not bear a tooth at the middle; the line from the apex to the lateral angle is straight.....*Idothea rectilinea* Lockington
- a'. Body oblong-ovate.
- b. Terminal segment of body truncate at its extremity.....*Idothea metallica* Bosc
- b'. Terminal segment of body not truncate at its extremity.
- c. The epimera of all the segments, from the second to the seventh inclusive, occupy the entire lateral margins of the segments...*Idothea baltica* (Pallas)
- c'. The epimera of all the segments of the thorax, from the second to the seventh inclusive, do not occupy the entire lateral margins of the segments.
- d. Terminal segment of body with distinct and prominent post-lateral angles. Basal article of the first pair of antennæ very much dilated.  
*Idothea ochotensis* Brandt
- d'. Terminal segment of body without distinct post-lateral angles, the sides of the abdomen tapering to a pointed extremity. Basal article of first pair of antennæ not dilated.....*Idothea phosphorea* Harger

## IDOTHEA GRACILLIMA (Dana).

*Stenosoma gracillimum* DANA, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 175.—STIMPSON, Bost. Jour. Nat. Hist., VI, 1857, p. 505.

*Idothea gracillima* MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 35.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 844; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 264; American Naturalist, XXXIV, 1900, p. 226; Harriman Alaska Expedition, Crust., X, 1904, pp. 216-218; Proc. U. S. Nat. Mus., XXVII, 1904, pp. 661-663.

*Localities*.—California; Bolinas, California.

The description of this species given by Professor Dana is very short and rather vague. He describes the body as extremely slender and

filiform, the thoracic segments subquadrate, head quadrate. He refers to the linear post-abdomen, which is truncated at the apex, three-jointed, and marked on either side with a suture. The antennæ are described as being a little shorter than half the body, with a ten- to twelve-jointed flagellum.

A species of *Idothea* was sent to the U. S. National Museum by Doctor Ritter. The specimens, which are eight in number, were collected by him at Bolinas, California. They are more closely allied to *I. gracillima* than to any other known species of *Idothea* from the Pacific coast of North America. Until evidence can be given of their distinctness, I shall consider them identical with *I. gracillima* (Dana).

Body slender, about seven times longer than wide,<sup>a</sup> with the sides nearly parallel. Surface entirely smooth. Color in alcohol uniformly pinkish. A note referring to the color of the specimens in life says that they are green, brown, and striped.

Head quadrate, with rounded antero-lateral margins, and a slight median excavation in the anterior margin. Eyes situated at the extreme lateral edge and about the middle of the head; they are small but distinct.

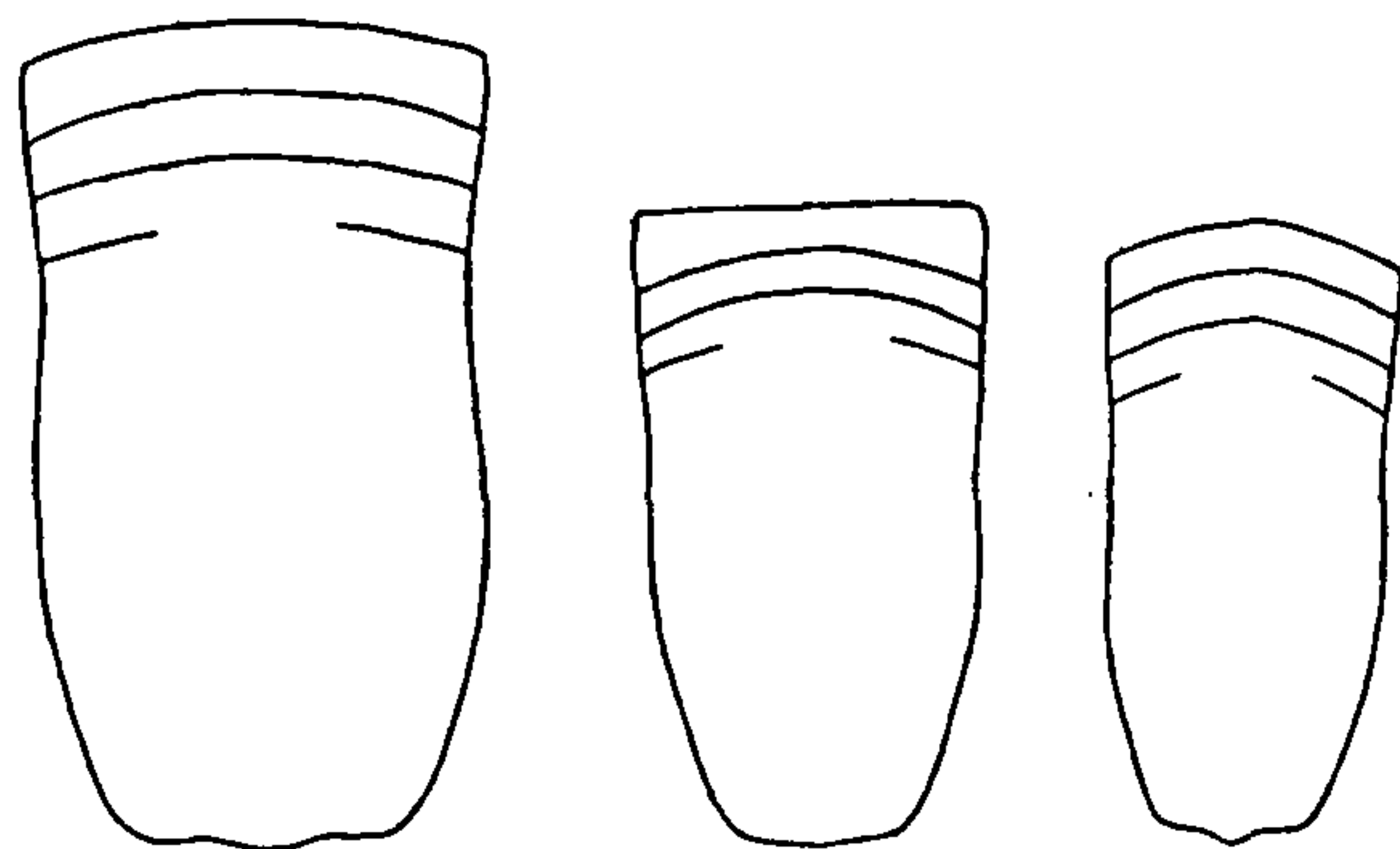


FIG. 385.—*IDOOTHEA GRACILLIMA*. ABDOMEN, SHOWING VARIATIONS IN FORM.

The first thoracic segment is short in the middle but is produced antero-laterally on either side; it is not wider than the head. The second, third, and fourth segments are subequal in length and are longer than the first segment. The fifth, sixth, and seventh segments gradually decrease in length. The epimera of all the segments are extremely narrow; those of the second and third segments extend but half the length of the segment; those of the fourth and fifth segments

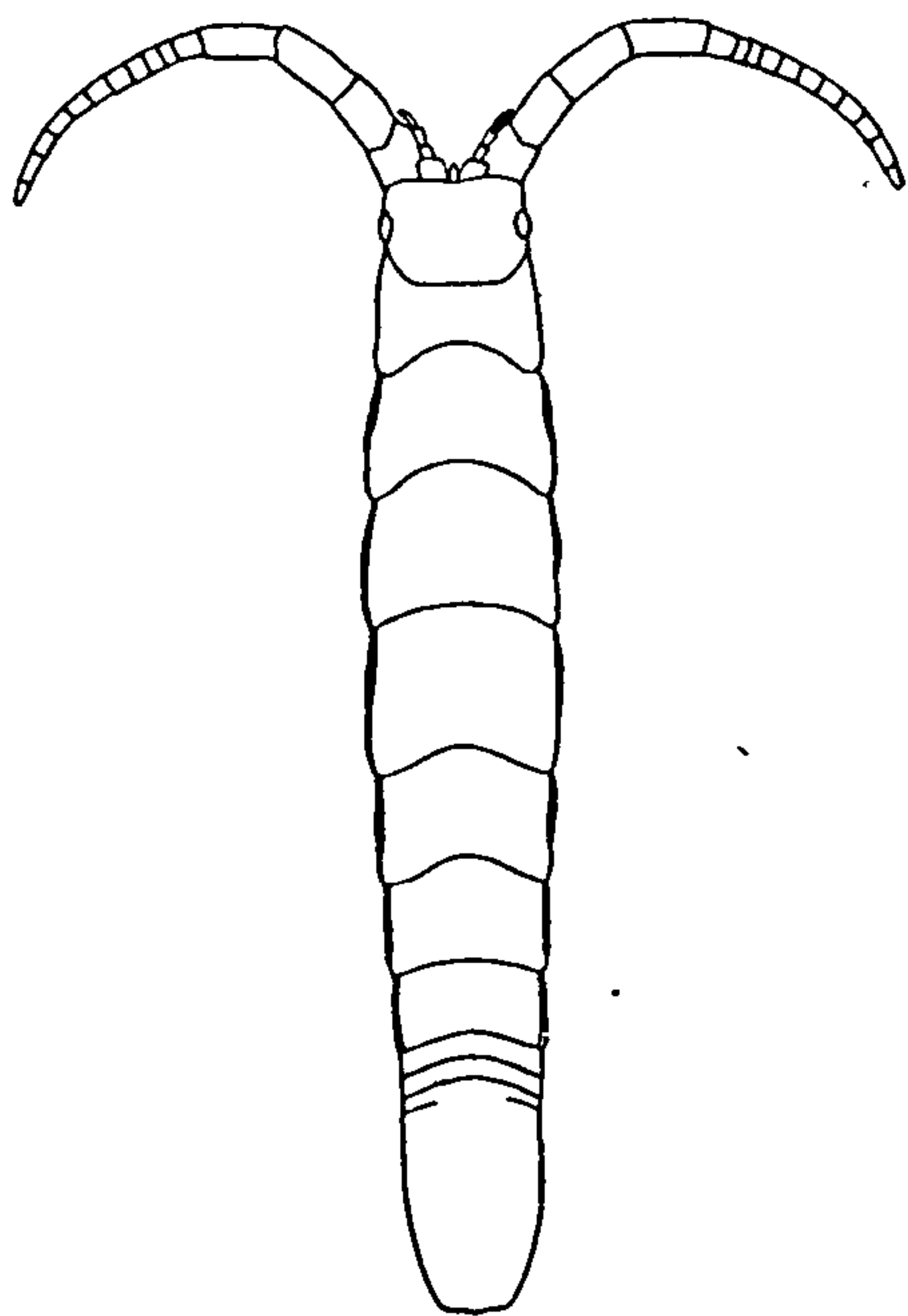


FIG. 384.—*IDOOTHEA GRACILLIMA*. × 5.

The first pair of antennæ are four-jointed, and extend a little beyond the extremity of the second peduncular joint of the second pair of antennæ. The second pair of antennæ are equal to half the length of the body; the last two joints of the peduncle are subequal; in the smaller specimens the flagellum is composed of ten joints; in the larger ones there are eighteen joints.

<sup>a</sup>The female is figured. The body is somewhat broader than in the male.



extend three-fourths the length of the segment; those of the last two segments extend the entire length of the segment.

The abdomen consists of three distinct segments, with suture lines on either side of another partly coalesced segment. The third or terminal segment has subparallel sides to about the middle, where the segment gradually becomes narrower to a truncate extremity. On the posterior margin of the terminal segment is a faint indication of a double emargination on either side of an obtuse median point.

Legs small and slender and devoid of hairs.

The five small specimens and one large one agree in having the terminal segment as described above. The two larger specimens show the double emargination more distinctly, one of the specimens more so than the other.

Figures showing all three variations are given.

The specimens agree in all other characters.

Dana's specimens were collected by Prof. J. Le Conte on the coast of California.

#### IDOTHEA UROTOMA Stimpson.

*Idotea urotoma* STIMPSON, Proc. Acad. Nat. Sci. Phila., XVI, 1864, p. 155.—MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 34.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 845; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 264; American Naturalist, XXXIV, 1900, p. 226.

*Locality*.—Puget Sound.

Body linear, elongate, nearly four and a half times longer than broad, 4 mm. : 17½ mm.

Head as wide as first segment of thorax and 2½ mm. long. Eyes small, round, and situated close to the lateral margins. The first pair of antennæ have the basal article large, dilated; the second and third are small and narrow, subequal; the fourth is clavate. The first pair of antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The joints of the peduncle of the second antennæ are short and thick; the first article is inconspicuous in a dorsal view; the second and third articles are subequal; the fourth and fifth are subequal and each is about one and a half times longer than the third article. Flagellum composed of eleven articles.

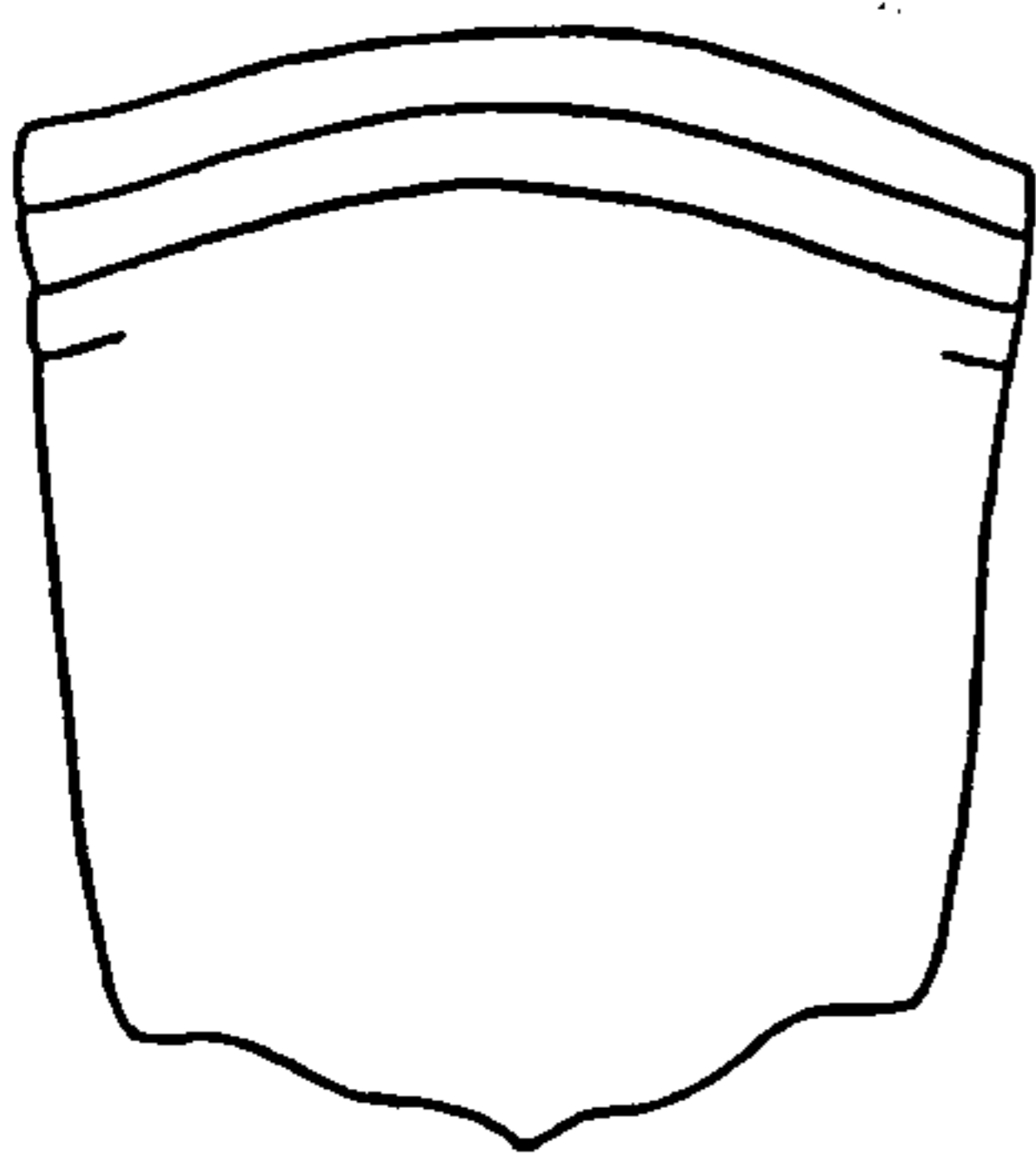


FIG. 386.—IDOTHEA UROTOMA.  
ABDOMEN. × 6½.

The first segment of the thorax has the antero-lateral angles produced to surround the posterior portion of the head, and is shorter in the middle of the dorsal surface than any of the six following segments, which are nearly subequal. The epimera of the second, third, and fourth segments are narrow plates, which in the second and third segments do not quite reach the middle of the lateral margin,

but extend fully to the middle on the fourth segment. The epimera of the fifth segment do not quite reach the posterior margin, but extend about three-fourths the length of the segment. The epimera of the last two segments extend the entire length of the segments.

The abdomen is composed of three segments, two short ones anterior to the terminal segment, which has suture lines on either side indicating another partly coalesced segment. The terminal segment is quadrangular with sides nearly parallel. The post-lateral angles are prominent, and are separated by a shallow emargination from the triangular middle portion, which is somewhat acutely produced in the middle.

The legs are all similar in structure.

This description is made from specimens sent me by Dr. Walter Faxon, from the Museum of Comparative Zoology at Harvard University. They were presented by Dr. Alexander Agassiz and are marked *Idothea urotoma* Stimpson in Stimpson's handwriting.

**IDOTHEA FEWKESI, new species.**

Body narrow, elongate, about five and a half times longer than wide,  $7\frac{1}{2}$  mm. : 42 mm.

Head one and a half times wider than long, 4 mm. : 6 mm.; with the anterior margin excavate in the middle between the antero-lateral angles. The eyes are small, composite, about twice as wide as long, and situated at the sides of the head, halfway between the anterior and posterior margins. The first pair of antennæ have the basal article greatly dilated; the second and third articles are subequal, and each is half as wide as the basal article and a little shorter; the fourth article is clavate, and a little longer than the third. The first pair of antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short, the second and third articles are subequal, each being 2 mm. in length; the fourth and fifth are subequal, each being 4 mm. in length, or twice as long as either the second or the third article. The flagellum is composed of sixteen articles and is 10 mm. long. When retracted, the second antennæ extend to the posterior margin of the fourth thoracic segment. They are about half as long as the body. The palp of the maxillipeds is composed of four articles.

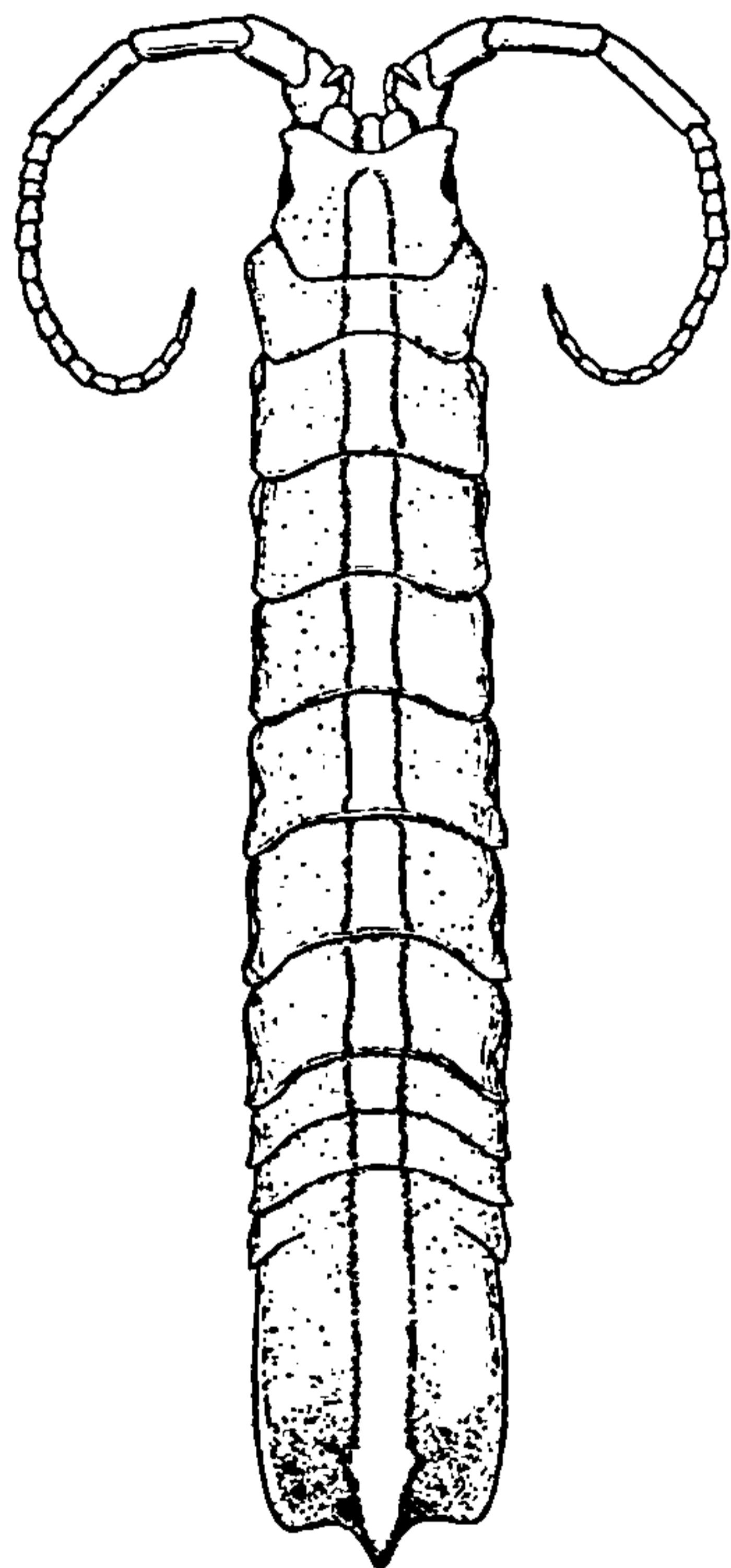


FIG. 387.—*IDOTHEA FEWKESI*.  
×  $\frac{1}{2}$ .

The first segment of the thorax is a little shorter in the dorsal median line than any of the others, being  $2\frac{1}{2}$  mm. long. The antero-

lateral angles of this segment are produced forward so as to surround the posterior portion of the head. The following segments are subequal in length, with the exception of the seventh, which is a little shorter than any of the others. Epimera are distinctly separated on all the segments with the exception of the first. The epimera of the second and third segments occupy half the lateral margin of the segments, being 2 mm. in length. The epimeron of the fourth segment is

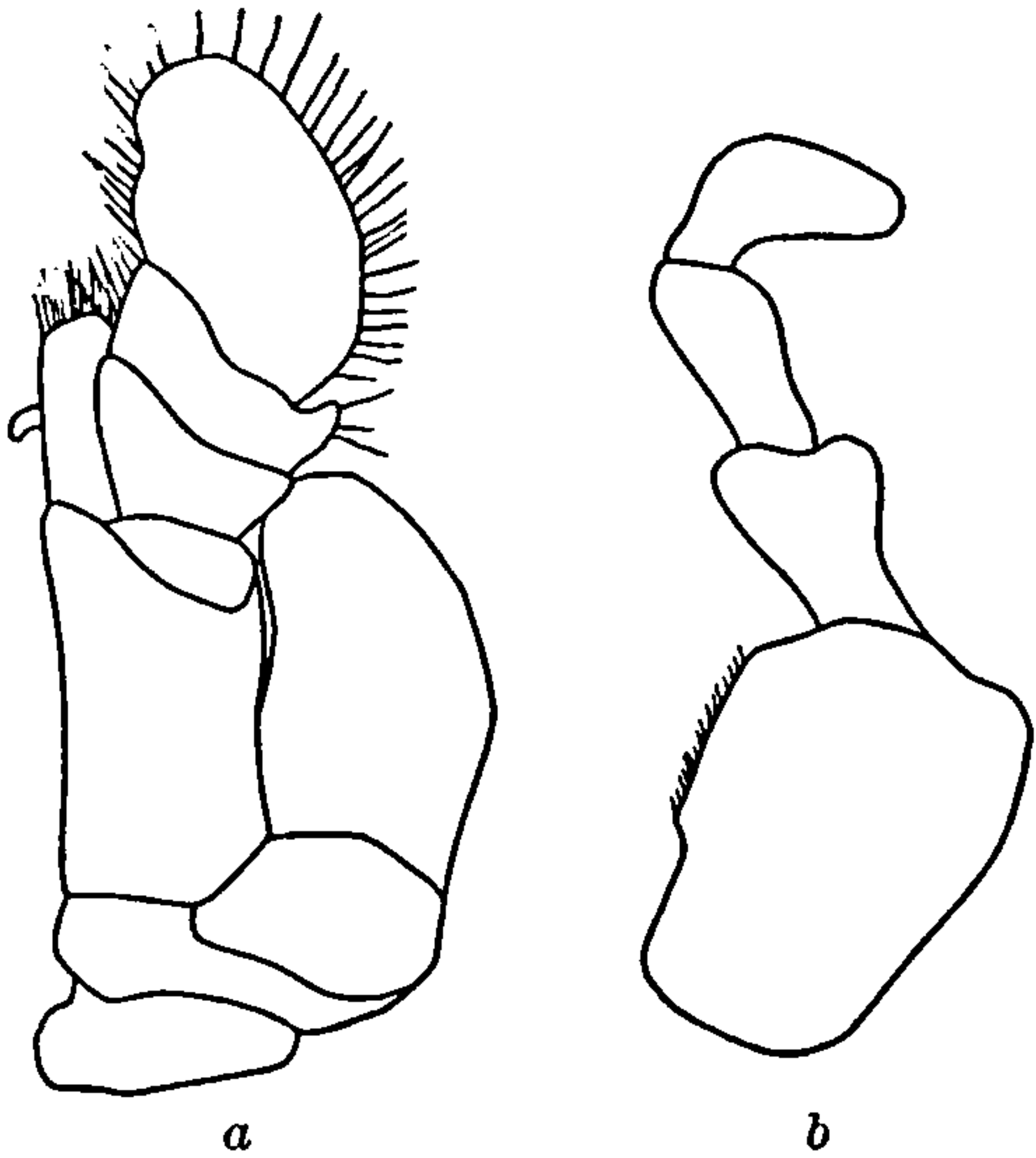


FIG. 388.—*IDOTHEA FEWKESI*. *a*, MAXILLIPED.  $\times 15\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

2½ mm. in length, the lateral margin of the segment showing below it being 1½ mm. in length. The epimera of the fifth and sixth segments occupy three-fourths of the lateral margin, being 3 mm. in length, the lateral margin of the segment below them being 1 mm. long. The epimeron of the seventh segment only occupies the entire lateral margin. The first three epimera are extremely narrow, being only ½ mm. wide. The last three are 1 mm. wide in the region of their greatest breadth.

The abdomen is composed of three segments, two short ones and a long terminal segment, which has a suture line on either side at the base indicative of another partly coalesced segment. The abdomen is twice as long as wide, being 14 mm. long and 7 mm. wide at the base, and is one-third the length of the entire body. The terminal segment has nearly subparallel sides. Its posterior margin is produced in a median point, which is strong and acute. The post-lateral angles are rounded.

All the legs are similar in character.

There are two specimens, one imperfect, from Santa Barbara, California.

This species is named for Dr. J. Walter Fewkes, zoologist and ethnologist, who collected the specimens.

The type is in the Museum of Comparative Zoology, Cat. No. 6730.

#### *IDOTHEA RECTILINEA* Lockington.

*Idotea rectilinea* LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 36.—MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 34.

*Idotea rectilineata* RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 845; Ann. Mag. Nat. Hist. (7), IV, 1899, pp. 264–265; American Naturalist, XXXIV, 1900, p. 226.

*Localities*.—Pacific coast from Humboldt County, California, to Ensenada, Lower California.

*Depth*.—30 to 40 fathoms, in sandy mud.

Body narrow, linear, filiform, about four times longer than wide, 4 mm.:17 mm.; length of abdomen about one-third that of entire length of body, 6 mm.:17 mm.

Head wider than long, with anterior margin slightly excavate. Anterior portion of head but slightly wider than posterior portion.

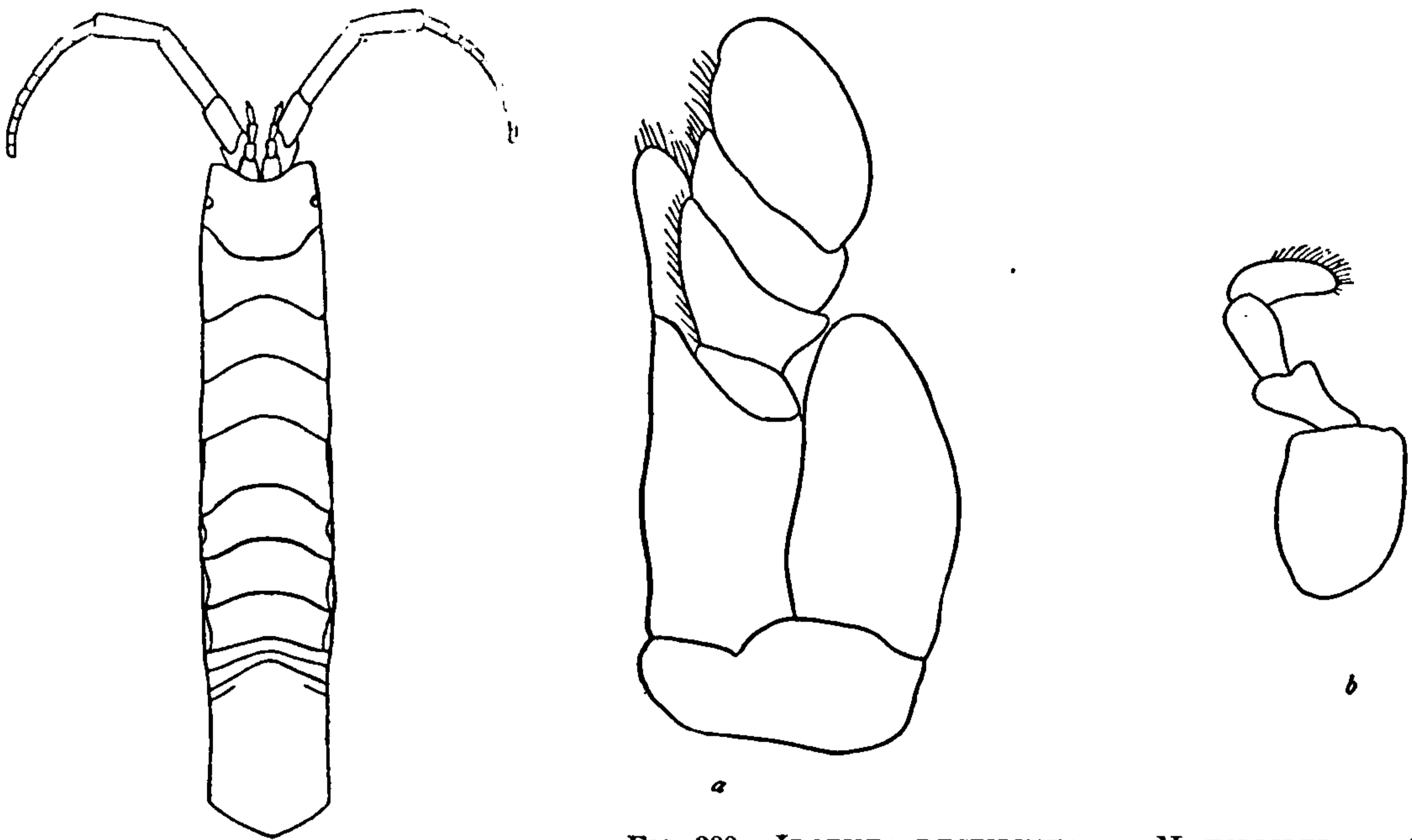


FIG. 389.—*IDOTHEA RECTILINEA*.

FIG. 390.—*IDOTHEA RECTILINEA*. *a*, MAXILLIPED.  $\times 23$ .  
*b*, FIRST ANTENNA.  $\times 23$ .

Eyes very small, transversely ovate, compound in structure, and situated about the middle of the extreme lateral margin. First pair of antennæ with the basal article enlarged; second and third articles equal in length, and somewhat shorter than the basal joint; fourth article clavate and a little longer than either of the two preceding ones. The first antennæ extend to the middle of the third peduncular article of the second pair of antennæ. The basal article of the second antennæ is scarcely visible from a dorsal view; the second and third articles are of equal length; the fourth and fifth are subequal and each is about twice as long as the third. The flagellum is composed of thirteen long, slender articles. When retracted, the second antennæ extend to the posterior margin of the fourth thoracic segment. The maxilliped has a palp of four articles.

The segments of the thorax are about equal in length, the first one only being a little shorter than the others. The first segment is not wider than the head. The epimera of the second, third, and fourth segments occupy the anterior half of the segments, and are very narrow; the epimeron of the fifth segment occupies the anterior two-thirds part of the segment; the epimera of the last two segments occupy the entire lateral margin.

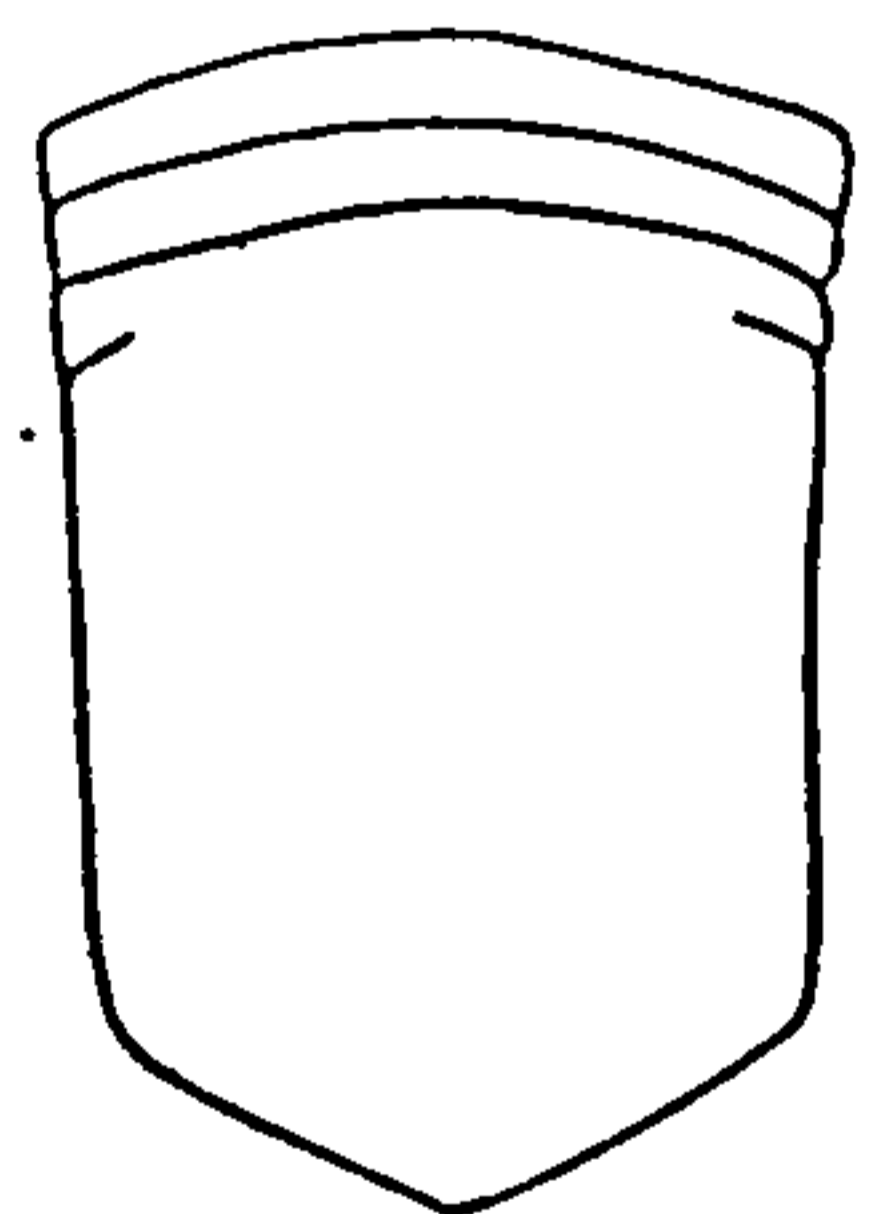


FIG. 391.—*IDOTHEA RECTILINEA*. ABDOMEN.  $\times 6\frac{1}{2}$ .

The legs are all similar in structure. Along the inferior margin of the merus, carpus, and propodus are a few hairs.

The first two segments of the abdomen are short, followed by one long rectilinear segment. The sides of the abdomen are almost parallel, the posterior end being three-fourths as wide as the anterior end. The posterior extremity of the terminal segment is produced in a very obtuse point, which does not extend far beyond the lateral angles.

#### IDOTHEA METALLICA Bosc.

*Idotea metallica* Bosc, Hist. Nat. Crust., II, 1802, p. 179, pl. xv, fig. 6.—LATREILLE, Hist. Nat. Crust. et Insectes, VI, 1803, p. 373.

*Idotea peloponesiaca* Roux, Crust. de la Méditerranée, 1828, pl. xxx, figs. 10–12.

*Idotea atrata* COSTA, Fauna del R. Napoli, Crust., 1838, pl. xi, fig. 3.

*Idotea rugosa* MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 131.

*Idotea compacta* WHITE, List. Crust. Brit. Mus., 1847, p. 95.

*Idotea algerica* LUCAS, Anim. artic. in Expl. Sci. Algérie, I, Crust., 1849, p. 61, pl. vi, fig. 2.

*Idotea robusta* KRØYER, Naturh. Tidsskr. (2) II, 1846–49, p. 108; Voy. en Scand., Crust., 1849, pl. xxvi, fig. 3.—REINHARDT, Naturhistorisk Bidrag til en Beskrivelse af Grønland, 1857, p. 35.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1863, p. 133.—VERRILL, Am. Jour. Sci., II, 1871, p. 360.—HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, Pt. 1, 1873,

p. 439; p. 569, pl. v, fig. 24.—HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Commissioner of Fish and Fisheries, Pt. 6, 1880, p. 349, pl. vi, figs. 30–32.

