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MILLIPEDS OF THE WEST INDIES AND GUIANA
COLLECTED BY THE ALLISON V. ARMOUR
EXPEDITION IN 1932

(WITH FOUR PLATES)

BY

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U.S. Department of Agriculture



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INTRODUCTION

During the first three months of 1932 the writer visited many of the Bahama and West Indian islands, and British and Dutch Guiana, while a member of the Allison V. Armour Expedition engaged in collection of seeds and plants for introduction into the United States. In the course of the expedition 30 islands were touched, many of which have been little explored by naturalists, the information on their flora and fauna being exceedingly fragmentary or entirely lacking. Although the time allotted to any of the islands or countries was very limited and was devoted principally to making general surveys and gathering material of the outstanding plants, it usually was found possible to spare a few moments to search for members of the humus fauna, particularly the millipeds, at each stop. In spite of the incidental opportunities for such collecting the final results were very satisfactory. New localities for many previously known millipeds were recorded, over two dozen undescribed species were discovered,¹ and interesting observations on environmental conditions and general distribution were made at first hand.

In the Bahamas the islands of New Providence, Cat, Conception, Mariguana, Great Inagua, and Rum Cay were visited, and the humus fauna was found to be very sparse, probably from a number of contributing causes. Most of the islands of the Bahamas are low and of limestone formation which drains rapidly, and the vegetation is seldom dense enough to provide material for large accumulations of humus. Rains are strictly seasonal, and long periods of drought are experi-

¹ Several of these forms had previously been found in Haiti, and descriptions were prepared for a paper on Haitian millipeds. These descriptions are included in this paper, but when the specimens collected by the Armour Expedition came from some other island, the Haitian type locality has been allowed to remain.

enced, when the earth surface dries to considerable depths, except in well-protected locations. The constant sea breezes cause rapid surface evaporation, and in general the islands are so arid that many of the plants are decidedly xerophytic in character. During the hurricanes, which are a menace throughout much of the year, many of the smaller islands are more or less inundated by sea water or drenched by spray for periods long enough to have a serious effect on many small creatures living in the soil. When it is understood that the delicate humus animals, like most millipeds, require an environment with an unbroken supply of food and moisture, and protection from the sun and flooding, it will be realized that such animals have lived in these islands under great difficulties. In the face of these difficulties it is astonishing that these creatures have managed to maintain the unbroken continuity through past ages that accounts for their presence on some of the islands today.

Unsatisfactory environmental conditions were found on many of the small West Indian islands where collecting was done, such as Beata and Saona Islands off the south coast of Haiti; Barbuda, Anguilla, and Saba in the northern Lesser Antilles; and Bequia, Cannouan, and Mayero in the Grenadines to the south. None of these islands has high elevations where rain forest conditions are approached, with the possible exception of Saba. The single day spent on that island did not allow a visit to the highest part, which is frequently cloud-covered and is said to have considerable rainfall. At the time of our visit Saba was rather dry, and few humus insects and no millipeds were found during the walk from the sea up through the town of Bottom to the still higher town of Windward at an elevation of 2,500 feet.

In the larger and more fertile West Indian islands, agricultural activities, which include cutting down the forests, burning of brush and grass lands, cultivation of various crops, pasturing of cattle, and general denuding of the land by other means, have undoubtedly contributed very greatly toward reducing the humus population. A striking example of these effects was found in St. Vincent, the most intensively and generally cultivated island seen by the expedition. In a trip over about half of the island few places were found where humus insects might exist continuously, and no millipeds were seen, although seven species have been reported, and one of these might be expected to be rather abundant, as in other places where it is known. There is little doubt that satisfactory conditions for milliped life are more frequently met with in the higher parts of the island than in the lower elevations, where the scarcity of forms may be at-

tributed to the more complete subjugation of the land to agriculture and other effects of dense human population.

A similar situation as regards the humus fauna probably exists in Barbados, the most completely cultivated island in the West Indies, but one not included in the itinerary of the expedition, so that direct observations were impossible. However, the only reason that can be advanced as to why there are but two species of millipeds known from Barbados is that the original species have been greatly localized or nearly exterminated by the intensive cultivation since European occupation. Both of the species reported, *Rhinocricus monilicornis* and *Orthomorpha coarctata*, are widely distributed through the West Indies, and it is much more likely that they were introduced into Barbados in modern times than that they represent the remnants of the aboriginal milliped fauna of the island, as the native home of neither species is definitely known.

In the following part of this paper are given descriptions of the new genera and species collected by the expedition; notes on the structure, distribution, and taxonomy of others previously known; line drawings of essential structural features of many species; and magnified photographs of some of the most outstanding species, which show to a slight extent the remarkable diversity, not only among the various orders of millipeds involved, but also within the orders themselves.²

Class DIPLOPODA
Subclass PSELAPHOGNATHA
Order ANCYROTRICHA
Family POLYXENIDAE

POLYXENUS LONGISETIS Pocock

Polyxenus longisetis Pocock, Journ. Linn. Soc. London, vol. 24, p. 474, 1894.

Pocock's assignment of this species to the genus *Polyxenus* appears definitely open to question, as the description is exceedingly short and contains few important details, and none of these relates to peculiarities of the genus. There is no indication that eyes are present, but the very long antennae suggest that the species should have been referred

²With the exceptions of *Lophoproctus comans*, photographed in water, and *Inodesmus peduncularis*, the millipeds used in illustrating this paper were lightly coated with ammonium chloride to bring out details of sculpturing in the photographs.

to *Lophoproctus*. This view is furthered by the illustration, which shows but a single row of hairs along the posterior margin of each segment, as in *Lophoproctus*, instead of two rows, as in *Polyxenus*. In other respects the disposition of the hairs is very similar to that in *Lophoproctus niveus* Loomis, except that segment 1 is not even indicated in the drawing and its two clusters of hairs apparently are shown as being on the back of the head. In neither of the above genera is there a row of hairs at the back margin of the head or of the first segment.

Specimens from Cuba and others collected by the Armour Expedition from Mount Misery, St. Kitts, January 24, 1932, have been referred to *P. longisetis*.³ These specimens are without eyes but in other respects answer the description of the species. An examination of the type is necessary to determine its genus and whether the above specimens have been correctly determined.

LOPHOPROCTUS COMANS, n. sp.

Plate 1, fig. 1

One female from the Maracas Valley, Trinidad, February 13, 1932.

Diagnosis.—The large size of the body, its exceedingly shaggy appearance, due to the long hairs of the lateral prominences and those on each side of the dorsum; and the broad, very dense fascicle of uniformly long hairs, are the outstanding characters by which this species may be recognized.

Description.—Body very shaggy; gray; quite large and stout; about 5.5 mm long, including the terminal brush of hairs; 1.2 mm wide; terminal brush a little more than 1 mm long and over half as broad; number of segments 11, with 13 pairs of legs.

Head oval, eyeless, with long, slender antennae; joint 1 short; joint 2 equal to 4, a third longer than 3, but little longer than 5, and noticeably shorter than joint 6, which is as long as the 2 subequal outer joints combined. Labrum deeply and narrowly notched at middle. From the outer margin of the head, just above the antennae and reaching across the front, the surface is densely beset with long, slightly curved, erect, clavate, barbed hairs, most closely set above the antennae; on each side of the middle of the front the hairy area extends forward considerably but at the middle the transverse band of hairs is narrow. Above this band of scattered hairs there is a single crescentic series of similarly shaped hairs on each side of the head, and near the outer end of the series there are three tiny round

³ Bull. Mus. Comp. Zool., vol. 75, pp. 357-358, 1933.

pits forming a triangle, each pit containing a very fine erect sensory hair; remainder of head glabrous.

First segment small and inconspicuous, a very narrow transverse ellipse not reaching the lateral limits of the body. On either side of the middle there is a very large transversely oval cluster of long erect radiating hairs; remainder of surface glabrous. Some writers appear not to have noted the first segment as distinct from the second segment but have combined the two in describing segment 1.

Second segment with the lateral prominence on each side produced forward about opposite the lateral angle of segment 1. Near the posterior margin on each side is a very narrowly oval cluster of long hairs, the two dorsal clusters connected by a submarginal row of much shorter depressed hairs.

