

# NEW AND RARE CUBAN AND HAITIAN TERRESTRIAL ISOPODA

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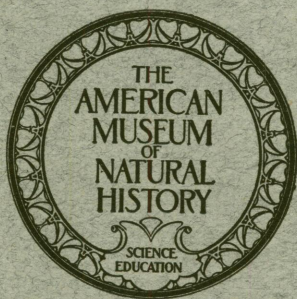
BY LEE BOONE

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# Article V.—NEW AND RARE CUBAN AND HAITIAN TERRESTRIAL ISOPODA

BY LEE BOONE<sup>1</sup>

TEXT FIGURES 1 TO 14

The Cuban and Haitian terrestrial Isopoda herein described are unusually interesting forms. Fourteen species, seven of which are new, and one new genus are Cuban, while the eighth new species is Haitian. I am indebted to my good friend Dr. Carlos de la Torre, of the University of Havana, for the gift of most of the Cuban species herein reported. Credit is due to Dr. de la Torre's assistants, Dr. C. G. Aguayo and Dr. P. J. Bermudez, who collected some of this material. Other Cuban species were contributed by Dr. Charles T. Ramsden of Guantanamo; by Dr. Mario Sanchez Roig of Havana; and by Mr. D. A. Welch of the Bernice P. Bishop Museum, Honolulu, Hawaii. Through the courtesy of Dr. Alexander Wetmore, assistant secretary in charge of the United States National Museum, I am permitted to publish my description and figure of *Cubaris hendersoni*, new species, collected at Tomazeau, Haiti, by the late John B. Henderson, II, a regent of the Smithsonian Institution, to whom I am indebted for much friendly assistance and encouragement in my earlier scientific work.

The types and paratypes of the following new species are in the collections of The American Museum of Natural History, and paratypes of these species are in the Poey Museum, Havana. *Porcellionides bermudezi*, *Delatorreia hoplites*, *Pseudarmadillo buscki*, *P. welchi*, *Cubaris ramsdeni*, *C. aguayoi*, and the series of specimens of *Philoscia briani* Arcangeli, *Trichorhina giannellii*, *Pseudarmadillo carinulatus*, *P. gillianus*, *Cubaris murina* Brandt, and *Tylos niveus* Budde-Lund, are to be found in these two museums. The types and paratypes of *Cubaris hendersoni* are deposited in the United States National Museum, as is the holotype of *Cubaris sanchezi*.

The drawings were made by Mrs. Helen Ziska of the American Museum, under my direction, except the two figures of *Tylos niveus* done by myself. My former colleague, Mr. Clarence R. Shoemaker, of the United States National Museum, made the photographs, and Mrs. Ziska retouched them.

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I am indebted to Dr. Roy W. Miner of the American Museum for the privilege of prosecuting this research in his department.

The most remarkable species in the present report is *Delatorreia hoplites*, new genus and new species, an inhabitant of the Marti Mountains, Cuba, a region subjected to an extended dry season. This isopod, for which it has been necessary to establish a new genus in the family Cubaridae, presents a most curious prolongation of the last thoracic segment into a domelike process that extends over and shields the entire abdomen. So far as I am aware, no terrestrial isopod from any part of the world possesses a similar development. Another of its unusual features is the development of the margins of the third, fourth, and fifth abdominal segments and uropod peduncle into ventral plates, apparently to form a protective border around the pleopoda. Possibly this device may assist in holding moisture. The new genus is nearer to *Pseudarmadillo* de Saussure than to any other American genus, but is very distinct therefrom.

The strictly American genus, *Pseudarmadillo* de Saussure, contains four valid species, all of which are represented in the present report. Two of these are new to science. These four species show four distinct gradations of ornamentation, ranging from a nearly smooth genotype, *P. carinulatus*, to the decidedly tuberculated pattern of *P. welchi*, which in turn shows kinship with the much more spinose pattern of *P. gillianus* Richardson. The ornamentation of *P. buscki* described in this paper is even more peculiar, for it is adorned with a remarkably fantastic development of spines, the more prominent ones being flattened like sword blades. This little isopod resembles a trilobite in appearance.

The writer realizes that it is quite possible that the finding of a much more extensive series of these four species of *Pseudarmadillo* may necessitate the reduction of the species *welchi* to the status of a subspecies of *gillianus*, since the specimens at hand show a tendency to intergradation between these two. However, present data necessitates their separation as distinct but closely related species.

The present material apparently establishes the Cuban origin of *P. carinulatus*, which has hitherto been known only from the description, in 1857, of a holotype vaguely referred to as coming from "Mexico or Cuba," and now deposited in the Geneva Museum.



## LIST OF SPECIES DISCUSSED

## ONISCIDAE

- Philoscia briani* Arcangeli  
*Trichorhina giannellii* Arcangeli  
*Porcellio laevis* Latreille  
*Porcellionides bermudezi*, new species  
*Pseudarmadillo carinulatus* de Saussure  
     " *welchi*, new species  
     " *gillianus* Richardson  
     " *buscki*, new species  
*Delatorreia*, new genus  
*Delatorreia hoplites*, new species

## CUBARIDAE

- Cubaris ramsdeni*, new species  
     " *sanchezi*, new species  
     " *aguayoi*, new species  
     " *hendersoni*, new species  
     " *murina* Brandt

## TYLIDAE

- Tylos niveus* Budde-Lund

## ONISCIDAE

## PORCELLIO Latreille

## Porcellio laevis Latreille

*Porcellio laevis* RICHARDSON, 1905, Bull. 54, U. S. Nat. Mus., p. 614, Fig. 666, *a* to *g* (after Sars).

MATERIAL EXAMINED.—One specimen from Media, Caenito, Cuba, collected August 19, 1928, by Mr. D. A. Welch. Nineteen specimens from San Antonio de los Baños, Cuba; Dr. P. J. Bermudez collector; deposited in the Poey Museum, Havana, and the American Museum. One specimen from Sierra de Najaza, Camaguey, Cuba; Doctors Bermudez and Aguayo collectors; deposited in the Poey Museum.

*Philoscia briani* Arcangeli

## Figure 1

*Philoscia briani* ARCANGELI, 1929 (November), Boll. Labor. Zool. gen. ed. Agr. R. Sc. Sup. Agric. Portici, XXIII, p. 136, Fig. 3, 1 to 6.

HEAD.—Head about two-thirds as long as wide with the frontal margin much deflected in a thick, rounded median lobe and arched on either side above the antennal base. This deflected surface is a little concave, and immediately above it the transverse line defining the deflected frontal margin appears from the dorsal view as a straight line simulating the frontal margin. The frontal side lobes are prominent, subtriangular with rounded margin, decidedly bent at the base and sides. The eye is of moderate size, anterolateral in position, approximately subelliptical in contour with the outer margin curved, the upper margin oblique and nearly straight, composed of eighteen to twenty ocelli. The outer antennae are very long and thin, about one-half as long as the body, with the basal article very short, the second and third articles

subequal in length but with the second article thicker than the third; the fourth article is one and three-fourths times as long as the third; the fifth twice as long as the third and longitudinally sulcated; the three-jointed flagellum is about one-fourth longer than the fifth article of the peduncle, the three joints decreasing in length a little from the first to third. The entire antennae, but especially the fifth peduncular article and flagella, are furnished with numerous fine tactile hairs, similar to but longer and more abundant than those on the body.

**THORAX.**—The thoracic segments have the proportions shown in figure 1 A. The epimeral margins of segments one to four, inclusive, are relatively straight; that of segment five is very slightly rounded at each angle; while those of segments six and seven are definitely rounded, with the posterior angles acute.

**ABDOMEN.**—The abdomen has the first segment one and one-half times as long as the second with the lateral margins concealed; the second segment is shorter than the third; the third, fourth, and fifth segments are approximately subequal in length; the sixth segment is about one-fifth longer than the fifth segment and is very much

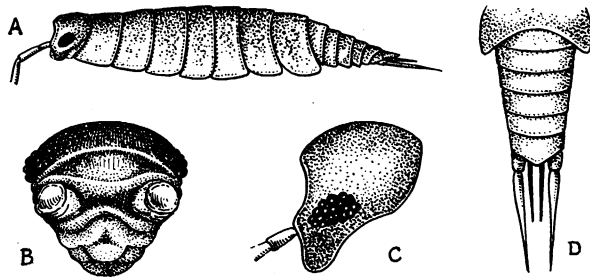


Fig. 1. *Philoscia briani* Arcangeli.

A. Lateral view. B. Head, front view. C. Head, lateral view. D. Abdomen.

wider than long, being in the form of a triangle, the posterior margins being straight lines uniting to form an obtuse angle, the apex of which does not extend so far as does the peduncle of the uropoda. The epimeral margins of the abdominal segments form a straight line. The uropod peduncle is stout. The inner branch is very slender and tapering. It is about two-fifths as long as the outer branch which is thicker but in the form of a very attenuated triangle. The seventh legs of the female are like those described by Dr. Arcangeli from the male type specimen. There is a small cluster of bristles on the outer distal angle of the carpal joint.

**COLOR.**—Alcoholic specimens show the ground color to be a dark maroon-brownish with numerous fleckings of opaque yellowish, these spots are abundant on both thoracic and abdominal segments. There is also a more or less distinct median longitudinal stripe of yellowish on the thorax, which on the abdomen resolves itself into two such stripes and on the telson into three longitudinal markings.

**TYPE.**—Arcangeli's type material was collected at Guayabal, Cuba, October 10, 1928, and at Soledad, Cuba, October 9, 1928. It is probably deposited at Naples.

**MATERIAL EXAMINED.**—A female, collected at Sierra de Anafe, Pinar del Rio, Cuba, by Doctors Bermudez and Aguayo, deposited in the Poey Museum; another



collected at Cojimer, May 2, 1931, by Dr. C. G. Aguayo, is deposited in The American Museum of Natural History.

The female herein described carries about ten or twelve young in the brood pouch.

Dr. Arcangeli describes and figures the male pleopoda of this species

***Trichorhina giannellii* Arcangeli**

Figure 2

*Trichorhina giannellii* ARCANGELI, 1929, Boll. Labor. Zool. gen. ed. Agr. R. Sc. Sup. Agric. Portici, XXIII, p. 134, Fig. 2, 1 to 4.

HEAD.—Head viewed dorsally two-thirds as long in the median line as wide, convex, with the frontal margin produced to a rounded obtuse angle; the frontal

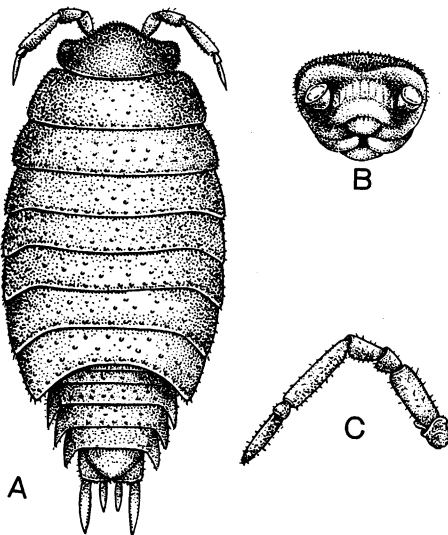


Fig. 2. *Trichorhina giannellii* Arcangeli.

