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GEO. D. SHAFER

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REPORT ON THE CRUSTACEA COLLECTED BY THE UNIVERSITY OF MICHIGAN-WALKER EXPEDITION IN THE STATE OF VERA CRUZ, MEXICO.¹

A. S. PEARSE.

The University of Michigan-Walker Expedition (summer of 1910), under the direction of Dr. A. G. Ruthven, obtained representatives of eleven species of crustaceans, four of them new, in southern Vera Cruz. The following paper is the result of the study of this material and contains the descriptions of the new species.

Most of the specimens were collected on the hacienda of Cuatotolapam which is on the plain at the base of the San Andreas Tuxtla mountains and in the canton of Acayucan (elevation fifteen meters). Several species were taken at Lake Catemaco, at an elevation of 398 meters, in the San Andreas Tuxtla range.

The numbers given to the specimens refer to the University of Michigan Museum catalogs.

COPEPODA.

1. *Cyclops leuckarti* Claus.—Six individuals of the species were collected with a Birge net from La Laja creek at Cuatotolapam on August 8, 1910.

OSTRACODA.

2. *Cypridopsis* sp.—Several specimens thus identified by Prof. Sharpe were taken in the shallow water in Lake Catemaco on July 27.

ISOPODA.

3. *Cubaris walkeri*, new species.—Body convex, minutely granulate; thoracic segments each with an elongated swollen mass of blended tubercles on each side 1 mm. from the middle line. Head more than twice as wide as long; anterior margin straight, strongly reflexed; eyes rather large, sixteen ocelli. Antennae with flagellum shorter than last joint of peduncle; first joint of flagellum less than a third as long as second. First segment of body separated by grooves from the lateral margins which are somewhat reflexed; lateral margins of other thoracic segments narrow, strongly flexed posteriorly; first coxipodite free along whole outer margin, divergent at posterior end; second coxipodite free along outer end and anterior margins, divergent at outer edge. Pleotelson strongly constricted in the middle, about as wide as long, width at distal end one-fourth less than at proximal end; a low tubercle near

¹When Dr. Pearse was called to the University of the Philippines, in April, 1911, this paper was completed except for the identifications of the ostracods and shrimps, and two species of Isopoda. He had already submitted the ostracod material to Prof. R. W. Sharpe for identification, and the other undetermined specimens were later sent to Miss Mary J. Rathbun of the U. S. National Museum. A specimen of *Probopyrus bithynis* found by Miss Rathbun on one of the shrimps and another species of isopod (*Porcellio rathkei*) that had not been submitted to Dr. Pearse were identified by Dr. Harriet Richardson. The Museum is indebted to these persons for their assistance.

A general account of this expedition will be published in the annual report of the head curator of the University of Michigan Museum for the year 1910-1911.—Alexander G. Ruthven.

proximal margin in median line. Uropoda with basal segment a little longer than wide; inner branch robust, spatulate, more than half as long as pleotelson, attached on the posterior inner margin of basal segment; outer branch small, conical, inserted more on the dorsal than ventral surface of the basal segment at the middle of its inner margin. Color of alcoholic specimens slaty; a series of longitudinal median white blotches along the segments from the head to the pleotelson; lateral margins of first, third, fourth and all abdominal segments more or less white. Dimensions: 11 by 5.5 millimeters.

Eleven specimens of this species (41706, 41709, 41711, 41712, 41713) were collected between August 3 and August 13, 1910. The two type specimens were taken at Cuatotolapam, August 4, and all of the others were secured at the same place. All of the individuals were found under logs, leaves or stones. The species is named for Bryant Walker of Detroit, Michigan, whose generosity made the expedition possible.

4. *Probopyrus bithynis* Richardson.—A specimen of this species was found by Miss Rathbun within the branchial chamber of one of the specimens of *Macrobrachium olfersii*. According to Miss Rathbun this is the first time that the species has been found parasitic on this shrimp.

5. *Porcellio rathkei* Brandt (?).—Several specimens thus identified by Dr. Richardson were taken in decaying palm trees in low jungle at Cuatotolapam. Dr. Richardson states that the markings differ from those shown by individuals from the United States, but that this is probably but a variation exhibited by *P. rathkei*.