Ensuing eight segments with vestiture similar to segment 2. Segment 3 with the lateral prominences somewhat directed forward, but on the other segments they are directed backward. Each of these lateral prominences bears a dense brush of very long, barbed hairs, some hairs being as long or even longer than any two segments combined. In general, these hairs are directed obliquely backward and show much less tendency to radiate in all directions than is usual in this family.

Last segment with a very large and exceedingly dense brush of slender, uniformly long, straight hairs lying parallel to each other, each hair with one to three tiny hooks on one side near the apex. The brush of hairs is about as wide as the last segment, the sides are almost parallel, and the end is squarely truncate.

Legs rather stout; joint 1 as long as broad; joint 2 about half as long as broad; joint 3 longer than broad; joints 4, 5, and 6 decreasing in length; joint 7 longer than any other joint, narrowly conical, with a spine beneath the apical third which is stouter than the terminal claw. Ventral-posterior face of joints 1, 2, and 3 with two to five short, clavate hairs in a single longitudinal series.

Type.—U.S.N.M. no. 1084.

LOPHOPROCTUS NIVEUS, n. sp.

Two females were collected in dry leaf-litter near the rocky cliffs on the southwest coast of Beata Island, January 18, 1932.

Diagnosis.—The smaller size, lighter color, shorter and more definitely radiating hairs of the lateral prominences, and the compound terminal pencil of hairs distinguish this species from *L. comans*, the only other named species in the West Indies.

Description.—Body of medium size; length without the terminal pencil of hairs, which is missing, 3.5 mm, width over 1 mm. Living color almost pure white. Segments 11, number of legs 13.

Head with the hairs distributed much as in *L. comans*, but they are somewhat shorter, and the two anterior areas are not so widely separated. Antennae with joints of different proportions from those of *L. comans*, as shown in figure 1.

First segment small and with two clusters of hairs as in *L. comans*.

Segment 2 with the lateral prominences slightly produced forward, but those on the other segments extend outward; the hairs on these prominences are straight and radiate in all directions, not curving backward as in *L. comans*, nor are they as long as in that species,



FIG. 1.—*Lophoproctus niveus*. Antenna.

although some of the longest hairs seem to have been lost from the specimens. Near the side of each segment, close to the posterior margin, is a small cluster of erect, radiating hairs, and along the posterior margin there is a close-set series of rather long hairs pointing backward.

Last segment with all hairs lost, but it is apparent that the terminal pencil was composed of two parts, as there is a round folliculate area above, and a larger reniform folliculate area below it. This caudal pencil of hairs probably was very similar to that of the following undetermined species from Nassau.

Legs resembling those of *L. comans*, except that the spine beneath the distal third of the last joint is smaller than the terminal claw.

Type.—U.S.N.M. no. 1085.

LOPHOPROCTUS sp.

Many specimens were collected at Nassau, New Providence Island, January 3, 1932.

All the specimens are so badly rubbed that it is impossible to gain a complete conception of the vestiture. However, the caudal pencil of hairs is composed of two definite parts, an upper round cluster of very long, light-colored, parallel hairs, beneath which there is a brush of equally dense, dark, parallel hairs about two thirds the length of the upper group but forming a cluster more than twice as wide and considerably thicker. The antennae and other structural characters

are very similar to those of *L. niveus*, but the living color was darker. The advisability of attempting to name this species is questioned until specimens with vestiture intact can be examined.

LOPHOPROCTUS sp.

Five specimens collected near Orangetown, St. Eustatius, January 22, 1932.

They appear to differ slightly from *L. niveus* and the Nassau species but are so badly rubbed that only a very incomplete description is possible, and this would complicate rather than aid future systematic work on the genus.

Subclass CHILOGNATHA

Order LIMACOMORPHA

Family GLOMERIDESMIDAE

GLOMERIDESMUS TRINIDADENSIS, n. sp.

Plate 1, fig. 2

Two males were collected in the Maracas Valley, Trinidad, February 13, 1932.

Diagnosis.—This is decidedly the largest member of the genus. The uncolored head and the shape of the pleurae are additional differences between it and *G. marmoratus* Pocock, its closest relative.

Description.—One male 10 mm long, the other one 11 mm long, and both 2 mm in diameter.

Head and ventral surfaces uncolored, yellow in the alcoholic specimens; the color of the segments above as in *G. marmoratus* Pocock.

Pleurae striate in front, their posterior margin simple, not at all serrate, transverse, with the inner corner slightly more than a right angle and not produced as is shown in Pocock's figure. The posterior lateral margin of the first joint of the legs simple, nonserrated.

The penes are soft, flexible, unchitinized structures, and in specimens just removed from alcohol they are distended, and four or five narrow, longitudinal, glabrous areas are to be seen in alternation with transversely striate, setiferous areas of similar width. On drying somewhat, the glabrous areas contract laterally and appear as deep furrows. The distended penes are capable of reaching back over the coxae of seven or eight pairs of legs and are much stouter than after a little drying.

Type.—U.S.N.M. no. 1086.

Order COLOBOGNATHA

Family SIPHONOPHORIDAE

SIPHONOPHORA MILLEPEDA, n. sp.

A single mature female and a number of tiny young were found beneath a rock in a cacao grove on the hills above Charlottstown, Man-of-War Bay, Tobago Island, February 20, 1932.

Diagnosis.—In this species the number of segments greatly exceeds that of any other known member of the genus. Other distinctive characters include the shape of the third antennal joint and the vestiture of the antennae; the very short, deeply emarginate hypostomal plate; and the reduced size of the first few pairs of legs.



FIG. 2.—*Siphonophora millepeda*. Head, antenna, and first segment, dorsal view.

Description.—Length of the type 58 mm, width 1.3 mm. Number of segments 190. Living animals cream-colored.

Head shorter than the beak, narrow, triangular, the sides almost straight (fig. 2). Beak very long and slender, nearly straight, hardly deflexed, the tip approximating the ends of the antennae. Hypostomal plate very short, broad, deeply emarginate. Antennae stout with joint 3 thickest, equalling joint 6 in length, the other joints shorter; joints 1 to 5 beset with hairs of various lengths; joints 6 and 7 much more densely covered with shorter hairs of uniform length.

Body densely beset with straight, erect hairs varying in length from moderately short to ones 4 or 5 times as long. Segments very strongly convex longitudinally, dorsum moderately depressed transversely. Posterior margin of segments finely and uniformly serrate.

The anal valves together are hemispherical and covered with hairs similar to those on the segments. Preanal scale transverse behind, with fewer and shorter hairs than the valves.

First few pairs of legs smaller and weaker than those farther back, gradually increasing in size on the first few segments. Coxae of first pair of legs each produced into a small, inconspicuous, triangular lobe at the distal end on the dorsal side.

The unconscious rivalry between millipeds for the greatest number of segments becomes keener with the finding of this Tobago Island species. Several years ago another species of this order was described from California,⁴ one of the specimens having 192 segments but the others falling considerably below this number. Although 192 segments is the greatest number thus far known for a milliped, it is not unlikely that specimens of the present species or the California one will be found exceeding this number.

Type.—U.S.N.M. no. 1087.

SIPHONOCYBE HARTI (Pocock)

Plate 1, fig. 3

Siphonorhinus harti Pocock, Ann. and Mag. Nat. Hist., ser. 6, vol. 15, p. 313, 1895.

Siphonophora nigrosignata Silvestri, An. Mus. Nac. Buenos Aires, vol. 6, p. 54, 1898.

Specimens of this species were collected in the Maracas Valley and in the Arena Forest area of Trinidad, February 1932.

Living color light golden brown with a broad dark brown line reaching from the first to almost the last segment. The anterior end of the body is slightly darker than the posterior end. Head and antennae pure white, in conspicuous contrast to the anterior segments. The dense pubescence of the segments gives the body a velvety appearance in life. The animals are very sluggish and move with great deliberation.

The gonopods are of the same general type as those of *Siphonophora progressor* Chamberlin, as shown in Chamberlin's drawing.⁵

There appear to be no grounds for maintaining Silvestri's species as distinct from *harti* Pocock.