*Idotea metallica* MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 35–38 (see Miers for synonymy). — HANSEN, Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn, 1887–88, p. 188.—DOLLFUSS, Feuille des jeunes Naturalistes, 1895, p. 8, fig. 24.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 226; Proc. U. S. Nat. Mus., XXIII, 1901, p. 541.—NORMAN, Ann. Mag. Nat. Hist. (7), XIV, 1904, p. 443.

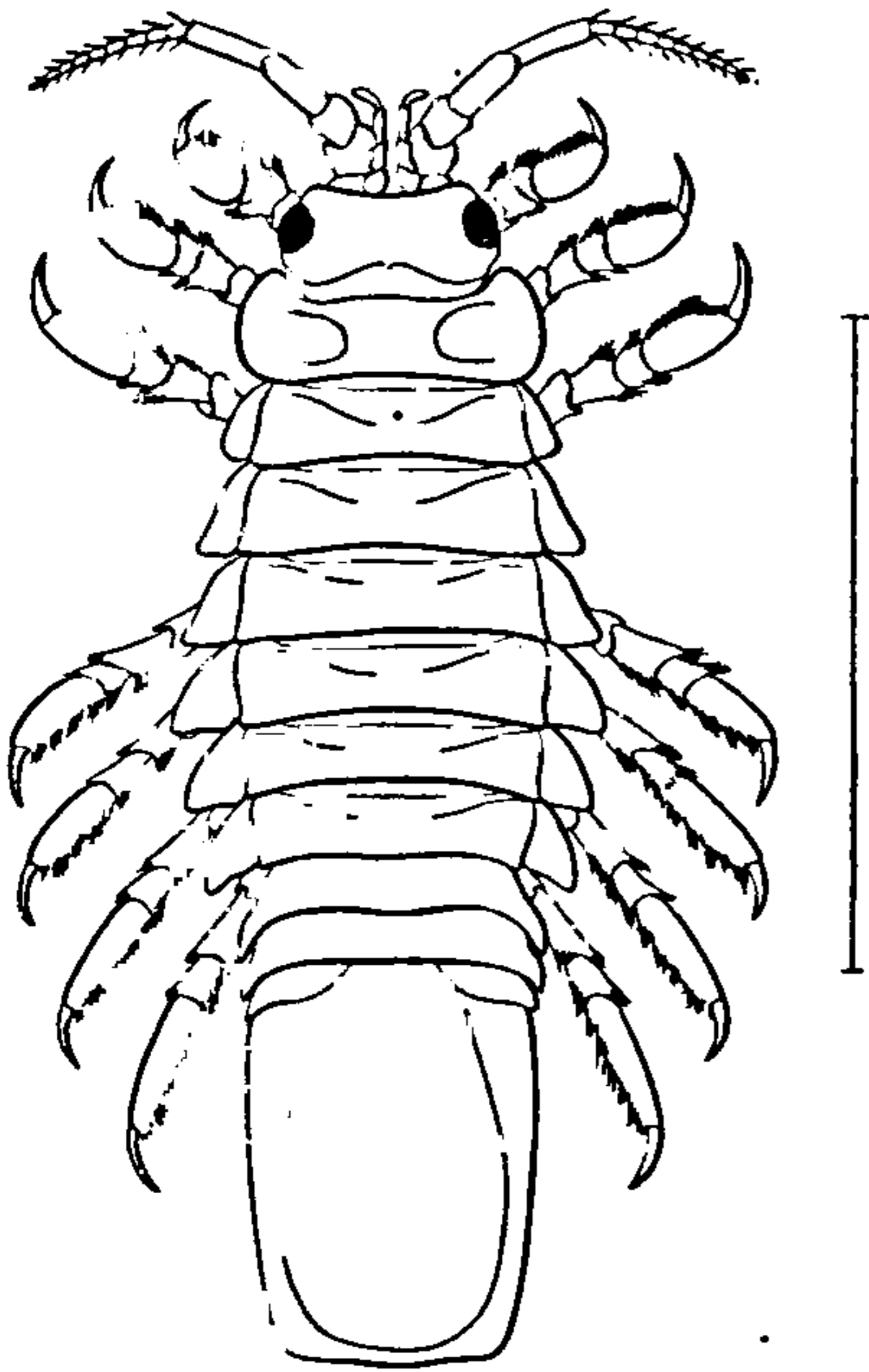


FIG. 392.—IDOTHEA METALLICA (AFTER HARGER). × 2.

*Localities.*—Off Maryland; Chesapeake Bay; North Carolina; Florida Keys; Newport, Rhode Island; Long Island; Nantucket; Vineyard Sound; Woods Hole, Massachusetts; Massachusetts Bay; Georges

Banks; Jeffries Bank; near Isles of Shoals; Halifax, Nova Scotia; La Have Bank; off No Mans Land; south of Block Island; off Martha's Vineyard; latitude  $64^{\circ} 46'$  north, longitude  $53^{\circ} 35'$  west; also, Mediterranean Sea; southwestern Ireland; between Greenland and Iceland; between Montevideo and Straits of Magellan; New South

Wales; Borneo; off Cape Negro; Latitude Cove, Patagonia; 40 miles south of Cape Sable.

*Depth.*—Surface to 91 fathoms.

From floating fucus.

Body oblong-ovate, about two and one-fourth times as long as wide, 8 mm. : 18 mm.

Abdomen a little more than two-fifths the entire length of body, 8 mm. : 18 mm.

Head wider than long, with anterior margin slightly excavate. The posterior portion is somewhat wider than the anterior portion. Eyes large and round, compound in structure, and situated at the extreme lateral margin. First pair of antennæ with the basal article not enlarged, the first and second articles being about equal in length and width. The third and fourth articles are somewhat longer than either the first or the second article. The first antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The first article of the second pair of antennæ is very short; the second and third are subequal; the fourth is one and a half times longer than the third, and the fifth is twice as long as the third. The flagellum is composed of eight articles and reaches when retracted to the anterior margin of the third thoracic segment. The maxilliped has a palp of four articles.

The segments of the thorax are subequal. The first segment extends a little beyond the lateral margins of the head on either side. The lateral portions of this segment and of those following are curved outward and somewhat upward, forming an angle with the portion of the segment to which it is adjacent. The epimera of all the segments, from the second to the seventh, inclusive, extend the entire length of the segment. The epimera are large and very wide, increasing in width to the seventh, which is wider than long.

The legs are all more or less alike in character. The free margins of all the joints and the inferior margin of the propodus is furnished with hairs. The abdomen has two short segments and one long terminal one, with lateral rudiments at its base of another partly coalesced segment. The terminal segment has the sides converging slightly to a truncate extremity.

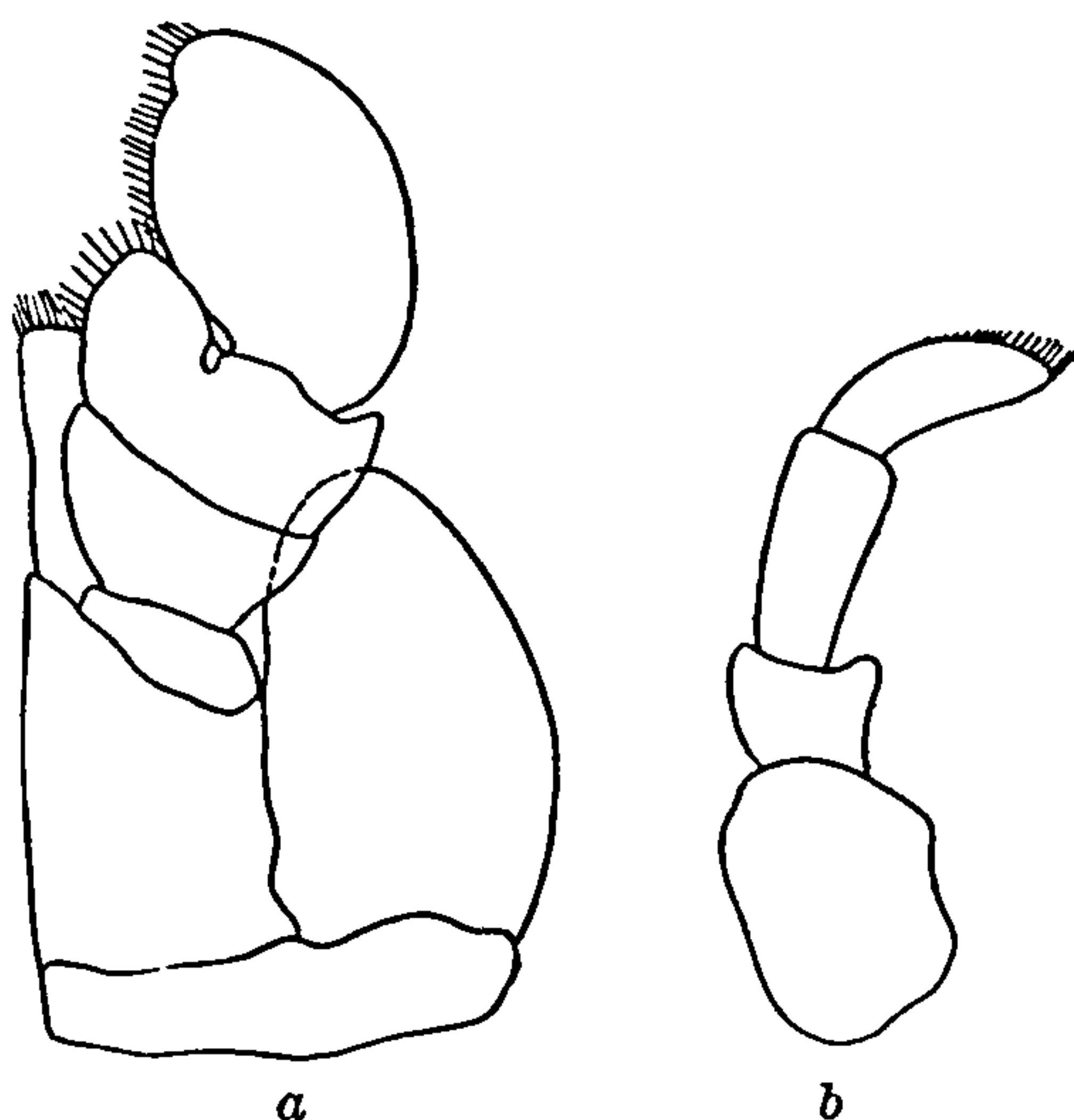


FIG. 393.—*IDOTHEA METALLICA*. *a*, MAXILLIPED.  $\times 27\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

IDOTHEA BALTICA (Pallas).<sup>a</sup>

*Oniscus balticus* PALLAS, Spic. Zool. (9), 1772, pp. 67-68, pl. iv, fig. 6.

*Idotea entomon* PENNANT, British Zool., IV, 1877, p. 25, pl. xviii, fig. 5.

*Stenosoma irrorata* SAY, Journ. Acad. Nat. Sci. Phila., I, 1818, p. 423.

*Idotea tricuspidata* DESMAREST, Dict. des Sci. Nat., XXVIII, 1823, p. 373, pl. XLVI, fig. 11; Consid. Crust., 1825, p. 289, pl. XLVI, fig. 11.—ROUX, Cr. de la Méditerranée, 1828, pl. XXIX, figs. 11, 12.—GOULD, Rep. Geol. Mass., 2d ed., 1835, p. 549.—MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 129.

*Idotea irrorata* MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 132.

*Stenosoma irrorata* GOULD, Rep. Invert. Massachusetts, 1841, p. 338.—DE KAY, Zool. New York Fauna, Crust., Pt. 6, 1844, p. 43, pl. x, fig. 42.

*Idotea irrorata* STIMPSON, Smithsonian Contributions to Knowledge, VI, 1853, p. 39.—LEIDY, Journ. Acad. Nat. Sci. Phila., 1855, p. 150.

*Idotea tricuspidata* SARS, Forh. Vidensk. Selsk. Christ., 1859, p. 151.—NORMAN, Report British Assoc., 1868, p. 197.—BATE and WESTWOOD, British Sessile-eyed Crust., II, 1868, p. 379.

*Idotea irrorata* HARGER with VERRILL, Report U. S. Fish Comm., 1873, Pt. 1, p. 569, pl. v, fig. 23; p. 316.—VERRILL, Am. Journ. Sci. Arts (3), VII, 1874, pp. 131, 134; Proc. Amer. Assoc., 1874, pp. 369, 371, 373.—WHITEAVES, Am. Journ. Sci. Arts (3), VII, 1874, p. 217.

*Idotea tricuspidata* STEBBING, Journ. Linn. Soc. London, Zool., XII, 1874, p. 148.

*Idotea irrorata* HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Fish Comm., Pt. 6, 1880, p. 343, pl. v, figs. 24-26.

*Idotea marina* MIERS, Journ. Linn. Soc. London, Zool., XVI, 1883, pp. 25-31.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 540.

*Idotea tricuspidata* DOLLFUS, Feuilles des jeunes Naturalistes, 24th year 1893-1895, p. 55.

*Idotea baltica* SARS, Crust. Norway, II, 1899, pp. 80-81, pl. xxxii.—NORMAN, Ann. Mag. Nat. Hist. (7), XIV, 1904, pp. 441-442.

*Idotea marina* PAULMIER, Bull. New York State Museum, 1905, pp. 175-176.

*Localities.*—Atlantic coast from Nova Scotia and Gulf of St. Lawrence to North Carolina; Bermudas; Barbados; also Mediterranean, Black, and Caspian seas; west coast of Europe to Great Britain; shores of the Netherlands; in German Ocean and Baltic Sea; Bohuslan, Sweden (W. Sachs); Runmarö, Stockholms skärgård (J. Lindahl); on Scandinavian and Finland coasts; South America, at Desterro and Rio Janeiro, Brazil; New Zealand; Red Sea; Java.

Found on surface, on floating seaweed, among algæ and eelgrass, in sand and gravel; from stomach of smelt, *Osmerus mordax*.

*Depth.*—Surface to 119 fathoms.

<sup>a</sup>I have accepted the name adopted by Sars for this form, *Oniscus marinus* Linnaeus being more properly applied to a species belonging to the genus *Jæra*, as Sars has suggested. Although *Oniscus tridens* Scopoli is earlier than *Oniscus balticus*, it probably refers to another species of *Idothea*, as Dollfus has pointed out.

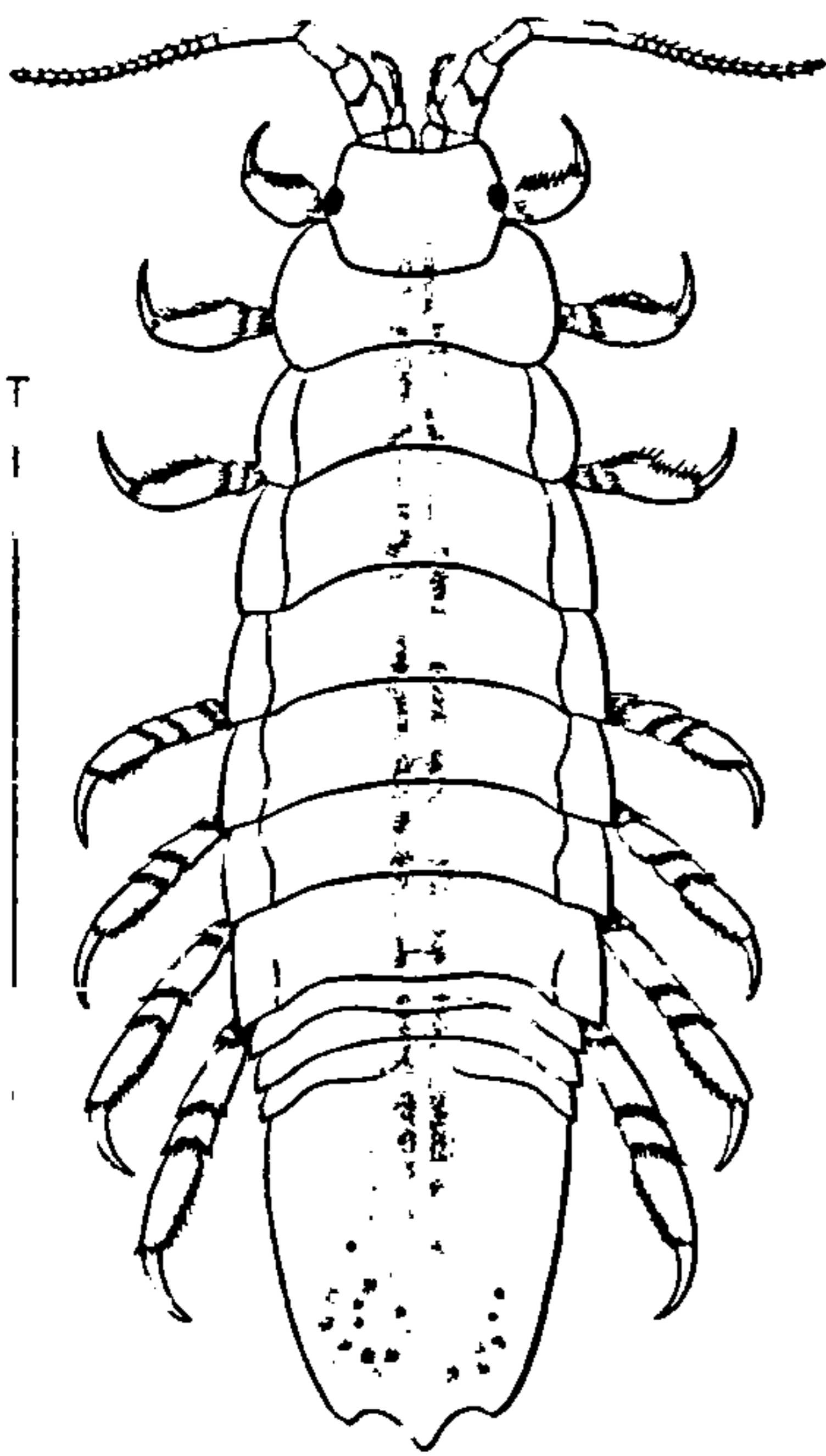


FIG. 394.—IDOTHEA BALTICA (AFTER HARGER). × 2.

Body oblong, ovate, almost three times longer than wide, 7 mm. : 20 mm.; length of abdomen a little more than one-third that of entire body, 8 mm. : 20 mm.

Head wider than long, slightly excavate in front. Eyes large, round, compound in structure, and situated just anterior to the median transverse line on the anterior portion of the head, at the extreme lateral margin. First pair of antennæ with the basal article not expanded, and equal in length to the second article; third and fourth articles slightly longer than either of the preceding ones. First antennæ extend to the end of the third peduncular article of the second pair of antennæ.

The basal article of the second antennæ is short; the second and third articles are about equal in length; the fourth is very little longer than the third; the fifth is about twice as long as the third. The flagellum consists of fourteen articles. When retracted, the second antennæ extend to the middle of the third thoracic segment. The maxillipeds have a palp of four articles.

The segments of the thorax are about equal in length, with the exception of the first, which is somewhat shorter than any of the others. The epimera of all the segments occupy the

entire lateral margins of the segments. They are in the form of large, broad plates, gradually increasing in width from the first to the sixth.

The legs are more or less alike in structure, and have a few hairs on the inferior margins.

The abdomen has two short segments followed by a long terminal one with sutures at the base. The sides of the abdomen converge to a narrow extremity, the width of which is to the base of the abdomen as 2:5. The posterior margin of the terminal segment is produced in the middle in an acute point, extending some distance beyond the lateral angles. Color varies greatly, being sometimes uniformly light or dark green, or brown and often striped with a median longitudinal stripe of a light color and a marginal stripe on either side, or with only marginal stripes. The colors are occasionally arranged in transverse bands or blotches.

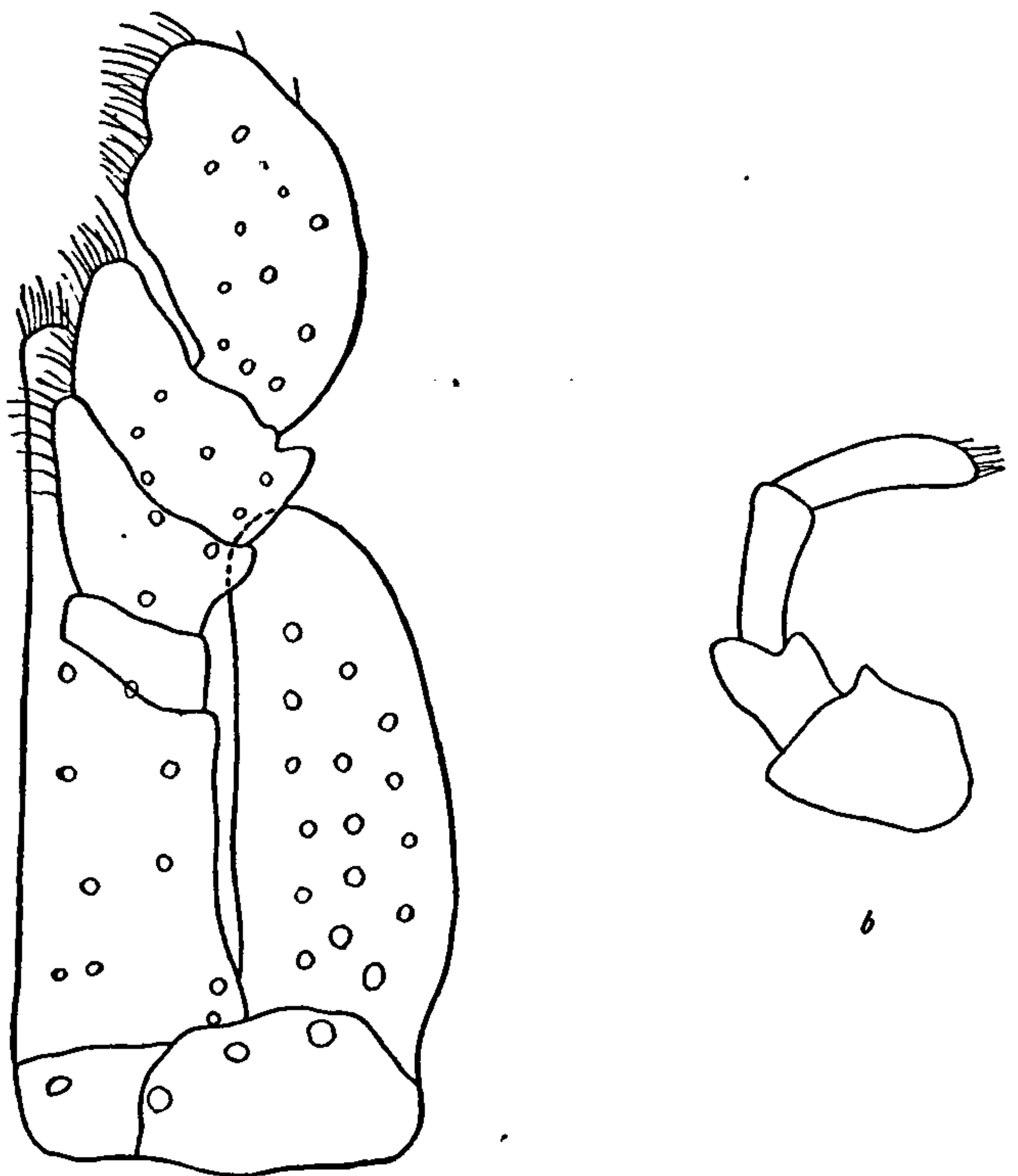


FIG. 395.—*IDOOTHEA BALTICA*. *a* MAXILLIPED.  $\times 41$ .  
*b* FIRST ANTENNA.  $\times 23$ .



## IDOTHEA OCHOTENSIS Brandt.

*Idotea ochotensis* BRANDT, Middendorff's Sibirische Reise, II, 1851, Crust., p. 145, pl. vi, fig. 33.—MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 32, pl. i, figs. 8-10.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 846; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 265; American Naturalist, XXXIV, 1900, p. 227; Harriman Alaska Expedition, Crust., X, 1904, p. 219; Proc. U. S. Nat. Mus., XXVII, 1904, p. 663; Bull. U. S. Fish Comm., 1905, p. 216.

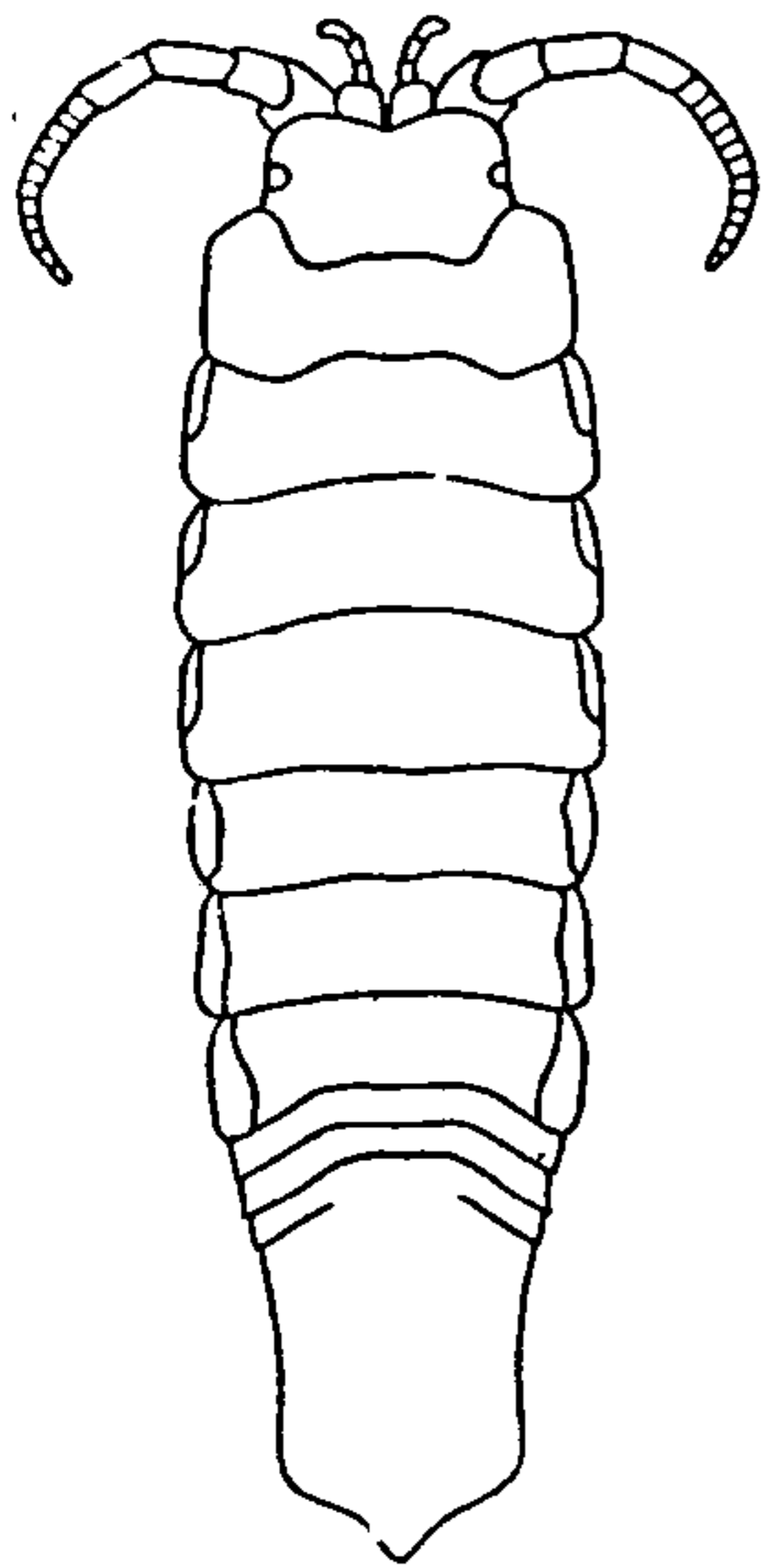


FIG. 396.—IDOTHEA OCHOTENSIS.

*Localities.*—Awaatsch Bay, Sea of Ochotsk; northwest coast of North America to Vancouver Island; Lands End and Fort Point, California; Humboldt Bay on Popof Island; Karta Bay; Port Renfrew, British Columbia (J. Lindahl).

From mouth of sculpin; in sand.

*Depth.*—Surface; beach; low water; 7-18 fathoms.

Body oblong-ovate, about three and a half times longer than wide, 12 mm.: 42 mm. Sides of thorax nearly parallel; abdomen tapering slightly, the posterior extremity being about four-fifths as wide as the basal part. Length of abdomen about two-fifths the entire length of body, 16 mm. : 42 mm.

Head a little wider than long, with the anterior margin sinuate. On either side of a median excavation is another very slight excavation. The posterior portion of the head is not wider than the anterior portion. The eyes are small, transversely ovate, compound, and situated on the extreme lateral margin about the middle of the head. The first pair of antennæ have the basal article very much dilated; it is longer and about twice as wide as any of the following articles. The first antennæ reach almost to the end of the second article of the peduncle of the second pair of antennæ. The basal article of the second pair of antennæ is almost inconspicuous from a dorsal view. The second and third articles are about equal in length. The last two articles are about one and a half times longer than the third article and are subequal. The flagellum consists of about eleven short articles. The second antennæ when retracted reach only to the middle of the third thoracic segment. The maxillipeds have a palp of four articles.

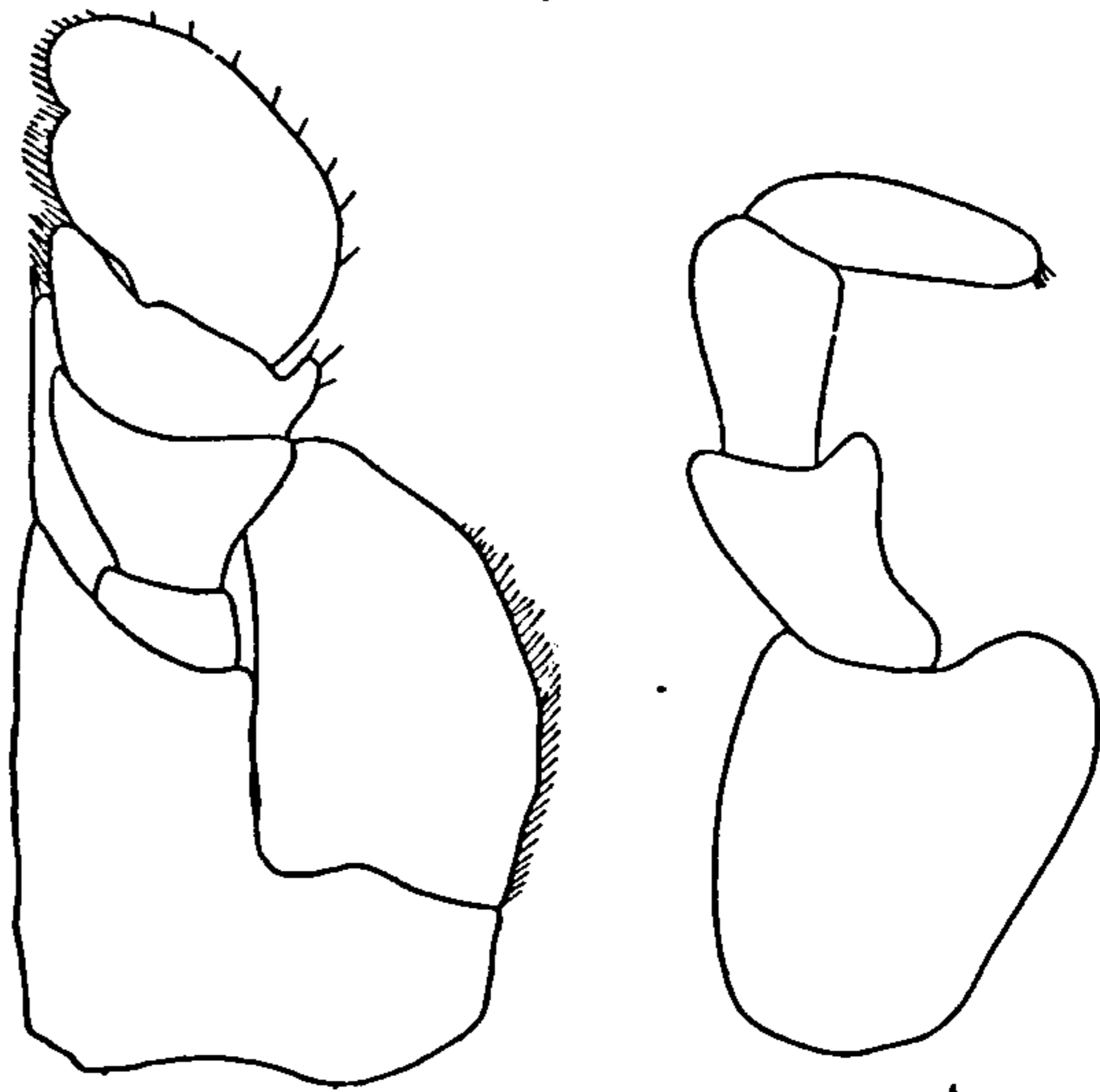


FIG. 397.—IDOTHEA OCHOTENSIS. a, MAXILLIPED.  $\times 15\frac{1}{2}$ . b, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

The first segment of the thorax is wider than the head, and produced

anteriorly at the sides to surround the posterior portion of the head. All the segments are equal in length. The epimeron of the second segment extends half the length of the lateral margin; it is broader at its anterior end than at its posterior end. The epimera of the third and fourth segments occupy the anterior two-thirds of the lateral margin. The epimeron of the fifth segment extends almost the entire length of the lateral margin of the segment. The epimera of the sixth and seventh segments reach the posterior extremity of the lateral margin, and are broader at the posterior end than at the anterior end. The legs are all similar. The inferior margin of the merus, carpus, and propodus is densely furnished with hairs.

The abdomen has two short segments and one long terminal one with lateral rudiments of another partly coalesced segment. The terminal segment tapers to about the middle, and from that point to the post-lateral angles, the sides are nearly parallel. The lateral angles are rounded. The posterior margin is produced in an obtuse median process, triangulate in shape, and extending some distance beyond the lateral angles. The apex of this process is rounded.

#### IDOTHEA PHOSPHOREA Harger.

*Idotea phosphorea* HARGER with Verrill, Report U. S. Commissioner of Fish and Fisheries, Pt. 1, 1873, p. 569 (275); p. 316 (22).—VERRILL, Am. Jour. Sci., 1874, pp. 43, 45, 131; Proc. Amer. Assoc., 1874, pp. 362, 367, 369.—WHITEAVES, Am. Jour. Sci., VII, 1874, p. 218.—HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Commissioner of Fish and Fisheries, Pt. 6, 1880, pp. 347-348, pl. v, figs. 27-29.

*Idotea marina* var. *phosphorea* MIERS, Journ. Linn. Soc. London, Zoology, XVI, 1883, pp. 31-32.

*Idotea phosphorea* RICHARDSON, American Naturalist, XXXIV, 1900, p. 227; Proc. U. S. Nat. Mus., XXIII, 1901, p. 541.—PAULMIER, Bull. New York State Museum, 1905, pp. 176-177.

*Localities*.—Coast of New England to Halifax, Nova Scotia, and the Gulf of St. Lawrence; Runmarö, Stockholms Skärgård (J. Lindahl).

*Depth*.—Surface to 18 fathoms. Found among seaweed; part of contents of haddock stomach.

Body oblong-ovate, three times longer than broad, 7 mm.: 21 mm. Length of abdomen a little more than one-third the entire length of the body, 8 mm.: 21 mm.