A. Dorsal view. B. Head. C. Antenna.

lateral lobes, which are confluent with the frontal margin, are prominent, rounded, but less advanced than the median lobe. The true frontal margin of the head is deflected downward and forward and is best seen in a ventral view (as in Fig. 2B), where it appears as a very wide V with the apex downward and the lateral extremities confluent with the frontal lateral lobes. The mesepistome is wide, with about eight longitudinal ridges, of which the median pair is the strongest. The eye, situated slightly behind and about midway of the frontolateral lobe, is small, and is composed of four to six extremely small ocelli which appear as one large ocellus. The external antennae, when extended, reach slightly beyond the posterior border of the first thoracic segment (see Fig. 2C). The second article of the peduncle has a distinct blunt tubercle on its outer side near the base; the fifth article is the longest of the

peduncular articles and is about equal in length to the flagellum, which is composed of two articles, the distal one being about three times as long as the basal, and very tapered. The entire antenna, but especially the flagellum, is covered with fine hairs similar to those on the body.

THORAX.—The thoracic segments have the respective lengths shown in figure 2 A; the epimeral margins of these segments form straight lines; the anterior angle of the first segment reaches to the base of the frontolateral lobes of the head. The posterior angle of the first to third thoracic segments is rounded; in the fourth to seventh segments, respectively, it becomes increasingly acute, corresponding to the curvature of the posterior margin of these segments.

ABDOMEN.—The first and second abdominal segments are short and have the lateral margins concealed; the third, fourth, and fifth segments are longer and have the postlateral angles acute. The telson is in the form of a short wide triangle with the sides nearly straight, the apex obtuse, blunted, about in line with the posterior margin of the peduncle of the uropoda. There is a slight concavity on the dorsal surface near the apex of the telson. The uropod peduncle is thick, truncated distally, not quite so long as the tapered exopodites. The endopodites are also tapered, about one-half as long as the exopodites.

The first pair of male pleopoda have the exopodite subovoidal, with a decided curvature posteriorly; the endopodites are not divergent. None have tracheae. The female brood pouch is very capacious. One female of average size is carrying a number of embryos, those visible through the pouch numbering four and each of a body width about equal to the length of a thoracic segment of the mother. These embryos are well-developed isopods with the segmentation of the body clearly distinct.

The entire dorsal surface of the isopod is clothed with short, posteriorly curved clavate hairs, beneath which there are numerous low irregularly spaced tubercles. On some specimens these tubercles are almost obsolete.

TYPE.—Dr. Arcangeli's type material was collected in Cuba at Guayabal, Santiago de los Vegas; Ruspoli; Guaro, Puerto Boniato, Santiago; El Cobre, in 1928; and is probably deposited in Naples, Italy.

MATERIAL EXAMINED.—Ten specimens, including both sexes and one female with young, collected at Cojimer, Cuba, May 5, 1931, by Dr. C. G. Aguayo. Five of these specimens are deposited in The American Museum of Natural History and five are deposited in the Poey Museum.

### PORCELLIONIDES Miers

#### *Porcellionides bermudezi*, new species

##### Figure 3

HEAD.—Head about twice as wide as long, with the frontal margin forming a broad median lobe whose anterior face is flattish and directed obliquely downward; deepest in the median area and narrowing toward the sides; abruptly bordered above by the frontal line which appears in an anterior view as an arc, the ends of which are confluent with the frontolateral margins, but from the dorsal view appears as a straight line. The frontal side lobes are of the shape figured and are not so prominent as in *P. minutissimus*. The eye is moderately large, subelliptical, composed of eight to ten ocelli. The external antennae are well developed, of moderate thickness, with numerous very fine tractile hairs; when extended, the antennae reach about to the hinder



margin of the second thoracic segment. The two-jointed flagellum has the distal article tapered, approximately one and one-half times as long as the other article.

**THORAX.**—The thoracic segments have the proportions shown in figure 3A, with the epimeral margins of the first segment slightly produced at the anterolateral angle and slightly rounded at the postlateral angle; the second, third, and fourth segments are similarly rounded at the postlateral angle; while the fifth to seventh thoracic segments are increasingly acute. The effect formed by the lateral epimeral margins is nearly that of a straight line.

**ABDOMEN.**—The first abdominal segment is entirely concealed, and the second has its lateral parts concealed; the third, fourth, and fifth segments, which slightly decrease in length posteriorly, each have the postlateral angles free and acutely produced. The telson is in the form of a wide, short triangle, the lateral margins of which are slightly concave, and the apex acute, extending only a trifle beyond the distal margin of the peduncle of the uropoda. This peduncle is short and stout. The

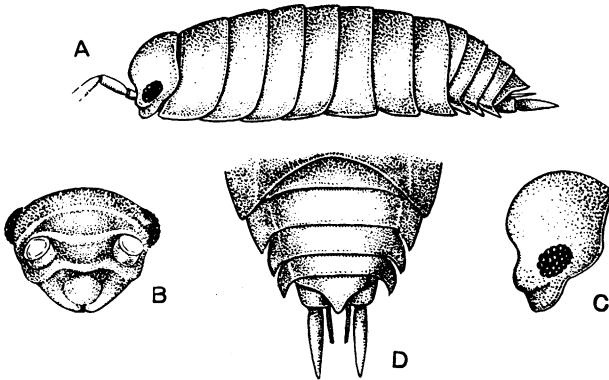


Fig. 3. *Porcellionides bermudezi*, new species.

A. Lateral view of type. B. Head, front view. C. Head, lateral view. D. Abdomen.

inner branch is slender and attached at the inner ventral angle of the peduncle. It is only half as long as the outer branch, which is quite wide and tapered distally.

The legs are well developed, rather slender, with small curved dactyli.

**TYPE AND HOLOTYPE.**—The pleopoda of the female type afford no diagnostic characters. Length of type about 2.5 mm. The holotype is 2.8 mm. long and 1.5 mm. wide.

**MATERIAL EXAMINED.**—The holotype, Cat. No. 6602, A. M. N. H., was collected at Rincon de Guanelo, Cuba, July 5, 1931, by Dr. C. G. Aguayo. I take pleasure in dedicating it to Dr. P. J. Bermudez.

*Porcellionides bermudezi*, new species, is closely related to *P. minutissimus* (Boone),<sup>1</sup> a cave-dwelling species from Hunt's Cave, New Providence, Bahamas, but is unquestionably distinct therefrom. In *P. bermudezi* the head is wider, with more rounded lobes, while in *minutis-*

<sup>1</sup>*Philoscia minutissima* Boone, 1918, Proc. U. S. Nat. Mus., LIV, p. 601, Pl. xcii, fig. 2.

*simus* the lobes appear somewhat angular when seen from above. The frontal line in *bermudezi* is less well marked, especially in the median region. The antennae of *bermudezi* have the terminal article one and one-half times as long as the proximal; the eyes are somewhat larger and better pigmented in *bermudezi* than in *minutissimus*.

### PSEUDARMADILLO de Saussure

#### *Pseudarmadillo carinulatus* de Saussure

##### Figure 4

*Pseudarmadillo carinulatus* DE SAUSSURE, 1857, *Revue et Magasin de Zoologie*, (2) IX, p. 308; 1858, *Mém. de la Soc. de Physique et d'Hist. Nat. de Genève*, XIV, part 2, p. 483, Pl. v, figs. 43, 43a; BUDDE-LUND, 1885, 'Crust. Isop. Terrestria,' pp. 41, 42; RICHARDSON, 1901, *Proc. U. S. Nat. Mus.*, XXIII, p. 572; 1905, *Bull. 54*, U. S. Nat. Mus., p. 660, Fig. 702.

Body strongly vaulted, about twice as long as wide, surface finely reticulated, regularly and minutely setigerous, sparsely and indistinctly tuberculate.

COLOR.—The living specimens have the head and first three thoracic segments creamy yellowish, irregularly and sparsely mottled with brownish. The fourth, fifth, sixth, and a greater part of the seventh segment are entirely conspicuously brownish black. The abdominal region is more mottled with brownish black in the median area and creamy yellow on the lateral parts.

HEAD.—The frontal margin of the head is produced into thin lobes (the central one being the largest), broad, shallow, truncate. The smaller lateral lobes are broadly rounded. The posterior region of the head is bulging, prominent, ornamented by a series of paired tubercles, one small one just on each side of the median line, followed by a similar larger tubercle which in turn is followed by a trilobed larger, more elongate tubercle, which extends almost to the eye. The anterior part of the head is moderately areolated.

The eye is oval, composed of several distinct, hemispherical ocelli, situated close to the lateral margin of the head. The first pair of antennae is inconspicuous; the second pair has the basal joint short, wider than long distally, bulbous; the second joint small, constricted distally, triangulate; the third joint is about one and one-half times as long as the first two taken together and is cylindrical, broader distally; the fourth and fifth joints are subequal, each about three-fourths as long as the third; the sixth joint is one and one-half times as long as the fifth and is laterally compressed distally; the flagellum is biarticulate, two-thirds as long as the sixth segment; the distal joint is three times as long as the basal and is finely setigerous and tipped distally with a bunch of long fine sensory hairs. In life the second pair of antennae is tinged with a delicate shade of rose, and is strongly geniculate, fitting within the grooved excavation of the ventral frontal margin of the head and the coxal depression of the first thoracic segment and reaching about one-fourth the length of the latter.

THORAX.—The first thoracic segment is one and one-half times as long in the median area as the head and has the anterior region strongly convex, bulging, the lateral parts are produced backward in moderate rounded expansions; the lateral marginal area is elevated in such a way as to form a concave surface. The second, third, and fourth segments are similar and subequal and have the lateral parts slightly



flaring and terminating laterally in wide, bluntly rounded processes. These latter are wider; the fifth and sixth segments are similar and subequal, each being about as long as the fourth and having the lateral margins relatively straight. The seventh segment is a trifle longer in the median area than the sixth segment and has the posterior margin sinuate and the lateral margins relatively straight. There are two small, blunt, conical tubercles, one on either side of the median line, separated from each other by a distance not quite equal to the width of one of the tubercles. These tubercles are smaller, placed much closer together, and not so conspicuously produced as those of the seventh segment of *P. dollfusi*.

**ABDOMEN.**—The abdomen has the lateral parts of the first and second segments concealed; the third, fourth, and fifth segments are subequal, have their lateral

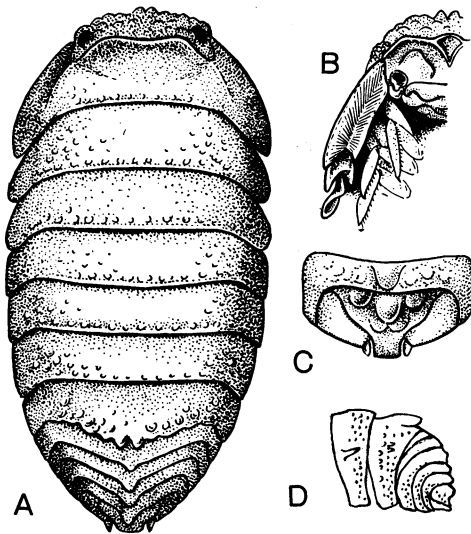


Fig. 4. *Pseudarmadillo carinulatus* de Saussure.