Family POLYZONIIDAE

SIPHONOTUS PURPUREUS Pocock

Siphonotus purpureus Pocock, Journ. Linn. Soc. London, vol. 24, p. 479, 1894.

Siphonotus virescens Silvestri, An. Mus. Nac. Buenos Aires, vol. 6, p. 55, 1898.

This species was collected in the following places. Roseau, Dominica; Port-of-Spain, Trinidad; Tobago Island; Fort-de-France, Martinique; Point-à-Pitre, Guadeloupe; Paramaribo, Dutch Guiana.

⁴ *Illacme plenipes* Cook and Loomis. Proc. U.S. Nat. Mus., vol. 72, pp. 10-12, 1928.

⁵ Proc. U.S. Nat. Mus., vol. 60, pp. 1-71, illus., 1922.

Pocock's description states that the head is "apparently furnished on each side with two large, black, prominent eyes, the upper of which are covered by, though visible through, the first tergite." In none of the specimens I have examined, several of which have been dissected, has there been more than one eye on each side, although the surface behind the eye, beneath the first segment, is sometimes dark-colored.

The dorsum of the segments has two transverse rows of short, rather widely spaced, erect setae; one row crossing the middle of the subsegment, the other in its posterior margin. First segment with setae more numerous and scattered over the entire surface.

Order MONOCHETA

Family STEMMIULIDAE

STEMMIULUS SURINAMENSIS, n. sp.

One male was collected 70 kilometers from Paramaribo, Dutch Guiana, beside the railway to the Cable Station, March 3, 1932.

Diagnosis.—The form of the gonopods, and the first and second legs, as shown in figure 3, *b* to *e*, distinguish this species.

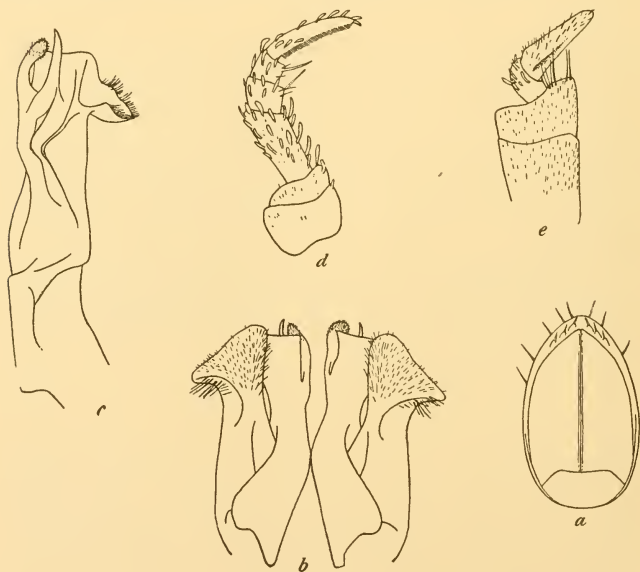


FIG. 3.—*Stemmiulus surinamensis*. *a*, last segment, anal valves and scale, ventral view; *b*, gonopods, anterior view; *c*, right posterior gonopod, posterior view; *d*, first male leg, anterior view; *e*, second male leg, anterior view.

Description.—Length about 20 mm. Number of segments 48.

Body with the first three segments broad, followed by a slight constriction. Posterior end of the body gradually narrowed, moderately compressed laterally.

Head rather dark; first and last segment light; color darkening from in front; segments with a narrow longitudinal median light band, on each side of which the dark color is nearly solid to a large lateral rounded spot of light maculations. Surface of the segments sculptured with numerous distinct irregular scratches in addition to the usual striations.

Single ocellus on each side large and strongly pigmented.

First segment with two strong lateral striae; margin rounded on the sides.

Last segment with apex slightly exceeding the valves. Valves with thin raised margins. Preanal scale truncate behind, the sides oblique (fig. 3, *a*).

Gonopods, first and second male legs as shown in figure 3, *b* to *c*.

Type.—U.S.N.M. no. 1088.

STEMMIULUS INSULANUS Chamberlin

Stemmiulus insulanus Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 178, 1918.

Three males and four females were collected in the Arena Forest area, Trinidad, and near King's Bay, Tobago Island, in February 1932.

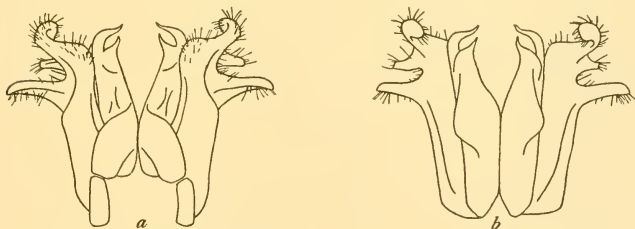


FIG. 4.—*Stemmiulus insulanus*. *a*, gonopods, anterior view; *b*, gonopods, posterior view.

All the above specimens are smaller than Chamberlin's type, which was a male. A 14-millimeter male and a female of the same length were the largest specimens collected by the writer. The living color notes state that the head, the first three segments, and the anal segment are light red, with the posterior half of segment 3 and succeeding segments dark colored.

The gonopods are shown in figure 4, *a* and *b*.

PROSTEMMIULUS WHEELERI (Silvestri)

Diopsiulus wheeleri Silvestri, Bull. Amer. Mus. Nat. Hist., vol. 24, pp. 568-569, 1908.

Numerous specimens were collected at Roadtown, Tortola, March 19, 1932.

The number of segments given by Silvestri for this species, on the basis of broken specimens, is too low, as the range observed in the Tortola specimens is from 40 to 45.

The largest female is 18 mm long.

The bodies are strongly compressed laterally in spite of Silvestri's statement to the contrary.

Order DIPLOCHETA**Family EPINANNOLENIDAE****EPINANNOLENE HAITIENSIS Chamberlin**

Epinannolene haitiensis Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 179-180, 1918.

A mature and an immature female were collected at the Citadel, near Cape Haitien, Haiti, March 27, 1932.

Family SPIROSTREPTIDAE**ORTHOPORUS ANTILLANUS (Pocock)**

Spirostreptus antillanus Pocock, Journ. Linn. Soc. London, vol. 24, pp. 483-484, 1894.

A number of specimens were collected at Hillsborough, Carriacou Island, February 8, 1932.

The largest specimen, a female, was 100 mm long with 60 segments; the largest male was 98 mm long with 63 segments.

ORTHOPORUS NITIDUS (Daday)

Spirostreptus nitidus Daday, Term. Füzetek, vol. 14, p. 137, 1891.

Two female specimens, collected in Trinidad without definite locality, were presented by Dr. F. W. Urich, of Port-of-Spain.

These specimens agree with Pocock's description, except that each has a greater number of segments than credited to the species, one having 64 segments, the other 68 segments.

ORTHOPORUS TRACTUS, n. sp.

A single female was collected in the Aripo Savannah, Trinidad, February 14, 1932.

Diagnosis.—The small size of the body and the median light stripe extending its full length distinguish this species from other members of the genus.

Description.—Length 30 mm, width 2 mm. Number of segments 51.

Body with a very definite, uniformly narrow, longitudinal median line of light color continuous from the front margin of segment 1 to the apex of the last segment; posterior quarter of segments transparent but the remainder brownish, areolate with light spots. Head areolate on the vertex, with a solid brown band between the eyes; remainder of the head and the antennae light colored.

Head smooth and shining and with a median furrow visible on the front of the vertex. Eyes composed of about 30 ocelli in 6 rows forming a triangle. Structure of the gnathochilarium typical of the genus.

First segment with two very strong lateral striae reaching from the eye around to the posterior margin. Laterad of these is a submarginal stria reaching from near the lower corner of the eye to the posterior margin.

Ensuing segments with a simple, very sharply impressed, transverse median line on the front segments, but following segment 6 or 7 it contains a single series of uniformly close-set, short, longitudinal striae beginning well below the pores. Ventral striae not reaching beyond the limits of the legs except on a few anterior segments. Dorsally, the surface of the segments is brilliantly shining and very sparsely and minutely aciculate-punctate. The front half of the anterior subsegments is finely striate-reticulate, but the posterior half is less sculptured.