Head broader than long, with the anterior margin straight on either side of a slight median excavation. The eyes are moderately large, round, compound in structure, and placed just in front of the median transverse line at the extreme lateral margin. Basal article of first

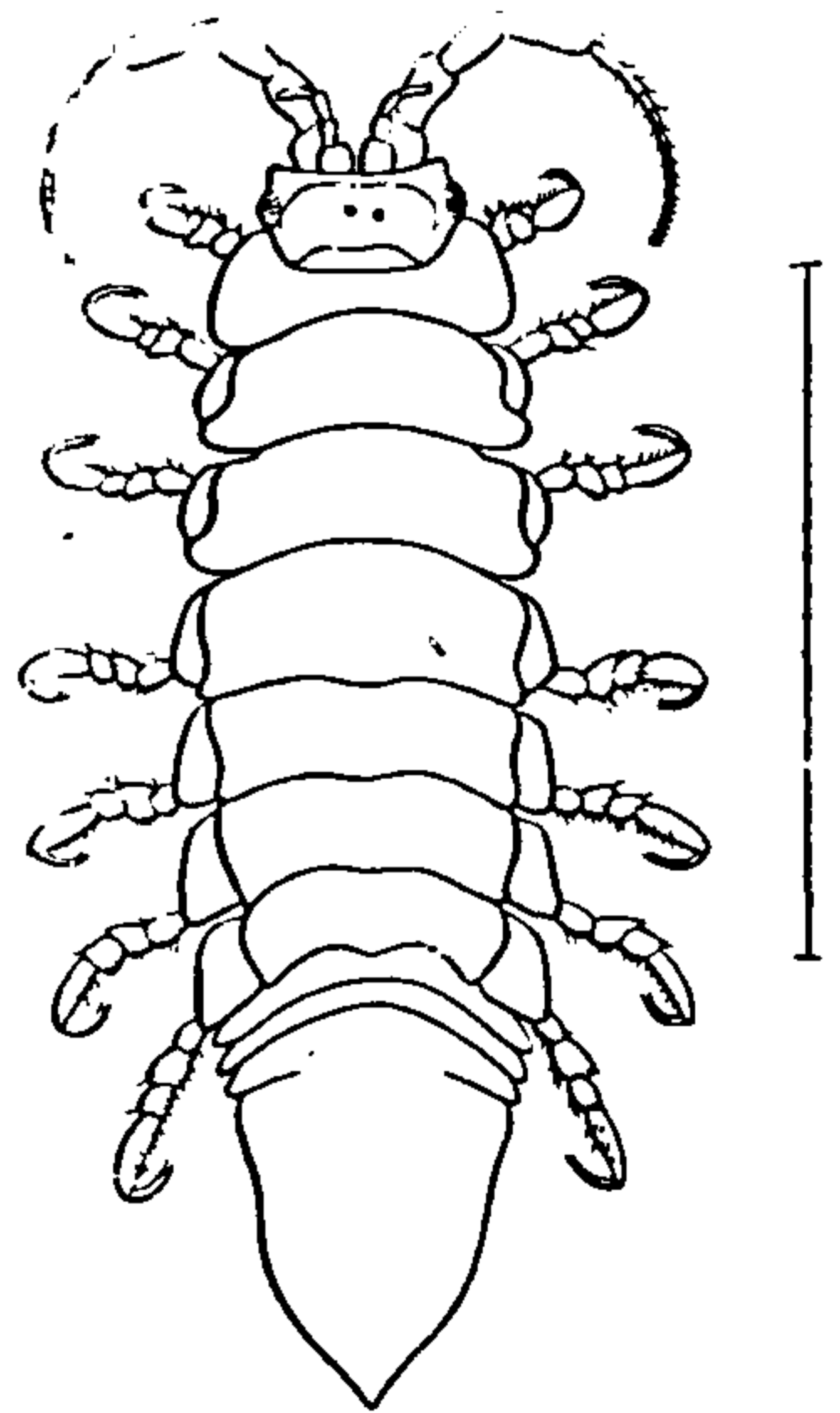


FIG. 398.—IDOTHEA PHOSPHOREA (AFTER HARGER).  $\times 2$ .

pair of antennæ not dilated, and but little wider than second article. First, second, and third articles about equal in length; fourth article a little longer than any of the others. The first antennæ extend to the end of the third peduncular article of the second pair of antennæ. The basal article of the second antennæ is almost inconspicuous; the second and third articles are subequal;

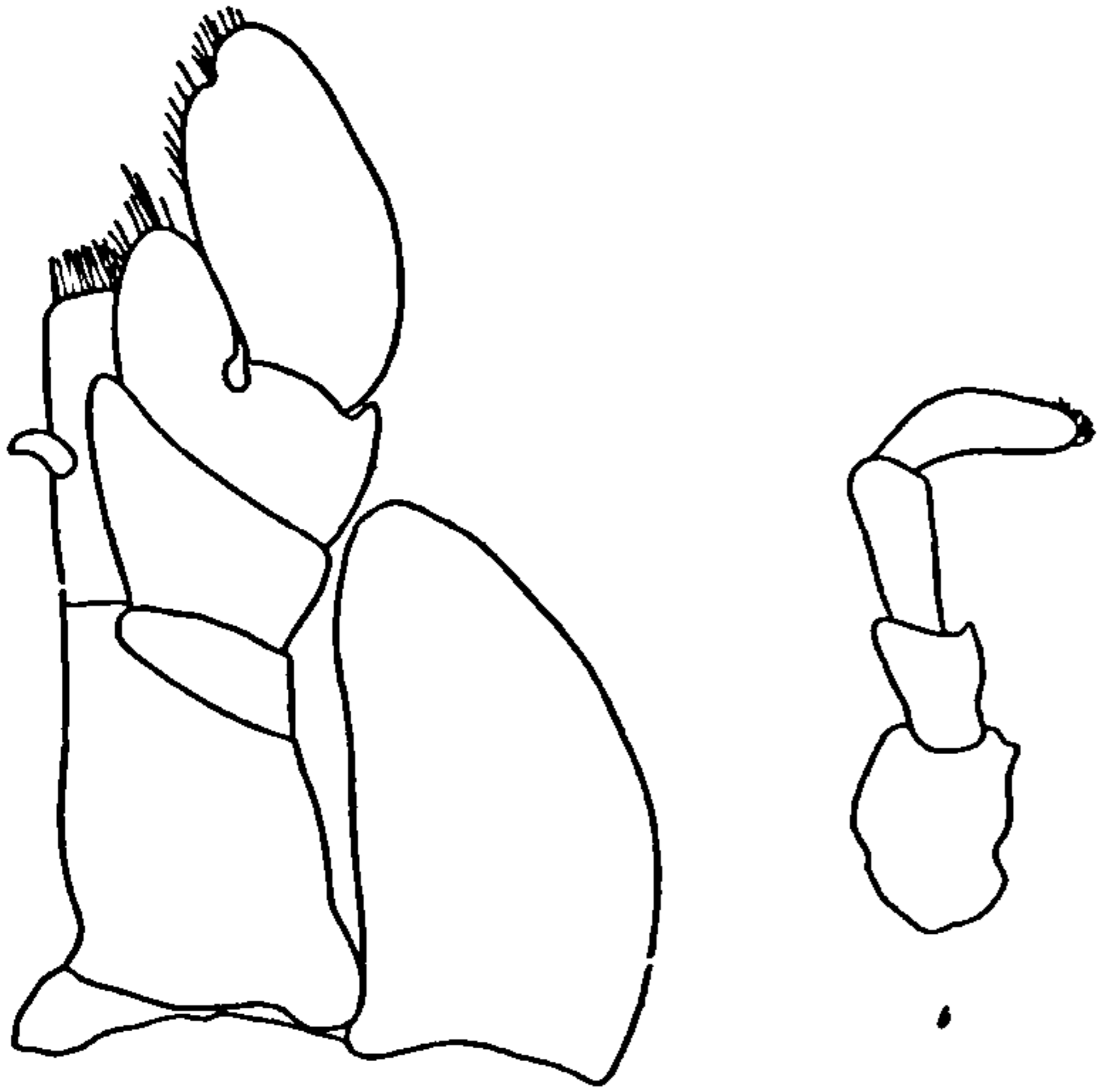


FIG. 399.—*IDOTHEA PHOSPHOREA*. *a*, MAXILLIPED.  $\times 27\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

the fourth is about one and a half times longer than the third; the fifth is a little longer than the fourth. The flagellum consists of sixteen articles. When retracted, the second antennæ extend to the posterior margin of the third thoracic segment. The maxillipeds have a palp of four articles.

The segments of the thorax are subequal, except the first, which is shorter in the median dorsal line. The epimera of the second and third segments occupy the anterior two-thirds of the lateral margin; the epimeron of the fourth segment occupies about four-fifths of the lateral margin; the epimera of the last three segments occupy the entire lateral margin and are increasingly broader at the posterior end.

The legs are more or less similar in structure, and are furnished with hairs along the inferior margin of the merus, carpus and propodus. The first two segments of the abdomen are short, followed by a long terminal one with lateral sutures at the base. The terminal segment tapers to a pointed extremity, on either side of which is an indication of a rudimentary lateral angle. Color usually dark green or brownish, with transverse patches of yellow.

The legs are more or less similar in structure, and are furnished with hairs along the inferior margin of the merus, carpus and propodus. The first two segments of the abdomen are short, followed by a long terminal one with lateral sutures at the base. The terminal segment tapers to a pointed extremity, on either side of which is an indication of a rudimentary lateral angle. Color usually dark green or brownish, with transverse patches of yellow.

#### 60. Genus *PENTIDOTEA*, new genus.

Flagellum of second antennæ multi-articulatè. Maxillipeds with a palp composed of five articles. Epimera of all the segments of the thorax with the exception of the first distinctly separated from the segments. Abdomen composed of three segments, with a suture line on either side of the terminal segment at the base, indicating another partly coalesced segment.

There are as yet but four species of this genus, all agreeing in having the palp of the maxillipeds composed of five articles.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS *PENTIDOTEA*.

- a*. Terminal segment of body with a deep emargination at its posterior extremity, the post-lateral angles formed being very acute.... *Pentidotea resecata* (Stimpson)
- a'*. Terminal segment of body not emarginate at its posterior extremity.

b. Terminal segment of body regularly and broadly rounded at its posterior extremity, with a very small and obtuse median tooth. Epimera of the second, third, and fourth segments do not extend quite the entire length of the segments. Those of the following segments occupy the entire lateral margin.

*Pentidotea vosnesenskii* (Brandt)

b'. Terminal segment of body with pronounced post-lateral angles, which are rounded, and with a distinct and acute median tooth at its posterior extremity.

c. Sides of thorax parallel. Eyes about twice as wide as long. Epimera of all the segments, from the second to the seventh, inclusive, occupy the entire lateral margins of the segments ..... *Pentidotea whitei* (Stimpson)

c'. Sides of thorax arcuate. Eyes transversely elongated, being five times wider than long. The first three epimera do not quite reach the post-lateral angles of the segments..... *Pentidotea stenops* (Benedict)

#### PENTIDOTEA RESECATA (Stimpson).

*Idotea resecata* STIMPSON, Bost. Jour. Nat. Hist., VI, 1857, p. 504, pl. xxii, fig. 7; Proc. Bost. Soc. Nat. Hist., 1859, p. 88.—MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 45.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 844; Ann. Mag. Nat. Hist. (7), IV, 1899, pp. 263-264; American Naturalist, XXXIV, 1900, p. 226; Harriman Alaska Exp., Crust., X, 1904, p. 216; Proc. U. S. Nat. Mus., XXVII, 1904, p. 661; Bull. U. S. Fish Comm., 1905, p. 216.

*Localities.*—Straits Juan de Fuca, opposite Port Townsend, Vancouver Island; Fort Rupert and Barclay Sound, British Columbia; Gulf of Georgia, Orcas Island; Ottar Bay, Pender Island; Pacific Grove; Santa Barbara; San Pedro; Humboldt Bay, and Monterey Bay, California; Tomales Bay, California; Kilisut Harbor, Port Townsend; Mawawshone Point, near Port Townsend; Quarantine Dock, Port Townsend; Karta Bay; Gulf of Georgia.

*Depth.*—Surface to  $3\frac{1}{2}$  fathoms. Found between high and low tide lines among rocks, seaweed, kelp, eelgrass, etc.

Body narrow, elongate, four and a half times longer than wide, 8 mm.: 36 mm.; length of abdomen one-third that of entire body, 12 mm.: 36 mm.

Head but little wider than long, with frontal margin slightly excavate. Eyes moderately large, round, compound in structure, and situated just in front of the median transverse line on the anterior portion of the head, and at the extreme lateral margin. First pair of antennæ with the basal articles greatly enlarged. The three following articles are slender and about equal in length to each other and to the basal article. The first antennæ extend to the end of the third article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short and almost inconspicuous from a dorsal view; the

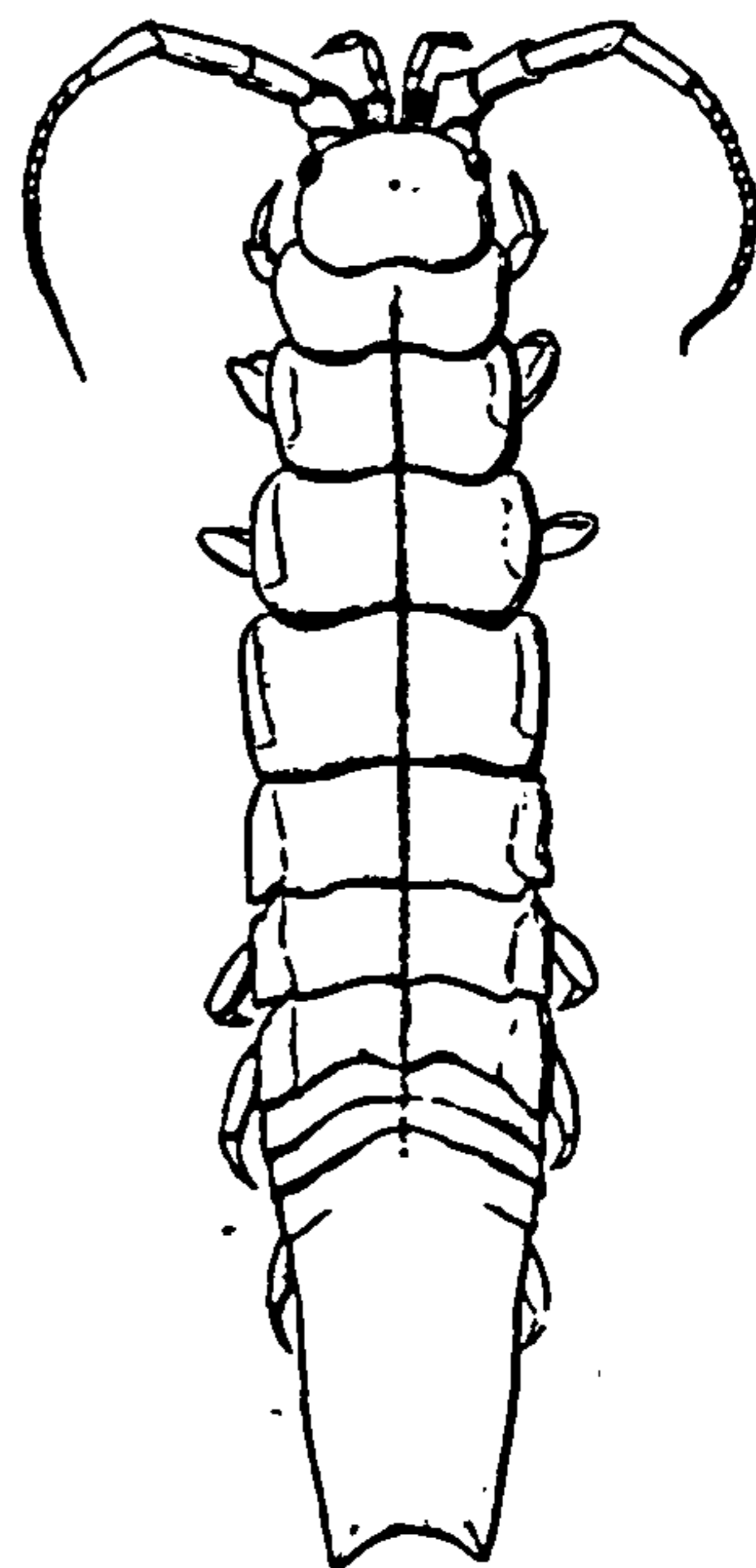


FIG. 400.—PENTIDOTEA RESECATA (AFTER STIMPSON).  $\times 1\frac{1}{2}$ .

second and third articles are of equal length; the fourth is almost twice as long as the third; the fifth is slightly shorter than the fourth. The flagellum consists of twelve articles. The maxilliped has a palp of five articles.

The first and seventh segments of the thorax are equal in length and shorter than any of the others. The third and fourth segments are the longest. The first segment is very little wider than the head; the anterolateral angles are produced to surround the posterior portion of the head. The epimera of the second, third, and fourth segments do not occupy the whole of the lateral margin of the segment; those of the second and third segments occupy the anterior two-thirds, that of the fourth segment, the anterior three-fourths part; the epimera of the three following segments occupy the entire lateral margin. All the epimera are large and conspicuous from a dorsal view.

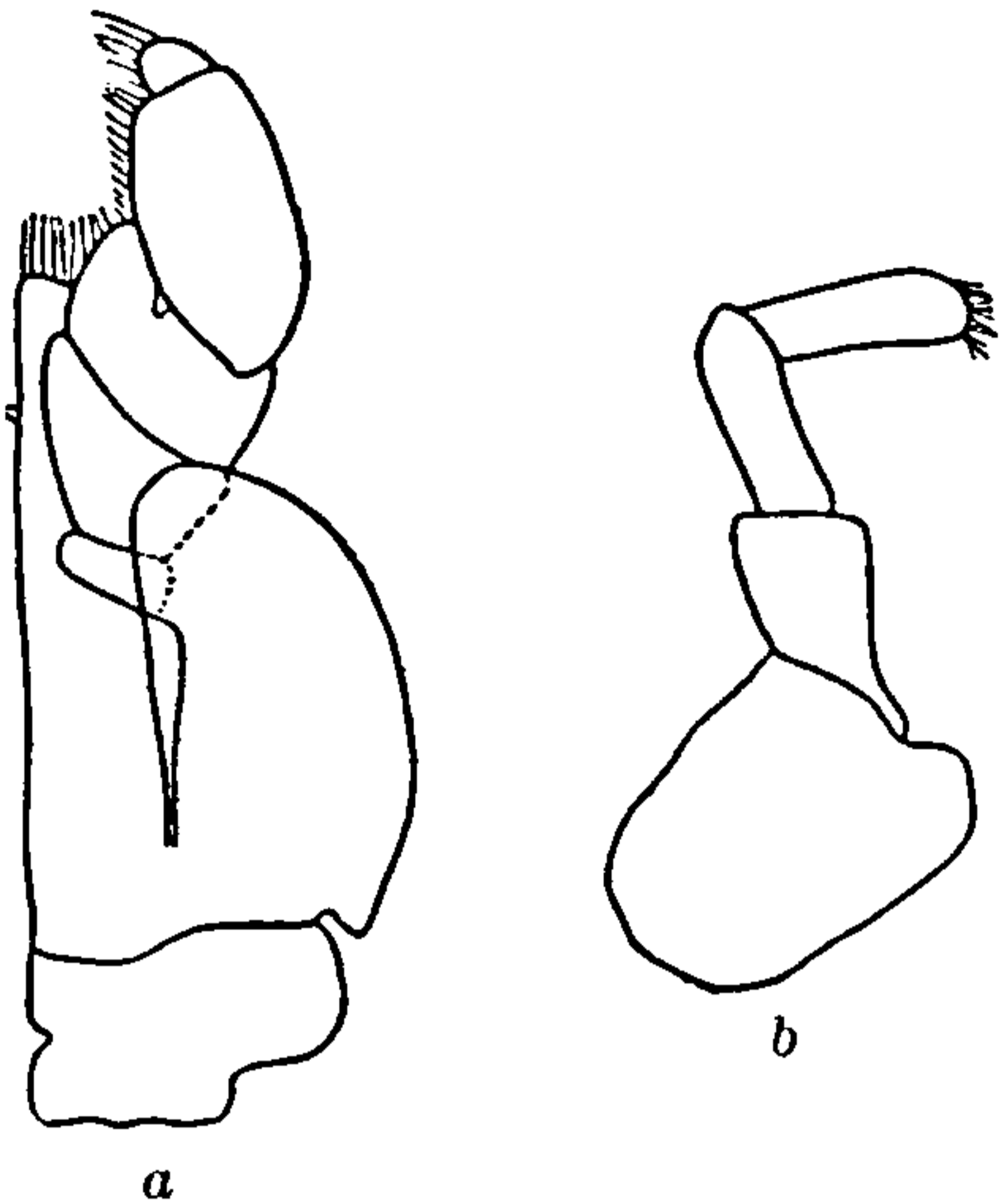


FIG. 401.—PENTIDOTEA RESECATA. *a*, MAXILLIPED.  $\times 15\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

The legs are similar in structure and furnished with hairs on the inferior margin of the merus, carpus, and propodus. The basis of all the legs is provided with a carinate process.

The abdomen has two short segments and one long one with lateral sutures at the base. The posterior margin of the terminal segment is deeply excavate, the lateral angles being acutely produced. The sides of the abdomen converge slightly from the base to about the middle of the segment, and then converge again slightly at the extremity.

#### PENTIDOTEA WOSNESENSKII (Brandt).

*Idotea wosnesenskii* BRANDT, Middendorff's Sibirische Reise, II, 1851, Crust., p. 146.

*Idotea hirtipes* DANA, U. S. Expl. Exp., Crust., XIV, 1853, p. 704, pl. XLVI, fig. 6.

*Idotea oregonensis* DANA, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 175.

*Idotea wosnesenskii* STIMPSON, Bost. Jour. Nat. Hist., VI, 1857, p. 504.—SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 281.

*Idotea media* (Dana?) SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 282.

*Idotea wosnesenskii* MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 40.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 846; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 265; American Naturalist, XXXIV, 1900, p. 227; Harriman Alaska Expedition, Crust., X, 1904, p. 218; Proc. U. S. Nat. Mus., XXVII, 1904, p. 663; Bull. U. S. Commission of Fish and Fisheries, 1905, p. 216.

*Localities.*—Sea of Ochotsk and Kamchatka Sea; west coast of North America to Monterey Bay, California; Dutch Harbor on Unalaska Island; White Water Bay, Alaska; Humboldt Bay on Popoff Island;

Yakutat; Glacier Bay; Garforth Island in Muir Inlet and Sitka, Alaska; Beaver Cove on Vancouver Island; Land's End, California; Gabnola

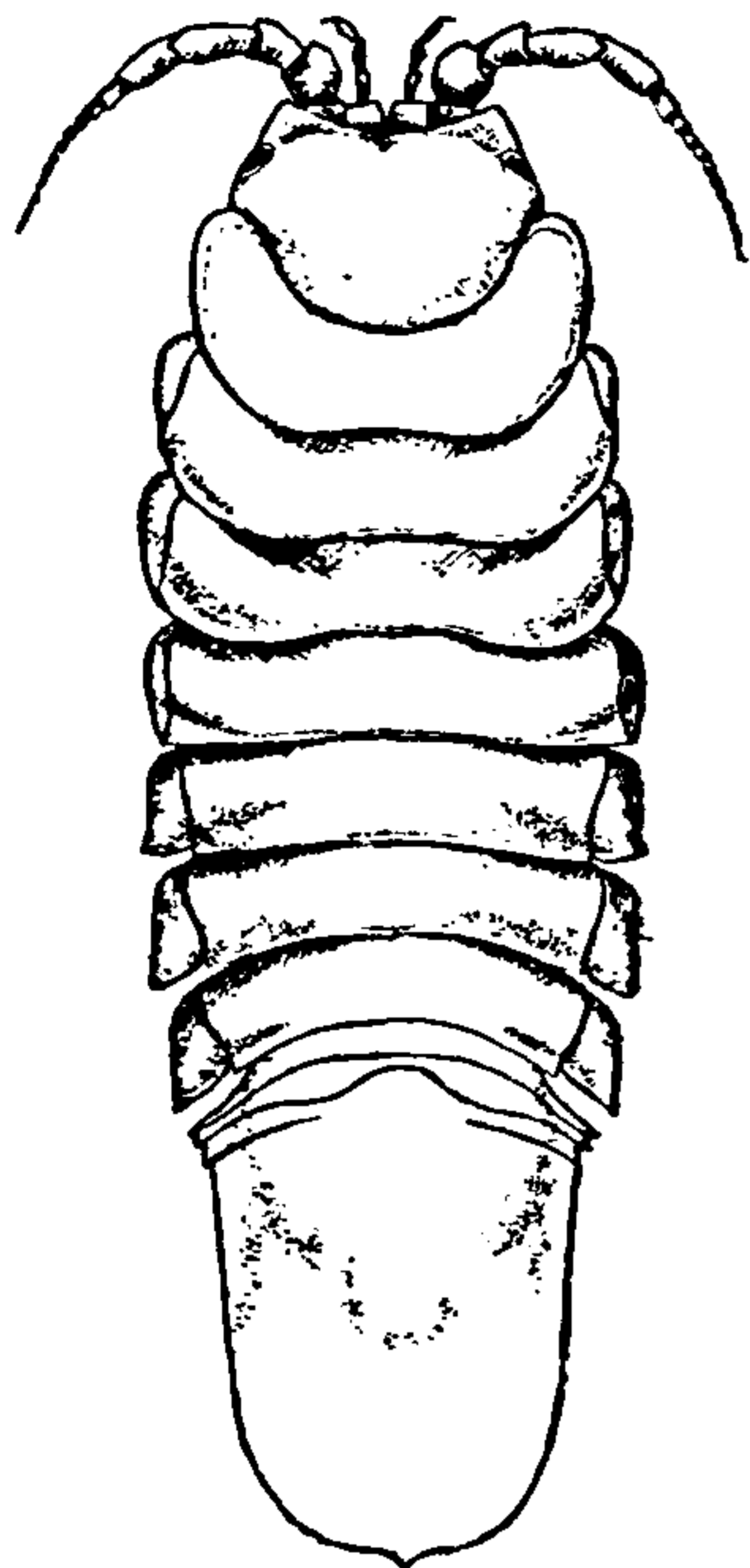


FIG. 402.—PENTIDOTEA WOSNESENSKII. MALE.

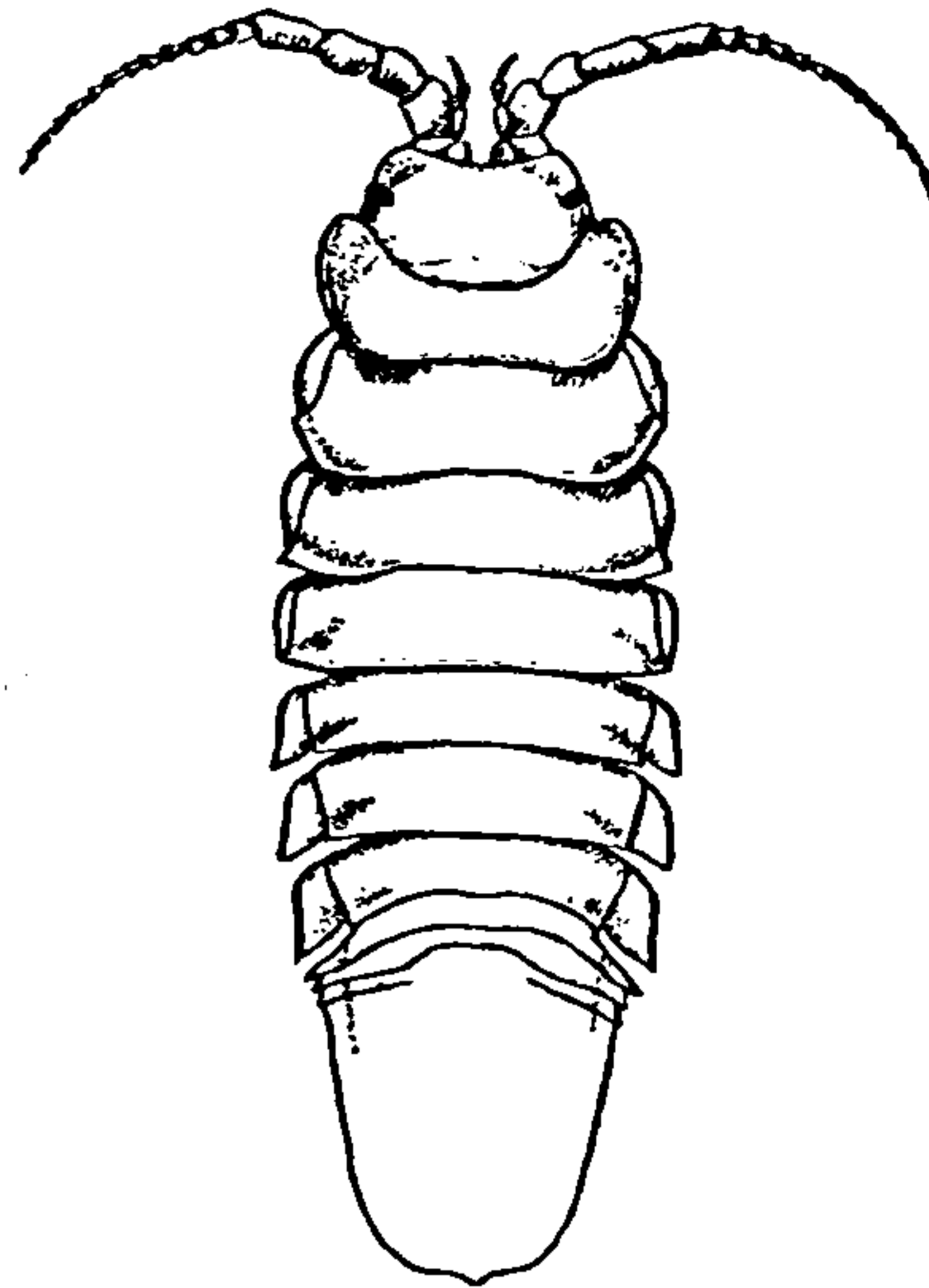


FIG. 403.—PENTIDOTEA WOSNESENSKII. FEMALE.

Island; Taylor Bay; Boca de Quadra; Head of Mink Arm; San Francisco, California; Gulf of Georgia; Farallone Islands, California; Fort Point, San Francisco, California; Port Renfrew, British Columbia. (R. Osburn.)

*Depth.*—Surface to 9 fathoms. Found at low tide, on beach, in sand and rocks; under stones.

Body oblong-ovate, with the sides of the thorax nearly parallel; length, three times its greatest breadth, 11 mm.: 32 mm. Length of abdomen about three-eighths the entire length of body, 13 mm.: 32 mm. Head wider than long, with frontal margin slightly excavate; posterior portion somewhat wider than anterior portion.

Eyes small, compound, transversely ovate, and situated at the extreme lateral margin, about halfway between the anterior and posterior margins. The first pair of antennæ are composed of four articles; the basal article is about twice as broad as any of those following; the first, second, and third articles are about equal in length; the fourth is a little longer and clavate in shape. The first antennæ extend a little beyond the middle of the third article of the peduncle of the second pair of antennæ. The second pair of antennæ have

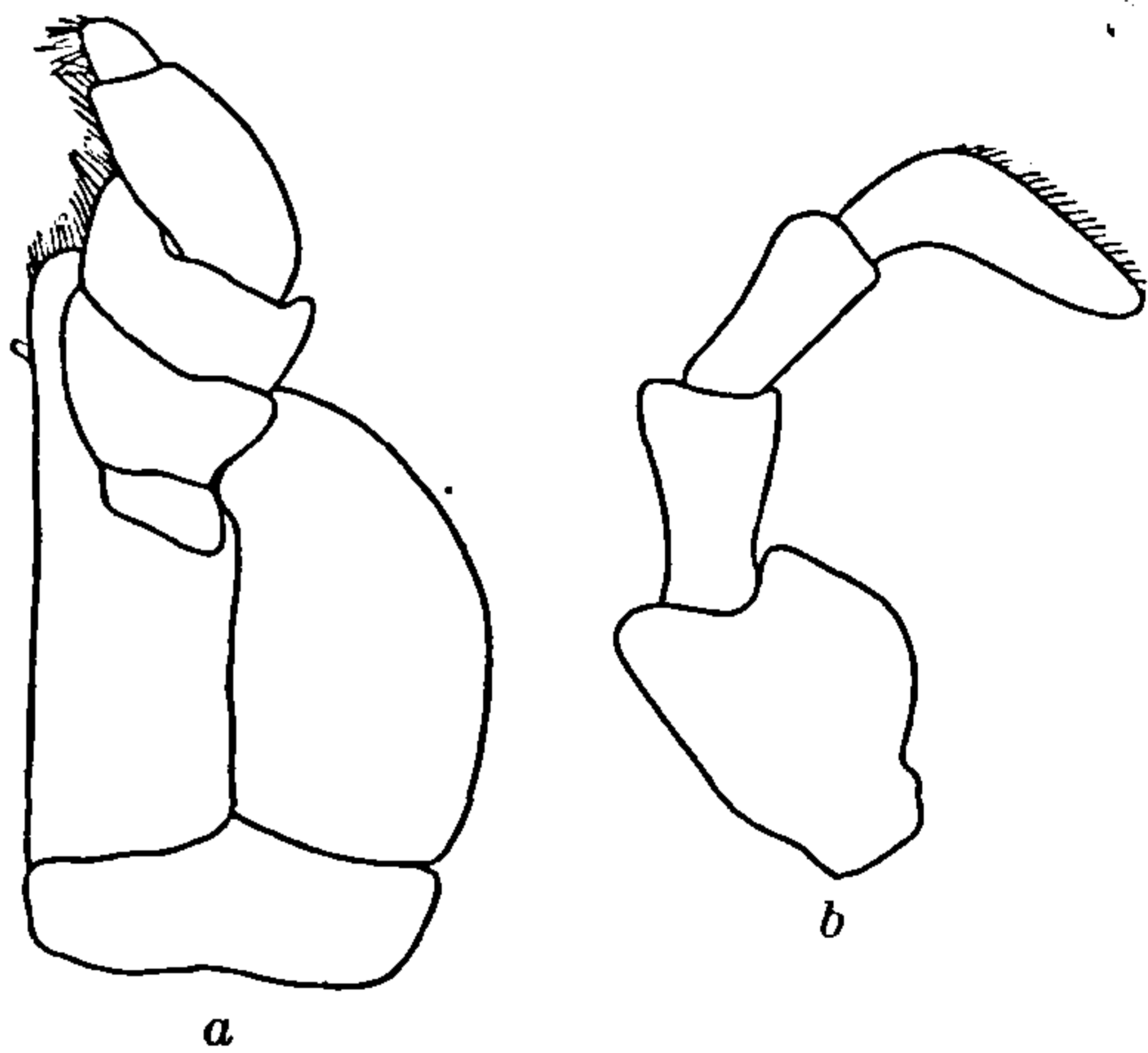


FIG. 404.—PENTIDOTEA WOSNESENSKII. *a*, MAXILLIPED.  $\times 15\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

a peduncle of five articles and a flagellum of sixteen articles. The basal article is short; the second and third are of equal length, and longer than the first; the last two are one and a half times longer than the third, and subequal. The flagellum consists of sixteen articles. The maxillipeds have a palp of five articles.

The thoracic segments are all equal in length. The epimera of the second, third, and fourth segments do not extend the entire length of the lateral margins, but occupy more than three-fourths of the margin. The anterior portion of the segment at the sides is excavate for the epimeron, and the posterior portion projects laterally as far as the exterior margin of the epimeron. The epimera of the last three segments occupy the entire lateral margin, and are increasingly wider posteriorly. All the epimera are large and conspicuous from a dorsal view.

The legs are similar in structure, and in the male are thickly furnished with hairs on the free margins of the joints. Those of the female have the propodus only furnished with thick bristles on the inferior margin.

The abdomen has two short segments, followed by one large terminal segment, which has lateral rudiments of another partly coalesced segment. The posterior portion of the segment is regularly and broadly rounded, with a very small obtuse median point, rounded at the apex.

The upper division of the opercular valves is crossed obliquely by a carina formed by the thickened anterior portion.

The following observations and measurements were made by Dr. James E. Benedict several years ago and intended for publication. He has given me permission to publish them here.

An examination of numerous lots from California to Alaska appear to show that the sexual differences are more marked in this than is usual in species of the genus.

Dana's figure is undoubtedly that of a male and agrees well with the specimens in the collection. The legs of the male are densely covered with hair; their heads are broad and very prominent. The outline of the thorax is but little arcuate. The abdomen is broad and but little tapering. The heads of the females are much smaller in proportion to the size and width of the animal than in the males. The abdomens are more tapering and the third and fourth segments of the thorax are wider, giving the animal a suboval outline. The terminal outlines of the abdomens of both sexes are alike.

In sorting the different lots preserved in alcohol the males can usually be separated from the females by the color alone, the larger yellow specimens always proving to be males, while the dark colored ones are usually, though not always, females, and in this collection commonly with eggs. Some lots contain a large excess of one sex or the other, while in other lots the sexes are associated in more even numbers. No females were found with hair on the legs or a well-developed male without it.

Doctor Stimpson says: "An exceedingly common species of a dark-green color found among seaweeds on rocky or stony shores between high-water and half-tide marks,"

*Measurements of a female 25 mm. long.*

	mm.
Width of head at the outer margin of eyes .....	4.5
Width of first thoracic segment.....	6.5
Width of second thoracic segment.....	8
Width of third and fourth thoracic segments .....	9
Width of fifth thoracic segment .....	8.5
Width of sixth thoracic segment .....	8
Width of seventh thoracic segment.....	7.5
Length of abdomen.....	10.5
Length of antenna with flagellum.....	9

*Measurements of a male 28.5 mm. long.*

	mm.
Width of head .....	5.5
Width of first thoracic segment.....	7.5
Width of second thoracic segment.....	8
Width of third, fourth, fifth, and sixth thoracic segments.....	9
Width of seventh thoracic segment .....	8.5
Length of abdomen.....	11
Length of antenna with flagellum.....	10

*Measurements of a male 35 mm. long.*

	mm.
Width of head .....	6.5
Width of first thoracic segment.....	9
Width of second thoracic segment .....	9.5
Width of third, fourth, fifth, and sixth thoracic segments.....	10.5
Width of seventh thoracic segment .....	10
Length of abdomen.....	13
Length of antenna with flagellum.....	10

**PENTIDOTEA WHITEI (Stimpson).**

*Idotea whitei* STIMPSON, Proc. Acad. Nat. Sci. Phila., 1864, p. 155.—MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 42-43.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, pp. 846-847; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 266; American Naturalist, XXXIV, 1900, p. 227.

*Localities.*—Puget Sound; Monterey Bay, California. From *Mytilus*.

Body narrow, elongate, with sides almost parallel; length equal to a little over three times its greatest breadth, 11 mm.:34 mm. Length of abdomen a little more than one-third that of entire body, 12 mm.:34 mm.