A. Dorsal view. B. Ventral view showing the coxopodites. C. Dorsal view of telson and uropoda. D. Lateral view of last thoracic segment of abdomen of de Saussure's type.

margins closely appressed, relatively straight, continuing the oval contour of the body; the sixth segment is triangulate with the apex produced in a truncate extremity. The posterior area is constricted above the margin and bent rimlike. The lateral margins are decidedly sinuate, differing from those of *P. dollfusi*. The abdomen is produced roof-like along the median line, the third, fourth, fifth, and sixth segments each being produced into a conspicuous spine in this median line; the spine on the third segment is compressed laterally, low, indistinct anteriorly, its apex being over the posterior margin of the segment; the spine on the fourth segment is laterally compressed, broadly rounded, decidedly larger than that of the third; the spine on the fifth segment is about equal to that on the fourth; the spine on the sixth segment is slightly lower than that of the fifth, but is also laterally compressed and broadly rounded. Posteriorly this tubercle is channeled by a shallow sinus giving the aspect

of two little tubercles. Close examination, however, proves it to be sculpturing of the major tubercle, in this respect differing from that of *P. dollfusi*. The ventral plates of the uropoda have their outer lateral margins sinuate, also extending beyond the inner branches of the uropoda. The ventral plates of the fifth segment are broad at their outer end; the ventral plates of the fourth abdominal segment are narrowed distally and bent; the ventral plates of the third abdominal segment are weaker than those of the fourth segment.

The uropoda have the basal joint subtriangulate, lying close to the terminal segment, continuing the oval outline of the body, entirely filling the space, and reaching almost to the extremity of the terminal abdominal segment. The outer branch is very minute and is inserted at the inner postlateral angle of the peduncle. It does not reach beyond the margin of the telson. The inner branch is visible only from the ventral surface. It is inserted at the upper inner angle of the peduncle and extends not quite to the extremity of the terminal abdominal segment. The inner branches have their inner lateral margins interlocking and produced to a ridge. The pair forms an acute triangle which is entirely surrounded by the much larger produced ventral plates of the peduncle.

The coxopodite of the first thoracic segment is a raised ridge extending the entire length of the segment. The coxopodite of segment two is a conspicuous tooth directed almost straight backward. There is a distinct tooth on the inner ventral surface of the lateral part of the seventh thoracic segment.

The seven pairs of legs are normal and are finely setigerous along the ventral margin of the last three joints.

**MATERIAL EXAMINED.**—Four specimens, Cat. No. 6612, American Museum of Natural History, were collected under a stone near the hydro-electric plant at Guaso, Guantanamo, Cuba, February 17, 1921, by Dr. Charles T. Ramsden, who kindly gave them to me. Ten additional specimens from the same place are in Dr. Ramsden's private collection.

The specimens appear to be the true *P. carinulatus* de Saussure, originally described from "Mexico or Cuba." The slight differences existing between my material and the description of the type do not justify specific rank. The figured ornamentation of the last thoracic segment of de Saussure's type shows the two large tubercles, "triquè-tres," not projecting beyond the posterior margin of the segment; but this may be due to the artist's rather primitive drawing. In my specimens, these teeth do project beyond the margin of the segment bearing them.

I am indebted to M. J. Carl, Assistant Director of the Geneva Muséum d'Histoire Naturelle, for the following observations on de Saussure's type, which is deposited in that museum, and also for the careful sketch of figure 4D.

In regard to your letter of September 17, I searched for the type of *P. carinulatus* Saussure. It is a dry preserved specimen, glued in a box, in bad condition, the body heavily coated with glue. Here is what one can distinguish; the sculpture is weaker than in your specimen [*P. welchi* Boone]. The two tubercles of the last thoracic seg-

ment are much smaller; seen from directly above or from the side, they reach the edge of the segment without distinctly passing beyond; they are not detached from the segment except at the extreme end, which is very blunt. Between the two "triquètres," there is no median tubercle.

The question of eyes is difficult to determine. There is not a bit of pigment, but in its place a knob bearing three or four convex and shining facets which could well be eyes.

The under side of the abdomen is partly hidden, partly destroyed. The uropods correspond to the description given by de Saussure. I see nothing here which resembles the figure, very odd, which Richardson gives of it for *P. gillianus*. I do not make out a row of round plates on the sides. This specimen does not seem to me to be very closely related to *gillianus*, in any case.

I am enclosing a sketch of the last two thoracic segments and of the abdomen, which may be of some use to you.

### ***Pseudarmadillo welchi*, new species**

Figures 5 and 8D, E, F

Body strongly vaulted, scarcely twice as long as wide, densely tuberculate, minutely setigerous.

HEAD.—Head with frontal margin produced into three lobes, the central one being slightly the largest, broadly rounded; the lateral lobes are also rounded. The posterior half of the head is bulging, prominent, overhanging the anterior portion. This prominent area is rendered more conspicuous by a series of rugose tuberculations consisting of paired rounded tubercles, one just on each side of the median line, followed by the most prominent triangulate tubercle, which is about twice as large as the first one, and is followed in turn by two much less prominent, lower, diagonally placed ridges. A few low, inconspicuous tubercles occur in the anterior region of the head. The second pair of antennae has the basal joint minute, the second joint three times as long as the first, the third about two-thirds the length of the second, the fourth about equal to the third, the fifth one and one-half times as long as the distal joint, which is tapering and finely setigerous.

THORAX.—The first thoracic segment is nearly twice as long in the median area as the head and has the median, anterior region strongly convex, bulging; the entire segment is densely tuberculate, except the lateral parts which are finely granular and produced backward in rounded expansions. The second, third, and fourth segments are subequal and have the lateral parts very slightly flaring and terminating laterally in rounded processes. The fifth and sixth segments are each slightly longer than the fourth and have the lateral margins relatively straight. The seventh segment is longer than the sixth and is greatly produced in the median area into paired long, acute, roof-ridged, toothlike processes which extend posteriorly nearly as far as the spine on the telson. These processes are separated from each other at the base by a small narrow U-shaped excavation; and about one-third the distance from the base there is a small blunt dentation on the inner margin of the major process. There is one tubercle on either side of each segment on the posterior margin, about halfway between the median line and the lateral margin, which is about twice as large as the surrounding tubercles. The tubercle on the first segment is larger than any of the others. The seventh segment, however, has three such tubercles on either side which are much closer together, the posterior pair being adjacent to the base of the

terminal processes of the seventh segment. A second similar line of tubercles, one on each segment, is midway between the first row of tubercles and the lateral margin; of these the first is the most prominent, although only slightly larger than the other body tubercles. The coxopodite of the first thoracic segment is a raised ridge extending the length of the segment and with its postlateral margin bent, flaring inward and bifurcate. Coxopodite two is a conspicuous tooth with the distal end evenly rounded. It is similar to and about half the size of the lateral marginal area of its segment and is directed diagonally backward.

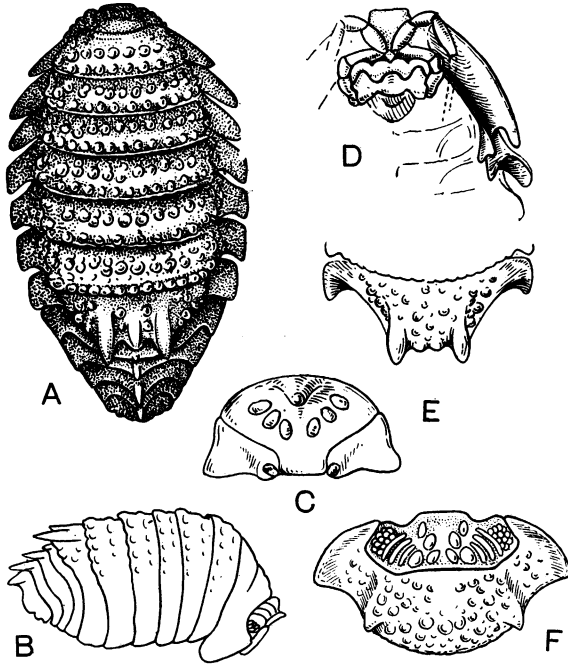


Fig. 5. *Pseudarmadillo welchi*, new species.

A. Dorsal view of type. B. Lateral view of same. C. Dorsal view of telson and uropoda. D. Ventral view of head showing antennae and coxopodites of the first and second thoracic segments. E. Last thoracic segment of a different specimen showing the variation in arrangement of teeth. F. Head and first thoracic segment from above. (See also Fig 8D, E, F.)

The seven pairs of legs are finely setose along the ventral margin of the distal three joints.

**ABDOMEN.**—The first and second abdominal segments have their lateral parts entirely concealed, and even their median part is overarched and hidden by the processes of the seventh thoracic segment, only a linear area of the posterior margin of the second segment being visible. The third, fourth, and fifth segments are subequal and have their lateral margins closely appressed, relatively straight, continuing the oval contour of the body. The sixth segment is trapezoidal with the anterior margin broad, roundly flaring, the lateral margins sinuate and the posterior margin very

narrow and truncate. The marginal area is constricted just below the paired tubercles and bent, rimlike. The abdomen is produced, roof-like along the median line, the third, fourth, fifth, and sixth segments each being produced into a conspicuous spine in this median line; the spine on the third segment is sharp, conic, compressed laterally and is the smallest of the series; the spine on the fourth segment is similar to the third, but one and one-half times as large; the spine on the fifth segment is similar to the fourth, but is larger, being the largest in the abdominal series, or three-fourths as long as the major process on the seventh thoracic segment. However, the thoracic process is directed straight back, whereas the abdominal spine points straight up. The median spine on the sixth abdominal segment is about as broad as that of the fifth, but only half as high, or about the height of the third and not so tapering, being evenly rounded at the apex. Posterior to this are two smaller tubercles one on either side of the median line. The ventral margins of the fourth and fifth abdominal segments form distinctively shaped plates, the fifth plate especially having its inner third decidedly bent.

The uropoda have the basal joint subtriangulate, lying close to the telson, continuing the oval outline of the body, entirely filling this space and reaching almost to the extremity of the telson. The outer branch is very minute and is inserted at the inner postlateral angle of the peduncle. It does not reach beyond the margin of the telson. The inner branch is visible only from the ventral surface; it is inserted at the upper inner angle of the peduncle and extends not quite to the extremity of the telson. The inner branches have their inner lateral margins meeting and slightly thickened. The pair form an acute triangle which is entirely surrounded by the much larger produced ventral plates of the peduncle.

TYPE.—Length of type, 9.5 mm.

MATERIAL EXAMINED.—The holotype, an adult female, was collected at Marti, Camaguay, Cuba, by Señor V. Rodriguez, and presented to me by Dr. Carlos de la Torre of Havana, Cuba. It is deposited in The American Museum of Natural History, Cat. No. 6623.

Ten additional specimens of this species were collected at Media, Caenito, Cuba, August 19, 1928, by Mr. D. A. Welch, for whom I name the species.