Pores beginning on segment 6.

Last segment ending in a thin, rounded-triangular production surpassed by the valves. Dorsal surface rather coarsely and densely punctured, the sides smoother.

Anal valves punctate throughout but more strongly so near the smooth raised margins.

The assignment of this species to the genus *Orthoporus*, on the basis of only female characters, is somewhat tentative, and final judgment must be withheld until a male is examined.

Type.—U.S.N.M. no. 1089.

ANETHOPORUS CLARKI Chamberlin

Anethoporus clarki Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 184-185, 1918.

Three females were collected at the eastern end of the Island of Tobago, February 20, 1932.

ANETHOPORUS GRACILIOR Chamberlin

Anethoporus gracilior Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 185-186, 1918.

A single female specimen, 53 mm long and 3.5 mm broad, with 56 segments was collected with the foregoing species. The specimen has a distinct depression on each side of the head between the eye and the antenna.

Order ANOCHETA

Family SPIROBOLIDAE

RHINOCRICUS LIMATULUS, n. sp.

Ten specimens were collected at St. Claude, above Basse Terre, Guadeloupe, March 13, 1932, by P. H. Dorsett and H. F. Loomis.

Diagnosis.—Closest relationship seems to be with *R. socius* Chamberlin, which has not been examined, but *R. limatulus* appears to differ in its smaller size, more uniform coloration, scobina in a shorter series, and in the form of the gonopods.

Description.—Length of the largest specimen, a male, 68 mm, width 6.5 mm; the females are stouter, one measuring 60 mm in length being 7 mm wide. Number of segments 46 to 49.

The living animals have a rather dull sheen and are dark slate-gray throughout, except for the narrowly colorless posterior margin of the segments.

Head with a definite furrow on the vertex and on the clypeal area but not between the antennae on the front, which is crossed transversely by a considerable number of fine impressed lines originating near the antennae and arching upward across the middle of the head. Antennal cones numerous.

First segment with a short but prominent marginal rim below the lower corner of the eye and not passing beyond the lower limit of the segment; sides broadly and evenly rounded.

Ensuing segments strongly convex, especially at each end of the body; the transverse depression scarcely evident on any segment. Pores very evident, each being placed in the bottom of a small pit which is bounded behind by a short, deep impression. Surface of the

segments smooth and with a dull sheen except just along the posterior margin, which shines in contrast. Ventral striations not reaching to the last joint of the legs. Scobina present from segment 12 or 13 to within 15 or 16 segments of the posterior end of the body, the scobina small and represented by a round pit followed by a narrow attenuated striate area.

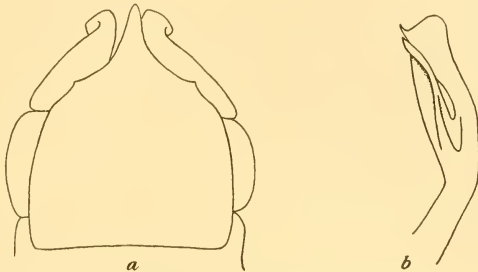


FIG. 5.—*Rhinocricus limatulus*. *a*, gonopods, anterior view; *b*, apex of inner gonopod, mesial view.

Last segment with the rather sharply angled tip equaling the valves. Anal valves of some specimens show a faint indication of having compressed margins. Preanal scale broadly rounded behind, the sides emarginate.

Gonopods as shown in figure 5, *a* and *b*.

Males without special modifications of the pregenital legs.

Type.—U.S.N.M. no. 1090.

RHINOCRICUS GRENADENSIS Pocock

Rhinocricus grenadensis Pocock, Journ. Linn. Soc. London, vol. 24, pp. 498-499, 1894.

Several specimens of this species were collected near Grand Etang, Grenada, February 10, 1932.

RHINOCRICUS ARBOREUS Saussure

Rhinocricus arboreus Saussure, Linn. Ent., vol. 13, p. 331, 1859.

Many specimens were collected from the branches and trunks of low bushes and trees on the high hills back of Roadtown, Tortola Island, March 19, 1932.

The living animals are brilliantly shining, black, and in the sunlight they show a slight bluish or greenish reflection. The labrum of these

specimens is without teeth in the emargination, a character not observed in other species of the genus.

RHINOCRICUS LEUCOSTIGMA Pocock

Rhinocricus leucostigma Pocock, Journ. Linn. Soc. London, vol. 24, pp. 500-501, 1894.

This species was found to be common in the vicinity of Roseau, Dominica, in January 1932, but with a range of size less than that credited to the species; the largest specimen was 45 mm long and many were less than 30 mm in length.

Chamberlin⁶ incorrectly assigned this species to the island of St. Lucia instead of Dominica.

RHINOCRICUS MARTINIQUENSIS Chamberlin

Rhinocricus martiniquensis Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 199, 1918.

Five specimens were found beside the road from Fort-de-France to St. Pierre, Martinique, March 10, 1932.

Although none of these specimens exceeds 30 mm in length, they agree with Chamberlin's description in other particulars. His as-



FIG. 6.—*Rhinocricus martiniquensis*. Gonopods, anterior view.

sumption of the difference between the anal segment in this species and *R. leucostigma* is correct, as was shown by direct comparison of specimens. *R. martiniquensis* has the margins of the anal valves much less compressed, and the median plate of the gonopods has the tip longer, more slender, and the apex rounded. In *R. leucostigma* the apex is almost squarely truncate.

Gonopods as shown in figure 6.

⁶ Bull. Mus. Comp. Zool., vol. 62, p. 199, 1918.

Males with the coxae of the third legs produced into triangular lobes; similar lobes, decreasing in size, are found on the next four legs. Joints 2 to 5 of legs 3 to 7 have a swollen pad on the under side.

RHINOCRICUS LATICOLLIS, n. sp.

Seven specimens were collected on the roadside between Fort-de-France and St. Pierre, Martinique, March 10, 1932.

Diagnosis.—The broad first segment, the reduced or entirely obsolete posterior stria on the dorsum of the segments, and the shape of the median plate of the gonopods distinguish this species from its closest relative, *R. martiniquensis*.

Description.—Length of the largest specimen, a female, 34 mm, width 3.5 mm. Number of segments 39 to 42.

Color much as in *R. martiniquensis*, but the median spots are broadly triangular with the base in front, the apex not quite reaching the posterior margin of the segment.

Antennae with numerous sense cones.

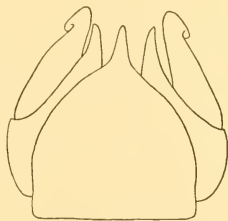


FIG. 7.—*Rhinocricus laticollis*. Gonopods, anterior view.

First segment noticeably wider than any other segment; the lateral margin on each side broadly rounded and with a very narrow, inconspicuous raised rim.

Segments 2 to 4 decreasing in width behind the first segment; the other segments of uniform width to near the posterior end of the body, which narrows rather gradually. Segments with two transverse striae, the anterior one rather prominent on the dorsum, curving back far below the pore to join the posterior one, which becomes very faint or is lacking on the dorsum a short distance above the pore. Scobina present. Last segment, anal valves, and preanal scale as in *R. martiniquensis*.

Males with the median plate of the gonopods broad to beyond the middle, the distal extremity narrowly produced, with the acute tip reaching no farther than the tips of the lateral lobes and not as far as the tips of the posterior gonopods (fig. 7).

Coxae of legs 3 and 4 moderately produced into triangular lobes. Joint 3 of legs 3 to 7 sometimes with a lobe or swollen prominence on the under side, the other joints nearly normal.

Type.—U.S.N.M. no. 1091.

RHINOCRICUS MONILICORNIS (Porath)

Spirobolus monilicornis Porath, Bih. Svensk. Vet.-Akad. Handl., vol. 4, p. 31, 1876.

Specimens were collected in St. Martins; Martinique; Trinidad; Georgetown, British Guiana; and Paramaribo, Dutch Guiana.