Head wider than long, with frontal margin very slightly excavate; posterior portion not wider than anterior portion. Eyes moderately large, transversely ovate, compound, and placed close to the lateral margin, about halfway between the anterior and posterior margins. The first pair of antennæ have four articles; the basal article is twice as broad as any of those following and a little longer; the next two articles



are nearly of equal length; the last one is clavate and somewhat longer than either of the preceding ones. The first antennæ do not extend

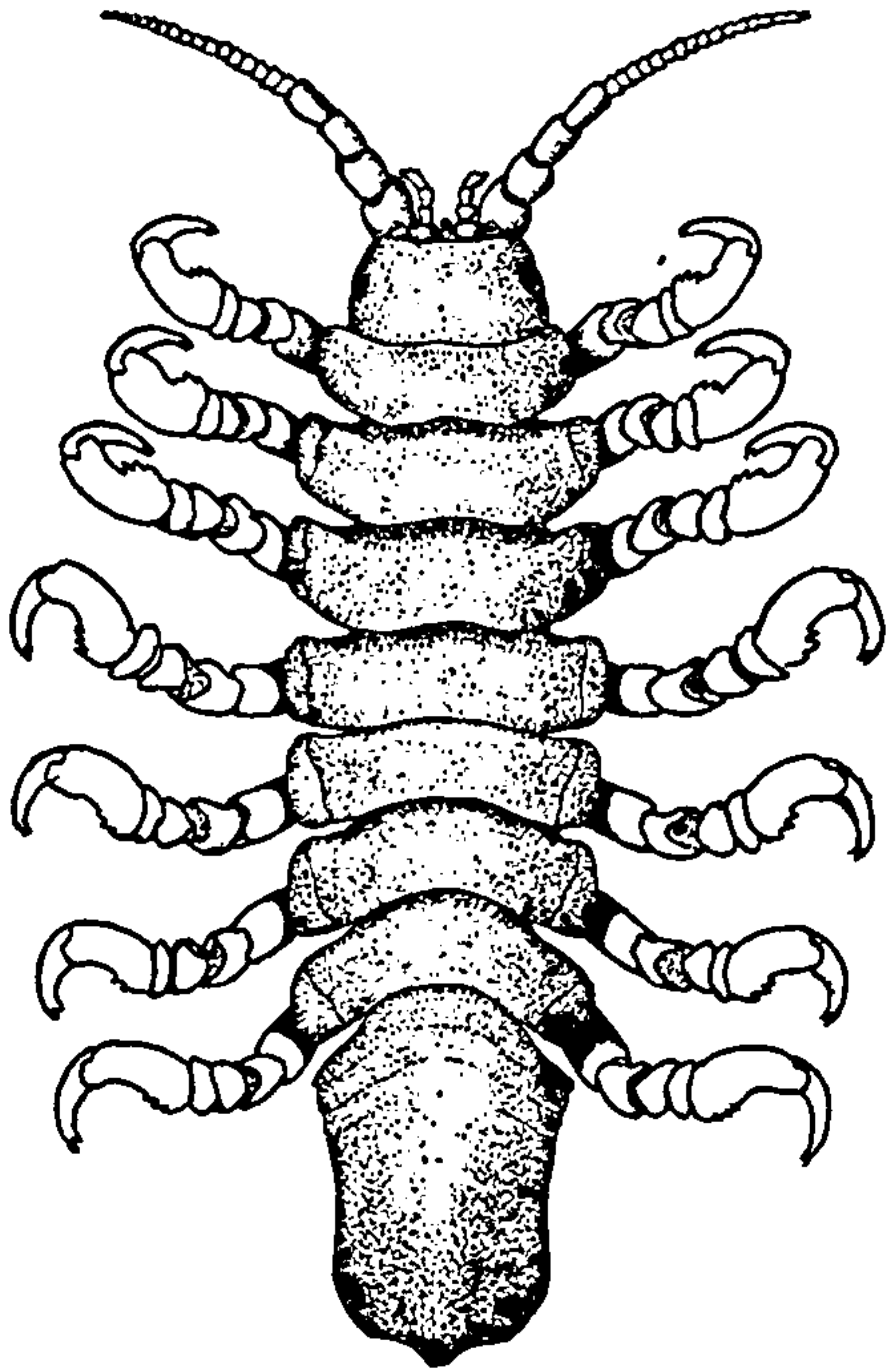


FIG. 405.—PENTIDOTEA WHITEI.  $\times 1\frac{1}{2}$ .

beyond the second article of the peduncle of the second pair of antennæ. The second pair of antennæ have a peduncle composed of five articles and a flagellum of seventeen articles. The first article of the peduncle is short, not reaching beyond the basal article of the first pair of antennæ; the next two articles are equal in length, and each is twice as long as the first article; the last two articles are each nearly twice as long as the third article. The maxillipeds have a palp of five articles.

The segments of the thorax are all of equal length. The epimera of all the segments, from the second to the seventh, inclusive, extend the entire length of the lateral margin. The epimeron of the second segment is somewhat broader anteriorly than posteriorly; the epimeron of the third segment and that of the fourth also are the same width throughout their length; those of the last three segments are increasingly wider posteriorly.

All the legs are similar in structure; the propodus is furnished with numerous stiff bristles along the proximal half of the inferior margin.

The abdomen is composed of two short segments and a long terminal one having lateral rudiments of another partially coalesced segment. The terminal segment has the sides somewhat concave, the post-lateral angles rounded, and an acute median terminal point triangularly produced with apex rounded. The opercular valves are in two parts each; a long anterior portion, crossed obliquely by a faint carina, and a short posterior portion.

Only one specimen of this species, a male, was collected at Monterey Bay by Mr. Harold Heath. It agrees in every detail with Stimpson's and Mier's descriptions. No figure has ever been given.

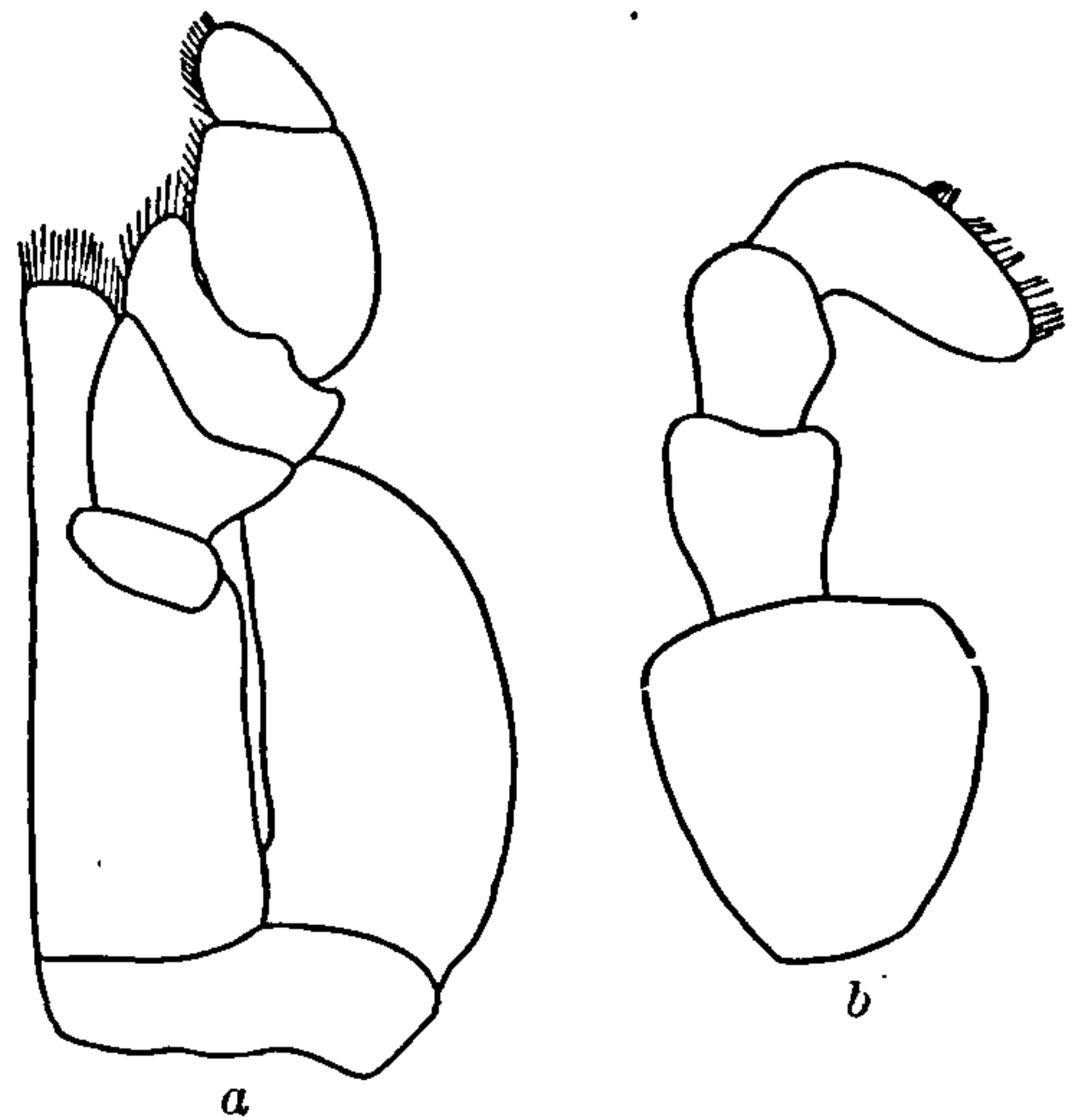


FIG. 406.—PENTIDOTEA WHITEI. *a*, MAXILLIPED.  $\times 15\frac{1}{2}$ . *b*, FIRST ANTENNA.  $\times 15\frac{1}{2}$ .

## PENTIDOTEA STENOPS (Benedict).

*Idotea stenops* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 54-55.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 846; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 266; American Naturalist, XXXIV, 1900, p. 227; Harriman Alaska Exp. Crust., X, 1904, p. 219; Proc. U. S. Nat. Mus., XXVII, 1904, p. 663.

*Locality*.—Monterey Bay, California.

Body oblong-ovate, nearly three times as long as wide, 15 mm.: 42 mm.

Head nearly twice as wide as long, 4 mm.: 7 mm. Frontal margin slightly excavate between the antero-lateral angles. The eyes are transversely elongated, being five times as wide as long and are situated at the sides of the head. The basal article of the first antennæ is greatly dilated; the three following articles are short and nearly subequal. The first pair of antennæ extend to the end of the second article of the peduncle of the second pair of antennæ. The first article of the second pair of antennæ is short and does not extend beyond the basal article of the first pair of antennæ; the second and third articles are subequal; the fourth and fifth articles are also subequal and each is a little longer than either of the two preceding articles. The flagellum is composed of fifteen articles. The second antennæ extend to the posterior margin of the second thoracic segment. The maxillipeds have a palp composed of five articles.

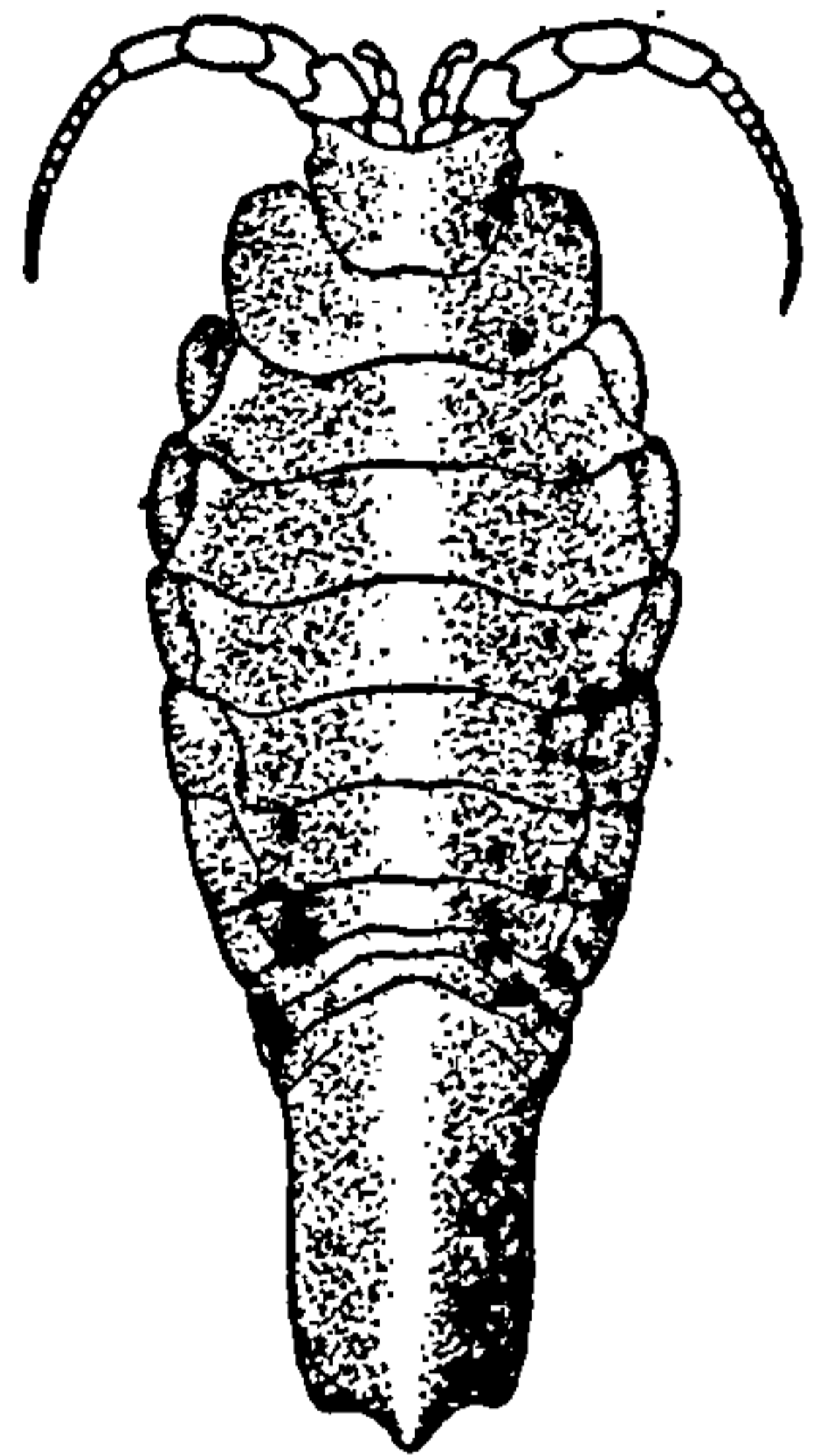


FIG. 407.—PENTIDOTEA STENOPS (AFTER BENEDICT).

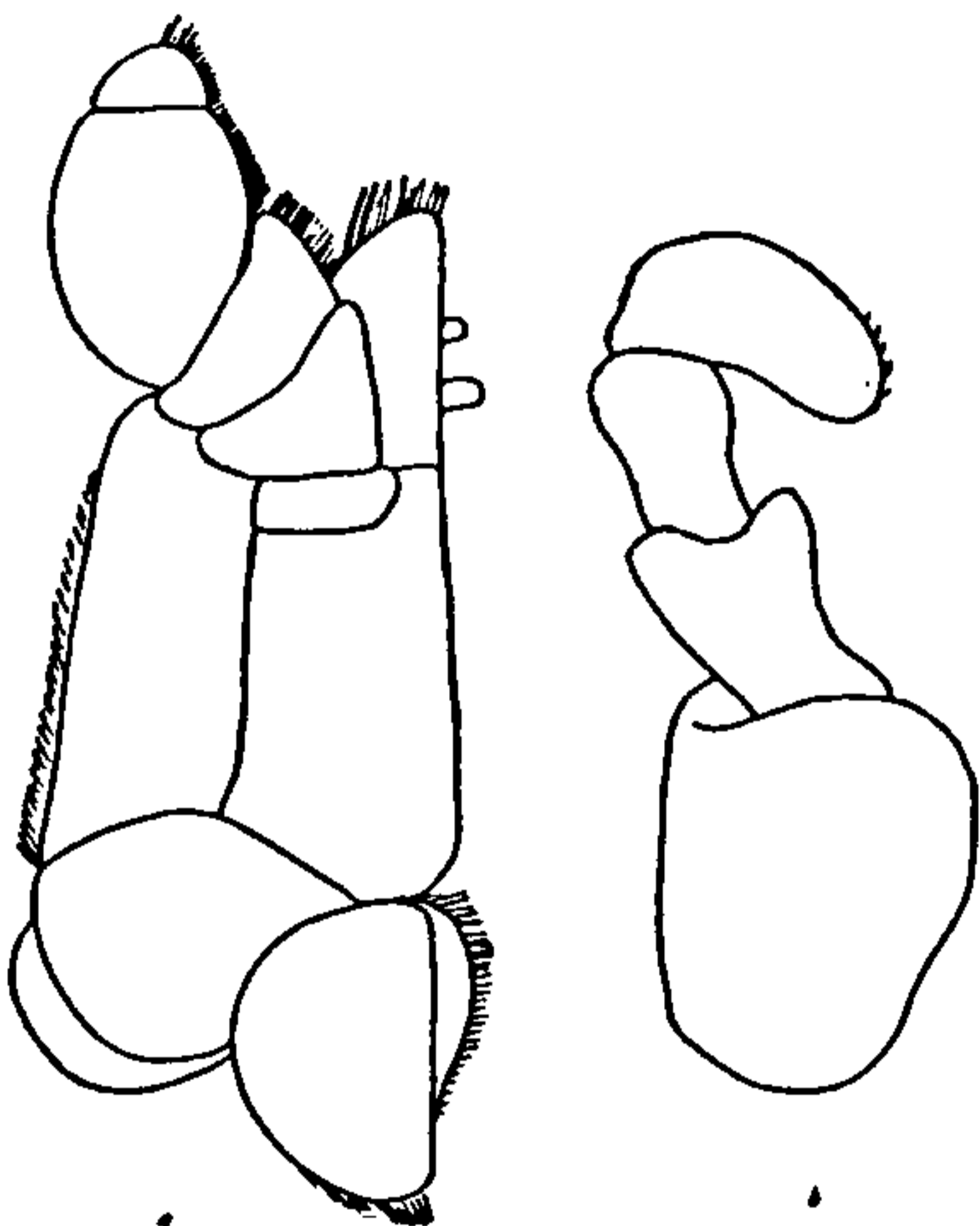


FIG. 408.—PENTIDOTEA STENOPS. a, MAXILLIPED.  $\times 11\frac{1}{2}$ . b, FIRST ANTENNA.  $\times 11\frac{1}{2}$ .

The first segment of the thorax has the lateral parts expanded and produced anteriorly, surrounding the posterior half of the head. The second, third, and fourth segments are subequal and longer than the first, fifth, and sixth segments, which are subequal. The seventh segment is a little shorter than the sixth. The epimera are distinctly separated on all the segments with the exception of the first. The first three occupy almost the entire lateral margin, the epimera being 5 mm. long, and the post-lateral angle of the segment occupying  $\frac{1}{2}$  mm. of the lateral margin below the epimeron. The last three epimera occupy the whole of the lateral margin; they are very broad, the last two being broader posteriorly than anteriorly.

The abdomen is composed of three segments—two short ones, followed by a long terminal segment which has at its base a suture line on either side, indicating another partly coalesced segment. The ter-

minal segment is 10 mm. wide at the base. The sides converge from the base to a point about the middle, where the segment is 8 mm. in width. From the middle to the extremity the abdomen is of equal width. The abdomen terminates in an extremity, which is acutely pointed in the middle of the posterior margin and has the post-lateral angles pronounced and rounded, but not produced.

All the legs are similar in structure.

### 61. Genus SYNIDOTEA Harger.

Flagellum of second antennæ multi-articulate. Palp of maxillipeds composed of three articles. Epimera of all the thoracic segments perfectly and firmly united with the segments. In the last three segments there is sometimes a faint depression marking the place of coalescence. The abdomen is composed of a single segment, with a suture line on either side at the base indicating another partly coalesced segment.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS SYNIDOTEA.

- a. Terminal segment of body emarginate or notched at the extremity.
  - b. Two spines or tubercles overhanging the frontal notch.
    - c. Antero-lateral processes produced horn-like.....*Synidotea ritteri* Richardson
    - c'. Antero-lateral processes not produced horn-like.
      - d. Spines united near the base .....*Synidotea pallida* Benedict
      - d'. Spines free at base.....*Synidotea erosa* Benedict
  - b'. No spines or tubercles overhanging the frontal notch.
    - c. With a low ridge arising between the eyes and interrupted on the median line.
      - d. Outlines of abdomen subparallel.....*Synidotea nebulosa* Benedict
      - d'. Outlines of abdomen strongly arcuate.....*Synidotea angulata* Benedict
    - c'. Without a ridge between the eyes.
      - d. Outline of abdomen subtriangular.
        - e. Front not excavated.....*Synidotea consolidata* (Stimpson)
        - e'. Front excavated.
          - f. Outlines of thorax subparallel.....*Synidotea marmorata* (Packard)
          - f'. Outlines of thorax strongly arcuate.....*Synidotea bicuspidata* (Owen)
      - d'. Outlines of abdomen rounded.
        - e. Length of abdomen equal to width at base...*Synidotea laticauda* Benedict
        - e'. Length of abdomen equal to one and one-half times the width at base.
          - Synidotea harfordi* Benedict
- a'. Abdomen pointed.
  - b. Undulations of the body not tubercular or spiny.
    - c. Tubercle in front of the eyes not margined.....*Synidotea nodulosa* (Krøyer)
    - c'. Tubercle on the frontal margin and forming a part of it.
      - Synidotea lævis* Benedict
  - b'. Undulations of the body tubercular and spiny.
    - c. Four spines on the front of the head; body spinous.
      - Synidotea muricata* (Harford)
    - c'. A wedge-shaped tubercle behind the frontal notch; body tubercular.
      - Synidotea picta* Benedict

## SYNIDOTEA RITTERI Richardson.

*Synidotea ritteri* RICHARDSON, Harriman Alaska Exp. Crust., X, 1904, pp. 219-220; Proc. U. S. Nat. Mus., XXVII, 1904, pp. 663-665.

*Locality*.—Lands End, San Francisco, California.

Body ovate in outline. Color yellow, with markings of black; terminal segment almost entirely black.

Head with prominent rounded antero-lateral angulations, at base of which, and just above the eyes, is a conspicuous horn-like projection, hook-shaped, directed upward and forward, one on either side of the head. In the median excavation of the frontal margin on either side of the median line is a prominent tubercle. Between the eyes and in line with them on the posterior portion of the head are two low tubercles. The eyes are situated at the extreme lateral margins on the posterior portion of the head, and are somewhat elevated above the surface; they are black and conspicuous, and composed of many ocelli. The first pair of antennæ consist of four joints, the last joint clavate and fringed with hairs. The second



FIG. 409.—*a*, HEAD OF SYNIDOTEA RITTERI.  
*b*, HEAD OF SYNIDOTEA CONSOLIDATA.

pair of antennæ have a five-jointed peduncle and a flagellum composed of eight joints; the third joint of the peduncle has a prominent tubercle.

The first four segments of the thorax are longer than the last three. The lateral parts of all the segments are widely expanded, with margins well rounded. The lateral parts are not separated from the dorsal portion of the segments, but are firmly anchylosed.

The abdomen consists of one segment, with suture marks, one on either side, indicative of another partly coalesced segment; it tapers gradually to a broadly rounded extremity, which is slightly excavate in the median line.

The seven pairs of legs are but sparingly furnished with hairs. The upper half of the opercular valve is black, the lower half yellow.

There are three longitudinal lines of low swellings on the body, one median, the other two placed one on either side of the median line.

Only one specimen was taken at Lands End, California, by Doctor Ritter and party.

This species is closely allied to *Synidotea consolidata* (Stimpson),<sup>a</sup>

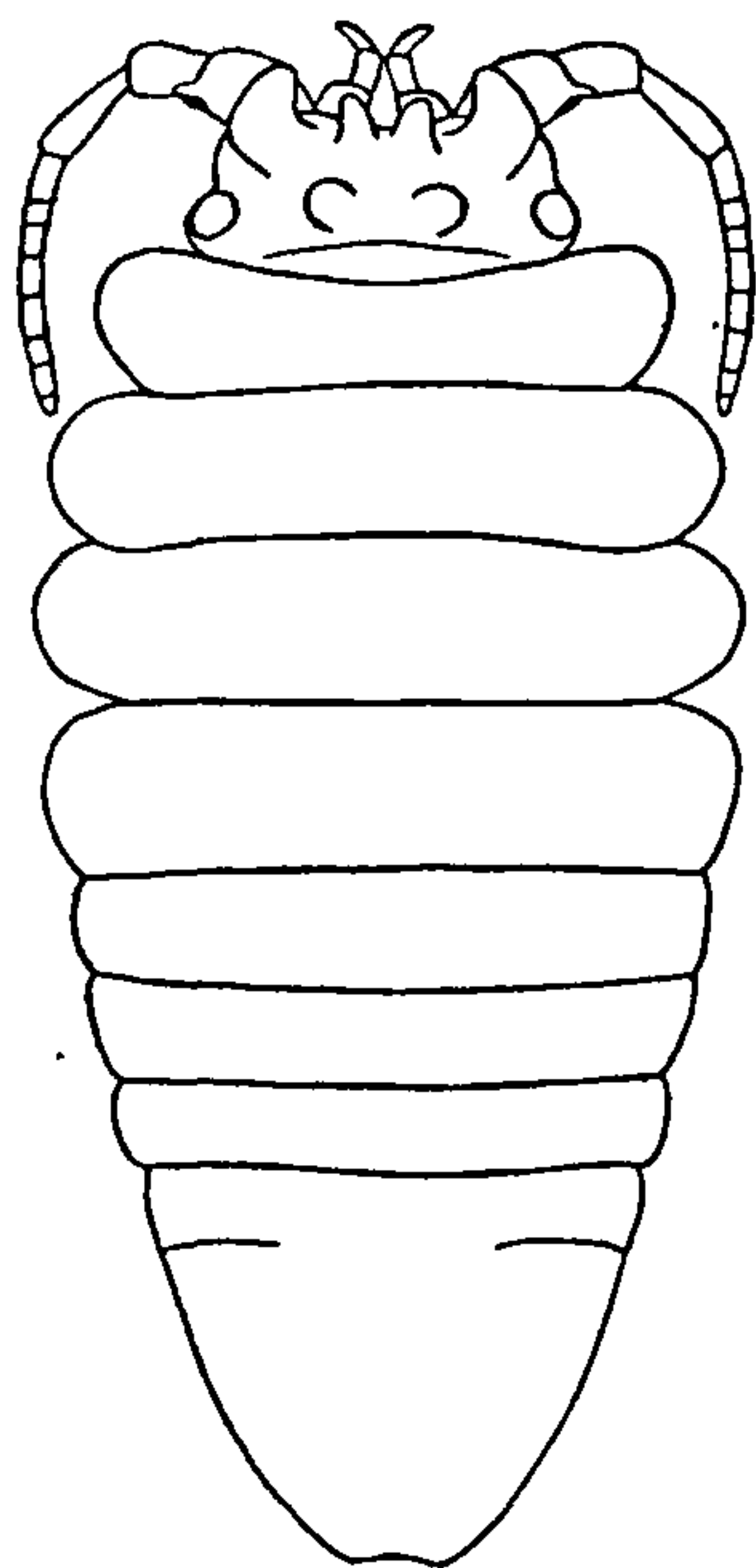


FIG. 410.—SYNIDOTEA RITTERI. × 10.

<sup>a</sup> Proc. Cal. Acad. Sci., I, 1856, p. 97; Bost. Jour. Nat. Hist., VI, 1857, p. 503.

but differs from that species in the shape and greater size of the tubercles in front of the eyes, the tubercles being hook-shaped and very prominent in *S. ritteri* and projecting far in front of the anterior margin of the head, while in *S. consolidata* they are small (Stimpson speaks of them as being minute), are not hooked, and do not project any considerable distance in front of the anterior margin of the head; in the greater size of the two median tubercles on the anterior division of the head (Stimpson does not mention these tubercles in his description, but in the specimens sent to the U. S. National Museum from

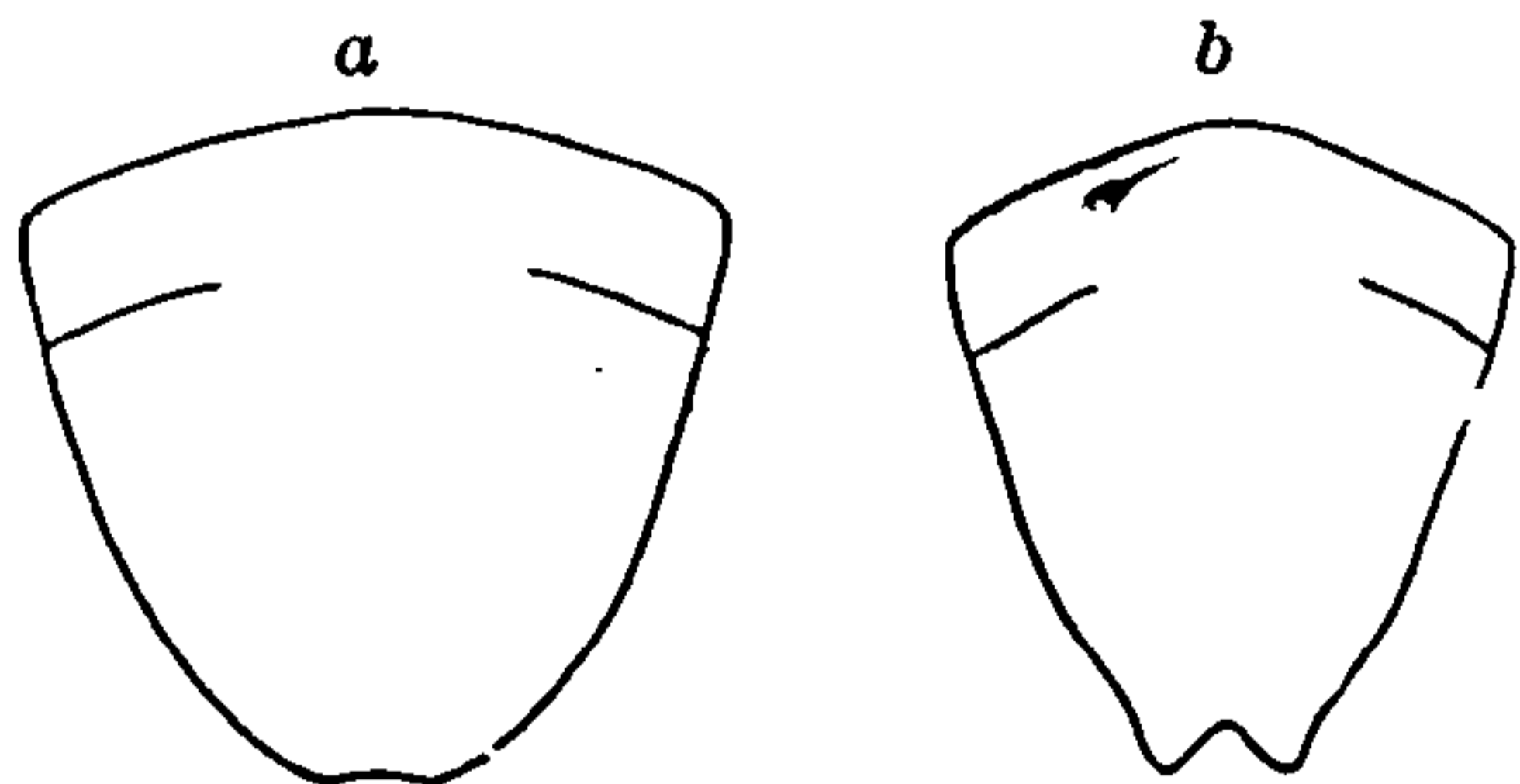


FIG. 411.—*a*, ABDOMEN OF SYNIDOTEA RITTERI. *b*, ABDOMEN OF SYNIDOTEA CONSOLIDATA.

Pacific Grove, California, by Mr. J. O. Snyder, and which Dr. James E. Benedict has identified with *S. consolidata* and figured in his paper on the genus *Synidotea*,<sup>a</sup> these tubercles are present, but very minute; they do not overhang the frontal emargination); in the shape of the terminal segment of the body, it being much broader,

and tapering very gradually to a broadly rounded extremity, which has a slight median notch or excavation in *S. ritteri*, while in *S. consolidata* the terminal segment of the body is narrower and tapers to an extremity marked by two pronounced teeth or angulations separated by a deep median notch.

Specimens of the same size were taken in making the above comparisons.

This species is named for Dr. William E. Ritter, of the University of California, from whom the specimens were received.

#### SYNIDOTEA PALLIDA Benedict.

*Synidotea pallida* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 396–397.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 227.

*Locality*.—Chirikof Island, Alaska.

*Depth*.—695 fathoms.

Body narrow, elongate, about two and a half times longer than wide, 5 mm.: 12 mm. Length of abdomen equal to less than half the length of the entire body, 5 mm.: 12 mm.

Head with the front excavate between the antero-lateral angles. The sides of the head are produced in a wide border, the exterior margin of which is straight. There are four tubercles on the anterior portion of the head, two in the center, one on either side of the median longitudinal line, and two lateral to these, one in front of each eye. The eyes are round and composite, and placed at the base of the lateral

<sup>a</sup> Proc. Acad. Nat. Sci. Phila., 1897, p. 393.

expansion, so that they seem more dorsal in position. The first antennæ have the basal article not enlarged; the second is about equal in length to the first; the third and fourth are subequal, and each is about one and a half times longer than the third. The first pair of antennæ extend to the end of the fourth peduncular article of the second pair of antennæ.

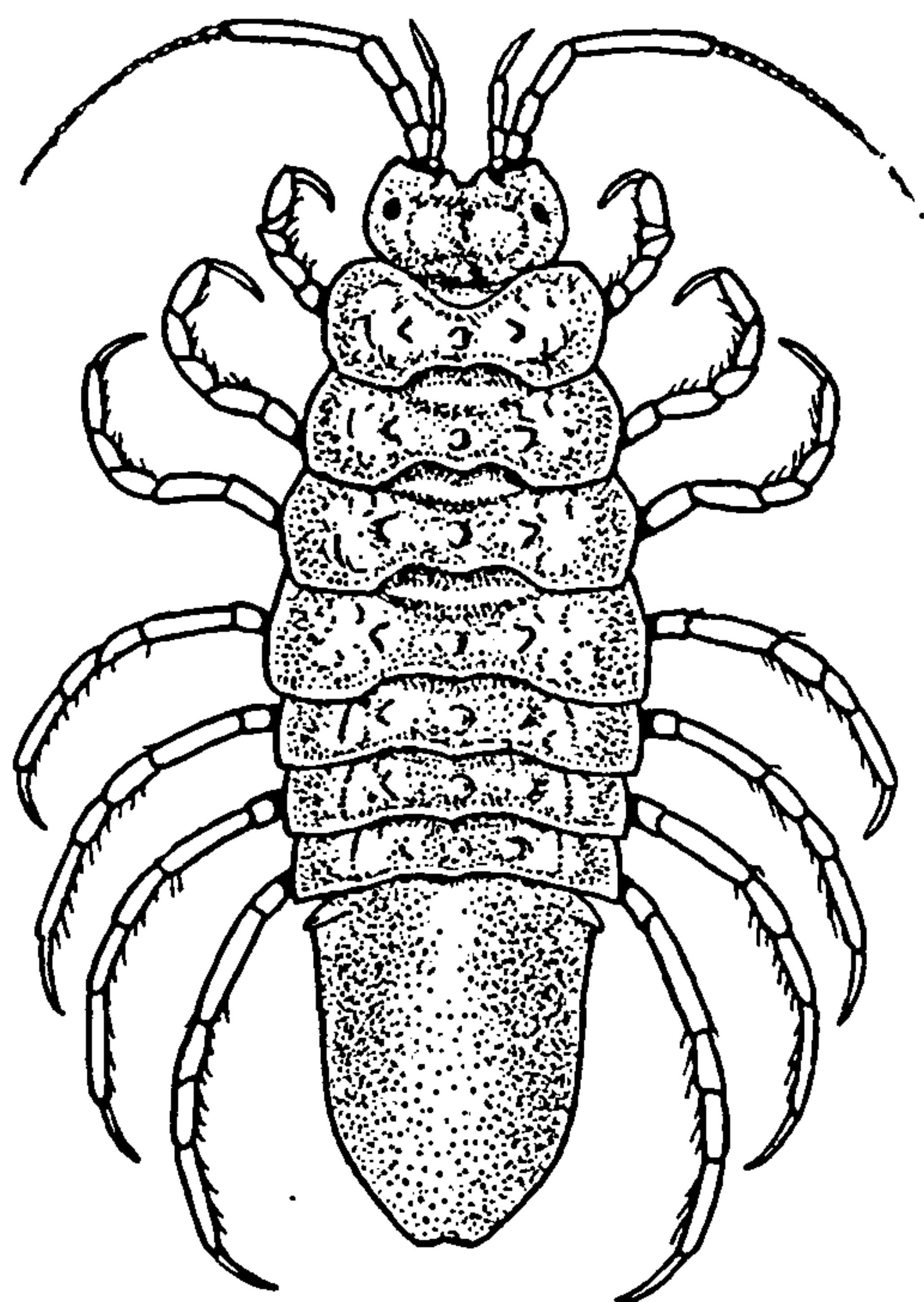


FIG. 412.—*SYNIDOTEA PALLIDA* (AFTER BENEDICT).  $\times 2\frac{1}{2}$ .

The basal article of the second pair of antennæ is almost inconspicuous from a dorsal view; the second article is short; the third, fourth, and fifth are progressively longer, each being one and a half times longer than the preceding article. The flagellum consists of ten articles. When retracted, the second antennæ extend to the posterior margin of the third thoracic segment. The maxillipeds have a palp of three articles.

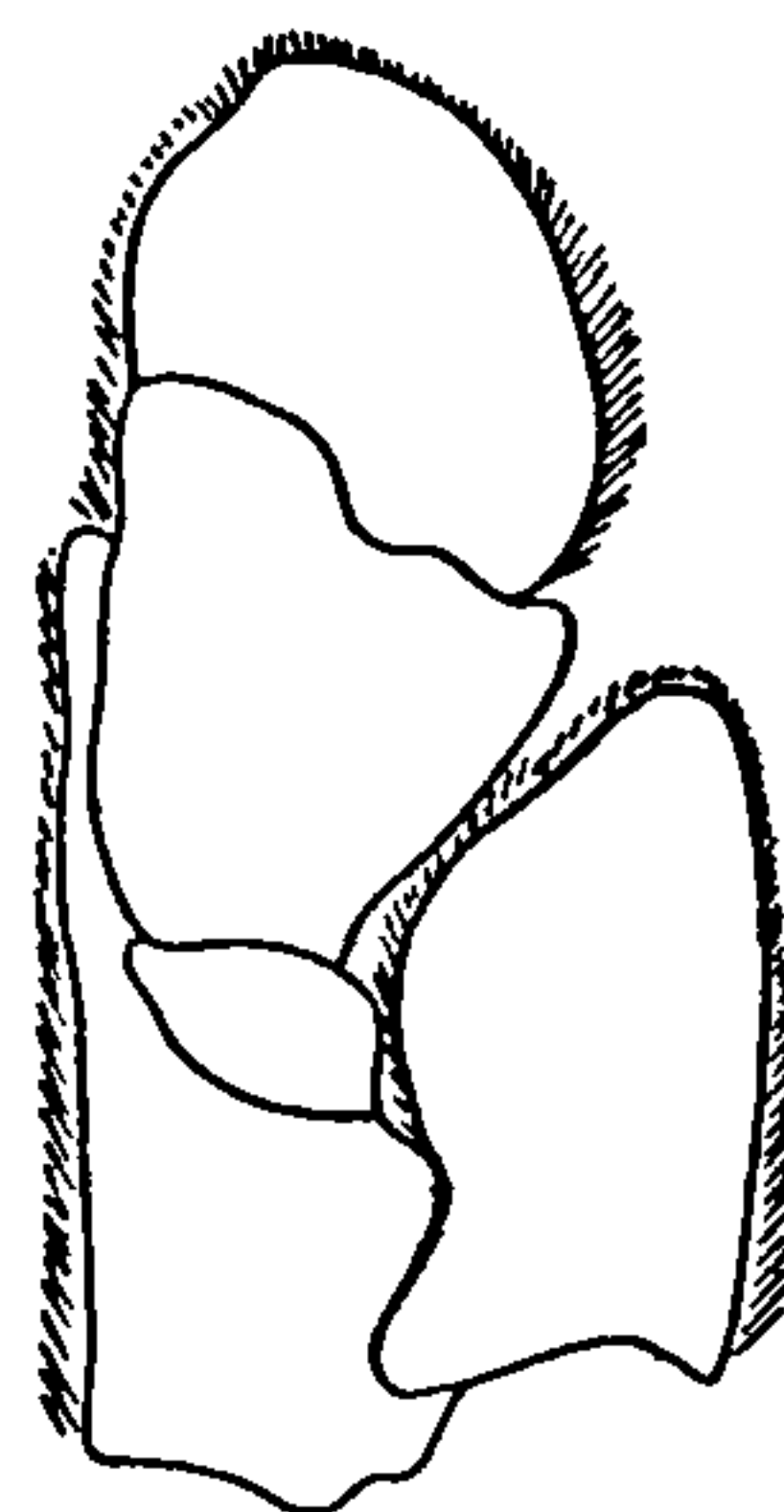


FIG. 413.—*SYNIDOTEA PALLIDA*. MAXILLIPED.  $\times 27\frac{1}{2}$ .