Six of Mr. Welch's series show the seventh abdominal segment like the type with one small median tooth between the larger paired triangular processes. The other four specimens of this series show a striking variation in having on the seventh thoracic segment two small median teeth, between the two larger triangulate processes (Fig. 8F), and also in having on each side an upper lateral line of spinelike tubercles, formed by the elongation of a tubercle on each thoracic segment.

Six specimens, collected at San Antonio de los Baños, Havana, Province, Cuba, by Dr. P. J. Bermudez, four deposited in the Poey Museum, one in the American Museum. One specimen, collected at Camoa, Cuba, by Dr. C. G. Aguayo, deposited in the Poey Museum.

Seven specimens, collected at Sierra de Anafe, Cuba, by Doctors Aguayo and Bermudez, all of which show the tubercles of the median lateral line on the thoracic segments enlarged, some tending to form small spines. Four deposited in the Poey Museum; three in the American Museum. Seventeen specimens collected in crevices of calcareous rock, Sierra de Caraballo, Santa Clara Province, Cuba, September 23, 1931, by Dr. P. J. Bermudez: four deposited in the American Museum, ten in the Poey Museum, three in the Boone collection. Five specimens collected at La Puntilla,



Remedios, Santa Clara Province, Cuba, October 25, 1931, by Dr. Bermudez. These twenty-two specimens from Santa Clara Province are especially interesting in that they are freshly collected specimens in excellent condition that show various growth stages. The smallest specimens are quite as highly ornamented as the largest. Variation in the degree of tuberculation is found as frequently in small as in much larger adults. All twenty-two specimens consistently show the paired triangulate processes of the seventh thoracic segment well developed but devoid of the smaller denticle between the pair, such as occurs in the specimens from Camaguey and Caenito. In one of the Santa Clara specimens, the paired median processes of the seventh thoracic segment are unusually long and pointed.

*Pseudarmadillo welchi* may be distinguished at once from its allies by the unique roof-ridged, dentated processes on the seventh thoracic segment and by the long spines on the abdomen.

### *Pseudarmadillo gillianus* Richardson

#### Figure 6

*Pseudarmadillo gillianus* RICHARDSON, 1902, Proc. U. S. Nat. Mus., XXV, pp. 509-11; 1905, Bull. 54, U. S. Nat. Mus., p. 655, Figs. 696-698.

Body strongly vaulted, a little more than twice as long as wide in large specimens; about three-fifths as wide as long in small specimens; the epimeral region bent distinctly outward. Surface of body definitely tuberculate, with a transverse row of four spines on the head and a median lateral row of seven long spines, one on each thoracic segment; a median dorsal line of four unequal teeth on the fourth to sixth thoracic segments.

**HEAD.**—Head with the frontal margin produced into three lobes, the median one being the largest, broadly rounded, as are also the lateral lobes. The posterior region of the head is bulging, a transverse row of four tubercles forming a crestlike elevation, the submedian pair being less prominent than the outer pair. A series of three or four lesser tubercles occurs between these and the eye, one being just above the latter. A few more low inconspicuous tubercles occur in the median anterior region of the latter. The articles of the external antennae are figured (Fig. 6B).

**THORAX.**—The first thoracic segment is convex in the median region and nearly twice as long as the head. It has the lateral parts narrowed, slightly flaring and terminating in a rounded process. The fifth and sixth segments are successively slightly longer than the fourth with the lateral margins relatively straight.

There is a median lateral row of long acute spines, one on each thoracic segment on either side. These spines are long, conical, acute, posteriorly directed, but of distinctly variable lengths. In some specimens the spines attain a length nearly equal to that of the related segment. In others they resemble a blunted coarse nodule.

There are also many coarse tubercles scattered irregularly but abundantly over the surface of all the thoracic segments but frequently tending to form a line along the posterior margin of the segment. The seventh segment is one-third longer in the median line than the sixth, being produced posteriorly in the median region into a pair of long acute spines which extend posteriorly nearly as far as the telson and which are separated from each other by a wide U-shaped sinus.

The coxopodite of the first thoracic segment is an elevated ridge extending the entire length of the segment and terminating posteriorly in an inbent bifurcate process

which is not so long as the rounded postlateral angle of the segment. The coxal process is usually bifurcate in large specimens, but there are also a number of well-developed smaller specimens before me in which this process is not bifurcate. Coxopodite two is directed diagonally backward and consists of a conspicuous tooth rounded distally and of about half the size of the postlateral margin of its related segment.

The seven pairs of legs are slender, with small acute dactyli and with bristly setae along the ventral margins of the ischial, carpal, and propodal joints.

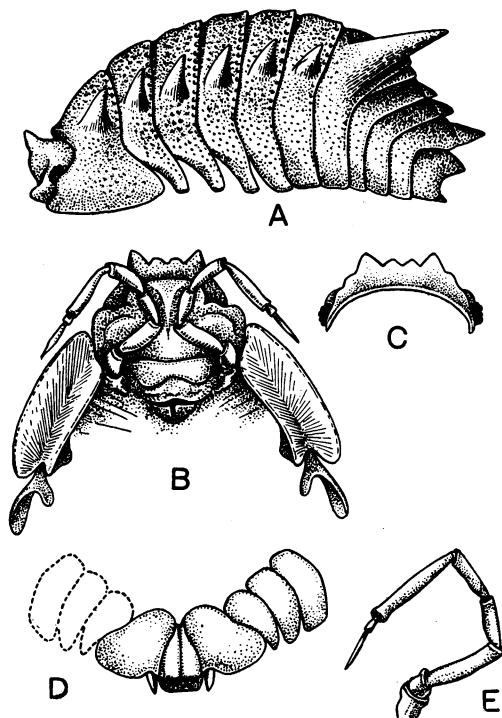


Fig. 6. *Pseudarmadillo gillianus* Richardson.

A. Lateral view. B. Ventral view showing coxopodites. C. Rear end of head. D. Ventral view of abdomen showing uropoda and ventral abdominal plates. E. Antenna.

**ABDOMEN.**—The abdomen has the first and second segments with the lateral parts entirely concealed, and in a dorsal view even the median region of these segments is hidden by the overarching processes of the seventh thoracic segments. The third, fourth, and fifth segments are subequal with the lateral margins truncated and closely appressed; the telson is trapezoidal with the anterior margin broad, rounded, the posterior margin quite narrow and truncated, the lateral margins sinuate. The posterior marginal area is constricted and then bent, rimlike. The third, fourth, fifth, and sixth abdominal segments are each produced into a laterally compressed spine situated in the median dorsal line, the spine of the third segment being the smallest

of the series, the fourth spine triangulate, usually about half as high as the more acute fifth which is decidedly the longest of the series; the sixth spine is equal to or a trifle larger than the fourth. Below this sixth spine there is a pair of low submedian tubercles. The ventral margins of the fourth and fifth segments form distinctively shaped plates, as shown in figure 6D.

The uropoda have the peduncle subtriangulate, closely appressed to the telson and entirely filling the space between the telsonic margin and the fifth segment; the ventral margin of the peduncle is produced into a conspicuous ventral plate, as shown in figure 6D. The outer branch of the uropoda is minute and conical. It is inserted at the inner distal angle of the peduncle and does not reach beyond the telsonic margin. The inner branch is visible only from the ventral surface; it is attached at the upper inner angle of the peduncle and does not quite reach to the telsonic margin. The inner branches have their lateral margins meeting and slightly thickened, the two branches forming an acute triangle with its apex pointing inward.

TYPE.—Doctor Richardson's type was collected in Neuva Gerona, Isla de Pinos, July 10, 1900, by Messrs. Palmer and Riley, and is deposited in the U. S. National Museum, Cat. No. 25694. It was named for Dr. Theodore Gill.

MATERIAL EXAMINED.—In addition to study of this type, I have had an opportunity to examine a single specimen collected near Havana, Cuba, by Dr. Mario Sanchez Roig; also a series of forty-six specimens representing various stages of growth, collected recently in Sierra de Anafe, Pinar del Rio, Cuba, by Dr. P. J. Bermudez and Dr. C. G. Aguayo; and six specimens collected in Sitio Perdido Jaruca, Havana, Cuba, July 16, 1930, by Dr. Bermudez; also two specimens from Los Chambas, Cuba. These specimens are to be found in the American Museum and the Poey Museum, respectively. I have also seen one specimen collected in the Sierra de Cubitas Mts., San Francisco, Camaguey, Cuba, by Dr. de la Torre.

### ***Pseudarmadillo buscki*, new species**

#### Figure 7

Body deeply vaulted, so highly ornamented with long and short bladelike spines set in longitudinal series that it resembles in miniature some ancient armored creature.

HEAD.—Head with the frontal margin trisinuate, the median lobe slightly elevated in the center; each outer lobe laminate, broadly and bluntly rounded; the lateral margins of the head are nearly straight and are surrounded by the first thoracic segment; the head is approximately twice as wide as long with the hind margin straight. The eye is small, convex, black, composed of about eight ocelli, situated midway of the lateral margin and shielded on the front by the laminate outer lobe of the frontal margin. The region just above the eye is coarsely tuberculate. The median part of the head behind the laminate frontal margin slopes upward and, just anterior to the posterior margin of the head, is produced into a pair of curious, laminate, lanceolate, acuminate processes, directed upward, with the tips curved outward and backward; at the base on the outer side of each process and above the eye are two small, spinose tubercles.

The epistome bears paired grooved excavations for the reception of the antennae; it has the shape and sculpturing indicated in figure 7B. The clypeus is shaped as figured (Fig. 7B).

The antennae have the articles developed in the ratio shown in figure G. When retracted, the proximal articles lie within the groove excavated on the epistome.

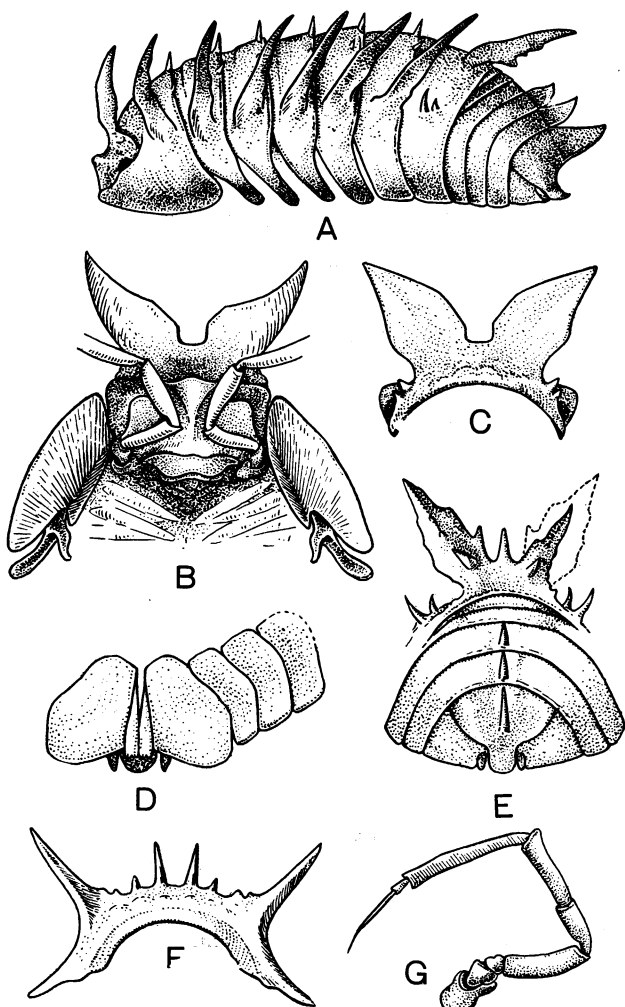


Fig. 7. *Pseudarmadillo buscki*, new species, type.