From these specimens and closely related forms it seems likely that with a larger number of specimens from more localities it would be found advisable to reduce *R. consociatus* Pocock, *R. juxtus* Chamberlin, and possibly *R. tobagoensis* Chamberlin, at least to the rank of varieties of *R. monilicornis*, rather than to maintain them as species distinguished by what appear to be intergrading characters of color, size, and structure.

RHINOCRICUS CONSOCIATUS Pocock

Rhinocriscus consociatus Pocock, Journ. Linn. Soc., London, vol. 24, p. 500, 1894.

Many specimens were collected on Bequia Island and at Hillsborough, Carriacou Island, in February, 1932. Both islands were very dry, and the specimens usually were found congregated beneath flat stones, logs, or pieces of boards on moderately exposed hillsides.

RHINOCRICUS CONSOCIATUS ECAUDATUS, n. var.

Specimens collected near Grand Anse, Grenada, February 10, 1932, show slight variations from the true *R. consociatus*. The last segment equals, but does not exceed, the anal valves, and the median plate of the gonopods has the sides slightly emarginate instead of being straight, but the inner gonopods of the two forms are similar. Although such differences are not considered sufficient for establishing another species, it seems advisable to call attention to them by recognizing the animals as a distinct variety.

Type.—U.S.N.M. no. 1092.

RHINOCRICUS GRAMMOSTICTUS Pocock

Rhinocriscus grammostictus Pocock, Journ. Linn. Soc. London, vol. 24, p. 501, 1894.

A number of specimens were found in the Cul de Sac Valley, and on the Bar de l'Isle, above Castries, St. Lucia, February 2, 1932.

None of the specimens exceeds the limit of size given by Pocock for this species, which increases the probability that *R. serpentinus*

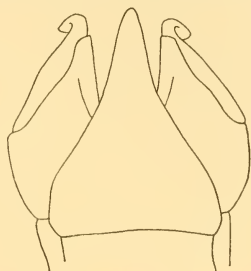


FIG. 8.—*Rhinocricus grammostictus*. Gonopods, anterior view.

Pocock is a valid species, although no specimens of it have been seen since it was described.

The gonopods of *R. grammostictus* are shown in figure 8.

NESOBOLUS MALTZANI (Pocock)

Rhinocricus maltzani Pocock, Journ. Linn. Soc. London, vol. 24, pp. 495-496, 1894.

Collected along the trail to Christoph's Citadel, Haiti, March 27, 1932.

CUBOBOLUS RAMAGEI (Pocock)

Rhinocricus ramagei Pocock, Journ. Linn. Soc. London, vol. 24, p. 489, 1894.

A number of specimens of this species were collected in the Cul de Sac Valley, St. Lucia, February 3, 1932.

As Pocock's description was based on a single female specimen, and the species has not subsequently been reported, the following notes are given.

Length varying from 42 to 55 mm.

Living color almost completely black above, except the head and the first two or three segments, which are light yellowish brown. The first segment has a small black area behind the middle of the anterior margin. Mucro of the last segment light brown. Antennae, legs, and ventral surfaces almost pure white. Pocock's statement that there is a light spot in the middle of the dorsum of each segment applies only to a few specimens after they have been preserved in alcohol, none being seen in living animals.

Antennal cones numerous.

Males with first two pairs of legs conspicuously smaller than the adjacent legs, otherwise unmodified. From the third pair of legs to within a few pairs of the posterior end of the body the fifth joint

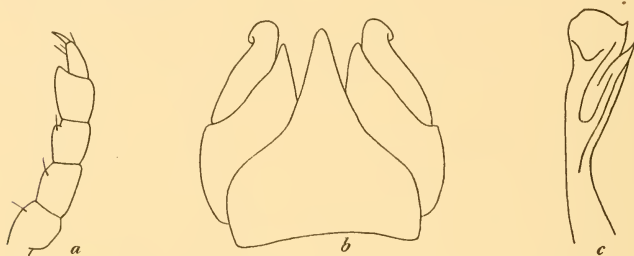


FIG. 9.—*Cubobolus ramagei*. *a*, seventh male leg, anterior view; *b*, gonopods, anterior view; *c*, apex of inner gonopod, mesial view.

of the legs is produced ventrally beneath the last joint (fig. 9, *a*). Coxae of the third legs somewhat triangularly produced.

Gonopods as shown in figure 9, *b*, the apical divisions of each inner gonopod separated for only a short distance (fig. 9, *c*).

MICROSPIROBOLUS SIGILLATUS, n. sp.

Male type was collected on Morne Pilboreau, above Ennery, Haiti, May 28, 1926, by O. F. Cook. A female specimen was collected in the same locality May 13, 1927, and another at the Citadel near Cape Haitien, March 27, 1932, by H. F. Loomis.

Diagnosis.—The most outstanding character of this species is the dorsal median marking, which consists of a solid band on the first few segments but thereafter the band is divided on the front of each segment to form a Y-shaped figure, with its stem on the hindbelt.

Description.—Length of the largest specimen, a female, 27 mm, breadth 2.5 mm. Number of segments 43.

In life the head is dark except at the labrum. First segment nearly white with a blackish spot behind at the middle and another on each side half way to the lateral margin. Ensuing segments with a broad black median band which is solid on the first few segments but on each segment thereafter is split widely apart to the hindbelt, forming a Y-shaped figure with the basal stem crossing the hindbelt; this figure pink along the sides and in the cleft. Laterad of the dark median figure is a broad cream band, below which is a still broader black band somewhat areolate with small light spots, and below this band the color is nearly white. Last segment dark, with a large semicircular

cream-colored spot on each side in front. Anal valves and preanal scale dark, antennae moderately so. Pleurae and basal joints of the legs light-colored, the outer joints darker.

Head with nearly circular eyes, composed of 21 or 22 large, convex ocelli in 5 or 6 series. Median groove faintly marked on the clypeus and lower part of the front. Clypeal fovea four on each side.

First segment narrowly rounded on the sides, subacute, the raised rim extending from opposite the eye around to the posterior margin.

Ensuing segments with the lateral suture sometimes faintly impressed beyond the pore, the other sutures not impressed but frequently showing as light lines in the integument. Transverse constriction marked by a pronounced sulcus extending across the dor-

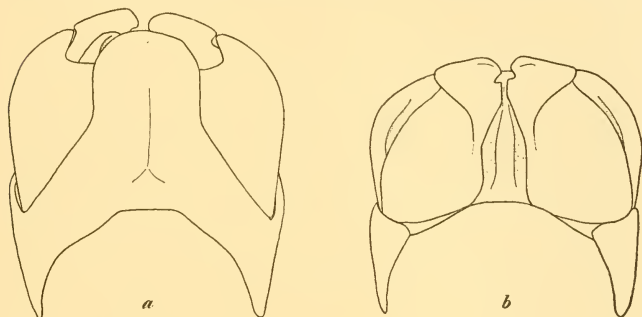


FIG. 10.—*Microspirobolus sigillatus*. *a*, gonopods, anterior view; *b*, gonopods, posterior view.

sum of all but five or six of the caudal segments; surface behind the sulcus definitely convex. Pores of moderate size, opening from the intersection of the lateral suture with the transverse suture, between the midbelt and hindbelt, and not quite half way between the impressed sulcus and the posterior margin. Surface of the segments lightly aciculated; ventral striae on the first few segments reaching three quarters of the way to the line of the pores, on the other segments becoming restricted to the vicinity of the base of the legs.

Last segment rather suddenly rounded at the apex, which equals, but does not exceed, the summit of the valves. Valves not margined. Preanal scale shorter and more broadly rounded than in the other species examined.

Males with the coxae and other joints of the pregenital legs unmodified. Gonopods as shown in figure 10, *a* and *b*.

Type.—U.S.N.M. no. 1093.

MICROSPIROBOLUS DORSETTI, n. sp.

Two males and two females were collected near Roadtown, Tortola Island, by P. H. Dorsett, March 18, 1932.

Diagnosis.—This species may be rather closely related to *M. richmondi* Chamberlin, as shown by the gonopods, but its principal differences are the larger size, greater number of segments, different coloration, and the lack of an impressed sulcus across any of the segments except a few near the head.