AMPHIPODA.

6. *Hyalella ornata*, new species.—Body slightly compressed; pleon segments 1 and 2 each produced into a dorsal spine in large individuals. Head longer than first peraeon segment; eyes large, elongated, elliptical. Side plates 1-4 rectangular with rounded corners. Pleon segments 3, posterior lateral angles slightly produced, tip rounded. Antenna 1 reaching beyond middle of flagellum of antenna 2, flagellum longer than peduncle, 6-7 segmented. Antenna 2 with ultimate segment of peduncle a little longer than the penultimate, flagellum longer than peduncle. Maxilla 1 with four plumose setae on apex of inner plate. Gnathopods ornamented with low, crescentic, hairy tubercles. Gnathopod 1 slender, palm transverse, sinous, defined by a tubercle. Gnathopod 2 in male, sixth joint stout, longer than broad, palm oblique, a notch near the base of the finger and a tubercle at the defining angle; finger stout, curved. Gnathopod 2 in female weak and slender, fifth and sixth joints both swollen into a large tubercle on the posterior margin, sixth about twice as long as broad, posterior margin longer than front; palm nearly straight, a shallow notch at base of finger. Posterior margin of second joints of peraeopods 2-4 smooth, posterior margin of 5 serrate. Peraeopod 4 not quite as long as 5. Ramus of uropod 3 as long as peduncle, slender, tapering, with a tooth and two setae at apex. Telson about as wide as long; apical margin thin and rounded, a slender setae on each side of apex. Length, 4 mm.

This species is given the name *ornata* on account of the tubercles which cover parts of the anterior margins of the last two segments and the

posterior margins of the last four segments of the first gnathopods of both sexes; they are also found on the same places on the second gnathopods of the female, but appear only on the posterior margins of the fourth and sixth segments of the second gnathopods of the male. About 200 specimens were collected in Lake Catemaco on July 27. They were found in large numbers on the stones near shore.

DECOPODA.

7. *Cambarus pilosimanus* Ortmann.—An adult female (41707) of this species was taken from a drainage ditch leading into La Laja creek at Cuatotolapam on July 18. Its measurements are as follows: length of carapace, 37; tip of rostrum to cervical groove, 24; width of carapace, 17; height of carapace, 15.6.

Three young female crayfishes (48708, 41710), about 22 mm. in length, collected on the shore of Lake Catemaco, July 27, appear to belong to this species.

8. *Cambarus ruthveni*, new species.—Only two specimens were collected, a male (41705) and a female (41704). Both were taken as they walked along the bank of a ditch in a guarda raya at Cuatotolapam, July 25. The female was carrying young that had completed their second moult; the male is first form. The characteristics of these two specimens are as follows:

Male: Rostrum subplane, margins elevated, convergent, slightly convex; acumen short, hairy below along lateral margins. Postorbital ridges slightly converging anteriorly, swollen at posterior end. Carapace compressed, plane above, granulated on sides, thickly punctuate above, almost smooth behind rostrum; cervical groove sinuate; no lateral spines; branchiostegal spine very small, blunt; areola almost obliterated in its middle third; posterior triangular space not clearly defined. Abdomen narrow, about as long as carapace; basal segment of telson with three spines on each side. Epistoma with anterior part triangular, rounded at tip. Antennal scale broadest toward the distal end; flagellum reaching to fourth abdominal segment. First pereopods elongated, hand elongated, somewhat compressed, margins subparallel; surface thickly granulate, granules distinct everywhere but more prominent toward inner margin; fingers almost as long as palm, both with a smooth ridge down the middle of each side, bearing a few tufts of bristles at tip, both denticulate on inner margin, the fixed finger with a larger tooth near base. Carpopodite with a very shallow sulcus on upper side; granulated everywhere; granules larger on inner side. Meropodite granulated above and below; smooth on inner and outer surfaces; granules on lower surface arranged in two rows. Ischiopodite of third pair of legs with a slender pointed hook. First pleopods (Fig. 3 A, B) rather short, straight; anterior margin with a shoulder near tips; outer and inner parts in close apposition to their tips; tip on inner part straight; tip of outer part stouter, blunt, bearing a horny spine near tip, flattened on inner face with hairs pinnately arranged on each side. Length, 58.5 mm.; length of carapace, 30; tip of rostrum to cervical groove, 19; breadth of carapace, 14.6; height of carapace, 14.