The first four segments of the

thorax are longer than the last three. The epimera of all the segments are firmly united with the segments. Three longitudinal rows of tubercles, one median and two lateral, extend the entire length of the thorax. The tubercles in the lateral rows are more pronounced. In a transverse line the tubercles are arranged three on each segment.

The abdomen is composed of a single segment with lateral sutures at the base indicating another partly coalesced segment; it is elongate with the posterior extremity rounded. There is a very slight indication of a median excavation at the posterior end.

The legs are more or less similar in structure.

#### *SYNIDOTEA EROSA* Benedict.

*Synidotea erosa* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 396-397.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 227.

*Locality*.—Sannakh Island, Alaska.

*Depth*.—483 fathoms.

Body oblong-ovate, three times longer than wide, 7 mm.:21 mm.

Head wider than long,  $2\frac{1}{2}$  mm.: 5 mm., with the anterior margin deeply excavate between the antero-lateral angles. The eyes are small, round, composite, and situated on either side, some distance from the

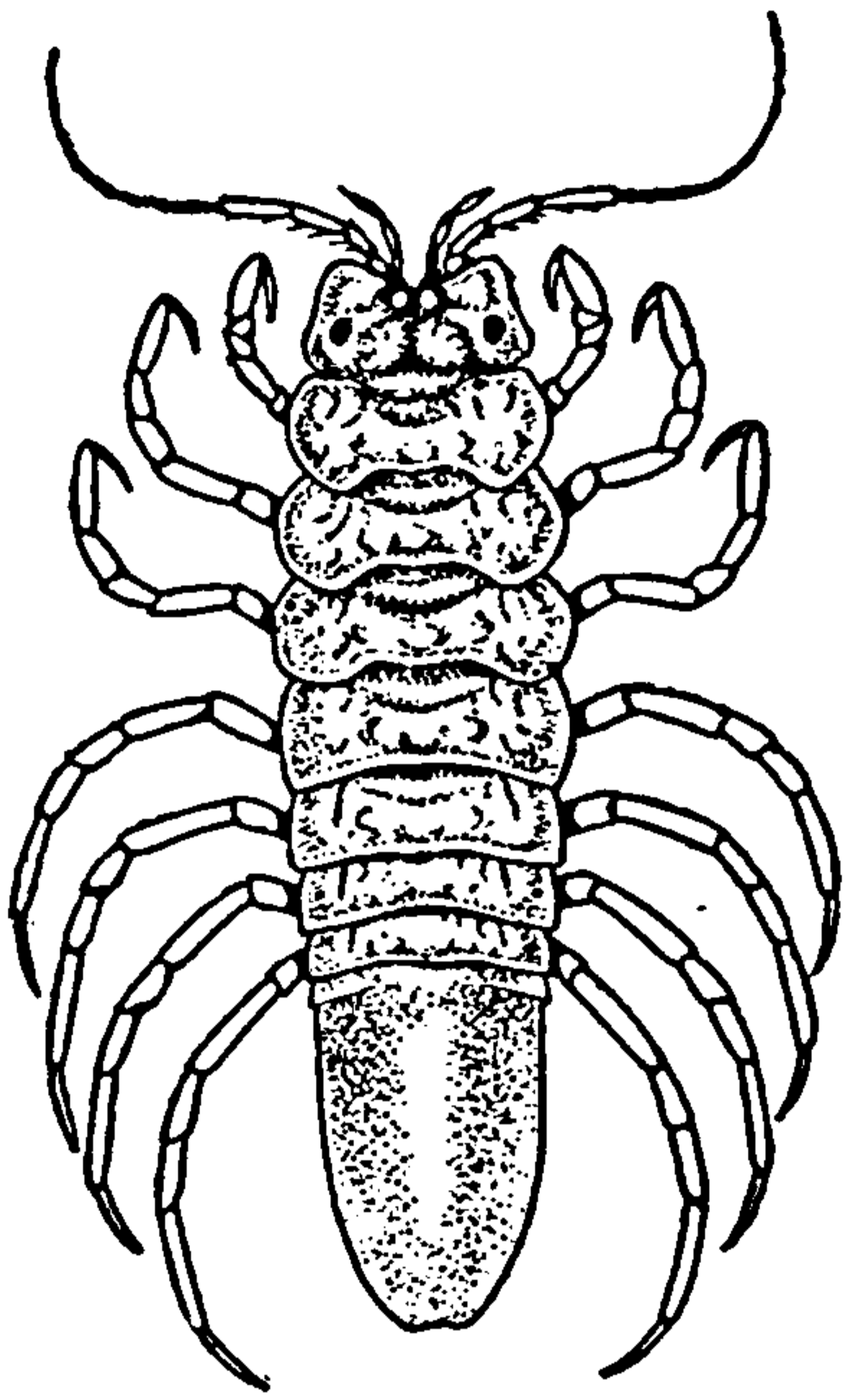


FIG. 414.—*SYNIDOTEA EROSA*  
(AFTER BENEDICT).  $\times 2$ .

lateral margin, which is expanded to form a narrow border. Two prominent tubercles, one on either side of the median line are placed just behind the anterior margin, from which position they overhang the frontal notch. Just in front of each eye is a low tubercle almost inconspicuous. Between the eyes, one on either side of the median line, are two large but low elevations. Back of these elevations is a low ridge. The first pair of antennae have the first two articles short and subequal; the last two are subequal, and each is one and a half times longer than either of the two preceding articles. The first pair of antennae extend to the middle of the fourth article of the peduncle of the second pair of antennae. The first two articles of the sec-

ond pair of antennae are short and subequal; the third and fourth are subequal and each is about twice as long as either of the two preceding articles; the fifth is one and a half times longer than the fourth. The flagellum is composed of seventeen articles. The maxillipeds have a palp of three articles.

The second, third, and fourth segments of the thorax are subequal and are the longest, each being about  $\frac{1}{2}$  mm. longer than any of the other segments, which are nearly subequal, the seventh being a little shorter than the sixth. The epimera of all the segments are firmly united with the segments, and there is no indication of a separation. On each segment of the thorax, on either side of the median line and a short distance from the lateral margin, is a low elevation, which in the first segment at its anterior portion is produced into two low tubercles.

The abdomen is composed of a single segment, which has a suture line at its base on either side; it is  $7\frac{1}{2}$  mm. long, about one-third the entire length of the body, and is 5 mm. wide. It tapers to a rounded extremity, which has a small and shallow median excavation, almost inconspicuous.

All the legs are similar in structure.

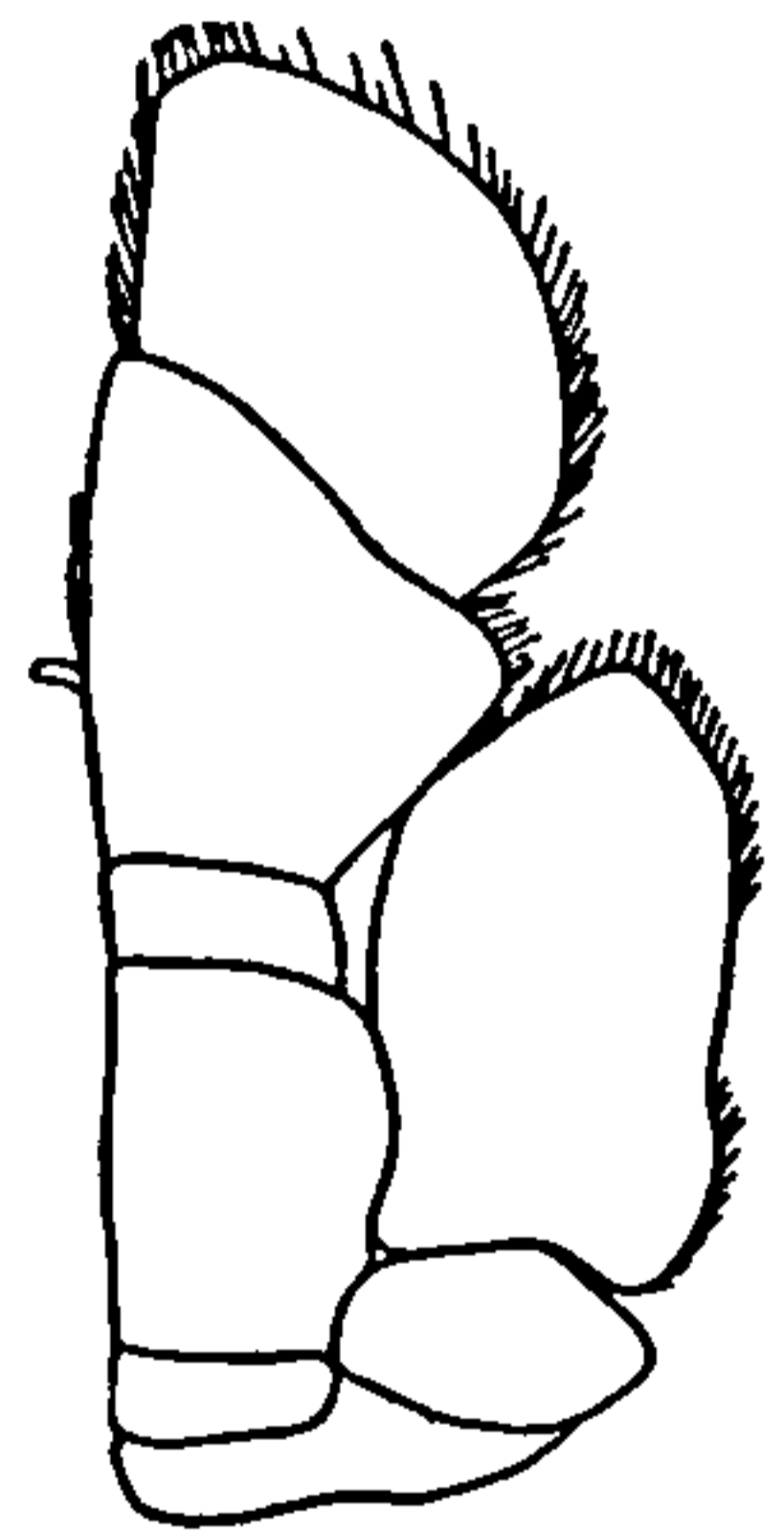


FIG. 415.—*SYNIDOTEA EROSA*. MAXILLIPED.  
 $\times 15\frac{1}{2}$ .

## SYNIDOTEA NEBULOSA Benedict.

*Synidotea nebulosa* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 397-399.—  
RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist.  
(7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 227.

*Localities.*—Unalaska; Kyska Harbor; Semidi Islands; Unimak Island; Bering Sea; Kamschatka; Constantine Harbor, Alaska; East of Amak Island, Alaska.

*Depth.*—6 to 32 fathoms.

Body ovate, a little more than twice as long as wide, 5 mm.: 11 mm. Length of abdomen a little more than one-third the length of the entire body, 4 mm.: 11 mm. Head, first four segments of thorax, and abdomen dark in color, the surface being densely covered with small black marks. The last three segments of the thorax are much lighter in color, being a light brown with only a few scattered markings of black.

The front of the head is almost straight, with only a very small median excavation. The anterior portion of the head is slightly narrower than the posterior portion. The lateral margins are straight. The eyes are large and round, composite in structure, and placed about the middle of the head near the lateral margins. The first pair of antennæ have the first and second articles about equal in length, the first article not being dilated; the third and fourth are subequal and each is about one and a half times longer than the second. The first antennæ extend to the end of the fourth article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is almost inconspicuous from a dorsal view; the second article is short, not much longer than the first; the third is but little longer than the second; the fourth and fifth are subequal and each is twice as long as the third.

The flagellum consists of six articles. When retracted, the second antennæ extend to the posterior margin of the second thoracic segment. The maxilliped has a palp of three articles.

The first four segments of the thorax are longer than the last three. All the epimera of all the segments are firmly united with the segments. The lateral margins of the segments are somewhat rounded.

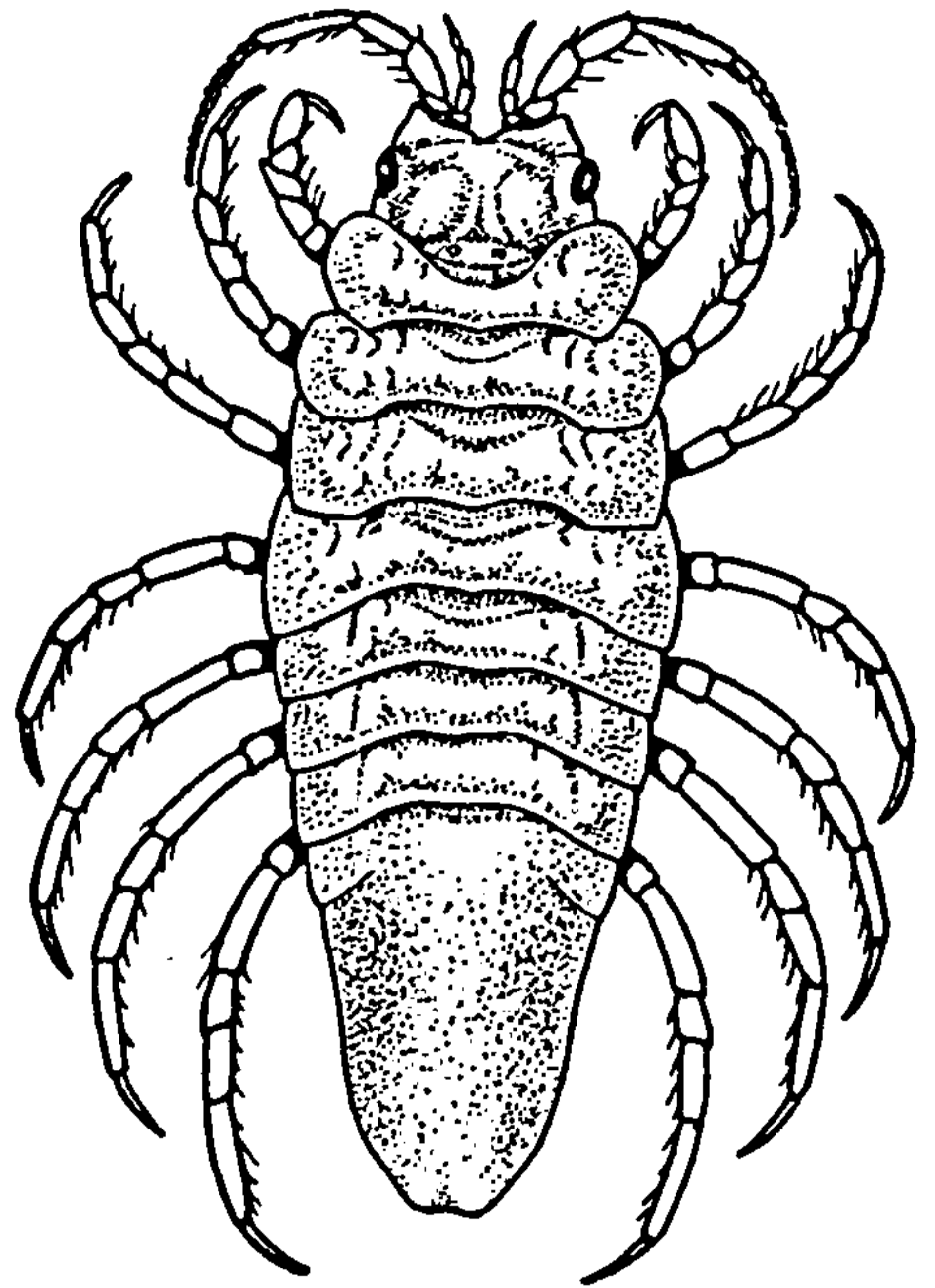


FIG. 416.—SYNIDOTEA NEBULOSA (AFTER BENEDICT).  $\times 3$ .

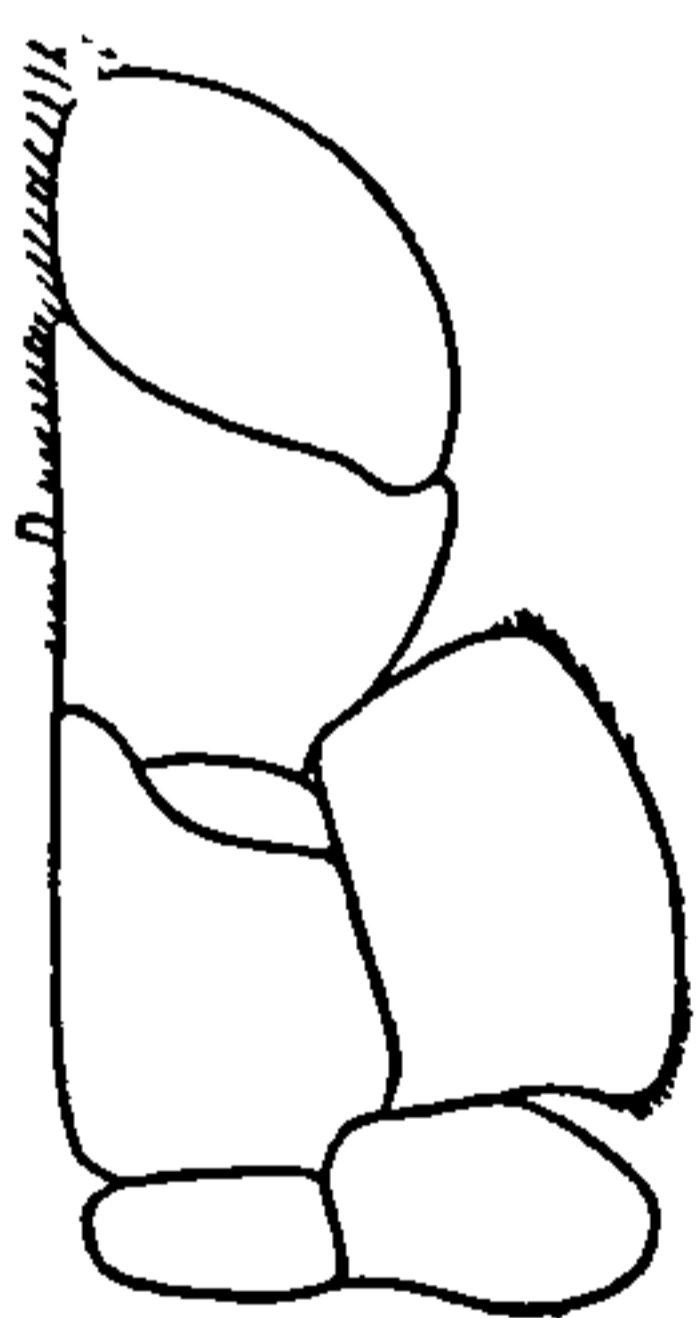


FIG. 417.—SYNIDOTEA NEBULOSA. MAXILLIPED.  $\times 27\frac{1}{2}$ .



The abdomen is composed of one segment with suture lines at the base indicating another partly coalesced segment. It is rounded posteriorly with the extremity truncate or slightly emarginate.

The legs are more or less similar in structure.

**SYNIDOTEA ANGULATA** Benedict.

*Synidotea angulata* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 395-396.—

RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist.

(7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 227.

*Localities.*—Off Cape Johnson, Washington; off Destruction Island, Washington; off Cape Flattery, Washington.

*Depth.*—31 to 38 fathoms.

Body narrow, elongate, three times longer than wide, 4 mm. : 12 mm. Length of abdomen one-third the length of the entire body, 4 mm. : 12 mm.

Head with a deep excavation between the antero-lateral angles. Just posterior to the frontal excavation is a ridge produced into two low tubercles, one on either side of the median line. Eyes large and round, composite, and placed about the middle of the head near the lateral margins. The basal article of the first antennæ is not expanded and is about as long as the second article; the third and fourth are subequal and each is about one and a half times longer than the

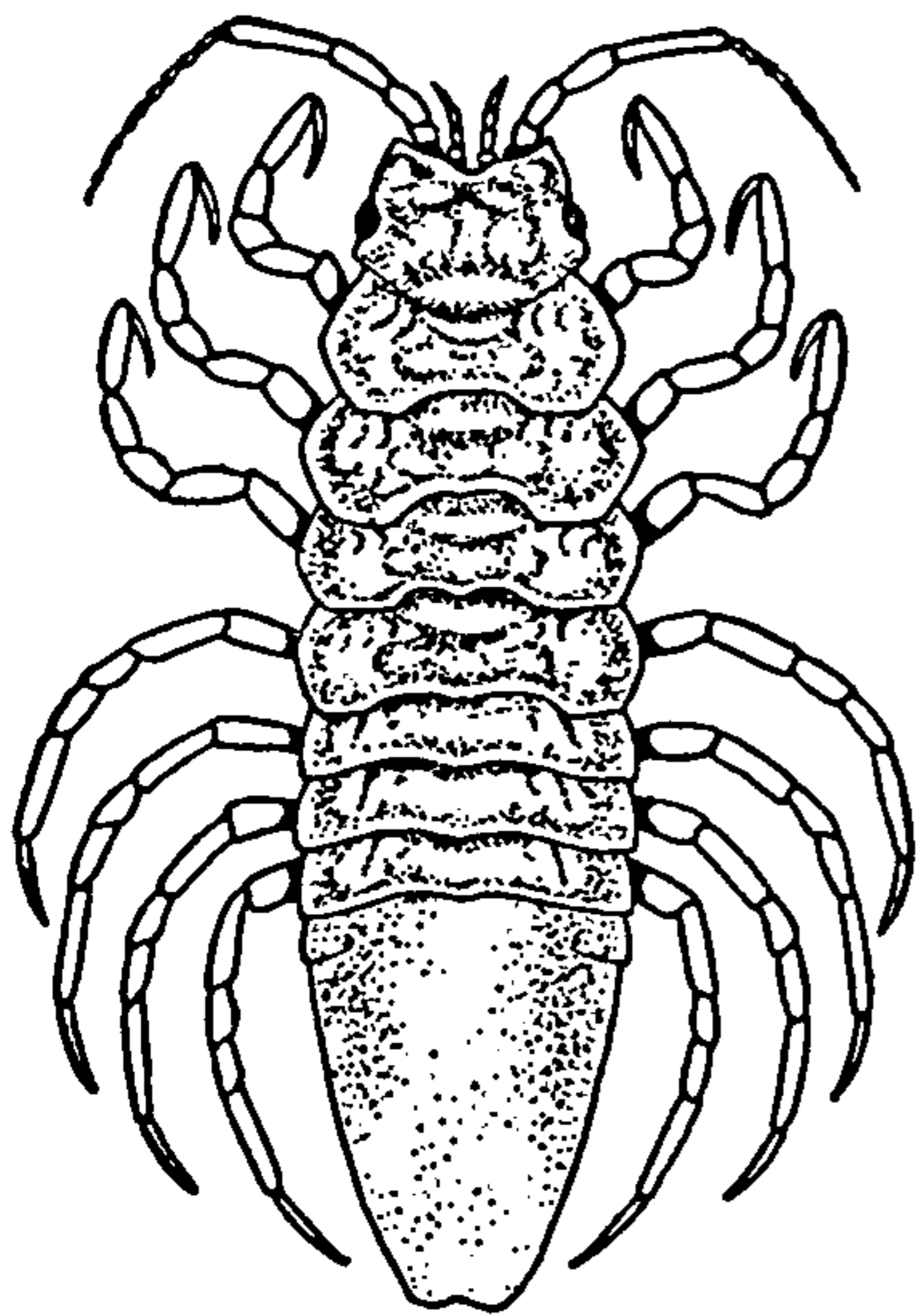


FIG. 418.—SYNIDOTEA ANGULATA (AFTER BENEDICT).  $\times 4$ .

second. The first pair of antennæ extend a little beyond the end of the third article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short and almost inconspicuous from a dorsal view; the second article is also short; the third and fourth are about equal in length and each is twice as long as the second; the fifth is nearly twice as long as the preceding article. The flagellum consists of twelve articles. When retracted the second pair of antennæ extend to the posterior margin of the third thoracic segment. The maxilliped has a palp of three articles.

The second, third, and fourth segments of the thorax are longer than the others. All the epimera of all the segments are firmly united with these segments. The lateral portions of the first four segments are expanded laterally with margins angulate. The last three segments have straight lateral margins.

The abdomen is composed of one segment with lateral sutures at the base, indicating another partly coalesced segment. The posterior portion is rounded, with apex slightly excavate.

The legs are more or less similar in structure.



FIG. 419.—SYNIDOTEA ANGULATA. MAXILLIPED.  $\times 27\frac{1}{2}$ .

## SYNIDOTEA CONSOLIDATA (Stimpson).

*Idotea consolidata* STIMPSON, Proc. Cal. Acad. Sci., I, 1856, p. 89; Bost. Jour. Nat. Hist., VI, 1857, p. 503.

*Edotea bicuspidata* MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 66.

*Synidotea consolidata* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 393.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 227.

*Locality*.—Pacific Grove, California.

Body ovate, twice as long as broad, 4 mm.: 8 mm.

Length of abdomen, 3 mm.

Head with a slight median excavation. Posterior to the median notch are two small tubercles on either side of the median line. Lateral to these tubercles and in front of the eyes are two larger tubercles, one on either side. Between the eyes in a transverse line are two small tubercles, one on either side of the median line and a little farther apart than the two anterior tubercles. Posterior to these two tubercles in the middle of the head is one small tubercle in the median line close to the posterior margin. The eyes are large and round, composite in structure, and placed close to the lateral margins. The basal article of the first pair of antennæ is short and not dilated; the first, second, and third articles are about equal in length; the fourth is nearly twice as long as the third. The first antennæ extend to the end of the third article of the peduncle of the second antennæ. The basal article of the

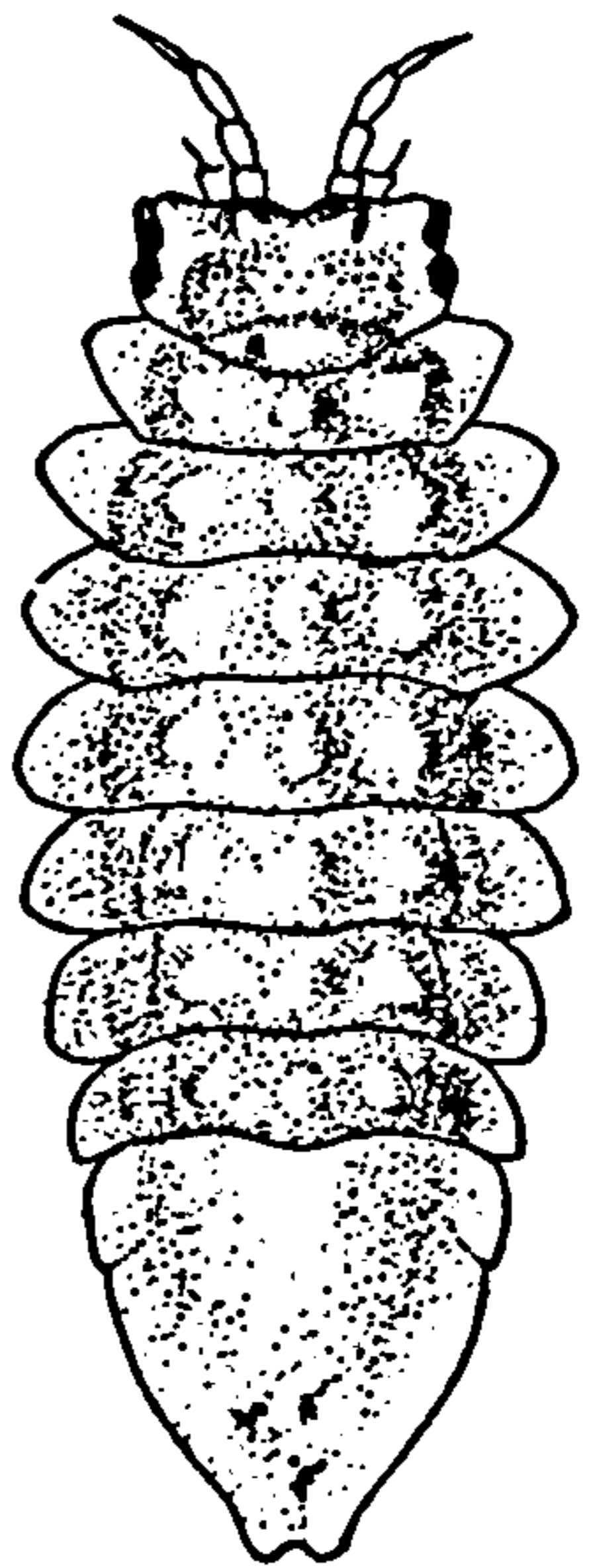


FIG. 420.—SYNIDOTEA CONSOLIDATA (AFTER BENEDICT).  $\times 6$ .

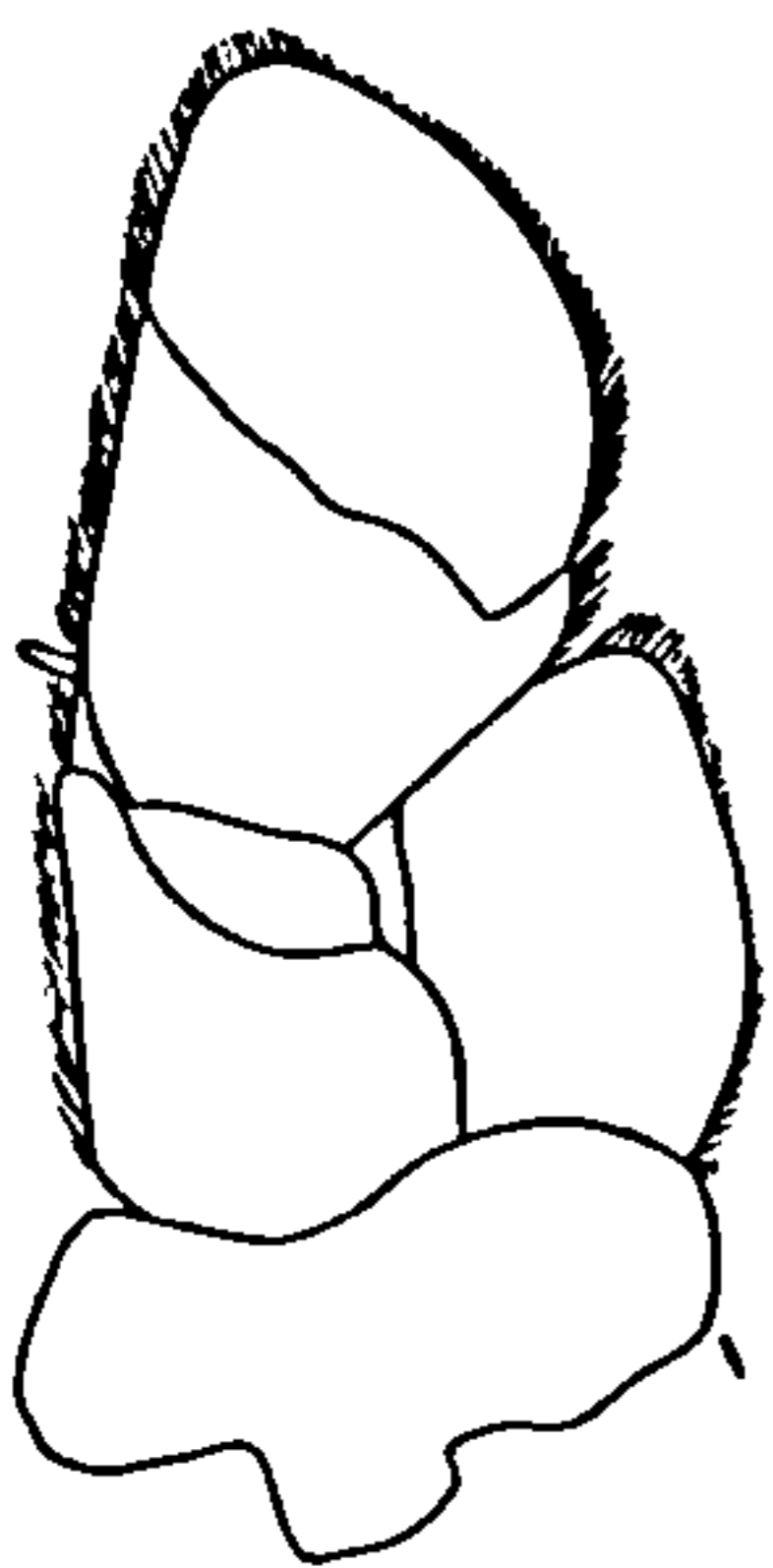


FIG. 421.—SYNIDOTEA CONSOLIDATA. MAXILLIPED.  $\times 39$ .

second pair of antennæ is almost inconspicuous; the second is short; the third and fourth are increasingly longer than the second; the fifth is about one and a half times longer than the fourth. The flagellum consists of eight articles. When retracted the second antennæ extend to the middle of the third thoracic segment.

The second, third, and fourth segments of the thorax are longer than the others. The epimera of all the segments are firmly united with the segments. The lateral portions of the segments are expanded and the lateral margins rounded in outline. Three longitudinal rows of low tubercles extend the entire length of the thorax, one median row and one on either side of this. On each segment these tubercles are situated in a transverse row of three.

The abdomen is composed of one segment, with lateral sutures at the base, indicating another partly coalesced segment. There are two very

small tubercles in longitudinal series in the median line at the base of this segment. The sides of the abdomen converge gradually to a narrow extremity, which has a deep median excavation.

*SYNIDOTEA MARMORATA* (Packard).

*Idotea marmorata* PACKARD, Mem. Bost. Soc. Nat. Hist., I, 1867, p. 296, pl. VIII, fig. 6.—WHITEAVES, Canad. Nat., 1875, p. 262.

*Idotea bicuspidata* STREETS and KINGSLEY, Bull. Essex Inst., IX, 1877, p. 108.

*Synidotea bicuspidata* HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Comm. of Fish and Fisheries, Pt. 6, 1880, p. 352.

*Edotea bicuspidata* MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 66.

*Synidotea marmorata* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 392.—RICHARDSON, Proc. U. S. Nat. Mus., XXIII, 1901, p. 542.—ORTMANN, Proc. Acad. Nat. Sci. Phila., 1901, p. 156.

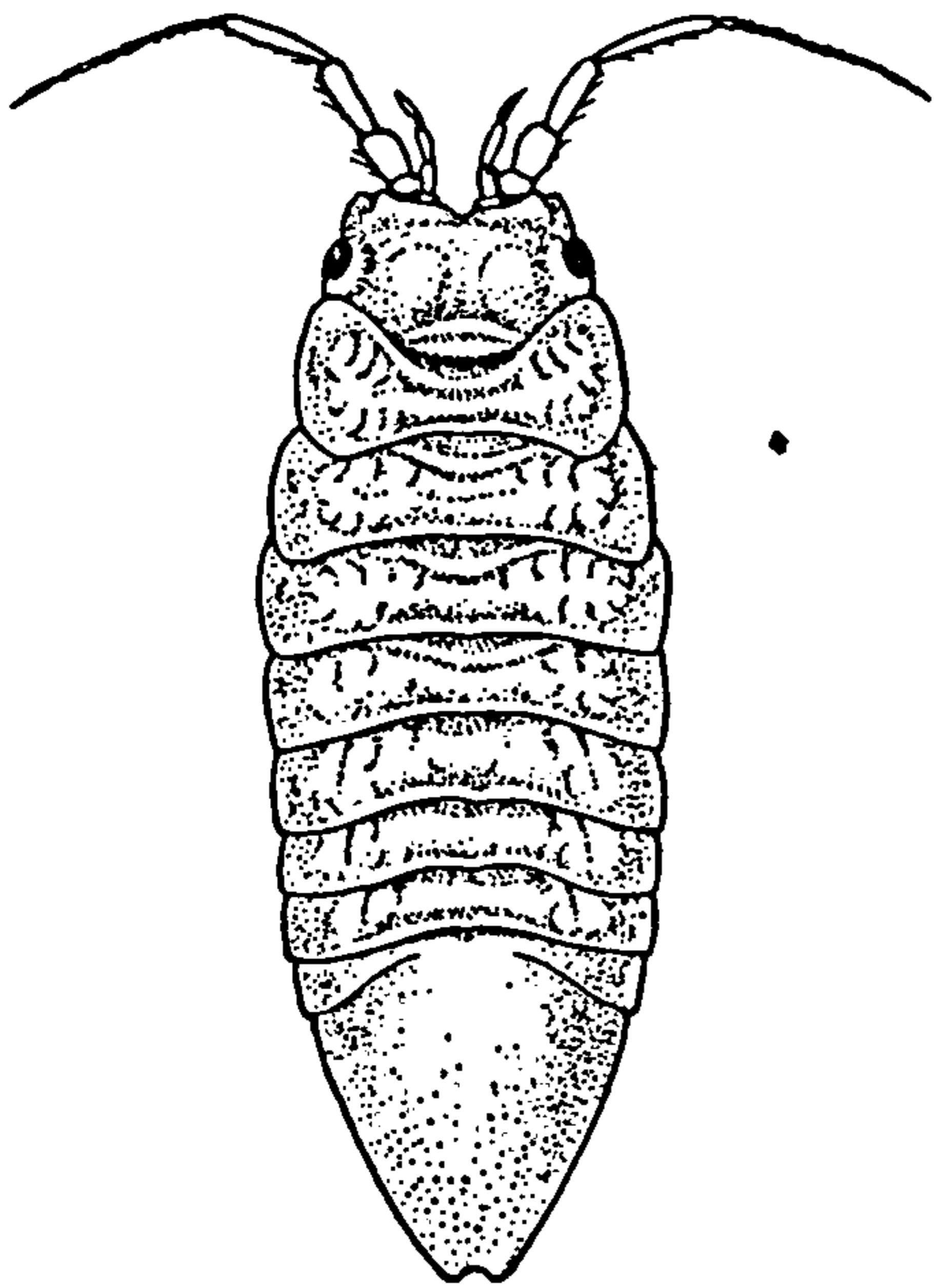


FIG. 422.—*SYNIDOTEA MARMORATA*  
(AFTER BENEDICT).  $\times 2\frac{1}{2}$ .