Description.—Length of the largest specimen, a female, 32 mm, width 2.7 mm. Number of segments 46 to 50.

Living colors: Head solid black; first segment salmon in front, changing to cream behind, the posterior margin narrowly black. Segments 2 to 6 dark throughout. Ensuing segments dark; in the females with a small transverse oval spot of salmon on each side of the forebelt, partly covered by the segment in front but showing through its transparent margin, another similar spot behind it on the midbelt (in alcoholic specimens the two spots appear more or less joined together); in the males the light spots of the midbody region are reduced in size, the anterior one sometimes missing on each segment, and the coloration otherwise is less vivid than in the females, the males being darker. Last segment with the exposed portion black, but on each side there is a large salmon spot showing through the overlapping penultimate segment. Behind segment 6 or 7 the ventral surface becomes increasingly lighter and is conspicuously salmon-colored on the last segments.

Head with a fine impressed median line on the vertex and another on the clypeal region. Clypeus with four fovea on each side.

First segment narrowly but evenly rounded on the sides, with a broad, low raised rim.

Ensuing segments with the transverse impression very faint on the dorsum of all but six or eight of the anterior segments, where it is marked by a very pronounced stria, which vanishes suddenly between segments 7 to 10. Exposed portion of the anterior half of the segments with surface similar to the posterior half, being rather coarsely reticulated and with a few fine scratches. Ventral striations not reaching beyond the tips of the legs.

Last segment with the tip usually exceeding the valves a little.

Males with the first five pairs of legs considerably heavier than the others, the sixth and seventh pairs intermediate in size. Legs 3 to 5 with coxae produced backward into broad, thick, rounded lobes; those of the fourth pair of legs a little larger than the others.

Seventh segment of the males with the ventral median ridge high, thickened on the sides but rather thin at the middle.

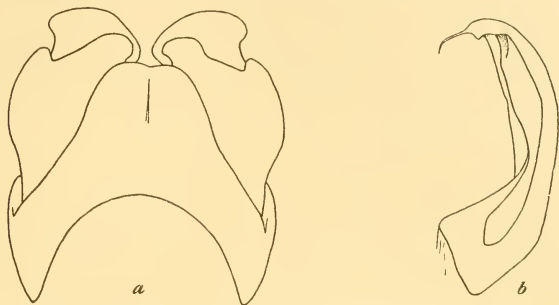


FIG. 11.—*Microspirobolus dorsetti*. *a*, gonopods, anterior view; *b*, inner gonopod, posterior view.

In spite of the fact that there are three legless segments at the posterior end of the body of the male type and four legless ones in the other, indicating that the animals are not quite mature, the gonopods of both seem to be fully developed, as shown in figure 11, *a* and *b*.

Type.—U.S.N.M. no. 1094.

APOROBOLUS, n. gen.

Type.—*Aporobolus crusoii*, n. sp.

Diagnosis.—This genus is unique in the Anocheta in that there are no repugnatorial pores on segment 7. In all other members of the order, pores extend from segment 6 to the penultimate segment in an unbroken series. The unusually low number of segments and the large basal joint of the antennae are other noteworthy characters. Relationship with *Microspirobolus* is indicated.

Description.—Body moderately slender, composed of fewer segments than is usual for the order.

Head with four fovea on each side of the clypeus. Antennae set in deep recesses on the sides of the head, the basal joint as large or larger than any other joint. Sense cones four.

First segment narrowed on the sides.

Second segment not markedly different from the next segment.

Ensuing segments bisected by a strong transverse constriction. Repugnatorial pores beginning on segment 6 and present on all other segments to the penultimate with the exception of segment 7, a con-

dition not known to occur in any other member of the order. Lateral or ventral striae not extending beyond the tips of the legs.

Last segment with the entire margin thickened, including the apex, which equals or just exceeds the valves.

Anal valves meeting in a deep groove, the margins not compressed.

Gonopods somewhat intermediate between those of *Rhinocricus* and *Microspirobolus*, but other characters point to closer relationship with the latter genus.

APOROBOLUS CRUSOI, n. sp.

One male and six females were collected February 20, 1932, at Man-of-War Bay, Tobago, the site of Robinson Crusoe's shipwreck.

Description.—Length of the largest specimen, a female, 20 mm, width 2 mm. Number of segments 35 to 38.

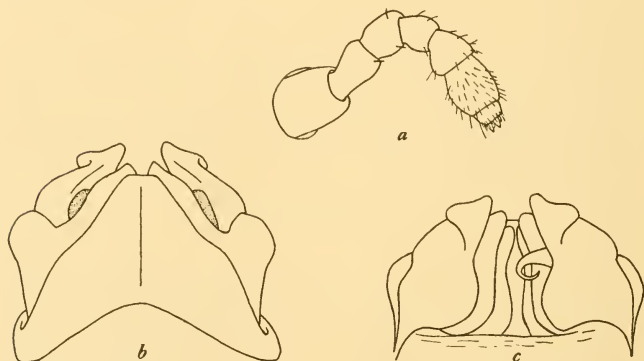


FIG. 12.—*Aporobolus crusoi*. a, antenna; b, gonopod, anterior view; c, gonopod, posterior view.

Living color white with a black stripe along the middle of the dorsum and another along each side.

Head with a short, deep furrow on the vertex; clypeus with four fovea on each side; ocelli rather large, 15 to 19 in number and arranged in three series; antennae deepset on the sides of the head, the cardo of the mandibles broadly and deeply excavated for their reception, basal joint long and thick, equaling or slightly exceeding joint 6 in both dimensions (fig. 12, a); sense cones four.

First segment with the sides narrowed, slightly emarginate in front and back just above the lateral margin. Anterior margin with a strong

raised rim reaching from the eye to the posterior corner of the segment.

Second segment continuing below segment 1 with scarcely any angulation of the surface, hardly differing from segment 3 in appearance.

Ensuing segments divided into halves by a strong transverse constriction containing a series of crescentic impressions reaching from the tips of the legs across the dorsum. Lateral striae confined to the ventral surfaces, not extending beyond the tips of the legs. Exposed dorsal surface of the segments smooth and shining, with a few short, fine longitudinal scratches. Anterior division of the segments almost flat longitudinally, posterior divisions moderately convex. Pores large, borne well behind the constriction. Pores of segment 6 larger than the others and lower on the body. Segment 7 without pores.

Anal valves strongly convex, smooth, without compressed margins, meeting in a deep groove.

Preanal scale broad, rounded-triangular.

The male type has 36 segments, of which the last 3 are without legs, but in spite of this the gonopods seem to be fully developed, as shown in figure 12, *b* and *c*. The gonopods bear some resemblance to those of the genus *Microspirobolus*, but the median plate is more triangular, and the inner gonopods are decidedly more simple, being slender and attenuated.

The pregenital legs of the male show no marked modifications, but the first two pairs of legs are nearly as long as the third pair and are considerably heavier.

Type.—U.S.N.M. no. 1095.

AZYGOBOLUS, n. gen.

Type.—*Azygobolus tumidus*, n. sp.

Diagnosis.—The location of the pore far behind the transverse depressions of the segments associates this genus with *Microspirobolus* and *Aporobolus*, but otherwise the relationship is remote, for the body is remarkably slender and submoniliform; the pores are borne on slight but evident swellings; and most unusual of all, the gonopods are devoid of a median plate, the generic name alluding to this unique condition. The posterior gonopods bend back over the coxae of the eighth pair of legs and appear incapable of being retracted into the body.

Description.—Body long, narrow, submoniliform, resembling *Nannolene* or some of the other cambalids rather than a spirobolid.

Head without a median sulcus on the vertex; clypeal setae four on each side; antennae short (fig. 13, *a*) and widely separated. Gnathochilarium as shown in figure 13, *b*.