A. Lateral view. B. Ventral view of head and first and second thoracic segments showing coxopodites. C. Dorsal-rear view of head. D. Ventral view of four rear abdominal segments, showing their ventral plates, also showing ventral aspect of uropoda. E. Rear view of last thoracic segment and abdomen. F. Third thoracic segment. G. Antenna.

**THORAX.**—The first segment is a little longer in the median line than the second segment and has each lateral region produced into a winglike expansion that anteriorly surrounds the lateral margin of the head, the anterolateral margin being subacute, the lateral margin evenly convex, and the postlateral angle widely rounded. The second, third, fourth, and fifth segments are approximately subequal in length; the epimera of the second, third, and fourth segments are extremely narrowed on their outer portion and flare outward and backward, with their respective lateral margins very narrow and rounded; the epimera of the fifth segment is very similar to that of the fourth but very slightly wider; the epimera of the sixth and seventh segments are each wider, approximately subequal, and truncated on their lateral margins.

The first thoracic segment has the coxopodite as illustrated; the epimeral margin of the segment widened into a laminate, winglike expansion; the coxopodite extending the full length of the inner part of this epimeral expansion and separated therefrom by a groove. The coxopodite of the second segment is a well-developed tooth, subacute distally, and coordinating with the adjacent third segment. On the fifth segment there is a small, distinct, coxal tooth.

Each of the second to seventh thoracic segments has approximately the anterior half of its dorsal surface smooth and on a slightly lower plane than the related posterior half, which is a little higher and which is ornamented near its posterior margin as follows: a submedian pair of acute, conical, upwardly directed long spines, outside of which there is another pair of similar spines which are not quite half so tall as the submedian spines; beyond these occur a third pair of short spines similar to the second pair, but not quite so tall; this third pair of spines, on one or two segments, is scarcely more than a spinose tubercle; just outside the third pair, along the lateral lines, there arises on each side a single long, sabre-bladelike process, which basally is about as wide as the elevated posterior portion of each segment and which is strongly compressed laterally, forming a flat blade; the process is long, directed upward, outward and backward, its anterior margin convex, its posterior margin slightly concave, the tip very acuminate. On the first segment, this process is wider and very similar in size and shape to the processes on the head; on the second, third, fourth, fifth, and sixth segments, the processes are narrower abruptly above the base and more acuminate, also distinctly longer; the third, fourth, and fifth processes being subequal; the process of the sixth segment is a trifle longer than that of the fifth segment.

The seventh thoracic segment, as stated above, has its epimera truncated; the segment is unusually produced in the median region, and prolonged into a remarkable long forked process, directed backward and slightly upward; each blade or fork is about two-fifths longer than the bladelike, three-sided acuminate process of the sixth segment, and is produced on the dorsal surface into a long, acuminate triangle that bears near the base of its inner margin a small denticle and, opposite this on the outer margin, a slightly larger tooth. On the ventral margin of the process there are two small teeth near the base. The long ones extend substantially beyond the distal margin of the abdomen. On the sixth segment anterior to the base of this long, curious process, there is also a submedian pair of upward pointing spines in line with, but shorter than, the similar pair of spines on the preceding segment. The sixth segment also has in line with the outer lateral process of the preceding segment, a short, broad, upward and outward pointing, flattened, acute triangulate process, and immediately behind it, a similar smaller spinose triangle which is very near the extreme base of the outer side of the long hinder process.



**ABDOMEN.**—The first and second segments are short and have the lateral parts entirely concealed; the third segment is one and one-half times as long as the second and does not bear a median tooth. The fourth and fifth segments are subequal, each a trifle longer than the preceding segment and are each produced in the median line into a conspicuous, laterally compressed, laminate tooth which basally is as wide as the related segment is long, and has its lateral margins very slightly convex, its apex acute; this tooth on the fourth segment is about as high as its basal width and is directed upward; on the fifth segment the tooth is similar to that of the fourth but a trifle longer and more acute; the sixth segment is substantially longer than the fifth and bears a median tooth which is one-third wider proximally and one and six-tenths times as high, with its anterior margin sloping (not convex) to the apex, its posterior margin slightly concave just below the apex, then moderately convex to the base where it is slightly constricted. The narrowed portion of the telson lies below and behind the tooth. It is about as long as the base of the tooth, bent outward posteriorly. The postlateral margins of the telson are very slightly sinuate; the distal margin is convex, very narrow, one-half as wide as the outer margin of the uropod peduncle and separated from it by a small sinus. Except for this sinus the peduncle of the uropod completely fills the space between the telson and the preceding segment, having its anterior margin about as long as its hind margin, which is truncated, as are the epimeral margins of the third, fourth, and fifth abdominal segments. The outer article of the uropoda is conical, conspicuous, attached to the posterior angle of the peduncle, directed obliquely backward as far as the telsonic margin, but separated from the telson by a sinus. The inner blades of the uropoda are long slender clublike processes, tapered proximally, rounded bluntly distally, each arising from the inner lateral angle of the broad, platelike ventral process of the peduncle and projecting distally beyond the margin of the plate beneath the telson but not so far as the distal telsonic margin. The entire ventral margin of the uropod peduncle is produced into a ventral plate that projects about as far inward as its basal width and has its antero-lateral and posterior margins convex. The inner lateral margins are slightly excavate for the inner articles of the uropoda. The epimeral margins of the fifth, fourth, and third abdominal segments are similarly produced into elongated narrower, ventral plates, which reach as far inward as does the uropod plate. The plate of the third segment is less developed distally than that of the fourth segment.

**TYPE.**—Length of type, about 10.2 mm.

**MATERIAL EXAMINED.**—The type and another specimen were collected by Mr. D. A. Welch in the Mercedes Valley, Caenito, Cuba, August, 1928. They are deposited in The American Museum of Natural History, Cat. No. 6615. The species is named in honor of Dr. August Busck, to whom I am inexpressibly indebted for much help in my earlier scientific work.

#### **DELATORREIA, new genus**

Body high, deep-vaulted, convex; epimeral margins very little convex on the second, third, and fourth segments, straight on the fifth, sixth, and seventh segments. Coxopodites present on the underside of all seven segments; the coxopodites of the first and second segments being much more prominent than the others and with their margins posteriorly cleft.

**HEAD.**—Frontal margin of head produced in three lobes: a median and two lateral.

Second antennae with the flagellum consisting of two articles, the second article twice or more than twice as long as the first.

THORAX.—Seventh thoracic segment produced into a greatly elongated and thickened bulbous process that overarches and projects considerably beyond the abdomen.

ABDOMEN.—Telson an approximate triangle with truncated apex, which is about one-third as wide as the anterior margin of segment. Uropoda with the peduncle large, in the form of a narrow triangle whose posterior margin is straight, substantially wider than the posterior telsonic margin and at right angles with its own anterolateral margin. This uropod peduncle is produced along its entire posterior margin into a broad ventral plate that projects inward for a distance greater than its outer marginal width. The inner ventral angles of these plates meet above the attachment of the inner branches of the uropod. The outer branch of the uropoda is minute, articulated at the inner posterior angle of the peduncle and visible both dorsally and ventrally. The inner branch is much larger but is only visible ventrally; it is attached at the upper inner ventral angle of the peduncle and is long and narrow, wider posteriorly. These inner branches lie side by side with their inner lateral margins touching. Their outer lateral margins are surrounded by the broad ventral plates of the peduncle.

The fifth, fourth, and third abdominal segments are also produced from their respective epimeral margins inward as far as the ventral plates of the uropod peduncle; the plate on the third abdominal segment is smaller than the others.

GENOTYPE.—*Delatorreia hoplites*, new species, collected at Finca La Loma, Sierra de Cubitas, Camaguey, Cuba, by Dr. Carlos de la Torre.

### ***Delatorreia hoplites*, new species**

Figures 8A, B, C, and 9

Body deeply vaulted, convex, considerably wider anteriorly than posteriorly, seventh thoracic segment greatly produced into a thickened bulbous process, over-arching, concealing, and extending beyond the abdomen; entire body surface granular.

HEAD.—Head rectangular, heavily areolated, posterior half bulging, frontal margin divided into a median and two lateral lobes; excavate for the antennae; dorsal surface of head deeply pitted in the median center, from which cavity two diagonal grooves or channels proceed, decreasing toward the postlateral angles of the head. A second similar, shorter areolation occurs just above the eye. The eye is situated midway of the lateral margin of the head. It consists of seven prominent, shining black, convex ocelli.

The ventral-frontal margin of the head is as deep as the head is long on the dorsal surface and is deeply grooved for the reception of the geniculate second antennae.

The first antennae arise slightly in advance of the inner basal margin of the second antennae and consist of three subequal articles.

The second antennae are pronouncedly geniculate; their first joint is short, bulbous; the second is minute, triangulate, hingelike; the third joint is about twice as long as the first and second joints considered together, and is cylindrical, broader distally; the fourth and fifth joints are subequal; each about two-thirds as long as the third; the sixth joint is about as long as the fourth and fifth joints taken together, the flagellum is biarticulate, about four-fifths as long as the sixth peduncular joint; the distal joint is two and one-fourth times as long as the basal and is finely setigerous. When retracted, the second pair of antennae fit into the grooved cavity of the frontal

margin of the head; the tip of the sixth peduncular joint and the entire flagellum extend onto the grooved margin of the first thoracic segment, reaching less than one-fourth of its length. When extended, this pair of antennae reaches to the posterior margin of the second thoracic segment. The clypeus is straight, ridged, moderately protruding. The palp of the maxillipeds consists of three articles.