Female: Similar to male; granulations on carapace less prominent. Annulus ventralis small, (Fig. 3 C) prominent, hemispherical, with a sinous longitudinal fissure; a conical tubercle (C, D) between the bases of the fifth walking legs which is a little larger than the annulus. Length, 51.7 mm.; length of carapace, 26.6; rostrum to cervical groove, 17; breadth of carapace, 13; height of carapace, 12.2.

This species has the spine between the fifth walking legs of the female which Ortmann assigns as a characteristic of the subgenus *Paracambarus*, but it cannot be placed in that group on account of the characteristics of the male (i. e., the presence of hooks on the third walking legs and the absence of horny tips on the branches of the first pleopods) which are like those of his subgenus *Paracambarus*. Nevertheless, as Andrews has demonstrated the presence of a spine on the sternum of the last thoracic segment in two of Ortmann's subgenera other than *Paracambarus*, i. e., in *Procambarus* (in the form of a rounded tubercle) and *Cambarellus*, the writer would assign *C. ruthveni* to the subgenus *Procambarus*.

Dr. Ruthven says that the species is a burrower, and that the burrows are common along the drainage ditches on the low land at Cuatotolapam.

9. *Macrobrachium acanthurus* (Wiegmann).—Several specimens were taken in seines from the Hueyapam River at Cuatotolapam. It was quite abundant along the shores.

10. *Macrobrachium olfersii* (Wiegmann).—Two specimens were taken in the seines with the last species.

11. *Trichodactylus constrictus*, new species.—The following description is from a female (41717) bearing young under her abdomen.

Carapace punctate above; front margin slightly concave, smooth, slightly reflexed. *H*-shaped depression well defined; posterior ends of lateral margins strongly narrowed, posterior seventh of carapace $\frac{3}{5}$ as wide as greatest width; three antero-lateral spines, first one some distance behind the orbit; gastric region strongly elevated. Front abruptly deflexed; orbital sinus in front of carapace rather deep. An obtuse spine at the ventral inner angle of the orbit; an elevated ridge on outer and ventral margins of orbit. Maxillipedes: eschium with inner and outer margins about equal in length; merus with inner margin $\frac{1}{3}$ as long as outer; exognath almost as long as endognath. Chelipeds: merus with a pointed spine on the inner and one on the outer margin below; also a spinous tubercle at the outer distal angle; carpus indistinctly punctate, a spine on the inner margin; hand rather flattened, punctations faint and tending to cause low transverse ridges, margins subparallel; fingers flattened, a prominent ridge on upper surface of each, gaping very little at base; nine denticles on moveable finger and eight on fixed finger, these are larger toward the distal ends of fingers. Ambulatory legs little compressed except the fifth pair, all sparsely pilose. Abdomen and under surface of body not punctate. Length of abdomen, 16.3mm; width, 14.6. Length of carapace 17.5; width, 19.

The above description was made from a specimen taken at Lake Cate-maco, July 27. Dr. Ruthven reports that it was collected with eight other females (No. 41718) along the lake shore under rocks which were not submerged or even washed by the waves. Four of the individuals

taken were carrying eggs and one besides the type bore young. The measurements of eight females collected with the type are as follows:

Carapace	}	Length	16.6	16.3	18.0	19.5	17.4	18.1	15.0	17.0
		Breadth	18.0	17.7	19.1	21.0	19.5	20.6	15.8	19.0

No males were collected. The species is named *constrictus* on account of the narrowness of the posterior portion of the abdomen.

EXPLANATION OF FIGURES.

Figure 1. *Cubaris walkeri*. A, ventral view of first and second side plates; B, dorsal view of head; C, second antenna; D, first maxilla; E, last two segments of body and uropods, dorsal view; F, ventral view of pleotelson and left uropod.