*Localities*.—Labrador; Grand Bank; Battle Harbor, Labrador.

*Depth*.—12 to 129 fathoms.

Body ovate, two and three-eighths times longer than broad, 8 mm.: 19 mm. Length of abdomen nearly equal to one-third the entire length of the body, 6 mm.: 19 mm.

Head with a deep median excavation or notch. On either side of the median notch the front is produced anteriorly and has the lateral portion bend downward, forming an angle with the dorsal portion. The eyes are large and round, composite in structure, and placed about the middle of the head at the extreme lateral margins. The first pair of antennæ have the basal articles long, not expanded, and about equal in length to the second article; the third is a little longer than the second; the fourth is about as long as the second. The first antennæ extend a little beyond the third article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short, and almost inconspicuous from a dorsal view; the second article is also short; the third is twice as long as the second; the fourth is one and a half times longer than the third; the fifth is one and a half times longer than the fourth. The flagellum consists of fourteen articles. When retracted, the second antennæ extend to the middle of the fourth thoracic segment. The maxilliped has a palp of three articles.

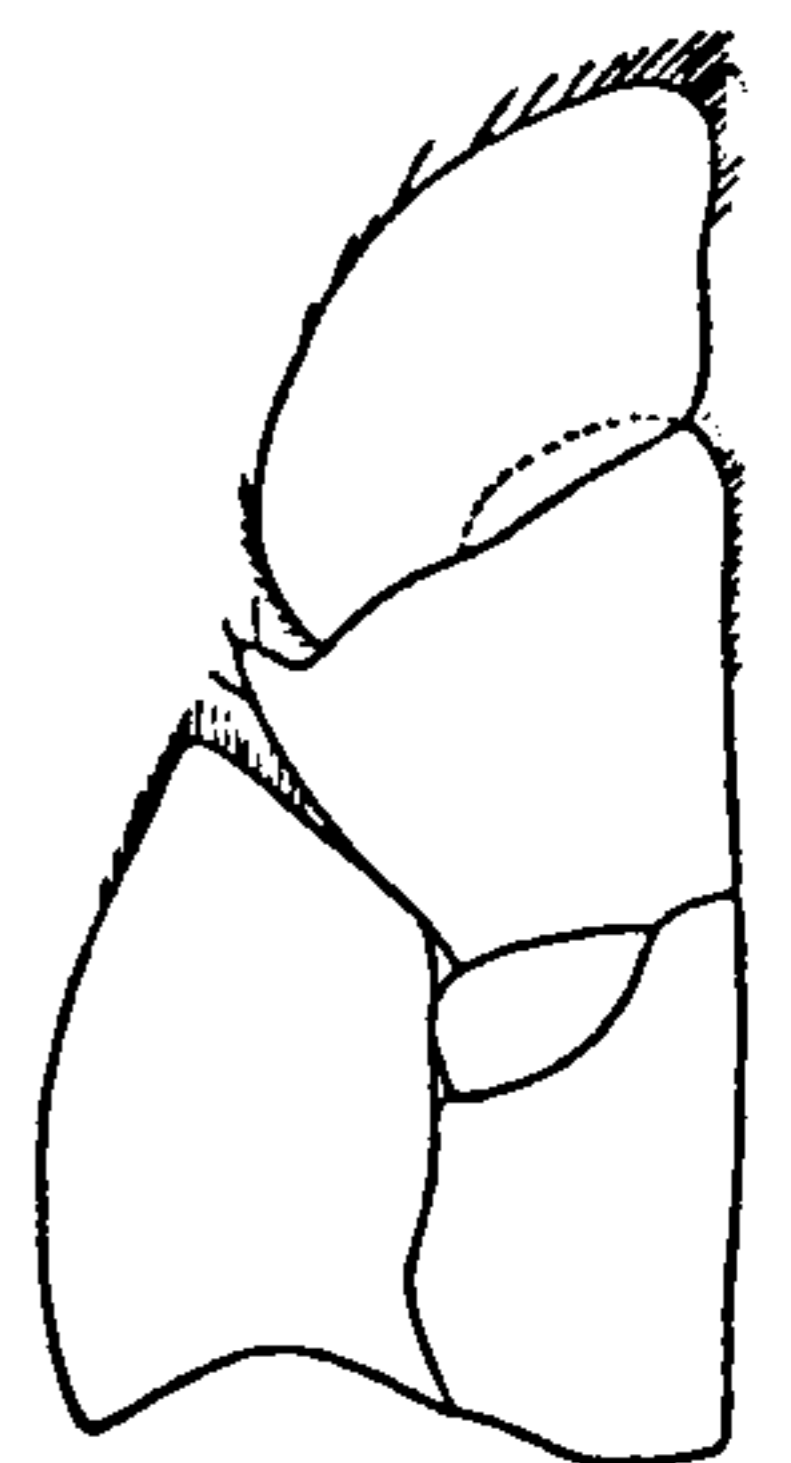


FIG. 423.—*SYNIDOTEA MARMORATA*. MAXIL-  
LIPED.  $\times 20\frac{1}{2}$ .

The four anterior segments of the thorax are longer than the last

three. The epimera of all the segments are consolidated with the segments. The lateral margins are almost straight and continuous.

The abdomen is composed of one segment, with lateral sutures at the base, indicating another partly coalesced segment; it tapers to a narrow extremity, the apex of which is emarginate.

The legs are more or less alike in structure.

#### SYNIDOTEA BICUSPIDA (Owen).

*Idotea bicuspidata* OWEN, Crustacea of the *Blossom*, 1839, p. 92, pl. xxvii, fig. 6.

*Idotea pulchra* LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, p. 44.

*Edotea bicuspidata* MIERS, Jour. Linn. Soc. London, XVI, 1883, p. 66.

*Synidotea bicuspidata* SARS, Crust. Norwegian North Atlantic Exp., 1885, p. 116, pl. x, figs. 24-26.—BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 391-392.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 848; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 228.

*Localities*.—West coast of Alaska and Bering Sea; Kara Sea (Hansen).

*Depth*.— $3\frac{1}{2}$  to 81 fathoms, in mud, sand, and gravel; from sponges.

Body ovate, about twice as long as wide, 12 mm.: 25 mm. Length of abdomen equal to one-third the entire length of body, 8 mm.: 24 mm.

Head with front produced on either side of a median excavation in a wide border, the lateral portion of which forms an angle with the dorsal portion. Eyes large, compound, and situated about the middle of the head at the extreme lateral margin.

The first pair of antennæ have the basal article short and not dilated; the second and fourth are about equal in length and not longer than the first article; the third is a little longer than any of the others.

The first pair of antennæ extend to the middle of the third peduncular article of the second pair of antennæ. The basal article of the second antennæ is inconspicuous

from a dorsal view; the second article is about as long as the first; the third and fourth are each about twice as long as the second; the fifth is nearly as long as the third and fourth together. The flagellum consists of fifteen articles. The second antennæ extend to the posterior margin of the third thoracic segment. The maxillipeds have a palp of three articles.

The segments of the thorax are subequal along the median dorsal line. The first is perhaps a little shorter. The epimera of all the segments are coalesced with the segments, with no indication of a

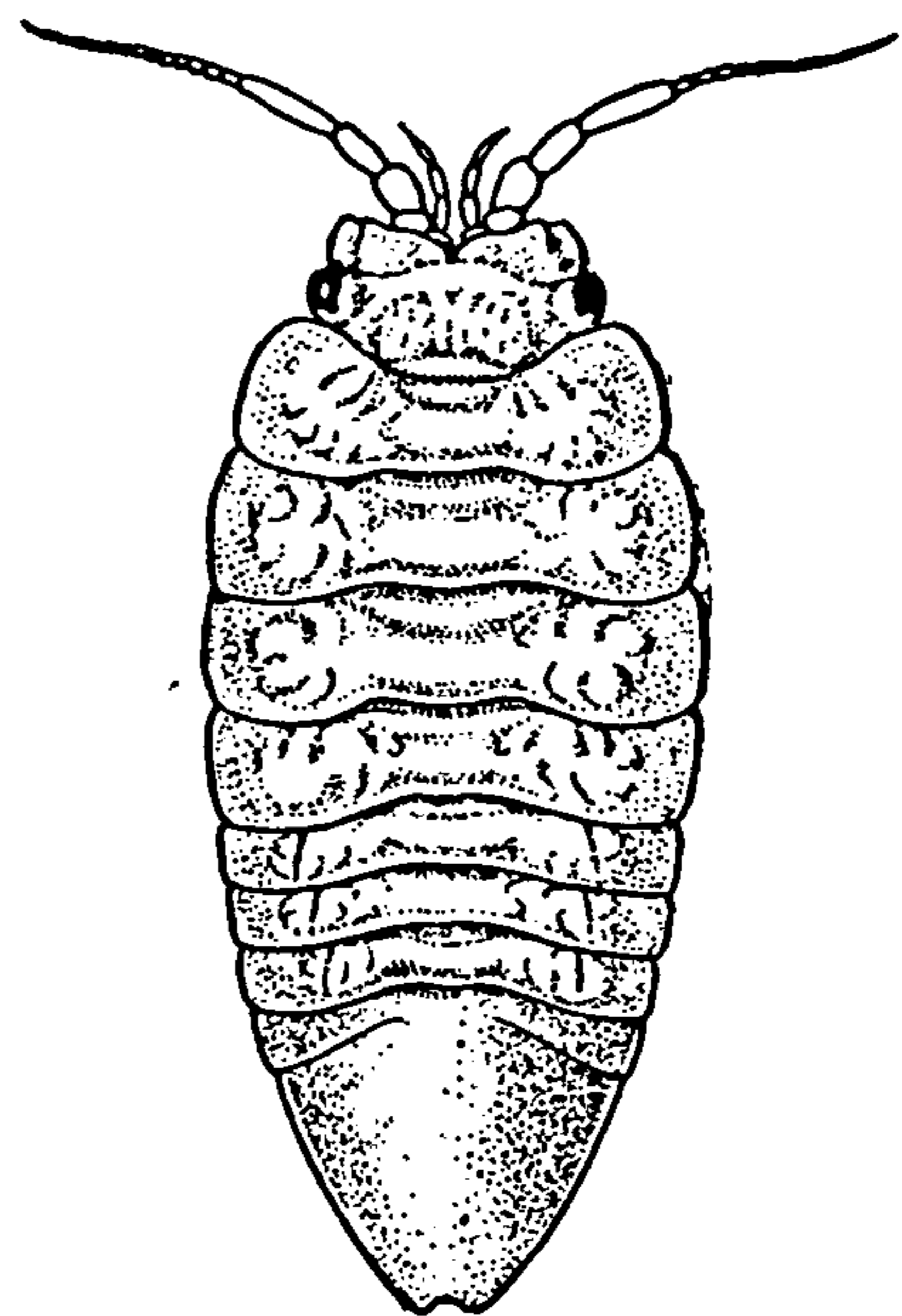


FIG. 424.—SYNIDOTEA BICUSPIDA (AFTER BENEDICT).  $\times 2$ .

separation on the first four segments. On the last three segments, however, there is a faint line indicating this. The lateral margins of the segments are straight.

The segments of the abdomen are all coalesced to form one large terminal segment. At the base of this segment is a suture line on either side, indicating another partly coalesced segment. The terminal segment is triangulate, with apex excavate, forming two blunt teeth or angles.

The legs are more or less similar in structure.

#### SYNIDOTEA LATICAUDA Benedict.

*Synidotea laticauda* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 393-394.—  
RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 268; American Naturalist, XXXIV, 1900, p. 228.

*Locality*.—San Francisco Bay.

Body oblong-ovate, a little more than two and a half times longer than wide;  $7\frac{1}{2}$  mm.:  $17\frac{1}{2}$  mm.

Head wider than long;  $2\frac{1}{2}$  mm.: 4 mm., with the anterior margin almost straight. Eyes small, round, composite, and situated at the

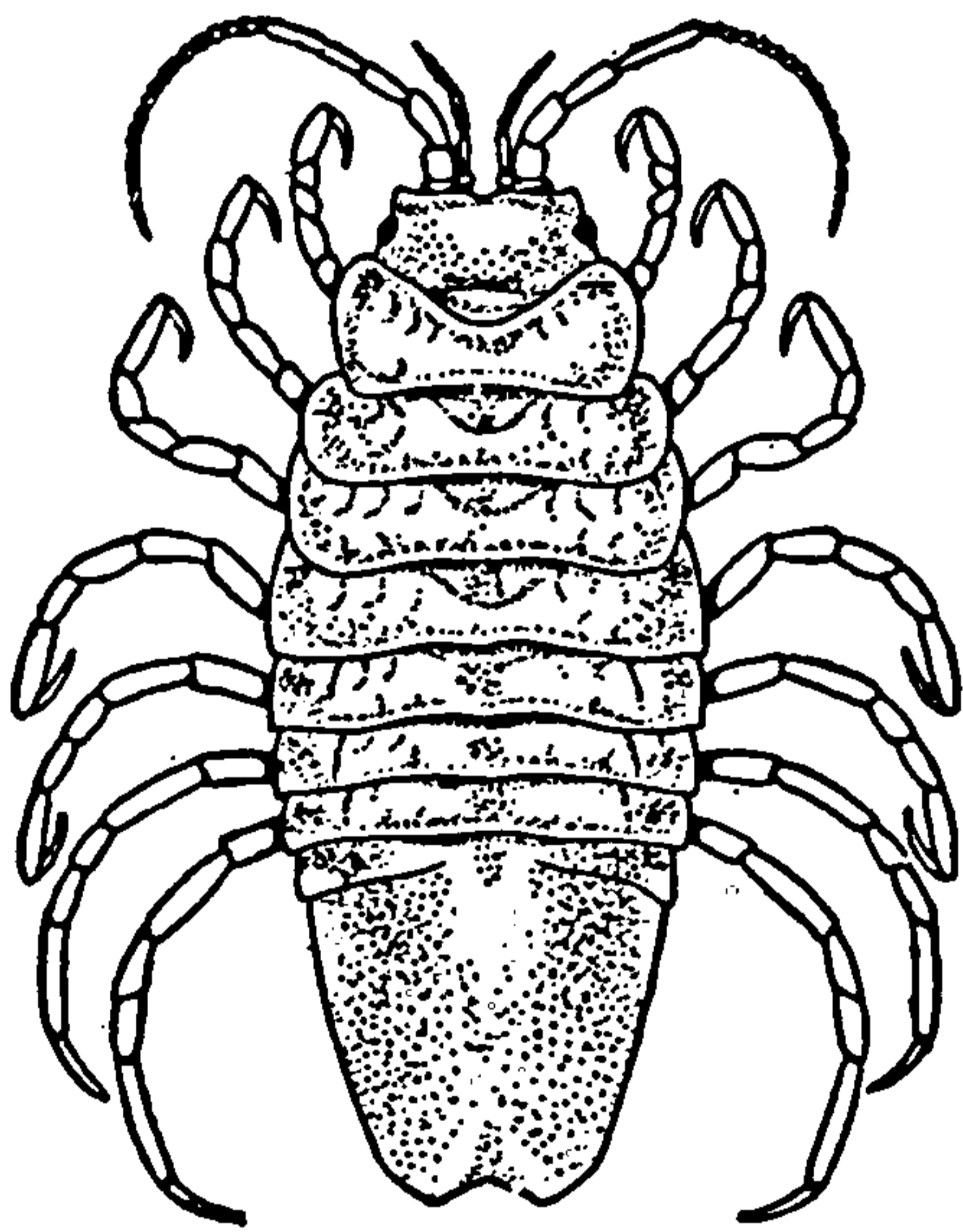


FIG. 425.—SYNIDOTEA LATICAUDA  
(AFTER BENEDICT).  $\times 2\frac{1}{4}$ .

sides of the head. The first pair of antennæ have the first three articles short and subequal. The fourth article is two and a half times longer than any of the preceding ones. The first antennæ extend to the end of the third article of the peduncle of the second antennæ. The first two articles of the second antennæ are subequal; the third and fourth are subequal, and each is about twice as long as the second; the fifth article is one and a half times longer than the fourth. The flagellum is composed of seventeen articles.

When retracted the second antennæ extend to the posterior margin of the fifth thoracic segment. The maxillipeds have a palp composed of three articles.

The first, fifth, sixth, and seventh segments of the thorax are subequal in length. The second, third, and fourth are subequal and are longer than the others, each being one-half millimeter longer than either the first, fifth, sixth, or seventh segments. The epimera of all the segments are perfectly and firmly coalesced with the segments, with no indication of a separation.

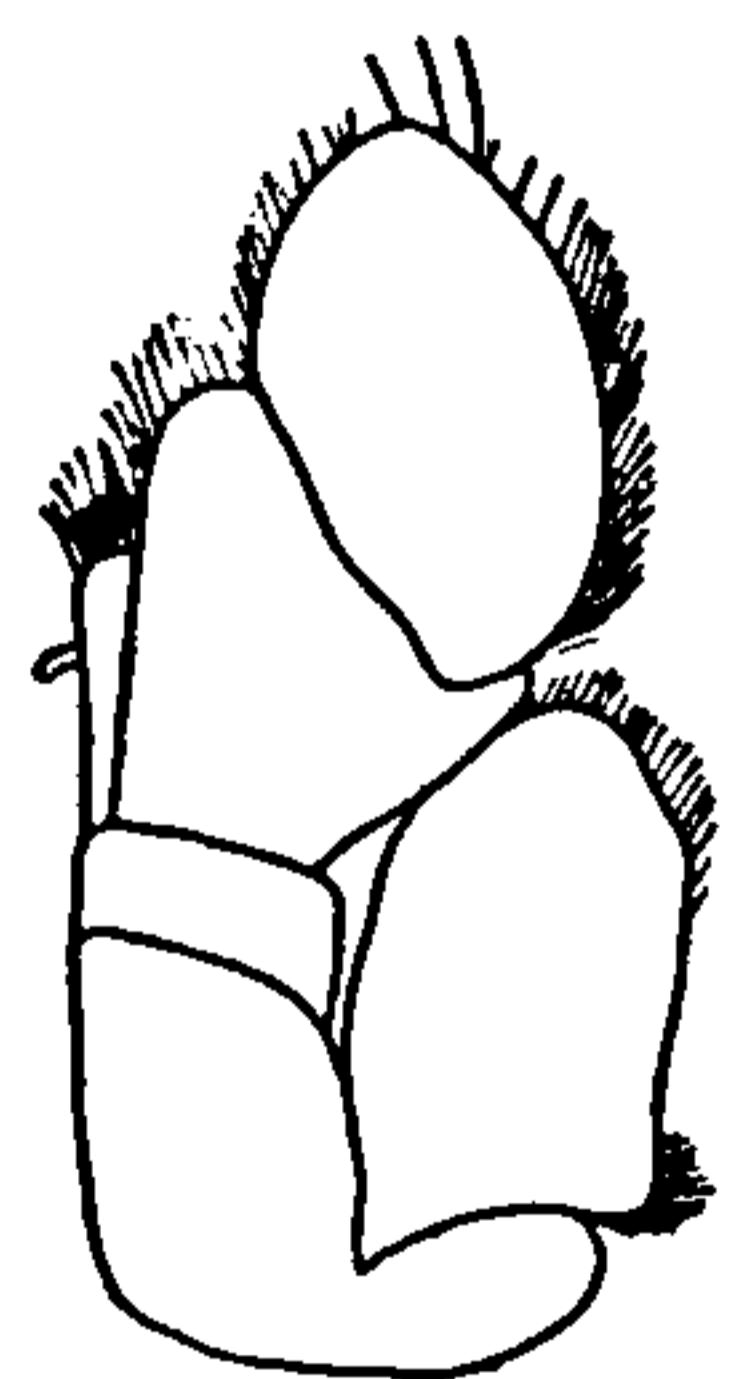


FIG. 426.—SYNIDOTEA LATICAUDA.  
MAXILLIPED.  $\times 15\frac{1}{4}$ .

The abdomen is composed of a single segment, with a suture line on either side at the base. The segment becomes somewhat narrower toward the extremity, which has a broad but shallow excavation or notch.

The legs are all similar in structure.

**SYNIDOTEA HARFORDI** Benedict.

*Idotea marmorata* HARFORD, Proc. Cal. Acad. Sci., VII, 1877, p. 117.

*Synidotea harfordi* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 402.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 269.

*Localities*.—Magdalena Bay, Lower California (Benedict); San Diego Bay, California.

*Depth*.—6 $\frac{3}{4}$  fathoms.

Body ovate, two and two-thirds times longer than wide, 6 mm.:16 mm. Length of abdomen 6 mm.

Front of head without any emargination or median notch, frontal margin straight. Head slightly narrower at its anterior end than at its posterior end. Eyes large and round, composite in structure, and placed in the middle of the head at the extreme

lateral margins. First pair of antennæ with the basal article short, not dilated; the second and third subequal, and each only a little longer

than the first; the fourth article is twice as long as the third. The first pair of antennæ extend to the end of the third article of the peduncle of the second pair of antennæ. The basal article of the second antennæ is short; the second article is twice as long as the first; the third is a little longer than 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 consists of thirty-one articles. When retracted the second

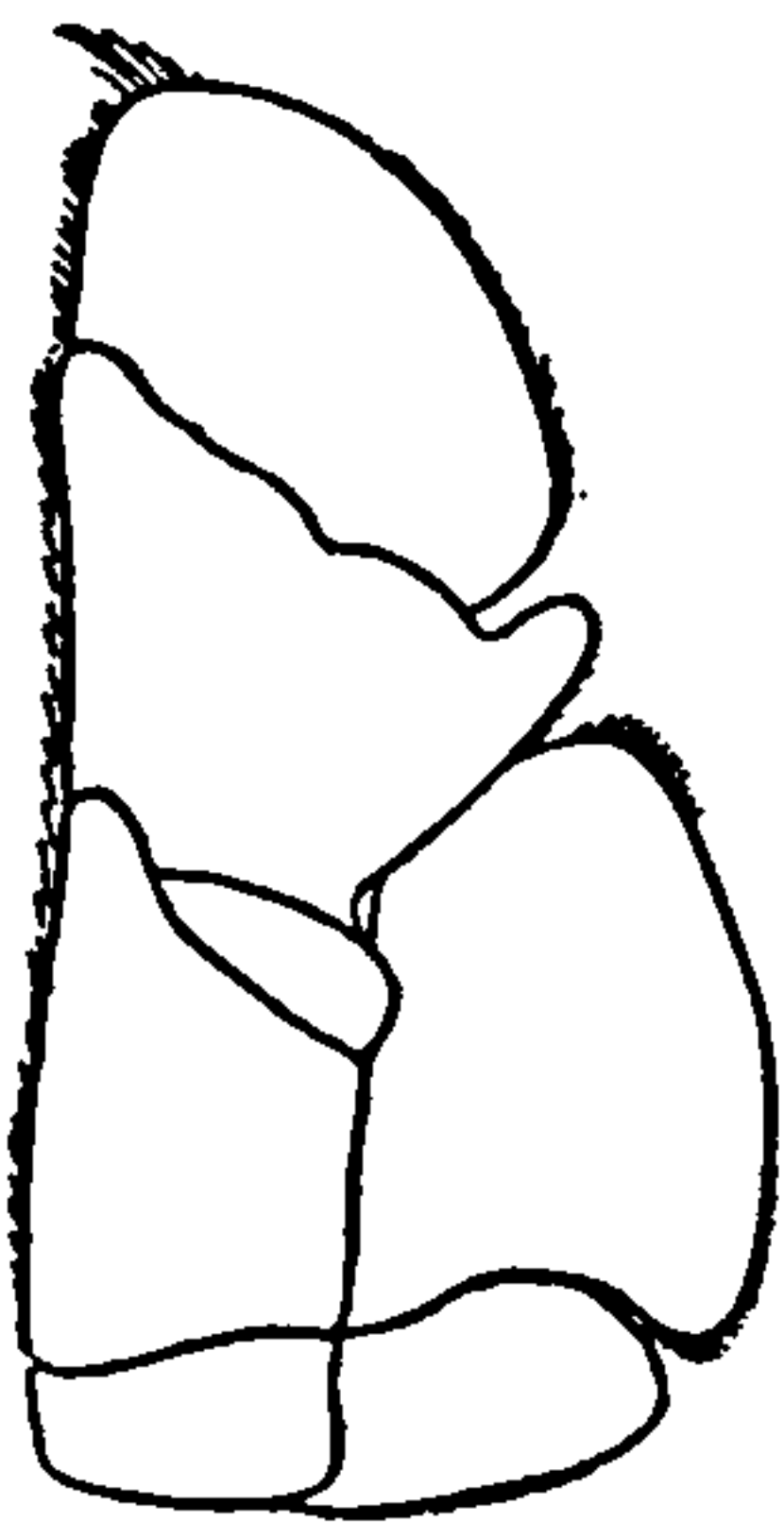


FIG. 428.—SYNIDOTEA HARFORDI. MAXILLIPED.  $\times 27\frac{1}{2}$ .

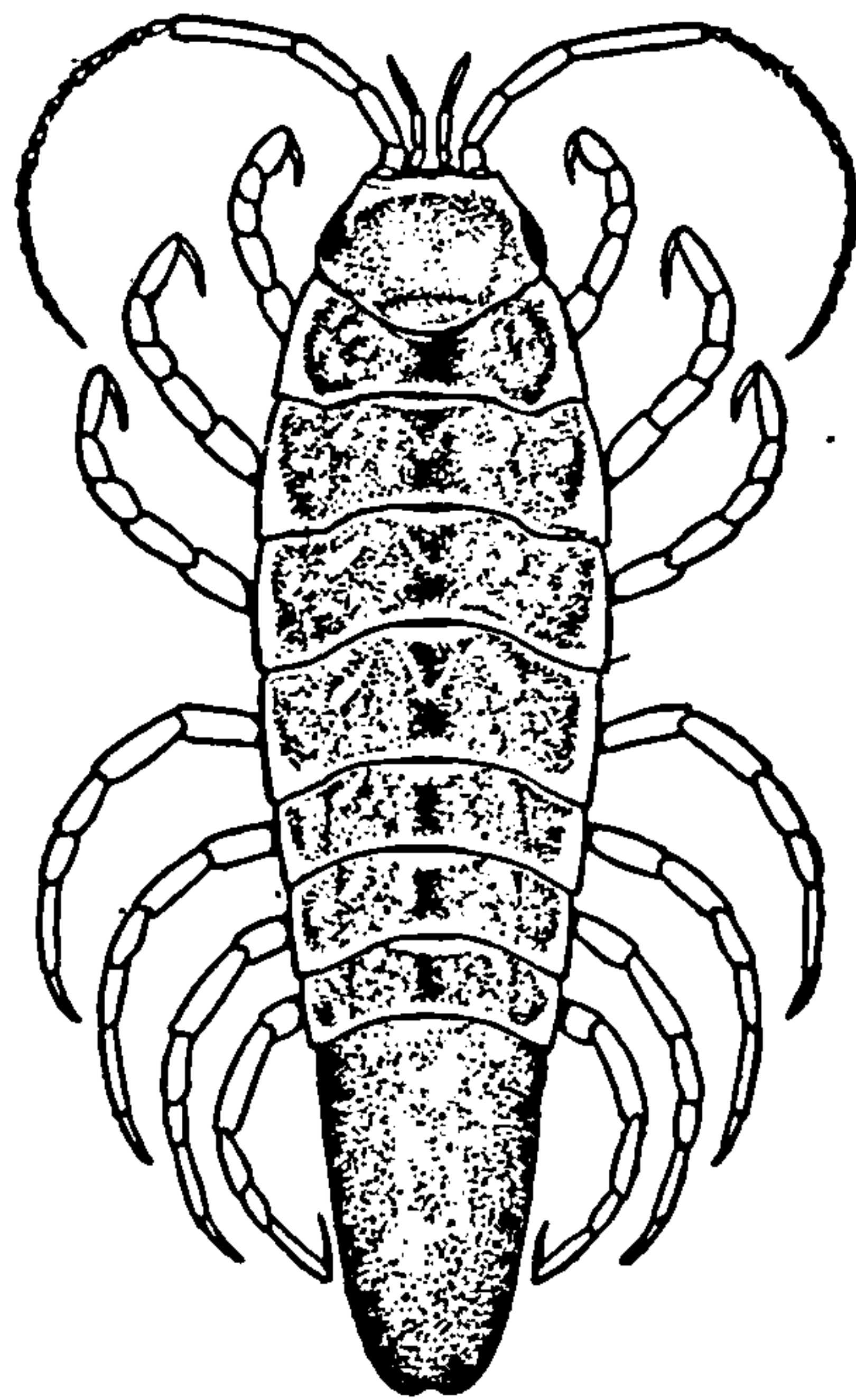


FIG. 427.—SYNIDOTEA HARFORDI (AFTER BENEDICT).  $\times 3\frac{1}{2}$ .

antennæ extend to the middle of the seventh thoracic segment. The maxilliped has a palp of three articles.

The first four segments of the thorax are longer than the last three. All the epimera of all the segments are firmly united with the segments. The lateral margins of the segments are straight.

The abdomen is composed of only one segment, with lateral sutures at the base, indicating another partly coalesced segment. The poste-

rior portion of the abdomen is rounded with a median excavation or notch at the extremity.

The legs are more or less similar in structure.

**SYNIDOTEA NODULOSA (Krøyer).**

*Idotea nodulosa* KRØYER, Naturhistorisk Tidsskrift (2), II, 1846, p. 100; Voy. en Scand., Crust., 1849, pl. xxvi, fig. 2.—REINHARDT, Grönlands Krebsdyr, 1857, p. 34.—LÜTKEN, Crust., Greenland, 1875, p. 150.

*Synidotea nodulosa* HARGER, Am. Jour. Sci. (3), XV, 1878, p. 374; Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Commissioner of Fish and Fisheries, 1880, Pt. 6, pp. 351-352; pl. vi, figs. 33-35.—S. I. SMITH, Report of Progress of the Geological Survey of Canada, 1880, p. 218.

*Edotea nodulosa* MIERS, Journ. Linn. Soc. London, Zool., XVI, 1883, p. 67.—HANSEN, Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn, 1887-88, p. 188.

*Synidotea nodulosa* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 398-399.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 228; Proc. U. S. Nat. Mus., XXIII, 1901, pp. 541-542.—OHLIN, Bihang till K. Sv. Vet.-Akad. Handl., XXVI, Afd. iv, 1901, No. 12, p. 29.

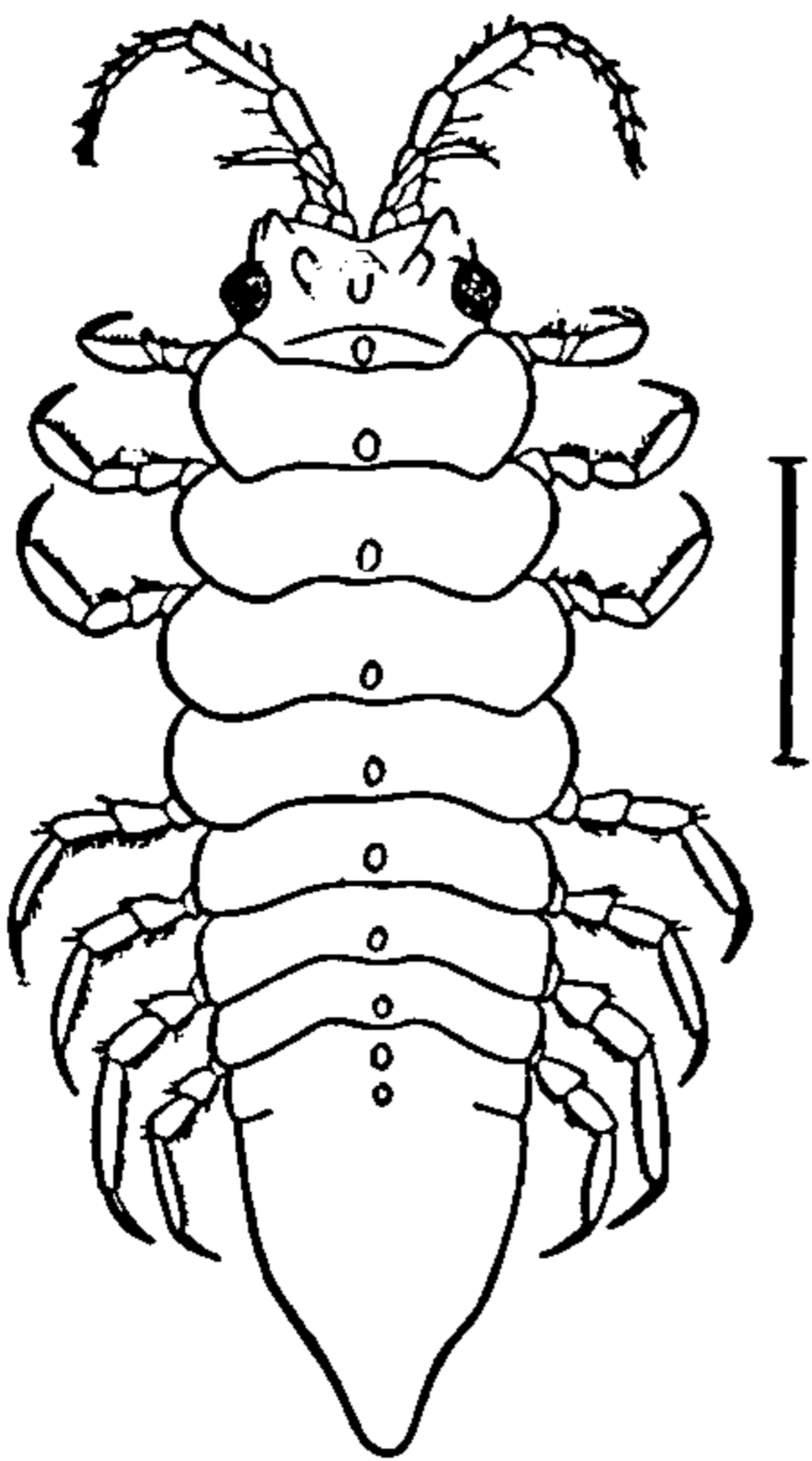


FIG. 429.—SYNIDOTEA NODULOSA (AFTER HARGER).  
× 4.

*Localities.*—Southern Greenland; Middle Ground; latitude 66° 46' north, longitude 54° 10' west; Halifax; Georges Banks; Arctic Seas and southward on Pacific coast as far as British Columbia; Jugor Schar (Hansen); Recherche Bay, between Reindeer Point and Fox Glacier, West Spitzbergen (Ohlin).

*Depth.*—6 to 111 fathoms (Smith). In stones, sand, and algæ.

Ohlin<sup>a</sup> says of the color: "It is a uniform dark olive-green, sometimes on the epimeres with a trace of purplish spots."

Body oblong-ovate, a little over twice as long as wide, 3½ mm.: 7½ mm.

Head wider than long, 1½ mm.: 2½ mm., with the anterior margin slightly excavate. The eyes are small, round, composite, and situated close to the lateral margin. In front of each eye and arising from the anterior margin is a conspicuous tubercle. In the median line on the anterior part of the head are two low tubercles in longitudinal series, the second one being slightly larger than the first. On either side of this longitudinal row is a small low tubercle. Back of this arrangement of tubercles are two low elevations, one on either side of the median line. Posterior to these elevations is a low ridge. The first pair of antennæ have the first two articles short and subequal; the third is one and a half times longer than the second; the fourth is

<sup>a</sup> Bihang till K. Sv. Vet.-Akad. Handl., XXVI, Afd. iv, 1901, No. 12, p. 29.

about twice as long as the second. The first antennæ extend to the end of the fourth article of the peduncle of the second pair of antennæ. The first two articles of the second pair of antennæ are short and subequal; the third and fourth are subequal, and each is about twice as long as either of the two preceding articles; the fifth is one and a half times longer than the fourth. The flagellum is composed of six articles. The second antennæ extend to the middle of the second thoracic segment. The maxillipeds have a palp of three articles.

The second, third, and fourth segments of the thorax are subequal and each is a little longer than any of the others, which are nearly subequal, the seventh being a little shorter than the sixth. The epimera of all the segments are firmly and perfectly united with the segments. A faint longitudinal depression marks the place of coalescence on the last three segments. Each segment has on either side a short distance from the lateral margin a group of five or six low rugosities.

The abdomen is composed of a single segment with a suture line on either side at the base. It is  $2\frac{1}{2}$  mm. wide by 3 mm. in length and tapers to a pointed extremity.

All the legs are similar in structure.

#### SYNIDOTEA LÆVIS Benedict.

*Synidotea lævis* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 399-400.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 269; American Naturalist, XXXIV, 1900, p. 228.

*Localities.*—Between Bristol Bay and Pribilof Islands, Alaska; Bering Sea.

*Depth.*— $29\frac{1}{2}$  to 36 fathoms. From sponges.

Body narrow, elongate, a little over three times longer than broad, 4 mm.: 13 mm. Length of abdomen equal to a little more than one-third the length of entire body, 5 mm.: 13 mm.