**THORAX.**—The first thoracic segment is about one and three-fourths times as long in the median line as the second segment and has the anterolateral parts greatly produced around the lateral margin of the head; the postlateral thoracic angle is slightly produced. The second, third, fourth, fifth, and sixth segments are subequal;

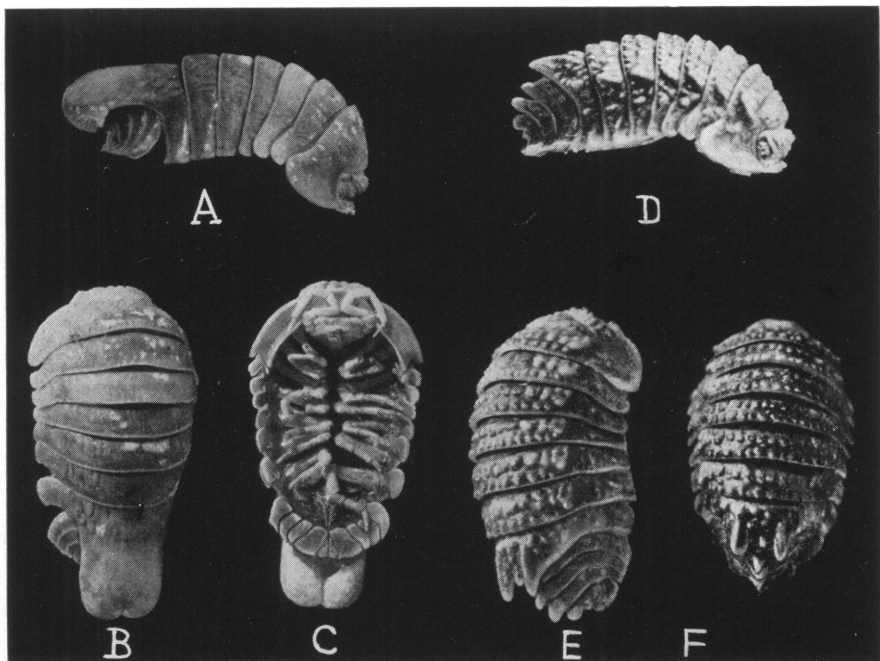


Fig. 8. *Delatorreia hoplites*, new species, type.

A. Lateral view. B. Dorsal view. C. Ventral view.

*Pseudarmadillo welchi*, new species, type.

D. Lateral view. E. Three-quarters dorsal view. F. Dorsal view.

the second, third, and fourth segments have the epimeral margins moderately rounded; the fifth, sixth, and seventh segments have the epimeral margins relatively truncated. The seventh segment is about three times as long in the median line as the sixth, but in the extreme lateral region is not quite so long as the sixth; the median part of the seventh segment is greatly produced into an elongated U-shaped, convex, thickened, bulbous process that overarches and projects considerably beyond the abdomen. This process has its dorsal posterior contour convex, equally bilobate; the entire ventral margin of the process is thickened, convex, curved under, the posterior part

being decidedly granulose. A large cavity exists within the process but becomes visible only upon careful examination of the under side.

The coxal plate of the first segment is equal and parallel to the margin of the segment, from which it is separated by a wide groove. The coxal plate of the second segment is a prominent, rounded, toothlike process, extending not quite so far as the posterior margin of the segment, from which it is separated by a groove-like concavity. The coxal plates are each represented on the third and fourth segments by a small ridgelike dentition almost midway of the anterolateral margin of the respective segments. On the fifth segment this coxal plate is slightly more prominent and a trifle

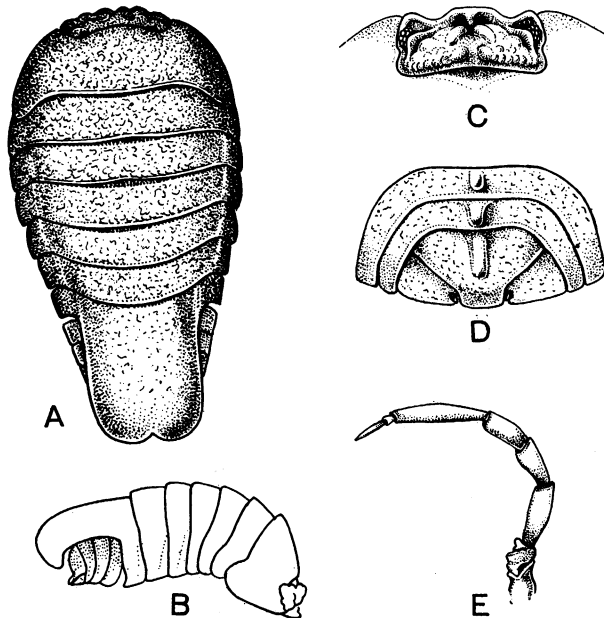


Fig. 9. *Delatorreia hoplites*, new species.

A. Dorsal view. B. Lateral view. C. Dorsal view of head. D. Rear view of abdomen. E. Antenna.

in front of the middle of the segment. The sixth coxal plate is more conspicuous than the fifth and is situated midway of the segment. The seventh coxal plate is a short, sharp, triangular tooth slightly more prominent than the sixth and situated midway of the posterior half of the segment.

The seven pairs of ambulatory legs are similar and subequal, each has the outer ventral margin of the second joint deeply keeled.

**ABDOMEN.**—The first abdominal segment is entirely hidden; the second segment is very short with the lateral parts entirely concealed and the entire dorsal surface overarched by the produced dome of the seventh thoracic segment; the third is the longest abdominal segment, being a trifle longer in the median dorsal area than any of the others, and it has its lateral parts produced, thus continuing the oval contour

of the body; the fourth segment and also the fifth are almost as long as the third. Each is produced in the median dorsal line into a prominent, laterally compressed node or tooth; the lateral margins of these segments continue the oval contour of the body.

The telson is about twice as long as the fifth segment with the anterior median region produced into a laterally compressed node, similar to and in line with those on the two preceding segments. The anterior margin of the telson is convex, the posterior margin straight, about three-fourths as wide as the peduncle of the uropoda; the posterior region of the telson is slightly constricted above the margin.

The uropod peduncle is large, triangulate, and entirely fills the space between the margins of the fifth and sixth abdominal segments, its posterior margin completing the oval contour of the posterior end of the body. The uropod peduncle is produced along its entire posterior margin into a broad ventral plate that projects inward for a distance greater than its outer marginal width, the inner ventral angles of these plates meet above the attachment of the inner branches of the uropod. The outer branches of the uropod are minute, set at the apex of the inner posterior angle of the peduncle, and are visible both dorsally and ventrally. They do not extend beyond the telson; the inner branches are much larger, but are only visible ventrally; they are attached at the upper inner ventral angle of the peduncle and lie side by side, with their posterior part wider than their anterior; their outer lateral margins are surrounded by the broad ventral plates of the peduncle.

The epimeral margins of the fifth and fourth abdominal segments are produced ventrally into elongate plates whose free inner margin is truncate and on a line with the uropod peduncle plates. The ventral plates of the third abdominal segment are smaller and have their inner margin diagonal.

The pleopoda are sexually modified, the first and second pair in the male are provided with stylets; the first and second pleopoda are opercular; the third and fourth pleopoda have the endopod marked by fluted, transverse folds; it is impracticable to diagnose the fifth pleopoda, owing to the dried condition of the specimen.

TYPE.—Length of type, about 10 mm.

MATERIAL EXAMINED.—The type, Cat. No. 6607, American Museum of Natural History, was collected at Finca La Loma, Sierra de Cubitas, Camaguey, Cuba, and given me by Dr. Carlos de la Torre, for whom I name the genus. Another smaller specimen was collected in Sierra de Cubitas, Camaguey, by Dr. P. Bermudez and deposited in the Boone collection, and one very large specimen from the Sierra de Najaza, Camaguey, also collected by Dr. Bermudez, deposited in the Poey Museum, Havana, Cuba.

### CUBARIDAE

#### CUBARIS Brandt

#### *Cubaris ramsdeni*, new species

Figure 10

Body deeply vaulted, decidedly convex, with distinct but not prominent irregular patches of tubercles in the median lateral region of each thoracic segment.

HEAD.—Head with epistoma nearly plain; a distinct blunt elongate tubercle occurs on each side just above the eye near the posterior margin of the head; fore edge almost straight. Eyes oval, consisting of sixteen hemispherical ocelli. Second pair of antennae, if extended, would not reach to the posterior margin of the second



thoracic segment; first joint small; second joint very minute, triangulate; third joint one and one-half times as long as the first two taken together; fourth joint geniculate, two-thirds as long as the third joint; the fifth joint is cylindrical, somewhat longer than the third joint; the sixth joint is about one and one-fourth times as long as the fifth; the flagellum is biarticulate, about as long as the fifth joint of the peduncle; the first joint of the flagellum is about one-third as long as the second joint.

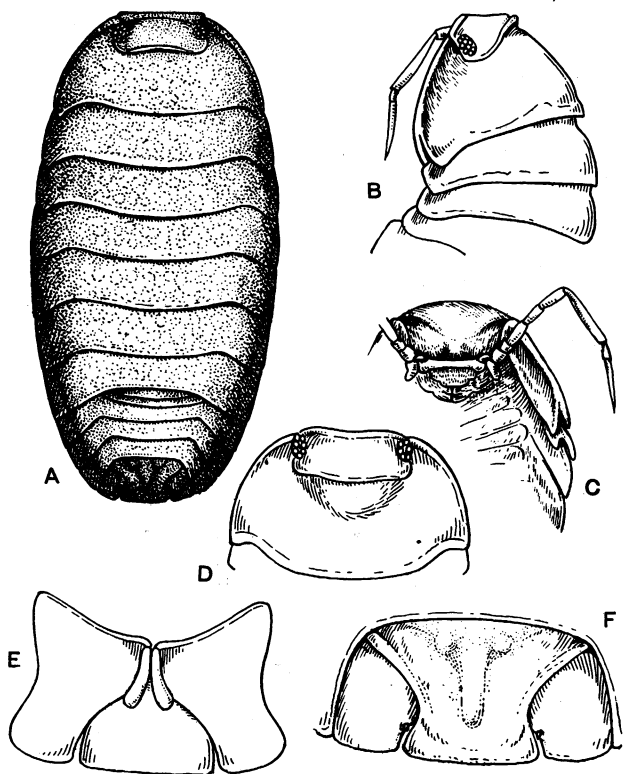


Fig. 10. *Cubaris ramsdeni*, new species.

A. Dorsal view. B. Lateral view of head and first and second thoracic segment showing coxopodites. C. Ventral view of head and first thoracic segment. D. Head and first thoracic segment. E. Telson and uropoda, ventral view. F. Dorsal view of same.

**THORAX.**—The first thoracic segment is one and one-half times as long as the second segment and has the anterolateral parts upturned, forming a thickened border on the upper side of the segment, which border is accentuated by a definite furrow that is wider anteriorly but narrows posteriorly where both the border and the furrow diminish and disappear. On the lower side of the segment the coxopodite is distinct only on the posterior fifth of the border as a small notch with strongly divergent sides. The coxopodite of the second segment is formed by the anterior margin being bent inward and produced into a diverging triangulate process whose free or postlateral

angle is a decided tooth that overlaps the anterior margin of the third segment. The second to seventh segments, inclusive, are similar and subequal; the second, third, and fourth segments are narrow in the lateral region, and have the lateral margins relatively straight; the fifth, sixth, and seventh segments are much wider in the lateral region; and the lateral margins are more nearly straight. The legs are similar and subequal, and have the third, fourth, and fifth joints beset with fine pointed spines along the inner margin.

**ABDOMEN.**—The abdomen has the first segment almost entirely concealed; the second segment has the lateral parts entirely concealed; the third, fourth, and fifth segments are subequal, and the lateral margins are comparatively straight; the sixth segment is exactly twice as wide on the anterior margin as on the posterior and has the sides more decidedly excavated than does *Cubaris vincentis* (Budde-Lund). The uropoda have the peduncle prominent, almost as broad as long, completely filling the space between the fifth and sixth segments; the exopodite is very minute and placed on the inner dorsal edge of the peduncle a little above the posterior margin; the endopodite is attached at the extreme inner lateral angle of the peduncle and projects slightly upon the ventrally exposed surface of the pleotelson.