Figure 2. *Hyallella ornata*. A, left second gnathopod of male; B, first antenna; C, second antenna; D, telson; E, uropod; F, first maxilla; G, second gnathopod of female; H, first gnathopod of male.

Figure 3. *Cambarus ruthveni*. A, inner surface of first pleopod of male; B, outer surface of first pleopod of male; C, ventral surface of a part of the seventh and eighth thoracic segments of female showing the annulus ventralis and the spine on the ventral surface of eighth thoracic-segment of female.

Figure 4. *Trichodactylus constrictus*. Dorsal view of type female and claw of another female. Photograph taken by E. W. Sink.

Ann Arbor, Mich., April, 1911.

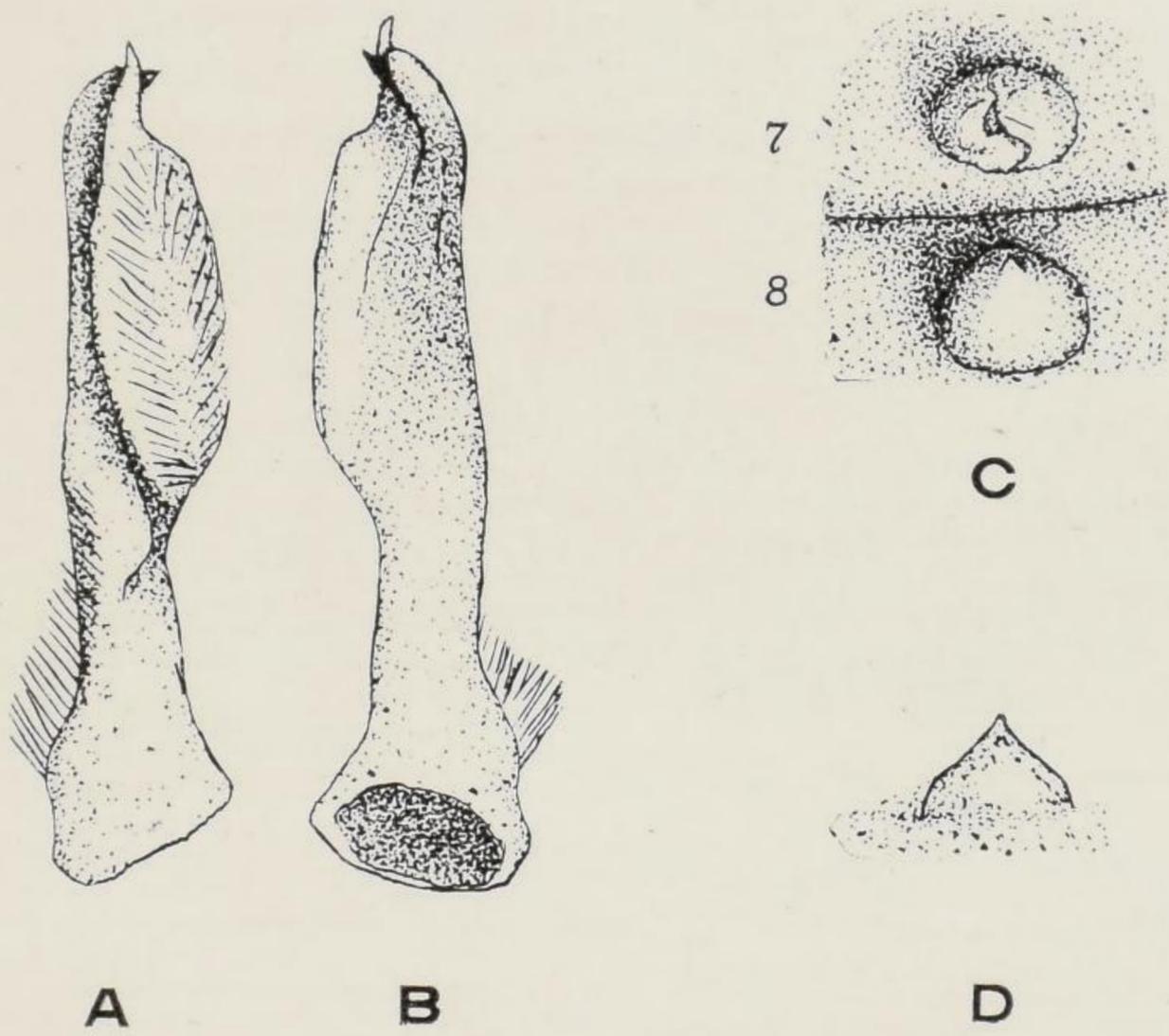


Fig. 3.