Head excavate between the lateral angles, with another median excavation or notch. There is a

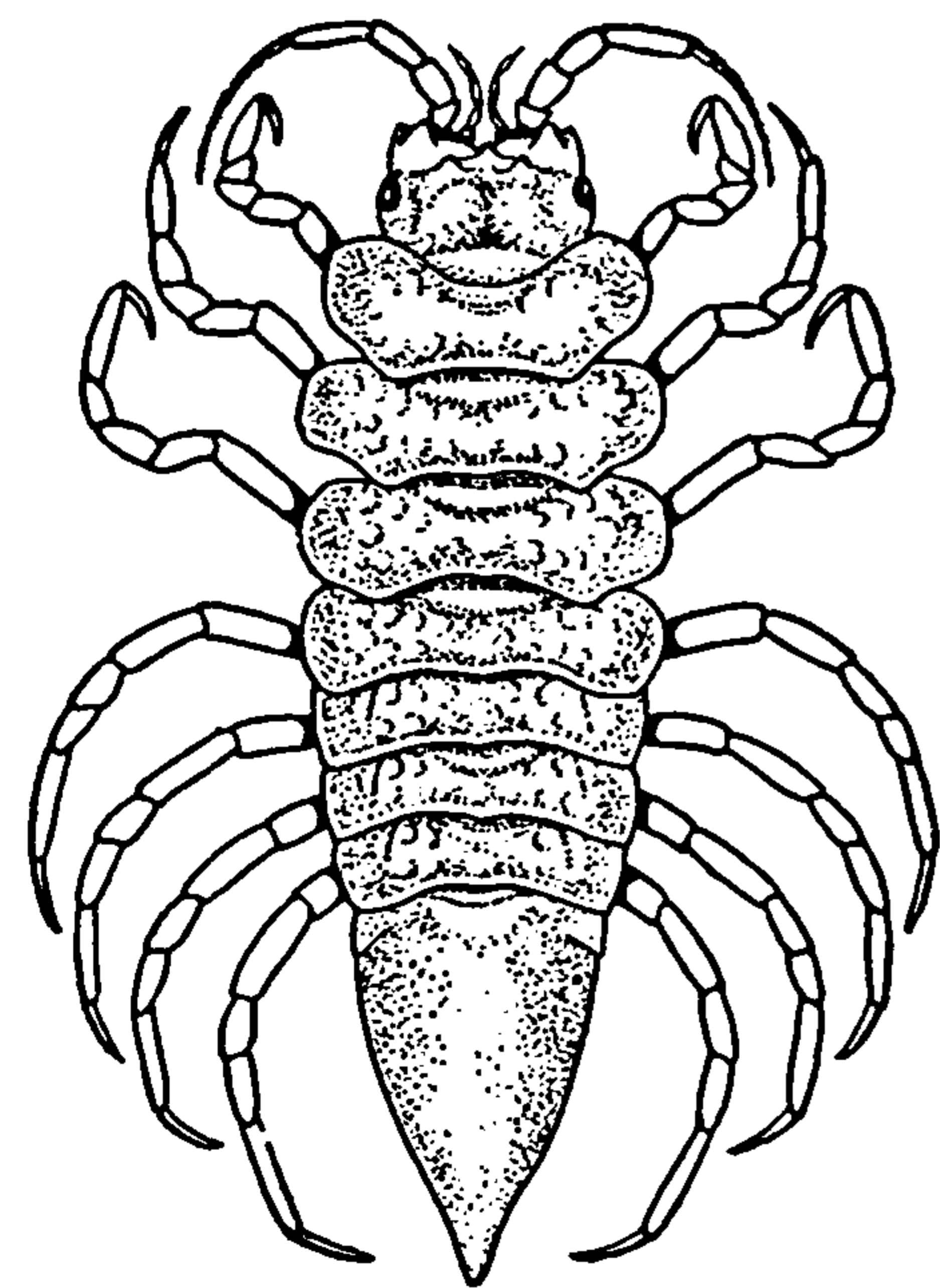


FIG. 431.—SYNIDOTEA LÆVIS (AFTER BENEDICT).  $\times 4$ .

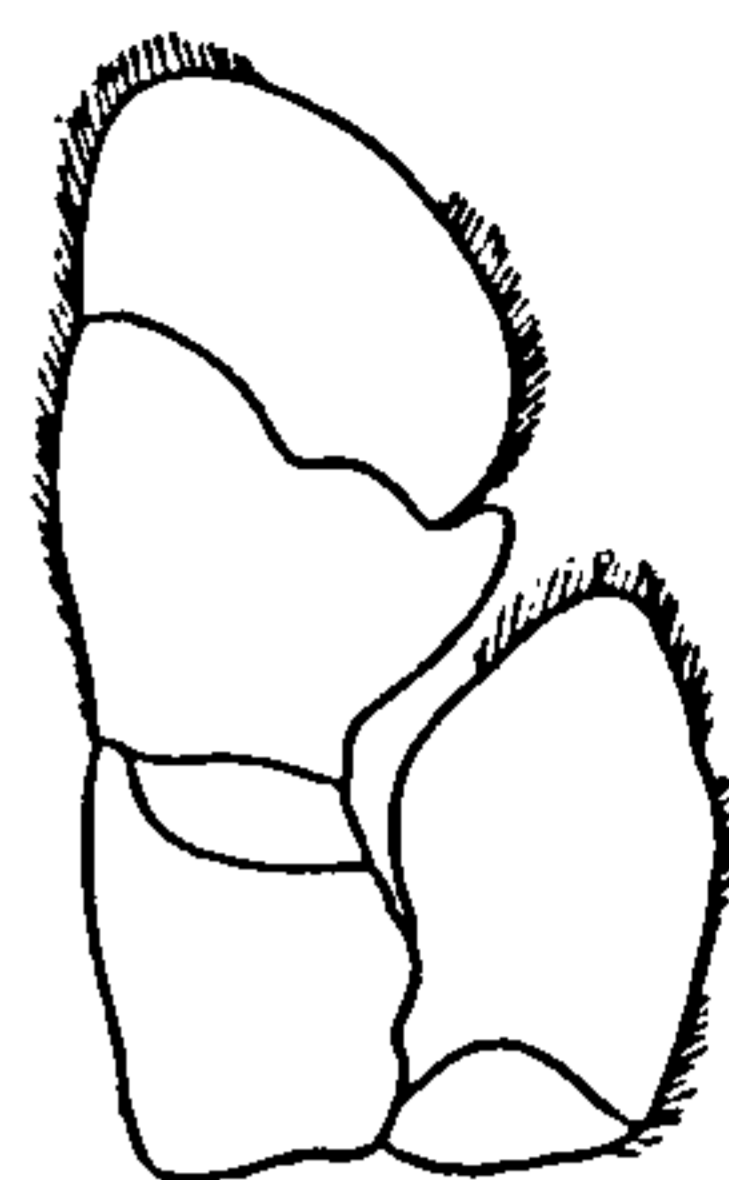


FIG. 430.—SYNIDOTEA NODULOSA. MAXILLIPED.  $\times 33$ .



FIG. 432.—SYNIDOTEA LÆVIS. MAXILLIPED.  $\times 27\frac{1}{2}$ .

very low tubercle just below the median notch. The eyes are large, round, and composite, and situated about the middle of the head at the



extreme lateral margin. The first pair of antennæ have the basal article not enlarged; the second article is about equal in length to the first; the third and fourth are subequal, and each is a little longer than the second. The first antennæ extend to the middle of the third peduncular article of the second pair of antennæ. The basal article of the second antennæ is scarcely conspicuous from a dorsal view; the second, third, and fourth articles are about equal in length; the fifth is one and a half times longer than the fourth. The flagellum consists of ten articles. When retracted the second antennæ extend to the middle of the third thoracic segment. The maxillipeds have a palp of three articles.

The first four segments of the thorax are about equal in length, and each is longer than any of the last three. The epimera are all entirely coalesced with the segments. The lateral portions of all the segments are expanded in rounded processes.

The terminal segment of the body or abdomen is acutely pointed at the extremity. On either side at the base of the segment is a lateral suture indicative of another partly coalesced segment.

The legs are more or less similar in structure.

#### SYNIDOTEA MURICATA (Harford).

*Idotea muricata* HARFORD, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 117.

*Synidotea muricata* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 400.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 269; American Naturalist, XXXIV, 1900, p. 228.

*Locality.*—Icy Cape, latitude  $70^{\circ} 15'$  north, longitude  $162^{\circ} 55'$  west; latitude  $41^{\circ} 3'$  north, longitude  $154^{\circ} 15'$  west.

*Depth.*—25 fathoms.

Body ovate, nearly three times longer than wide, 8 mm.: 22 mm. Length of abdomen a little more than one-third the length of the entire body, 8 mm.: 22 mm.

Head with a deep median excavation or notch. Between the eyes on the anterior portion of the head is a group of four small but very pronounced and clearly defined tubercles, two in longitudinal series and one on either side of these in transverse line half way between the other two. In front of the eyes and a little lateral to this group of tubercles are two very large tubercles, one on either side.

Just back of the group of four tubercles are two groups of low tubercles, irregularly arranged in masses, one group placed on either side of the median line. Posterior to these masses of

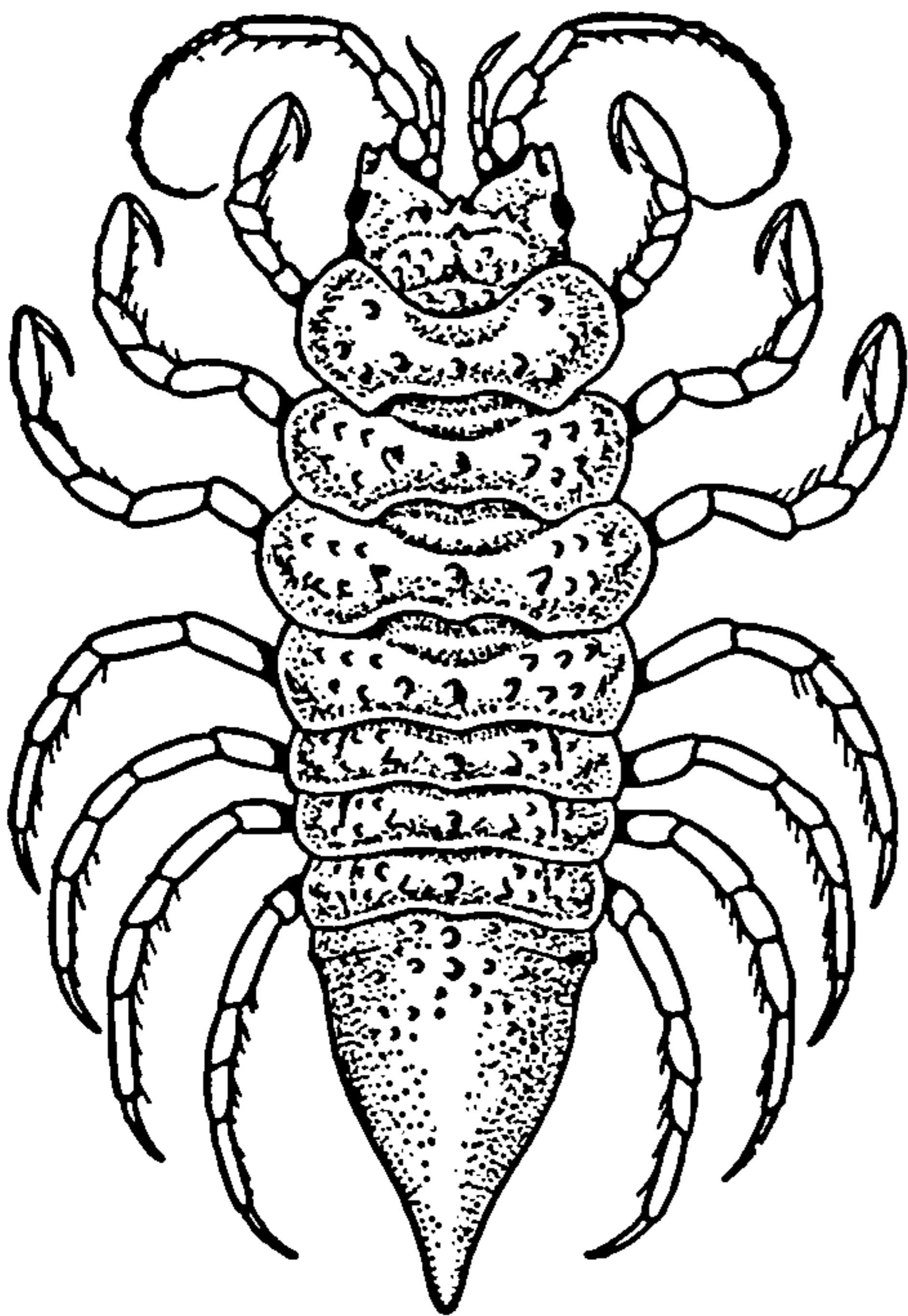


FIG. 433.—SYNIDOTEA MURICATA (AFTER BENEDICT).  $\times 2\frac{1}{2}$ .

tubercles is a transverse row of three tubercles, the central one being in the median longitudinal line and larger than either one of the others. The eyes are large and round, composite in structure, and situated about the middle of the head, a little distance from the lateral margins. The basal article of the first pair of antennæ is somewhat enlarged and almost twice as wide as the second article, which it equals in length; the third and fourth articles are subequal and each is about twice as long as the second article. The first antennæ extend to the end of the fourth peduncular article of the second antennæ. The basal article of the second pair of antennæ is inconspicuous from a dorsal view; the second, third, and fourth articles are successively a little longer than the preceding article; the fifth is about twice as long as the fourth. The flagellum consists of thirteen articles. When retracted, the second antennæ extend to the posterior margin of the third thoracic segment. The maxilliped has a palp of three articles.

The four anterior segments of the thorax are longer than the last three. All the epimera are firmly united with the segments. In the median longitudinal line is a row of large tubercles, one for each segment, triangular in shape with acutely pointed extremities. On either side of the median row of tubercles is a group of six or more tubercles, of which the innermost one is larger and more conspicuous than any of the others in the group, so that a longitudinal series is formed of these larger tubercles, one on each segment, and placed one row on either side of the median row of tubercles. The sides of the segments are expanded with lateral margins rounded.

The abdomen consists of one segment with lateral sutures at the base indicating another partly coalesced segment. At the base of the segment in longitudinal series in line with the median row of tubercles on the thorax are two tubercles. There are about six small tubercles irregularly arranged on either side of the median line on the anterior portion of the abdomen. The terminal segment of the body is pointed at the extremity, the posterior half narrowing rapidly to an acute tip.

The legs are more or less similar in structure.

#### SYNIDOTEA PICTA Benedict.

*Synidotea picta* BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 401-402.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 269; American Naturalist, XXXIV, 1900, p. 228.

*Localities.*—Alaska and Bering Straits.

*Depth.*—5 to 20 fathoms in sand and rocks.

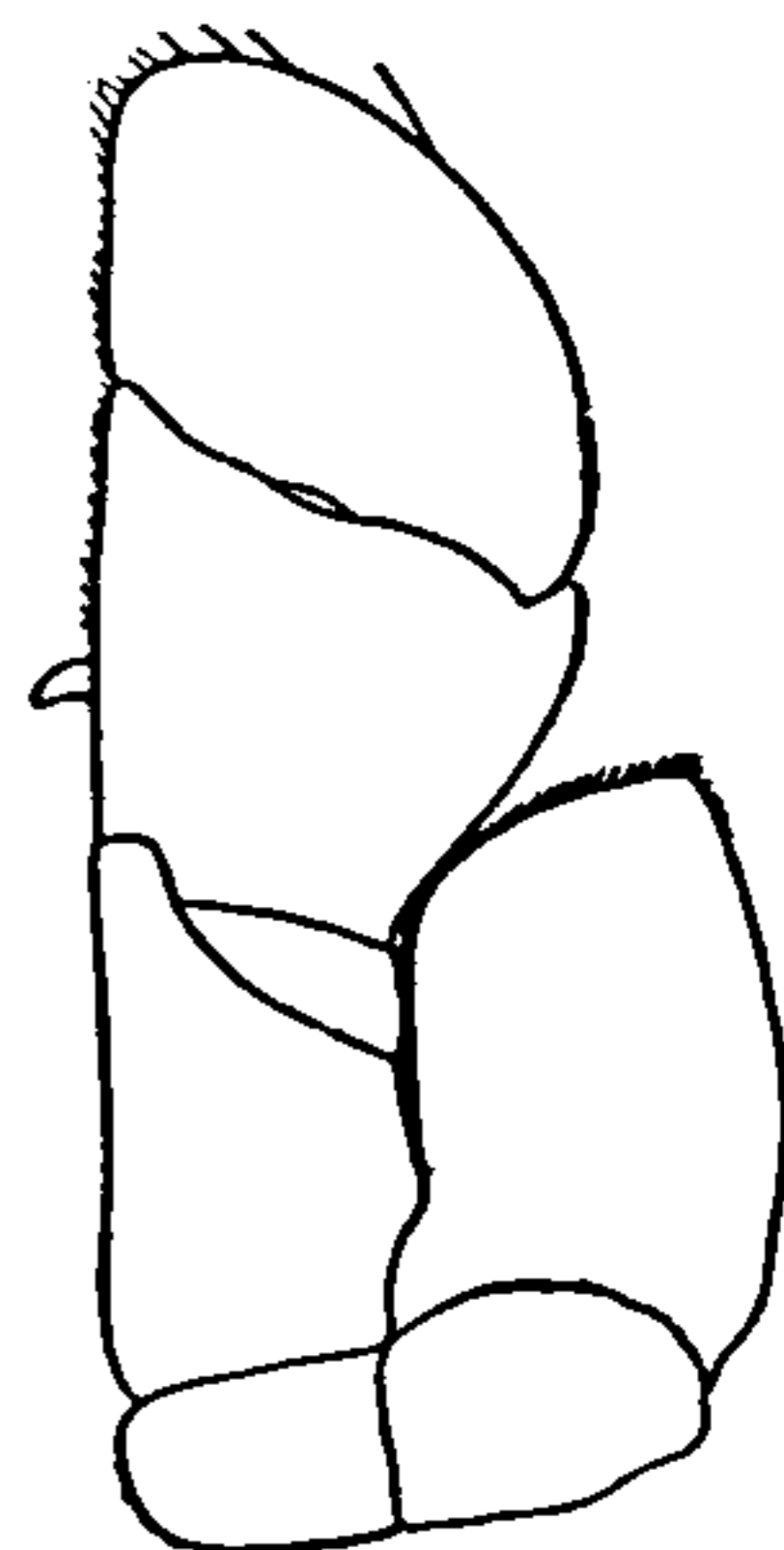


FIG. 434.—SYNIDOTEA MURICATA. MAXILLIPED.  $\times 20\frac{1}{2}$ .

Body ovate, two and two-thirds times longer than broad, 6 mm.: 16 mm. Length of abdomen three-eighths the length of entire body, 6 mm.: 16 mm.

Head with deep median excavation or notch in front. In the median

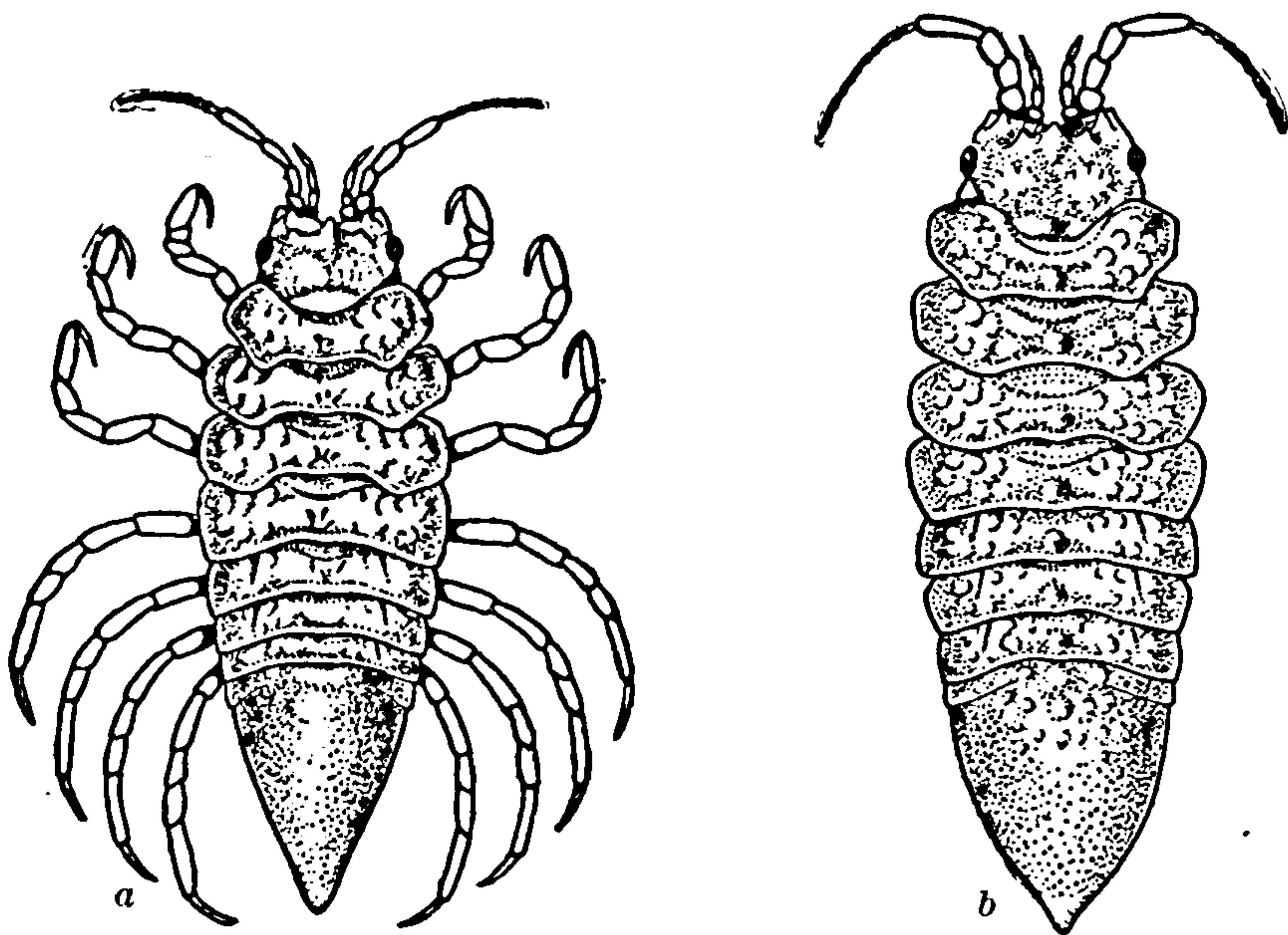


FIG. 435.—*SYNIDOTEA PICTA* (AFTER BENEDICT).  $\times 3$ . *a*, TYPICAL FORM. *b*, VARIETY.

line, just below the frontal notch is a large and prominent tubercle, narrow and elongate. On either side in line with this tubercle is a small rounded tubercle. These three tubercles are placed in a transverse line between the eyes. A little in front of these tubercles, and

halfway between the median notch and the lateral margins are two tubercles, one on either side in front of the eye. Back of the three tubercles in transverse series are two rugosities, one on either side of the median line, and posterior to these is a low ridge produced in a median tubercle. The eyes are large and round, compound in structure, placed about the middle of the head and a short distance from the lateral margin. The first antennæ have the basal article short and not expanded; the second and third articles are about equal in length; the fourth is a little longer than the third. The first antennæ extend to the end of the third peduncular article of the second pair of antennæ.

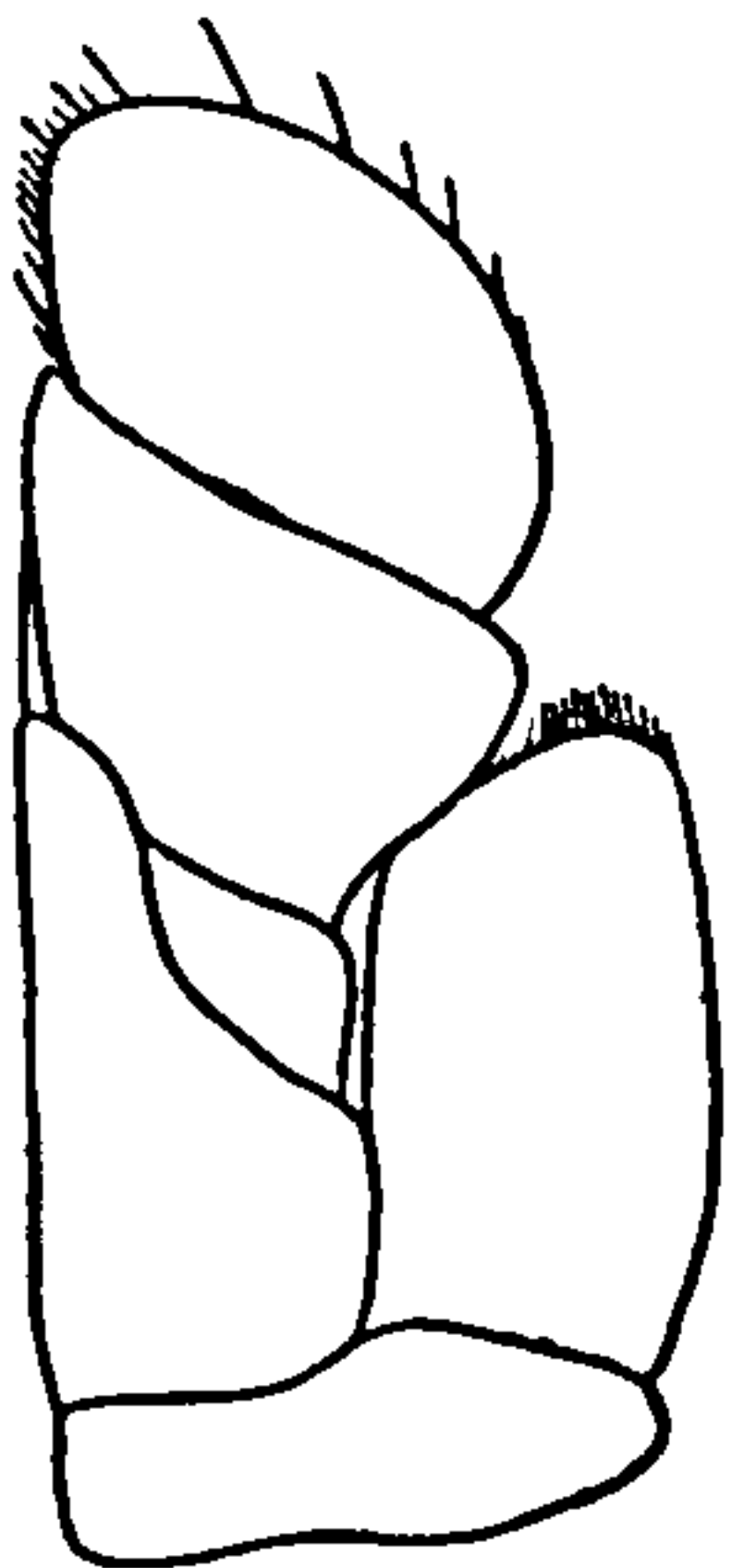


FIG. 436.—*SYNIDOTEA PICTA*. MAXILLIPED.  $\times 27\frac{1}{2}$ .

The basal article of the second antennæ is inconspicuous from a dorsal view; the second, third, fourth, and fifth are each successively a little longer than the preceding article. The flagellum consists of ten articles. When retracted the second antennæ extend to the middle of the third thoracic segment. The maxillipeds have a palp of three articles.

The first four segments of the thorax are longer than the last three. In all the epimera are firmly united with the segments. Along the

median longitudinal line of the thorax is a row of low tubercles, one for each segment, which increase in size toward the posterior end of the series. On either side of this median tubercle is a group of low tubercles on each segment of the thorax, with six or more tubercles in each group.

The abdomen is composed of a single segment, with lateral sutures indicative of another coalesced segment. At the base of the segment, in line with the median row of tubercles on the thorax, are two tubercles in longitudinal series. On either side of this series are low rugosities. The abdomen is acutely pointed at the extremity, becoming more rapidly narrow from the middle of the segment.

The legs are more or less similar in structure.

## 62. Genus COLIDOTĒA Richardson.

Flagellum of second pair of antennæ multi-articulate. Epimera of the four anterior thoracic segments coalesced and firmly united with the segments, there being no indication of a separation. Epimera of last three segments of thorax distinctly separated from the segments. Abdomen consisting of a single segment, with a suture line on either side at the base indicating another partly coalesced segment. Maxillipeds with the palp composed of four<sup>a</sup> articles.

### COLIDOTEA ROSTRATA (Benedict).

*Idotea rostrata* BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 53-54.

*Colidotea rostrata* RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 849; Ann. Mag. Nat. Hist. (7), IV, 1899, p. 270; American Naturalist, XXXIV, 1900, p. 228.

*Locality*.—San Pedro, California.

Body oblong-ovate, about two and a half times longer than wide, 5 mm. : 12 mm.

Head wider than long, 2½ mm. : 3 mm., with the anterior margin produced in the middle in a short rostrum, rounded at the apex. The antero-lateral angles are prominent, rounded; and extend anteriorly as far as the rostrum. The eyes are small, rounded, and composite; they are situated at the sides of the head. The first pair of antennæ have the basal article somewhat enlarged; the three following articles are short and nearly subequal, the terminal one being a little longer. The first pair of antennæ extend to the end of the second article of peduncle of the second pair of antennæ. The second antennæ have

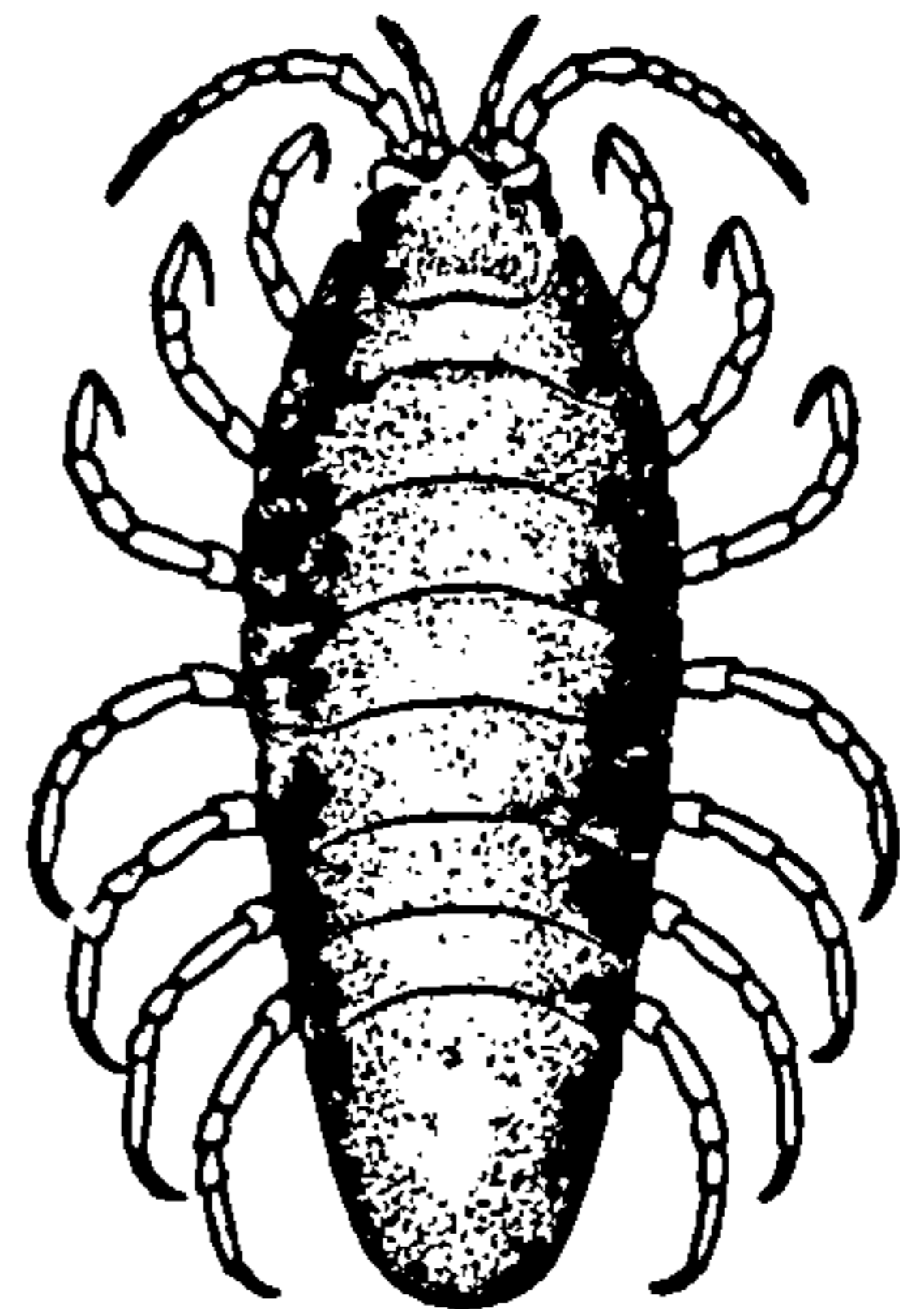


FIG. 437.—COLIDOTEA ROSTRATA (AFTER BENEDICT). × 3.

<sup>a</sup>In the Proc. U. S. Nat. Mus., XXI, 1899, p. 843 (key) and p. 849, fig. 22, the maxilliped is described and figured as composed of two articles. The maxilliped appears two-jointed from the inner side, and the figure and the examination was made from that side. In reexamining the material for the present paper, the mistake was noticed and the correction is herein made.

the first article almost inconspicuous from a dorsal view; the second article is large; the third is shorter than the second; the fourth and fifth are subequal and each is one and a half times longer than the third. The flagellum is composed of six and seven articles in one specimen; of four and five in the other. The palp of the maxilliped is composed

of two articles. When retracted the second antennæ extend to the posterior margin of the second thoracic segment.

The first segment of the thorax has the antero-lateral angles produced to surround the posterior half of the head. The second segment is a little longer than the first; the third, fourth, and fifth segments are the longest; the sixth is about equal in length to the second; the seventh is as long as the first. There is no indication of epimera on any of the first four segments. The epimera of the fifth segment are narrow, almost inconspicuous plates, placed about the

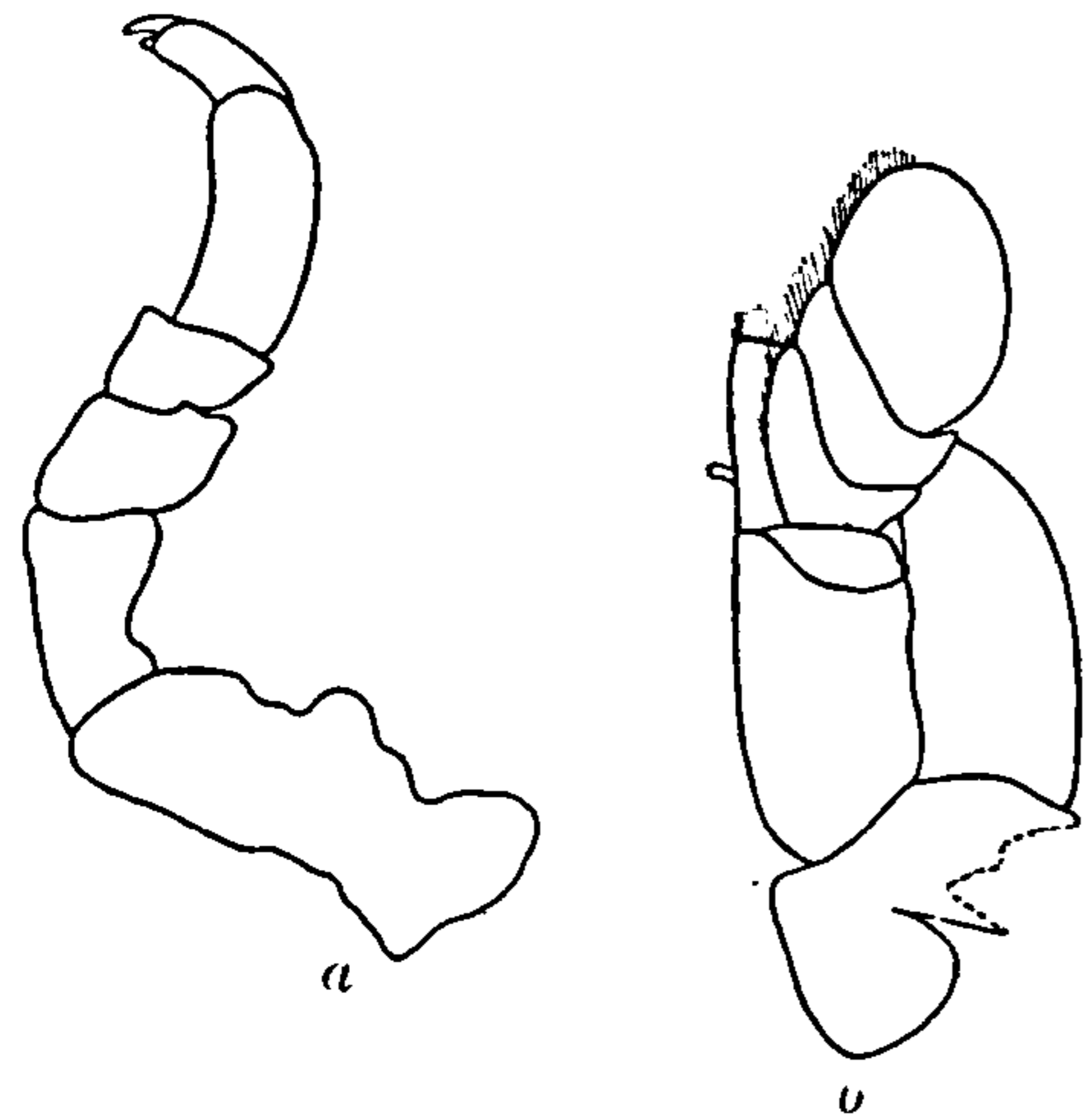


FIG. 438.—COLIDOTEA ROSTRATA. *a*, LEG OF SECOND PAIR.  $\times 15\frac{1}{2}$ . *b*, MAXILLIPED.  $\times 27\frac{1}{2}$ .

middle of the lateral margin. The epimera of the sixth and seventh segments are wide plates occupying the posterior half of the lateral margin.

The abdomen is composed of a single segment with a suture line on either side at the base. Its posterior margin is rounded.

All the legs, with the exception of the first pair, have a small rounded carina on the basis at the proximal extremity. On the four posterior pairs of legs this carina becomes more triangular in shape.

### 63. Genus EDOTEA Guérin-Ménéville.

Flagellum of second antennæ rudimentary. Maxillipeds have a palp composed of three articles. Epimera of all the segments of the thorax firmly and perfectly united with the segments. Abdomen composed of a single segment, with lateral incisions or suture lines at the base, indicating another partly coalesced segment. All the legs prehensile.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS EDOTEA.