**TYPE.**—The type is about 10 mm. long.

**MATERIAL EXAMINED.**—The type and nineteen paratypes were collected at "El Ocuaj," Guantanamo, Cuba, October 3, 1913, by Dr. Charles T. Ramsden, for whom I name the species. The type and three of the paratypes were given me by Dr. Ramsden and are deposited in The American Museum of Natural History, Cat. No. 6603, type; Cat. No. 6604, paratypes; the remaining fifteen paratypes are in his private collection in Guantanamo, Cuba.

*Cubaris ramsdeni* is very close to *Cubaris vincentis* (Budde-Lund)<sup>1</sup> from which it is distinguished: (1) by not having "the double antero-median tubercle" on the first thoracic segment; (2) by the decidedly different coxopodite of segment II; (3) by the differently shaped telson and the absence of a triangular tubercle near its base; (4) by the different location of the exopodite of the uropod.

*Cubaris ramsdeni* is also near *Cubaris grenadensis* (Budde-Lund),<sup>2</sup> from which it may be distinguished: (1) by the different and much shorter coxopodite one; (2) by the absence of a "blunt antero-median tubercle" near the base of the telson; (3) by the fact that the anterior margin of the telson of *C. ramsdeni* is twice as wide as its posterior margin while that of *Cubaris grenadensis* (Budde-Lund) is described as, "apex nearly as wide as the basis"; (4) by the fact that the uropod endopodite of *grenadensis* is much longer than that of *ramsdeni*, while the exopodite of *ramsdeni* is placed much nearer the posterior margin than is that of *grenadensis*.

<sup>1</sup>*Armadillo vincentis* Budde-Lund, 1904, 'Revision of Crustacea Isopoda Terrestria with additions and illustrations,' part 3, p. 110, Copenhagen=*Cubaris cincta* (Dollfus) Richardson, 1905, Bull. 54, U. S. Nat. Mus., pp. 647-648, Fig. 690.

<sup>2</sup>*Cubaris grenadensis* (Budde-Lund), Richardson, 1905, Bull. 54, U. S. Nat. Mus., p. 651, Fig. 694.

**Cubaris sanchezi**, new species

## Figure 11C

Body ovate, strongly vaulted, 11 mm. long, 5 mm. wide, surface very minutely tuberculate, with paired median lateral patches on each of the thoracic segments composed of unequal, coarsely irregular tubercles that appear as sinuate ridges. Color (preserved specimen) uniformly grayish with indistinct yellowish blotches in the tuberculated areas.

HEAD.—Head not quite three times so wide as long, somewhat rectangular, with the frontal margin relatively straight and produced into a very narrow border. Eyes small, round, composed of thirteen ocelli and situated in the extreme postlateral angles of the head. The first pair of antennae is rudimentary. The second pair of

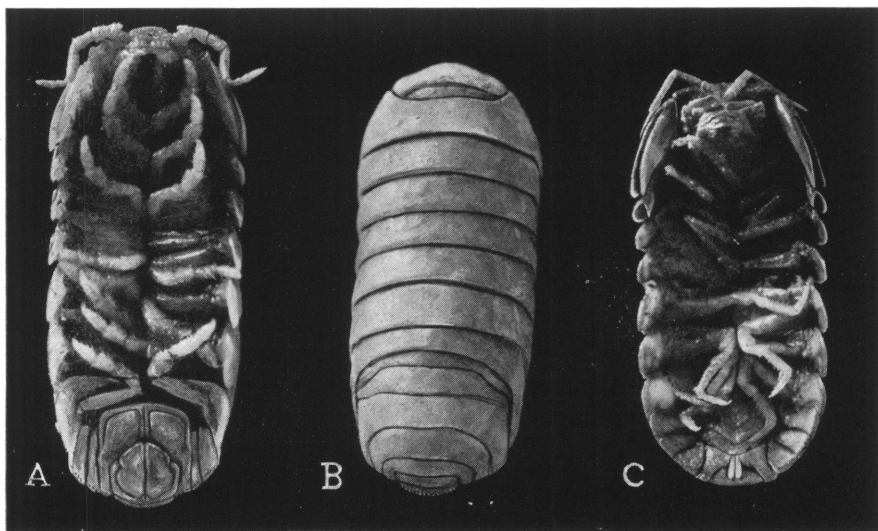


Fig. 11A and B. *Tylos niveus* Budde-Lund, ventral and dorsal views. C. *Cubaris sanchezi*, new species, ventral view.

antennae has the basal article short, stout, the second article a minute, triangulate hinge, the third joint slightly longer than the first two taken together, the fourth joint two-thirds as long as the third, the third and fourth joints together forming a geniculation, the fifth joint slightly longer than the third, the sixth joint as long as the fourth and fifth taken together; the biarticulate flagellum is about as long as the fifth segment, the basal joint being short, while the distal joint is two and one-half times as long as the basal. The head is marked by a pair of diagonal depressions, each of which extends from behind the eye to the middle of the frontal margin, creating the impression of supraocular lobes.

THORAX.—The first thoracic segment is about two and one-half times as long as the head, and has the anterolateral angles produced around the sides of the head and the postlateral regions also somewhat produced with lateral margin thickened; the

second segment is two-thirds as long as the head; the second to seventh segments, inclusive, being similar and subequal, the lateral margins of the second, third, and fourth segments being rounded, while those of the fifth, sixth, and seventh segments are relatively straight, thus enabling the contracted isopod to form a tight ball.

The coxopodite of the first segment extends the entire length of and is parallel to the segment from which it is separated by a shallow groove that slightly deepens posteriorly. The posterior rounded margin of the coxopodite is likewise equal to that of the segment. The coxopodite of the second segment forms a long, slender, strongly divergent toothlike process whose outer free margin is conspicuously arcuate.

ABDOMEN.—The abdomen has the first segment almost entirely concealed, being represented by a mere line in the median dorsal region; the second segment has the lateral parts concealed; the third, fourth, and fifth segments are similar and subequal and have their lateral margins relatively straight; the sixth segment is two-thirds as long as wide, the anterior and posterior margins are parallel, the anterior being only slightly the longer. The sides of this segment are roundly, rather deeply constricted. The uropoda occupy the space between the terminal segment and the lateral part of the fifth segment, being minutely separated from each distally; the outer branch is minute, and it arises from the angulation of the inner margin of the peduncle; the inner branch of the uropoda is five-sixths as long as the telson and is clavate and directed posteriorly in a nearly straight line.

MATERIAL EXAMINED.—The holotype, Cat. No. 50419, United States National Museum, was collected at Almendares River, "La Chorrera" near Vedado, near Havana, Cuba, by Dr. Mario Sanchez Roig, for whom I name the species.

The present species is closely related to *Cubaris silvarum* (Dollfus)<sup>1</sup> from which it is distinguished by the following characteristics: coxopodite one of *Cubaris sanchezi* is more divergent in the posterior half; it extends the entire length of and is nearly parallel to the lateral margin of the first thoracic segment on the anterior half; coxopodite two of *Cubaris sanchezi* is longer than that of *Cubaris silvarum* (Dollfus) and also has the outer free margin decidedly arcuate. The peduncle of the uropoda in *C. silvarum* is figured as being laterally separated from the telson by a distinct space, while in *C. sanchezi* this separation is barely indicated; the inner branch of the uropoda in *C. silvarum* is described as "extending to one-half the length of the pleotelson," while that of *C. sanchezi* is five-sixths as long as the telson.

### ***Cubaris aguayoi*, new species**

#### Figure 12

Body oval, decidedly convex, approximately twice as wide as long, the entire surface finely punctate and with a series of conspicuous paired median lateral patches of coarse, irregular tuberculations on the head and thoracic segments.

HEAD.—Head two and two-thirds times as wide as long, 4 mm. wide, 1.5 mm. long, with the frontal margin relatively straight and produced into a narrow border which is

<sup>1</sup>1896, Proc. Zool. Soc. London, pp. 393-394.

a little more prominent at each end; distinct paired median lateral tubercular patches occur on the head, one above each eye. The eyes are situated in the extreme post-lateral angle of head and are of moderate size, each consisting of ten to twelve ocelli. The first pair of antennae is rudimentary. The second pair of antennae is unfortunately broken in both specimens.

**THORAX.**—The first thoracic segment is one and three-tenths times as long as the second segment and has the posterior margin nearly straight in the median region, very little produced on either side. The lateral margin of this segment is rounded, rimlike, and there is a decided depression on the dorsal surface just above the margin, this depression being stronger anteriorly. The second to sixth thoracic segments are similar, subequal, the lateral parts of the second, third and fourth segments are

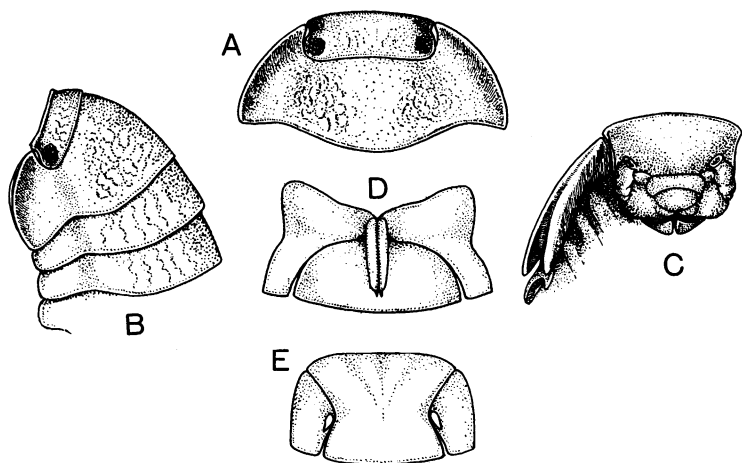


Fig. 12. *Cubaris aguayoi*, new species, type.

A. Head and first thoracic segment, dorsal view. B. Lateral view of anterior segments. C. Ventral view showing coxopodites. D. Ventral view of telson and uropoda. E. Dorsal view of telson.

narrowed with rounded extremities, while those of the remaining thoracic segments are relatively straight.

Coxopodites are present on the first two segments. That on the first segment extends the entire length of the segment; anteriorly the groove that divides the coxopodite from the outer margin of the segment narrows but extends to the frontal margin of the segment. Posteriorly the coxopodite ridge diverges and terminates in a rounded process similar to that of the main part of the segment, which it equals in length. As shown in figure 12C, the coxopodite margin is visible as a rimlike margin extending beyond that of the segment on its rounded portion.

The coxopodite process of the second segment is in the form of a divergent tooth, much smaller than the margin of the segment, as shown in figure 12C. The paired median lateral tubercular patches of the thoracic segments are quite large and prominent.

**ABDOMEN.**—The abdomen has the first segment linear, almost entirely concealed; the second segment subcrescentic with the lateral parts concealed; the third, fourth,



and fifth segments approximately subequal, with the lateral margin truncated. The sixth segment is two and one-third times as long as the fifth, with the posterior margin truncate and not quite so wide as the anterior; of the shape shown in figure 12E. There is a pair of low rounded elevations on the median anterior region of the telson. The uropoda entirely fill the lateral space between the fifth and sixth segments; the peduncle is large as shown in figure 12E; the outer branch is very small, attached at the dorsal inner lateral angle of the peduncle. The inner branch is slender, lying straight beside its companion and extending a little more than two-thirds the length of the telson.