Fig. 4.

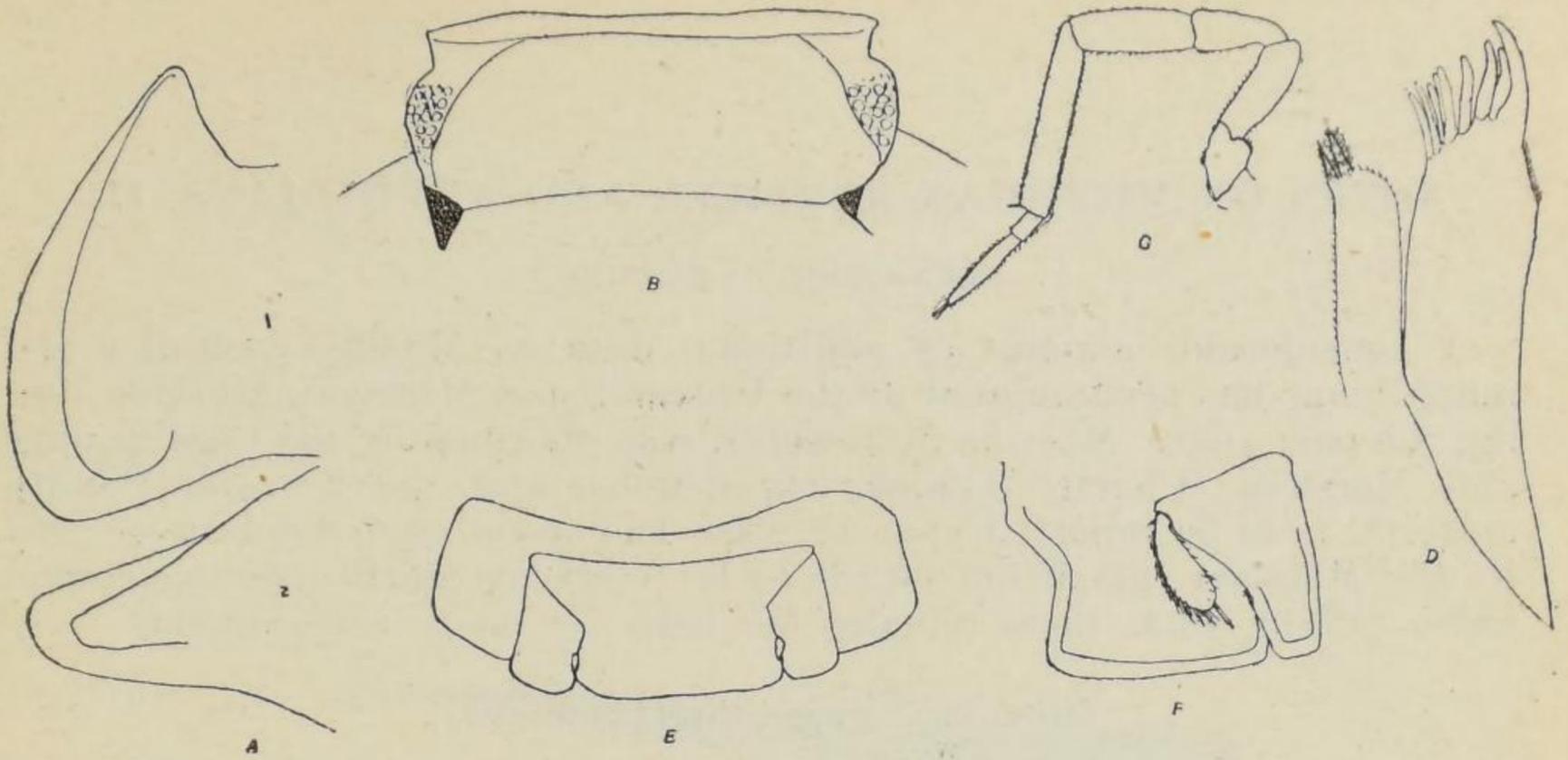


Fig. 1.