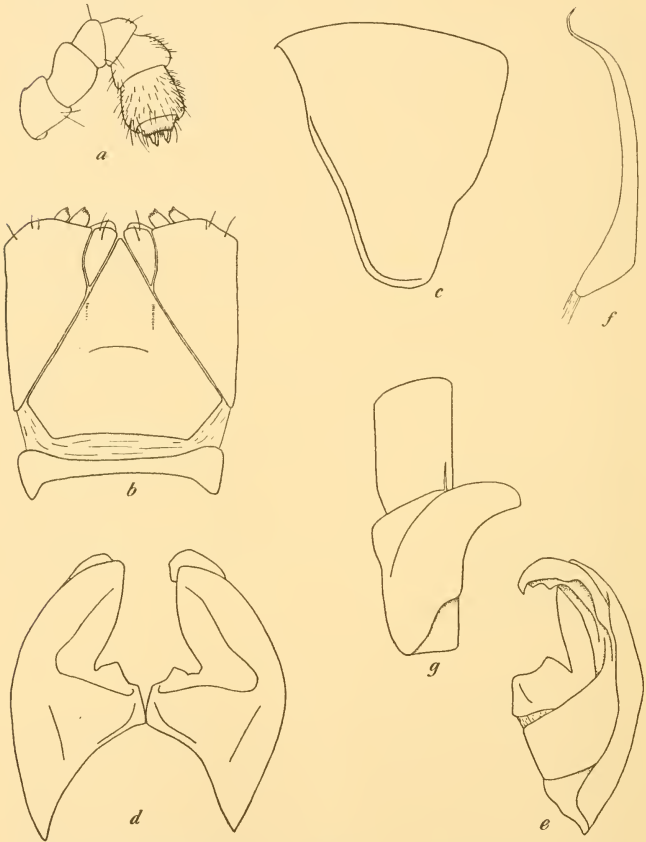


FIG. 13.—*Azygobolus tumidus*. *a*, antenna; *b*, gnathochilarium; *c*, first segment, lateral view; *d*, gonopods, anterior view; *e*, posterior gonopod, posterior-lateral view; *f*, inner gonopod; *g*, coxa and second joint of fifth male leg, mesial view.

First segment narrowed on the sides; slightly emarginate behind the eye, the posterior border more definitely emarginate above the angle (fig. 13, *c*).

Second segment with a pronounced anterior corner or shoulder obscured from the side by the first segment.

Ensuing segments each with a strong transverse median depression, in front of which the surface is sculptured with circular and crescentic impressions; the posterior half of the segment smooth, higher, and much more strongly convex, the large pore half way to the back margin and opening from the apex of a broad but distinctly evident swelling. Legs and pores terminating on the antepenultimate segment, possibly indicating that the animals lack one moult of maturity.

Last segment with the apex slightly exceeded by the moderately inflated anal valves, which meet in a deep groove and lack compressed margins.

Gonopods completely lacking a median plate, the mesial junction of the lateral lobes fully exposed in front. Apical halves of the posterior lobes bent back and carried outside the body, and their shape indicates that they are incapable of retraction within the body at any time.

Coxae of the fifth male legs with prominent lobes.

AZYGOBOLUS TUMIDUS n. sp.

Plate 2, figs. 1 and 2

Many specimens, including the male type, were collected at Marigot, St. Martins Island, March 17, 1932. Other specimens were found at Point-à-Pitre, Guadeloupe, March 11, 1932.

Description.—Length of the largest specimen 29 mm, width 1.2 mm. Number of segments 42 to 46.

Living color dark brown throughout.

Head smooth and shining throughout; vertex without a sulcus; clypeus with eight setae, the interval between the second and third setae on each side greater than that between the first and second or the third and fourth; labrum shallowly emarginate, the teeth inconspicuous; antennae too short to reach the posterior margin of segment 1, sense cones four; ocelli 28 to 34, in five or six series paralleling the first segment and forming a subtriangular patch.

First segment with a very pronounced, narrow raised rim extending from the lower corner of the eye to the posterior margin; surface smooth.

On the remainder of the body the strongly convex posterior halves of the segments give the animals a submoniliform appearance much like that of *Nannolenc*. The pore swellings are not very apparent from above, but when viewed from the side they are immediately evident.

Apex of the last segment rather broadly rounded and not separately produced, being exceeded by the anal valves, which lack compressed margins.

Preanal scale large, broad, the posterior margin rounded-transverse, the lateral angle on each side somewhat thickened or inflated.

Gonopods as shown in figure 13, *d* and *e*. They lack a median plate, and the distal half of the posterior lobes are bent back outside the body with their tips reaching above the coxae of the next pair of legs. Inner gonopods simple, the tips greatly drawn out, almost hairlike (fig. 13, *f*).

Coxae of the fifth male legs each with an erect lobe bent forward at the apex (fig. 13, *g*).

Type.—U.S.N.M. no. 1096.

TRIGONIULUS LUMBRICINUS (Gerstaecker)

Spirobolus lumbricinus Gerstaecker, Gliederthier-fauna Sansibar, p. 516, 1873.

This widespread tropical species was found in St. Kitts, Dominica, Martinique, British Guiana, and Dutch Guiana.

SPIROSTROPHUS NARESI (Pocock)

Spirobolus naresii Pocock, Ann. and Mag. Nat. Hist., vol. 11, p. 252, 1893.

This species was found in abundance in Dominica, Martinique, Guadeloupe, and St. Lucia.

Order MEROCHETA

Family STRONGYLOSOMIDAE

ORTHOMORPHA COARCTATA (Saussure)

Polydesmus coarctata Saussure, Mem. Myr. Mex., p. 297, 1860.

This milliped was found in St. Eustatius, St. Kitts, St. Martins, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, Bequia, Carriacou, Trinidad, and Dutch Guiana.

ONCIUROSOMA sp.

Three 19-segmented specimens of this genus were collected about 70 kilometers from Paramaribo, Dutch Guiana, near the railway to the Cable Station on the Surinam River, March 3, 1932.

Although they probably represent a new species, as none exceeds 11 mm in length, their structural characters, particularly those of the male, have not fully developed and it is inadvisable to give them specific designation. From the form of the lateral keels and the last seg-

ment it is apparent that they are most closely related to the genotype, *O. neotropicum* Silvestri.

Family CHELODESMIDAE

AMPHELICTOGON BIDENS, n. sp.

Plate 1, fig. 4

A male type and two females were found near Arthurstown, Cat Island, January 4, 1932, in a natural pit in the limestone rock, locally called a "banana hole" from the fact that bananas are planted in these pits, which afford protection from the constant winds.

Diagnosis.—Judging from Chamberlin's description⁷ *A. bahamiensis* is closely related to *A. bidens* but has only a single tooth on the inner side of the posterior or ventral division of each gonopod, whereas *A. bidens* has two teeth. Moreover, it is inferred that *A. bahamiensis*

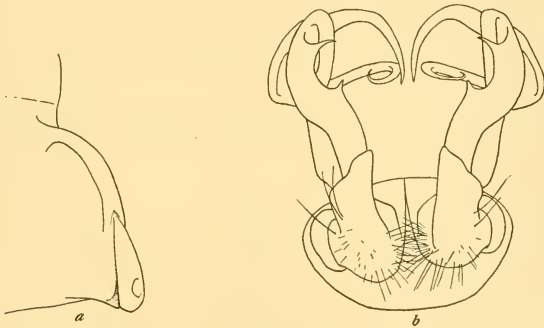


FIG. 14.—*Amphelictogon bidens*. a, lateral keel of segment 15, male; b, gonopods.

conforms to the generic description in having one or two teeth on the posterior margin of the keels, but the keels of *A. bidens* are without marginal teeth.

Description.—Length 20 mm, width 2.5 mm. Male a little more slender than the female. Body widest at the second segment in both sexes.

In live specimens the head is chestnut-brown with a darker area between the antennae; first segment brown with the lateral angles almost white; segments 2 to 4 chestnut-brown with the posterior angles nearly white, the other nonporiferous segments, including seg-

⁷ Bull. Mus. Comp. Zool., vol. 62, pp. 231, 232, 1918.

ment 20, uniform chestnut-brown throughout, as are the antennae and legs; poriferous segments with the entire keels and some of the adjacent area of the dorsum white. The median line of the body is darkened by the internal ganglion showing through the body wall.

Head with a very deep median furrow on the vertex.

Segments with the keels well developed and without any teeth on the caudal margin as ascribed to members of this genus. Pore swelling long and thick (fig. 14, *a*).