TYPE.—The type is 11 mm. long.

MATERIAL EXAMINED.—The type, Cat. No. 6606, American Museum of Natural History, and a paratype, deposited in the Poey Museum, Havana, Cuba, were collected in Camoa, Cuba, January, 1930, by Dr. Carlos G. Aguayo, of the University of Havana, to whom I dedicate the species.

*Cubaris aguayoi* is readily distinguished from its allies by the distinctive coxopodites of the first thoracic segment, also by the strong depression or sulcus on the dorsal surface of this segment, above the lateral margin.

#### ***Cubaris hendersoni*, new species**

##### Figure 13

Body ovate, strongly convex, 13.8 mm. long, 7.0 mm. wide, entire surface finely tuberculate and punctate and with a series of paired median lateral patches of coarse irregular tuberculations on the thoracic segments. Color (recently preserved specimens) brownish gray, ground surface broken by light yellow patches in the large tuberculate areas.

HEAD.—Head more than twice as wide as long, 4 mm.; 1.7 mm. with the frontal margin relatively straight and produced into a narrow border which is a trifle more prominent at each end. The eyes, situated in the extreme postlateral angles of the head, are rather prominent for this genus, consisting of about fourteen coarse, irregular ocelli. The first pair of antennae is rudimentary. The second pair of antennae extends almost to the anterior margin of the third thoracic segment; the first joint is short and very broad distally; the second joint is minute, triangulate; the third joint is one and one-half times as long as the first two taken together; the fourth joint is three-fourths as long as the third, the third and fourth together forming a geniculation; the fifth joint is somewhat longer than the fourth; and the sixth joint is nearly one and one-half times the length of the fifth joint, while the flagellum, consisting of two subequal joints, is about equal to the fifth joint.

THORAX.—The first thoracic segment is about twice as long as any of the succeeding segments. The posterior margin is straight in the median area and very slightly produced on either side. The second, third, fourth, fifth, and sixth thoracic segments are similar and subequal. The lateral parts of the second, third, and fourth segments are produced into narrow processes with rounded extremities, while the lateral margins of the fifth, sixth, and seventh segments are relatively straight, thus enabling the contracted isopod to form a perfect ball.

Coxopodites are present on the first two segments. That on the first segment extends the entire length of the segment. Anteriorly, the groove that divides the

coxopodite from the outer margin of the segment runs to the frontal margin of the segment. Posteriorly the coxopodite diverges and terminates in a rounded margin similar to that of the main part of the segment, the coxopodite being produced slightly farther than the segment. On each outer lateral face of the first thoracic segment there is a deeply cleft sulcus, just inside and paralleling the lateral margin, anteriorly reaching the border of the segment but posteriorly terminating a short distance from the hinder margin. The character at once distinguishes the species from any of the described American Cubaridae. The coxopodite of the second segment extends approximately the entire lateral margin of the segment but is strongly divergent, the distal margin being produced quite as far posteriorly as that of the segment, and the incision between them deep. The paired tuberculate patches occupying the median

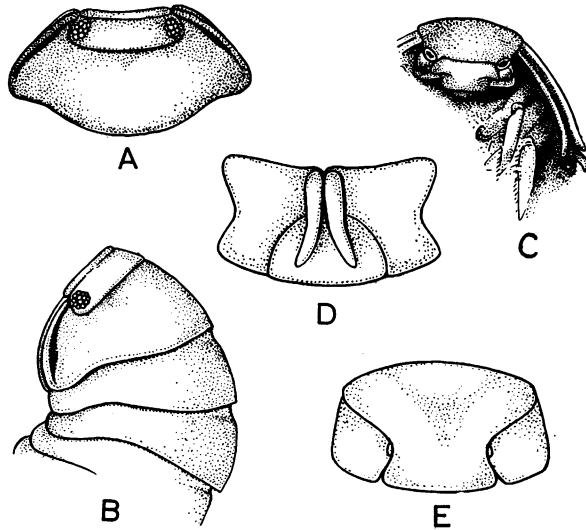


Fig. 13. *Cubaris hendersoni*, new species.

A. Dorsal view of head and first thoracic segment showing distinctive submarginal groove in latter. B. Lateral view of anterior segments. C. Ventral view of anterior region showing coxopodites. D. Ventral view of telson and uropoda. E. Dorsal view of same.

lateral area of the respective thoracic segments mark a faint, sinuated area on either side of the isopod; the first and second segments have sixteen irregular unequal tubercles each on either side, while the third segment bears twelve, the fourth segment fourteen, the fifth segment twenty, the sixth segment sixteen, and the seventh segment only ten tubercles.

**ABDOMEN.**—The abdomen has the first segment linear, almost entirely concealed; the second segment subcrescentic with the lateral parts entirely concealed, while the third segment is most prominent but only slightly longer than the fourth and fifth segments which respectively decrease in length. The sixth segment is longer than the width of its posterior margin which is truncate, its anterior margin being one and two-thirds times as wide as the posterior line. The uropoda completely fill the lateral space between the fifth and sixth segments; the outer branch is extremely minute,

even for a member of this genus; the inner branch is four-fifths as long as the telson, and has its inner margin strongly convex and the outer margin correspondingly arcuate.

**MATERIAL EXAMINED.**—The type, Cat. No. 50418, United States National Museum, and two paratypes, were collected in Tomazeau, Haiti, April 2, 1917, by John B. Henderson, II, to whom I dedicate the species in cordial recollection of an esteemed friendship.

This species is readily distinguished from its allies by the peculiarly grooved lateral margin of its first segment and the long coxopodite, also by the strong second coxopodite and by the exceedingly long and curved inner branches of the uropoda.

### **Cubaris murina** Brandt

*Cubaris murina* BRANDT, 1833, Bull. Soc. Imp. de Naturalistes de Moscou, VI, p. 38; RICHARDSON, 1905, Bull. 54, U. S. Nat. Mus., p. 645, Figs. 687, 688 (synonymy and description).

**MATERIAL EXAMINED.**—Forty-eight specimens of various sizes, including both sexes, were collected at Media, Caenito, Cuba, August 18 and 19, 1928, by Mr. D. A. Welch, and deposited in the American Museum.

## **TYLIDAE**

### **Tylos** Latreille

#### **Tylos niveus** Budde-Lund

Figures 11A, B, and 14

*Tylos niveus* BUDDE-LUND, 1885, 'Crust. Isop. Terrestria,' pp. 278, 279; RICHARDSON, 1901, Proc. U. S. Nat. Mus., XXIII, p. 561; 1902, Trans. Conn. Acad. Arts and Sci., XI, p. 301; 1905, Bull. 54, U. S. Nat. Mus., p. 585, Fig. 645, *a, b*.

Body elliptical in outline, 11 mm. long, 5 mm. wide, very convex; surface coarsely granular and densely, minutely setigerous. Ground color creamy yellowish, irregularly and sparsely speckled with tiny black spots.

**HEAD.**—Head with frontal margin produced to a rounded rostral point that unites with the carinated margin of the epistome, which is visible dorsally as a heavy ridge; the postlateral angles of the head are rounded, and the posterior margin is comparatively straight. Eyes round, complex, situated postlaterally. First pair of antennae is composed of one article and is immovable. The second pair of antennae has a peduncle of five joints, the first four being short, stout, subequal, the fifth being three-fourths as long as the first four taken together, and slender, and a flagellum of four short joints. It extends to the posterior margin of the second thoracic segment.

**THORAX.**—The first thoracic segment, not quite 1.7 mm. long, has the antero-lateral margins produced surrounding the entire lateral margin of the head and the postlateral margins somewhat produced. The second to seventh segments, inclusive, are similar and subequal, each about 1 mm. long. Each of the first, second, third, and fourth segment bears a line of constriction parallel and near its anterior margin. The first segment is wider than the others, its lateral margins being produced as far as the outer margins of the epimera of the other segments and having its epimera represented by a heavily carinated ridge that extends seven-eighths of the length of the

lateral margin of the segment. The epimera of the other segments are distinct, dorsally distinguished by suture lines; the second, third, and fourth are similar, triangulate; the fifth is smaller, rounded; the sixth and seventh are larger, squarish.

**ABDOMEN.**—The first two abdominal segments have the lateral margins covered by the seventh thoracic segment; the first segment is about .6 mm. long, the second not quite .9 mm., the third not quite 1 mm. long, the fourth is about 1 mm. long and the fifth about .8 mm. long; the last three complete the elliptical outline of the body, their lateral margins forming a line curving inward toward the terminal segment. The sixth abdominal segment is very small, roughly quadrangular with the anterior margin rounded and the posterior slightly curved and thickened. The third, fourth, fifth, and sixth abdominal segments have inferior processes on the ventral side, plates extending from the margin inward surrounding the uropod-operculum, those of the third, fourth, and fifth segments are paired; that of the sixth segment is a broadly U-shaped narrow rim surrounding the posterior half of the uropoda and extending to their point of attachment; those of the fifth segment are long and have their anterior expansion tetragonal, meeting in the middle and extending anteriorly as far as the

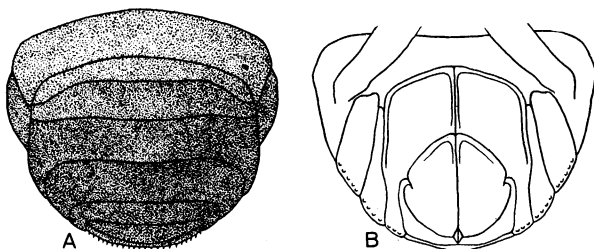


Fig. 14. *Tylos niveus*, Budde-Lund, dorsal and ventral views of abdomen.

basal joint of the seventh pair of legs, having the anterior part larger and stronger than the uropoda; the plates of the fourth segment are long and narrow, tapering inward to a blunt point; those of the third segment are oblong and relatively inconspicuous.

The uropoda form opercular valves that meet in a straight line; their entire inner lateral margins are thickened into a ridge on the interior side, fitting the operculum tightly into the aperture. The anterior branch of the uropoda is represented by a very minute joint that is thickened internally, fitting into the margin of the sixth abdominal segment.

**MATERIAL EXAMINED.**—Four specimens, U. S. National Museum, Cat. No. 50409, were secured by Dr. Mario Sanchez Roig along the seashore at La Puntilla, Vedado, near Havana, Cuba, 1913; collector's number 82. A fifth specimen is in Dr. Roig's private collection in Cuba. These represent the first Cuban record of this species, the type of which came from Key West, Florida. There are specimens from Planter, Key Largo, Florida, in The American Museum of Natural History, which I have also examined, and with which the Cuban specimens have been compared. Four specimens collected at Cojimer, Cuba, April, 1930, by Dr. Aguayo and Dr. P. J. Bermudez, two of which are in the Poey Museum, Havana, one in the American Museum collection and the fourth in the Boone collection, have likewise been examined. These establish the second Cuban record of this species.