- a*. Antero-lateral angles of head produced into horn-like projections. Lateral margins of thoracic segments produced into horn-like projections. Four tubercles situated on the dorsal surface of head.....*Edotea acuta* Richardson
- a'*. Antero-lateral angles of head not produced into horn-like projections but rounded. Lateral margins of thoracic segments not produced into horn-like projections. Two tubercles situated on the dorsal surface of head just back of the anterior margin.
- b*. Lateral margins of thorax nearly straight. Lateral incisions at base of terminal segment of body slight. Second pair of antennæ extend to the middle of the fourth article of the antennæ of the first pair; second article half as

long as first; third twice as long as second; fourth a little longer than third; the fifth is half the length of the fourth. Two longitudinal lateral rows of low tubercles extend the entire length of the thorax, one row on either side along the lateral portions of the segments . . . . . *Edotea triloba* (Say)

*b*. Lateral margins of thorax rounded. Lateral incisions at base of terminal segment of body deep. Second pair of antennæ do not quite extend to the end of the third article of the first pair of antennæ; first, second, and third articles subequal; fourth article a little longer than third; fifth article half the length of the fourth. There are no tubercles on the lateral portions of the segments of the thorax . . . . . *Edotea montosa* (Stimpson)

#### EDOTEA ACUTA Richardson.

*Edotea acuta* RICHARDSON, American Naturalist, XXXIV, 1900, p. 228; Proc. U. S. Nat. Mus., XXIII, 1901, pp. 544-545.

*Depth*.—105 fathoms.

Head with the antero-lateral angles produced in knob-like projections. Four tubercles situated on the surface of the head, two on the anterior part and two on the posterior part. First pair of antennæ twice as long as the lateral projections. Second pair not reaching beyond the

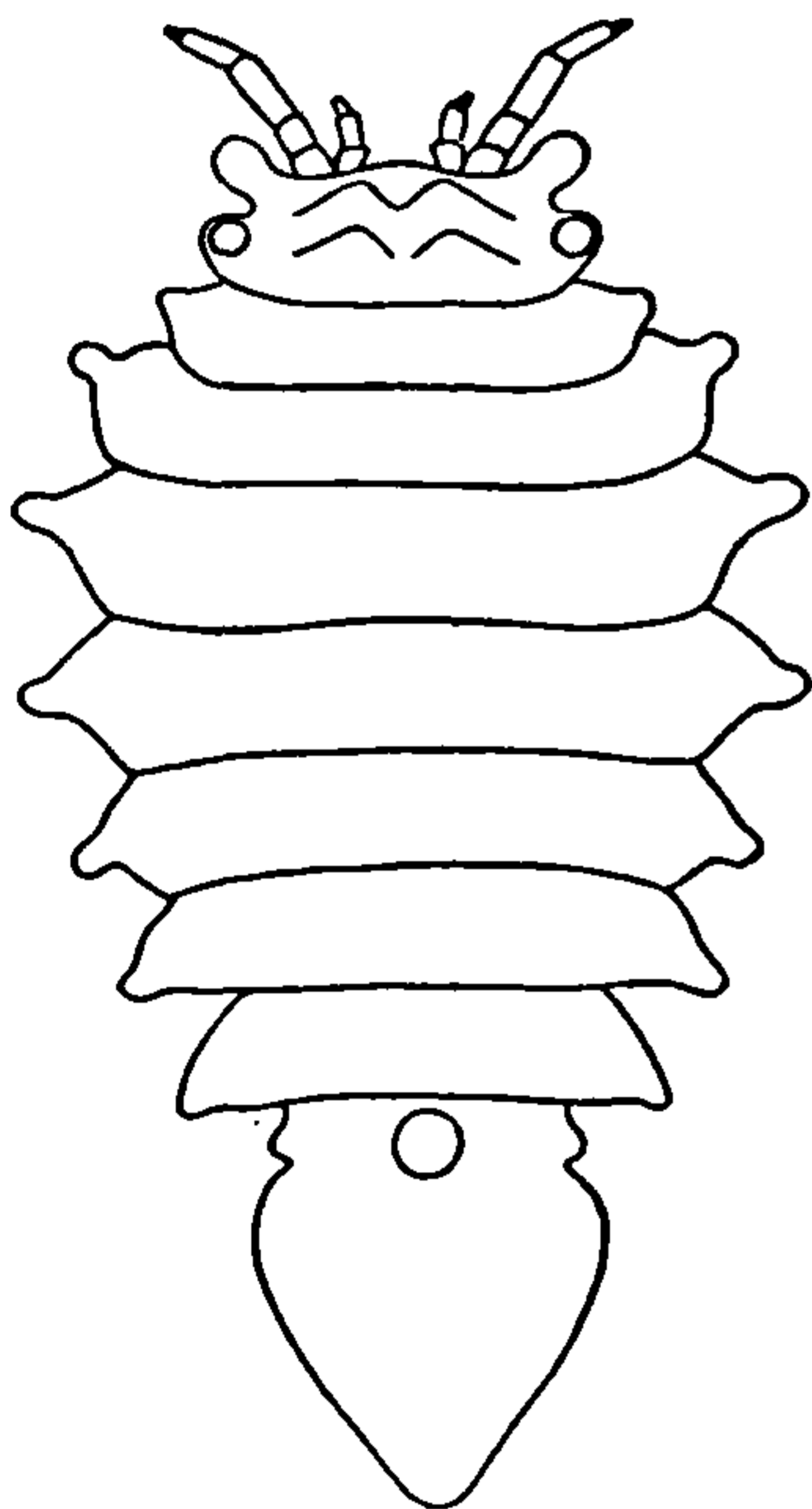


FIG. 439.—EDOTEA ACUTA.

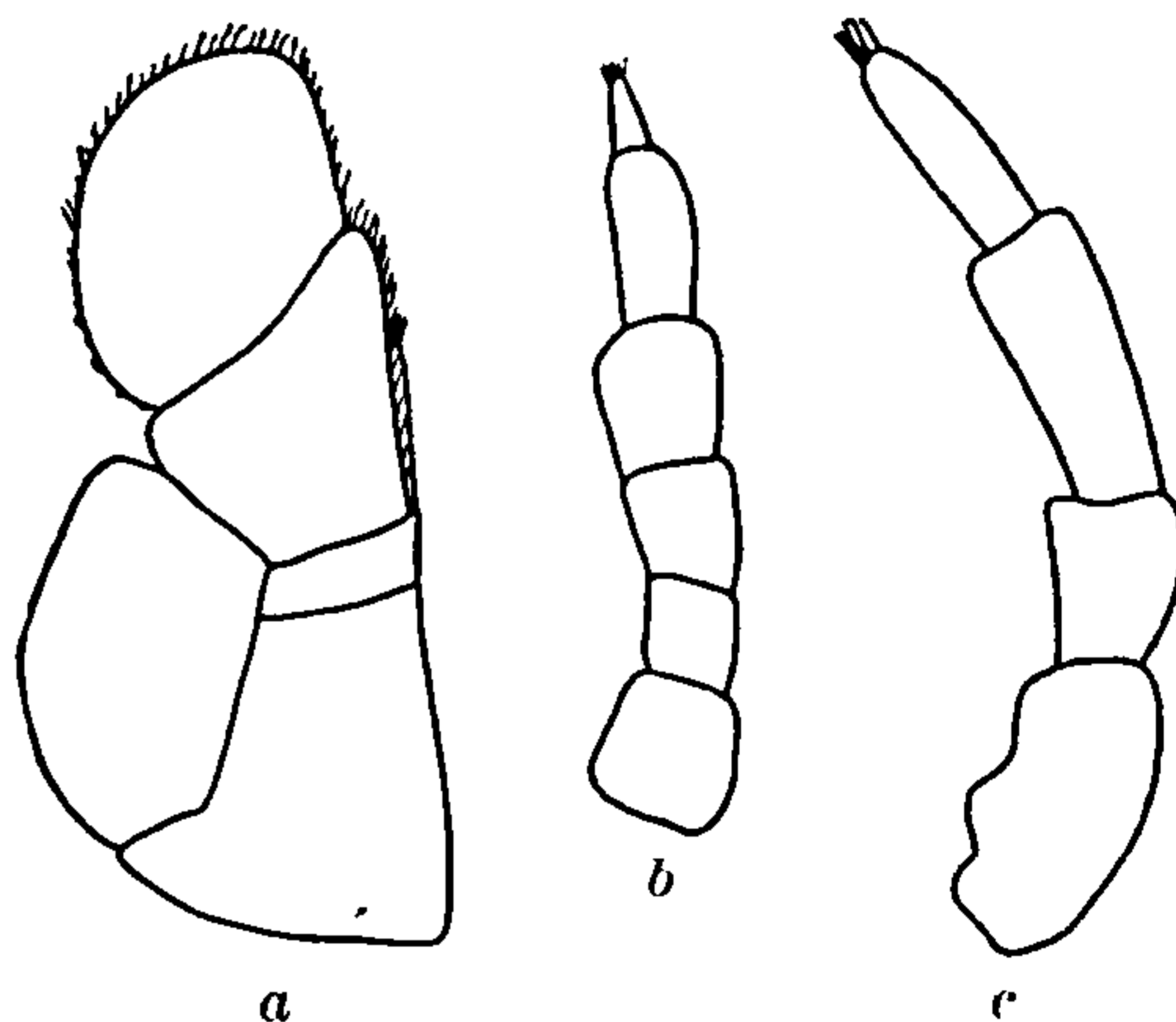


FIG. 440.—EDOTEA ACUTA. *a*, MAXILLIPED.  $\times 51\frac{1}{2}$ . *b*, SECOND ANTENNA.  $\times 51\frac{1}{2}$ . *c*, FIRST ANTENNA.  $\times 51\frac{1}{2}$ .

lateral projections, and carrying a rudimentary flagellum composed of one article.

Thoracic segments subequal. Sides of all the segments produced into knob-like projections.

Terminal abdominal segment with a transverse depression or groove on either side of which the lateral margin is indented. Apex of segment produced as in *Edotea montosa*.

Color white.

Three specimens were found in the stomach of a cod, taken by the U. S. Bureau of Fisheries steamer *Albatross* while cruising in the Atlantic Ocean from Woods Hole, Massachusetts, to Nova Scotia.

*Depth*.—105 fathoms.

*Type*.—Cat. No. 23909, U.S.N.M.

## EDOTEA TRILOBA (Say).

*Idotea triloba* SAY, Jour. Acad. Nat. Sci. Phila., I, 1818, p. 425.—MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 134.

*Jæra triloba* WHITE, List Crust. Brit. Mus., 1847, p. 97.

*Epelys trilobus* HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, 1873, Pt. 1, p. 571 (277), pl. vi, fig. 28; p. 370 (76).—VERRILL, Am. Jour. Sci., VII, 1874, p. 135; Proc. Amer. Assoc., 1874, p. 372.—HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Commissioner of Fish and Fisheries, 1880, Pt. 6, pp. 358-359, pl. vii, figs. 42-43.

*Edotea triloba* MIERS, Jour. Linn. Soc. London, XVI, 1883, pp. 70-71.—RICHARDSON, American Naturalist, XXXIV, 1900, p. 228; Proc. U. S. Nat. Mus., XXIII, 1901, p. 545.—PAULMIER, Bull. New York State Museum, 1905, p. 177.

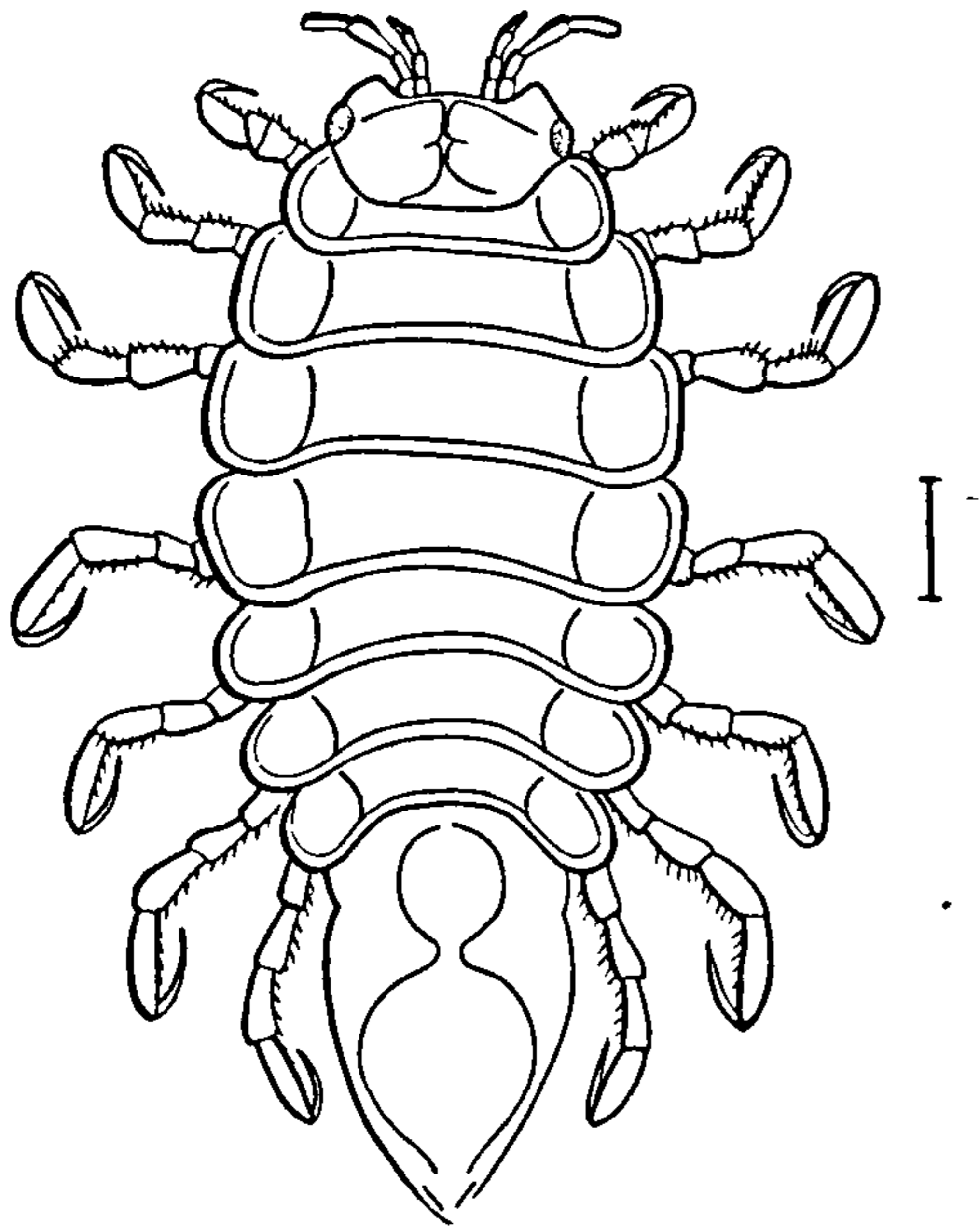


FIG. 441.—EDOTEA TRILOBA (AFTER HARGER). × 10.

*Localities.*—Egg Harbor, New Jersey; eastern shore of Staten Island; Savin Rock, near New Haven, Connecticut; Noank Harbor, Connecticut; Vineyard Sound, Provincetown, Massachusetts; near Cape Cod; Gloucester; 30 miles northeast of Portland, Quohog Bay, Casco Bay, Maine.

*Depth.*—Surface to  $\frac{1}{2}$  fathom, in low, muddy water; in eelgrass.

Body ovate, a little more than twice as long as wide, 3 mm. : 7 mm. Length of abdomen equal to 3 mm.

Head produced in the middle of the front, with two conspicuous tubercles, one on either side of the median line and close together, situated on the anterior margin. Antero-lateral angles of the head prominent and produced in rounded lobes, upon which the eyes are placed. The first pair of antennæ have the first and second articles equal in length; the third article is twice as long as the second; the fourth article is about two-thirds the length of the third. The first pair of antennæ are longer than the second pair, the second antennæ reaching only to the middle of the fourth article of the first pair of antennæ. The first, second, and third articles are short and subequal; the fourth is one and a half times longer than the third; the fifth is just a little longer than the fourth. The flagellum is minute, composed of one article, which is one-third the length of the fifth article. When retracted the first antennæ extend only to the middle of the lateral

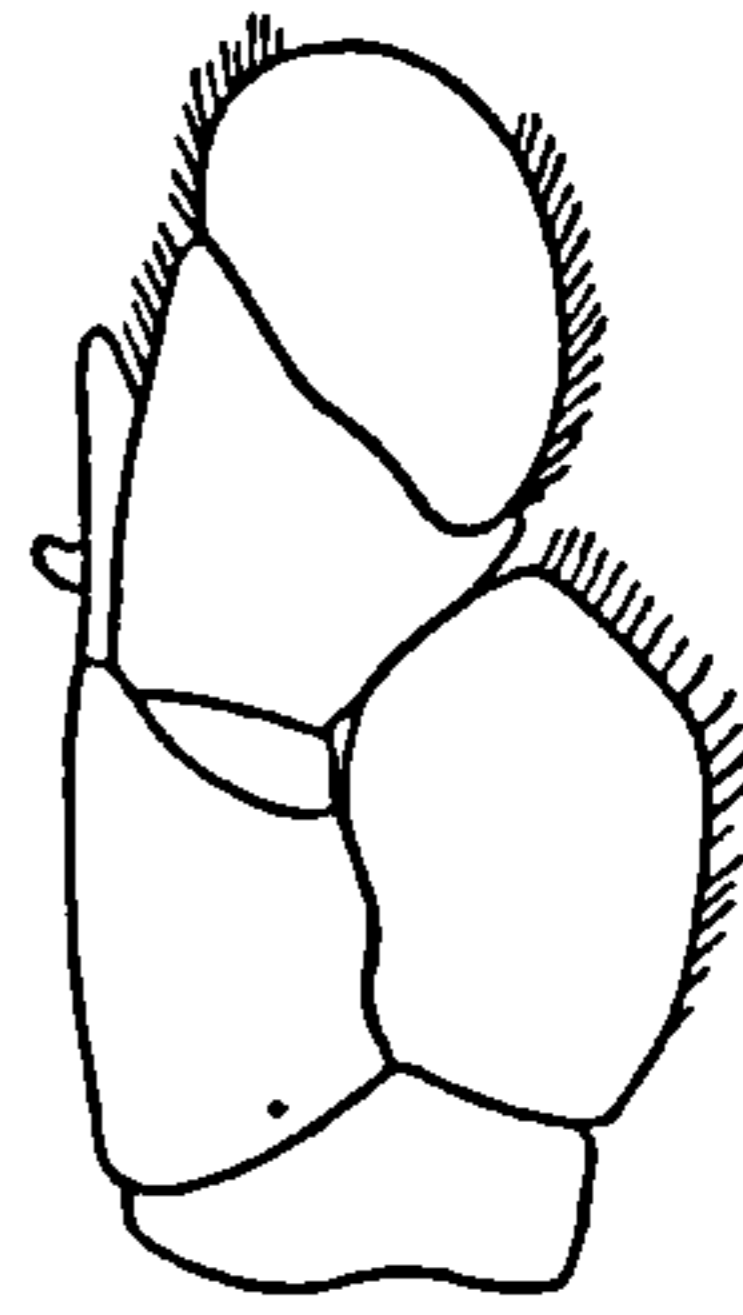


FIG. 442.—EDOTEA TRILOBA. MAXILLIPED. × 51 $\frac{1}{3}$ .

margin of the first thoracic segment. The maxilliped has a palp of three articles.

The third and fourth segments of the thorax are longer than any of the others and are also the widest. The epimera of all the segments are united with the segments. The lateral portions of the segments are laterally expanded, the lateral margins being almost straight. Two longitudinal rows of low tubercles are placed one on either side along the lateral portions of the segments, each segment having two tubercles, one on either side.

All the legs are prehensile; the first are much shorter than any of the others.

The abdomen is composed of one segment with suture lines at the base indicating another partly coalesced segment as well as slight incisions in the lateral margins. A large, rounded prominence is situated in the median line at the base of the abdomen. This prominence is followed by a depression, so that in a lateral view the abdomen is seen to be in the form of two elevations with a deep depression separating them. The extremity is also separated off from the second elevation by another depression. The sides of the abdomen converge rapidly from a point a little below the middle to a narrow and pointed extremity.

#### EDOTEA MONTOSA (Stimpson).

*Idotea montosa* STIMPSON, Smithsonian Contributions to Knowledge, VI, 1853, p. 40.

*Epelys montosus* HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, Pt. 1, 1873, p. 571

(277); p. 370 (76).—VERRILL,

Am. Jour. Sci., VII, 1874, p. 45;

Proc. Amer. Assoc., 1874, p.

367.—SMITH and HARGER, Trans.

Conn. Acad. Sci., III, 1874, p. 3.—

HARGER, Proc. U. S. Nat. Mus.,

II, 1879, p. 161; Report U. S.

Commissioner of Fish and Fish-

eries, 1880, Pt. 6, pp. 359-360, pl.

viii, figs. 44-47.

*Edotea montosa* MIERS, Jour. Linn.

Soc. London, XVI, 1883, p. 72.—

RICHARDSON, American Natural-

ist, XXXIV, 1900, p. 228; Proc.

U. S. Nat. Mus., XXIII, 1901, p.

545.

*Localities*.—Block Island Sound; Long Island Sound; Vineyard Sound; Eastport, Maine; Georges Bank; Stellwagens Bank; Casco Bay; Bay of Fundy; Halifax, Nova Scotia; Grand Menan.

*Depth*.—8 to 25 fathoms, in mud and fine sand.

Body ovate, a little more than twice as long as wide, 4 mm.: 9 mm.

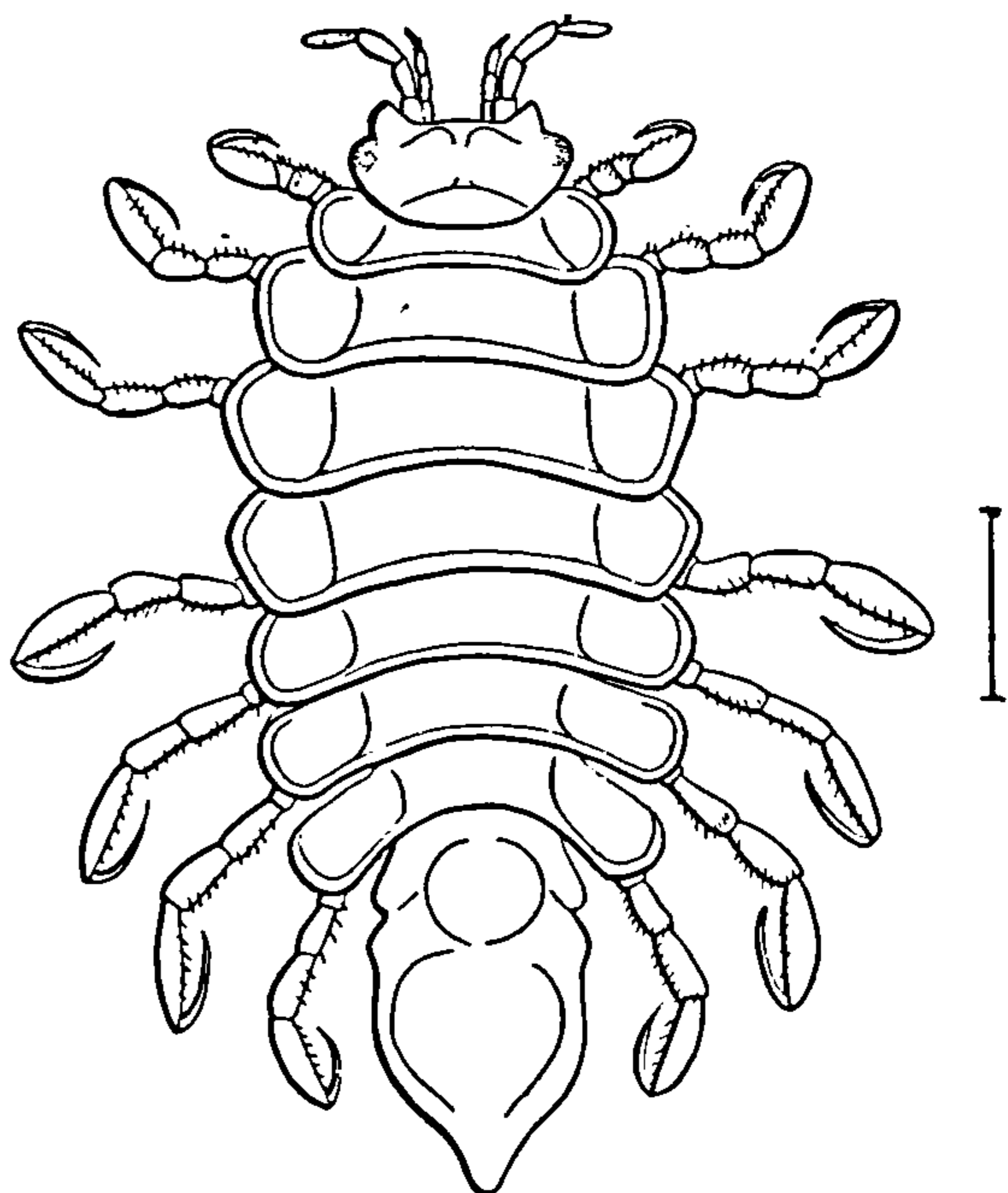


FIG. 443.—EDOTEA MONTOSA (AFTER HARGER).  
× 6.



Length of abdomen equal to one-third the length of the entire body, 3 mm.: 9 mm.

Head with the front triangularly produced and with two low tubercles situated on the anterior margin, one on either side of the median line. Eyes situated on the antero-lateral lobes, which are rounded. The first pair of antennæ have the first and second articles equal in length; the third is twice as long as the second; the fourth is but little longer than half the length of the third. The first pair of antennæ is longer than the second, the second pair not quite extending to the end of the third article of the first pair of antennæ. The second antennæ have the first, second, and third articles subequal; the fourth is a little longer than the third; the fifth is one and a half times as long as the fourth. The flagellum consists of one article one-half as long as the fourth peduncular article. When retracted, the first pair of antennæ extend to the middle of the lateral margin of the first thoracic segment. The maxilliped has a palp of three articles.

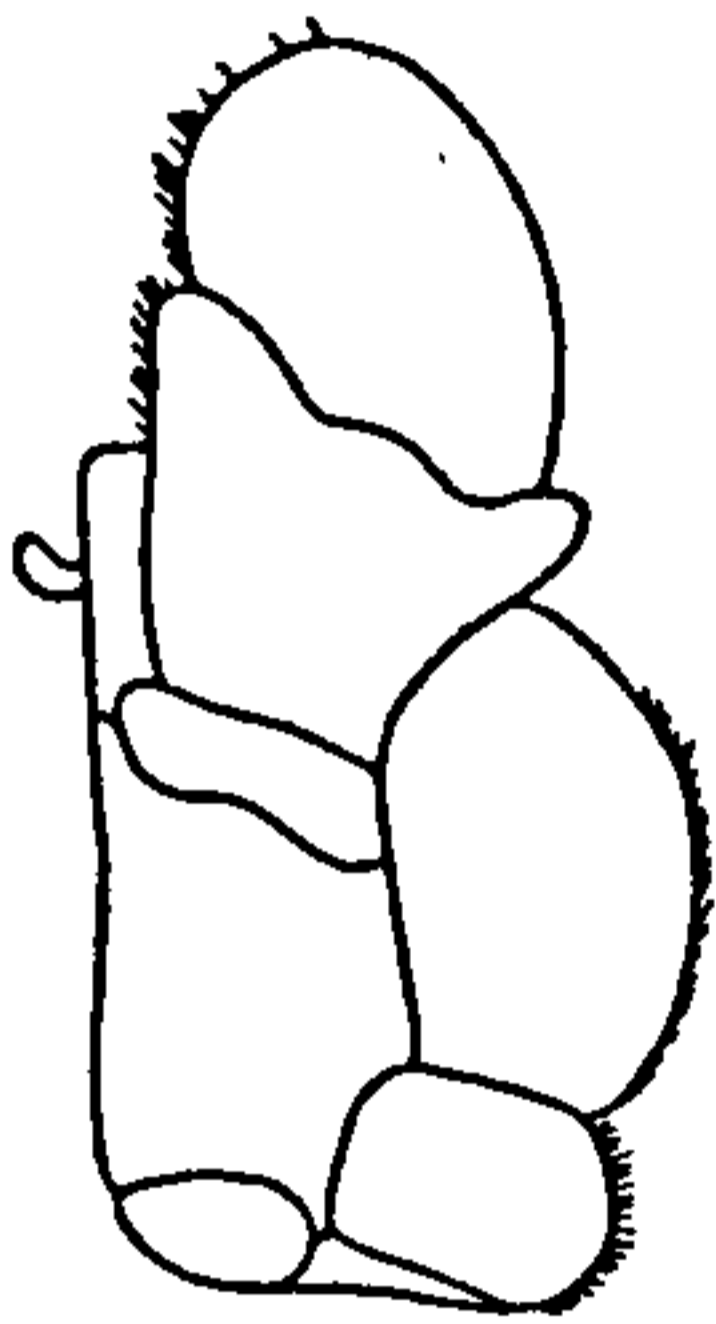


FIG. 444.—EDOTEA  
MONTOSA. MAX-  
ILLIPED.  $\times 38\frac{1}{2}$ .

The third and fourth segments of the thorax are the widest and longest. The epimera are firmly united with the segments in all the segments. There is a slight linear depression on either side of each segment, probably indicating the place where the coalescence has taken place. The lateral margins of all the segments are rounded.

The first pair of legs are much shorter than the other six pairs. All are prehensile.

The abdomen is composed of a single segment. Another coalesced segment is indicated by lateral incisions at the base of the abdomen, and a slight depression extending a short distance inward on either side from these lateral incisions. A depression in the dorsal surface occurs just a little below the place where the lateral incisions are situated, thus giving the abdomen the appearance, in a lateral view, of two elevations separated by a depression. Another depression near the extremity of the abdomen separates off the small terminal point from the large median elevation. The sides of the abdomen converge to a triangulate extremity.

#### 64. Genus EUSYMMERUS Richardson.

Body elliptical. Palp of maxillipeds composed of four articles. Second pair of antennæ with joints of flagellum all consolidated and forming a single piece. Eyes dorsally situated.

Lateral margins of thoracic segments expanded, edges straight and full. Epimera of second, third, fourth, and fifth segments coalesced

and firmly united with the segments; those of the sixth and seventh segments distinct and visible.

Abdomen composed of one segment with suture lines indicative of another partly coalesced segment.

**EUSYMMERUS ANTENNATUS** Richardson.

*Eusymmerus antennatus* RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, pp. 852-853; Ann. Mag. Nat. Hist. (7), IV, 1899, pp. 273-274.

*Locality*.—Abreojos Point, Lower California.

*Depth*.—5½ fathoms.

Body elliptical, tapering toward the extremity; surface smooth.

Head three times broader than long, with the antero-lateral angles prominent. Anterior margin excavate. Lateral margins expanded. Eyes situated dorsally on the extreme lateral margin in the median

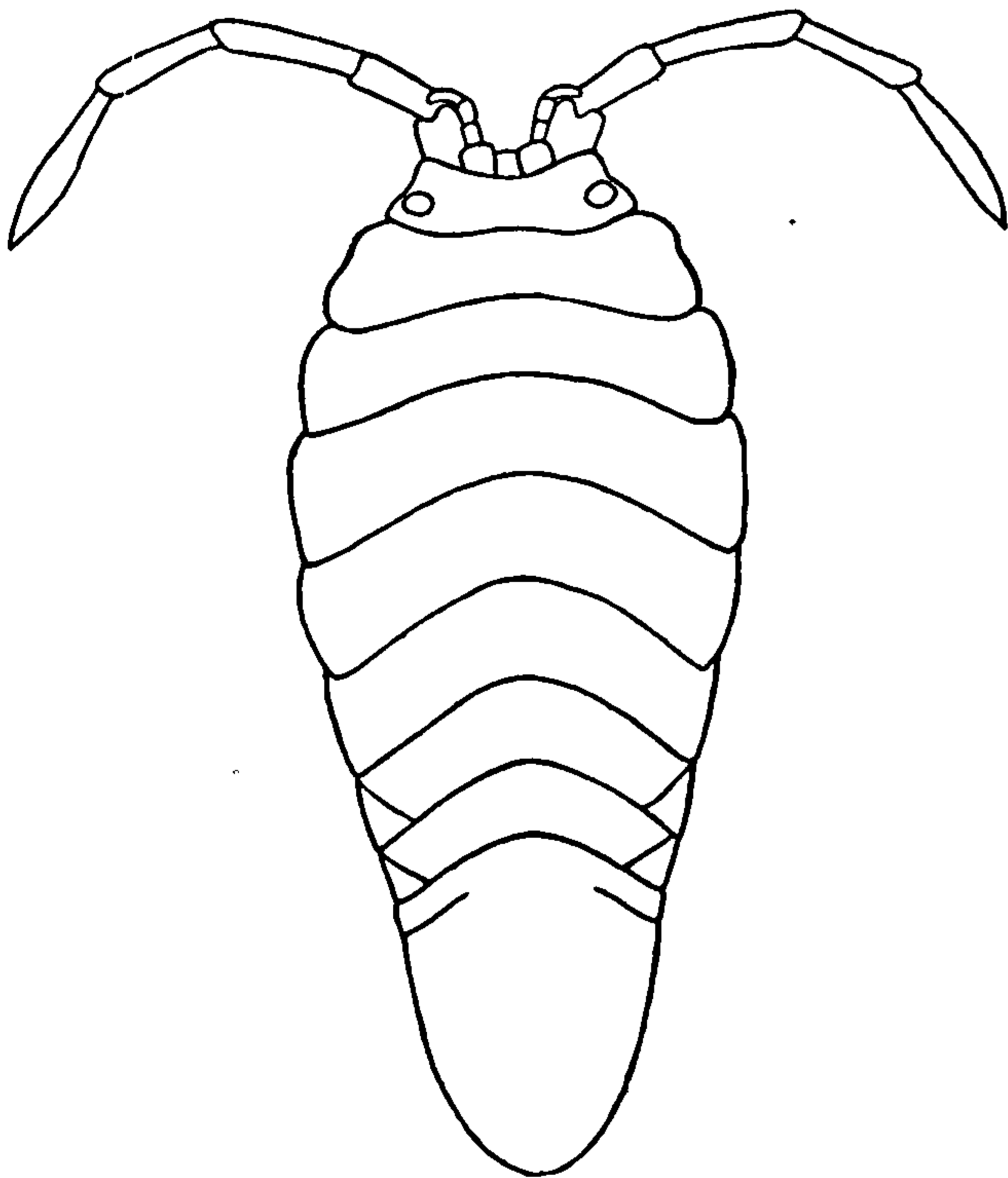


FIG. 445.—EUSYMMERUS ANTENNATUS. × 8.



FIG. 446.—EUSYMMERUS ANTENNATUS. MAXILLIPED. × 27½.

transverse line. First pair of antennæ composed of four articles, short, extending only a little beyond the second joint of the second pair of antennæ. Second pair of antennæ consist of six articles, and are geniculate, the last or flagellar joint being somewhat clavate.

Thoracic segments with the lateral margins expanded. Lateral edges straight, full. Epimera of second, third, fourth, and fifth segments coalesced and firmly united with the segments; epimera of sixth and seventh segments distinct and articulating with segments.

Abdomen composed of only one segment with suture lines indicative of another partly coalesced segment. It is posteriorly rounded, and tapers from the base to the extremity.

Legs slender, with dactyli bi-unguiculate.

Color of specimen brown. Lateral edges of thoracic segments colorless.

One specimen from off Abreojos Point, Lower California, station 2835, was collected by the U. S. Bureau of Fisheries steamer *Albatross*; depth, 5½ fathoms.

*Type*.—Cat. No. 22580, U.S.N.M.

### 63. Genus ERICHSONELLA<sup>a</sup> Benedict.

Flagellum of second antennæ consisting of a single clavate article. The maxillipeds have a palp composed of four articles. The epimera of all the segments of the thorax, including the first, are distinctly separated from the segments. The abdomen is composed of a single segment.

#### ANALYTICAL KEY TO THE SPECIES OF THE GENUS ERICHSONELLA.

- a*. Surface of body smooth throughout. Outline of body regular. First pair of antennæ short. Terminal segment of body shows but slight traces of a lateral tooth near its base on either side.....*Erichsonella attenuata* (Harger)
- a'*. Surface of body tuberculated. Outline of body serrate. First pair of antennæ long. Terminal segment of body with a prominent lateral tooth near the base on either side.
- b*. Large bifid tubercle on center of head. Median longitudinal row of tubercles on each thoracic segment.....*Erichsonella filiformis* (Say)
- b'*. Large tridentate spine on center of head. Median longitudinal row of tubercles on each thoracic segment, and a longitudinal row of tubercles on either side of median row on first four thoracic segments.  
*Erichsonella floridana* Benedict

#### ERICHSONELLA ATTENUATA (Harger).

*Erichsonia attenuata* HARGER with VERRILL, Report U. S. Commissioner of Fish and Fisheries, 1873, Pt. 1, p. 570 (276), pl. VI, fig. 27; p. 370 (76).—HARGER, Proc. U. S. Nat. Mus., II, 1879, p. 160; Report U. S. Commissioner of Fish and Fisheries, 1880, Pt. 6, pp. 356–357, pls. VI, VII, figs. 36–37.

*Erichsonella attenuata* RICHARDSON, American Naturalist, XXXIV, 1900, p. 228; Proc. U. S. Nat. Mus., XXIII, 1901, p. 543.

*Localities*.—Great Egg Harbor, New Jersey; Noank, Connecticut.

Body narrow, elongate, six times longer than wide, 2 mm. : 12 mm. Head wider than long, 1½ mm. : 2 mm., with the anterior margin slightly excavate between the antero-lateral angles. Eyes small, composite, and situated at the sides of the head, halfway between the anterior and posterior margins. There is a prominent elevation situated on the head between the eyes. The first pair of antennæ have the basal article large and somewhat dilated; the second article is a little shorter than the first, and about half as wide; the third and fourth articles are equal in length, and each is one and a half times longer

<sup>a</sup> Proposed by Dr. James E. Benedict for the preoccupied *Erichsonia*.