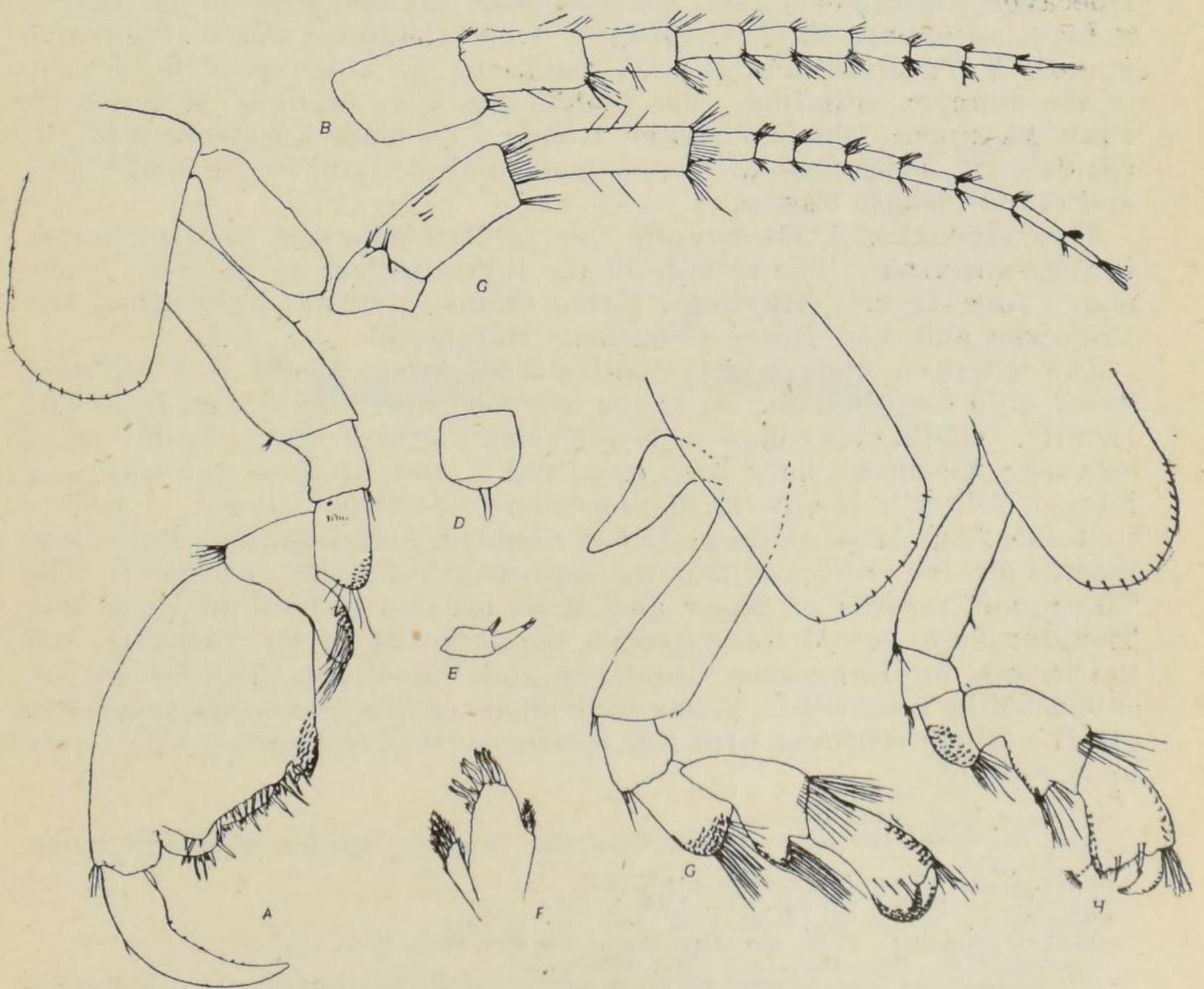


Fig. 2.