Gonopods as shown in figure 14, *b*.

Sternum between the third legs of the male with two small, forwardly directed processes. The fourth sternum with processes more rounded and not produced forward.

Type.—U.S.N.M. no. 1097.

ANTILLODESMUS VINCENTI (Pocock)

Odontopeltis vincenti Pocock, Journ. Linn. Soc. London, vol. 24, p. 514, 1894.

A. grenadanus Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 236, 237, 1918.

Three males and three females were collected in Grenada, February 10, 1932.

Comparison of my Grenada specimens with Chamberlin's description of *A. grenadanus* and Pocock's description and figures of



FIG. 15.—*Antilodesmus vincenti*. Gonopod.

Odontopeltis vincenti leads to the conclusion that but one species is involved.

The living color of the animals is chestnut-brown with the keels and a triangular area on each segment yellow, the base of the triangle extending along the posterior margin contrary to the description of *A. grenadanus*, but Pocock stated that the color varies considerably, so that differences in color pattern are of little weight.

One of the gonopods is shown in figure 15.

BEATADESMUS, n. gen.

Type.—*Beatadesmus utowani*, n. sp.

Diagnosis.—Although no males have been seen, the validity of this genus seems well substantiated by the combination of characters represented by the very strong teeth of the lateral and posterior margins of the segments near the middle of the body, and the different coloration of the poriferous and nonporiferous segments.

Description.—Body with the dorsum moderately convex, the sides parallel to about segment 16. Posterior subsegments smooth above or with one or two tiny tubercles on the surface of the keels.

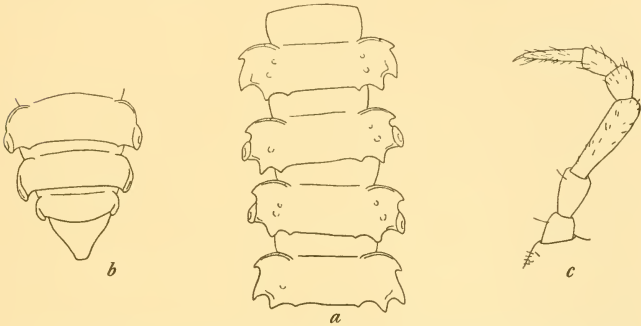


FIG. 16.—*Beatadesmus utowani*. *a*, segments 8 to 11, dorsal view; *b*, segments 17 to 20, dorsal view; *c*, first leg of segment 8, female.

Head wider than the body, the cardo of the mandibles especially prominent, long, subrectangular; antennae long and slender, joints 2 to 6 inclusive of uniform thickness.

First segment semicircular, with an erect seta on each side of the middle close to the front margin.

Ensuing segments with a sharp, prominent tooth at the anterior corner of each keel from segment 2 to segment 16 (fig. 16, *a*), behind which the tooth vanishes (fig. 16, *b*); on the middle segments the tooth is larger and is produced outward and backward; posterior angles of the nonporiferous segments all strongly produced caudad, especially in the midbody region; on the poriferous segments the thickened rim surrounding the pore occupies much of the lateral margin of the keel and replaces the produced angle. Posterior margin of the segments with a large tooth mesad of the posterior angle of each keel and usually with a much smaller tooth mesad of it; these teeth dis-

appearing on the last few segments. Poriferous segments differing in color from the others.

Anal valves subrectangular, flattened, with prominent margins.

Joint 3 of the legs much longer than any of the other joints (fig. 16, *c*); sterna near the middle of the body wider than the length of the third leg joint.

BEATADESMUS UTOWANI, n. sp.

A number of fragments of dead specimens and a single live but immature female (18 segments) were found January 18, 1932, under rocks on Beata Island, off the south coast of Haiti. The name given this animal associates the island where it was found with the yacht *Utowana*, on which the members of the expedition lived during three months of exploration in the West Indies.

Description.—Length of females probably about 25 mm, width 3.5 mm; males shorter and more slender. Body with the sides parallel from near the head to about segment 16; dorsum not strongly arched.

The immature female was entirely white in life, but the dead specimens obviously retained much of the color of the living animals, and although none of these had the head or first three segments, all of the poriferous segments are present and usually have a narrow brown area along the transverse sulcus on each side of the middle, the remainder of the surface white; nonporiferous segments with a median light area which is broader at the posterior margin than in front, the remainder of the segment brown or with a narrow portion of the longitudinal margin of the keels white.

Anterior half of all segments brown below, the dorsum with a white median area, widest at the anterior margin, extending backward and on some of the last segments joining with the white portion of the posterior subsegment. Last segment, valves, preanal scale, and legs entirely dark colored.

The sterna have 30 to 40 tiny, short hairs scattered over the surface but with slightly greater density in front than on the back half.

Other characters have been given in the generic description.

Type.—U.S.N.M. no. 1098.

BELONODESMUS THAXTERI Chamberlin

Plate 1, fig. 5

Belonodesmus thaxteri Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 246-247, 1918.

This species is very abundant in the forests near Port-of-Spain, Trinidad, and probably is common throughout the island. Its range

also includes Tobago Island, near the eastern end of which, at Man-of-War Bay, it was collected in February 1932.

This species was erroneously placed in the Polydesmidae instead of the present family, where all its characters indicate that it belongs. The pores are not "near the margin of the keels on the dorsal side" but are actually in the thickened rim of the margin, the oblique elevation of the keels allowing the pores to be plainly seen from above. The gonopods, one of which is shown in figure 17, are definitely chelodesmid.



FIG. 17.—*Belonodesmus thaxteri*. Gonopod.

In addition to the characters given in the original description, it was noted that there is a serrate-tubercular ridge on the side of each segment from 2 to 17 located a short distance above the base of the legs. The sterna are high and wide with the legs lateral to them; there is a distinct tooth behind each coxal joint on the segments from just in front of the middle of the body to its rear end.

In the male the fifth joint of the first leg is produced distally into a lobe reaching almost to the claw of the last joint; the succeeding four pairs of legs have similar ventral lobes decreasing in size. Sternum between the fourth legs with two thin, high, transverse tubercles; that between the fifth legs with two smaller conic tubercles; and that between the sixth legs with two higher tubercles.

PRIODESMUS ACUS Cook

Plate 2, fig. 3

Priodesmus acus Cook, Proc. U.S. Nat. Mus., vol. 18, pp. 55, 56, 1895.

A mature female and a nearly mature male were collected about 70 kilometers from Paramaribo, Dutch Guiana, beside the railway leading to the Cable Station on the Surinam River, March 3, 1932.

Since the female of this species closely follows the description and drawings of the male of *P. acus*, the validity of *P. parae* Cook, erected with some question as to its distinctness from *P. acus*, is substantiated.

A character not noted in the description of *P. acus* is the presence of slender tubercles that project beyond the margin of the segment just above each posterior leg on segments 2 to 18. The female measures 20 mm in length.

Family EURYURIDAE

APHELIDESMUS DIVERGENS Chamberlin

Plate I, fig. 6

Aphelidesmus divergens Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 249, 1918.

Numerous specimens were collected in Trinidad and Tobago, February 1932.

The antennae are separated by less than the diameter of one of the sockets. Front of the head conspicuously swollen between the antennae and immediately below them.



FIG. 18.—*Aphelidesmus divergens*. Gonopod.

Segments 2, 3, and 4 with a small but distinct tooth at the anterior corner of each keel.

Segments coarsely tuberculate along the posterior margin below the keels; on the anterior segments this tuberculation is not confined to the marginal area alone but extends onto the lateral surface. Anterior corner of the keels, beginning with segment 5, beset with many sharply conic tubercles, as is also the posterior margin of each keel.

In both sexes there are two conic tubercles on each side of the sternum opposite each leg with the exception of the first two pairs of legs.

One of the gonopods is shown in figure 18.

Family PLATYRHACHIDAE

NANORRHACUS LUCIAE (Pocock)

Plate 1, fig. 7

Platyrrhachus luciae Pocock, Journ. Linn. Soc. London, vol. 24, pp. 511-512, 1894.

Numbers of specimens were found in the forest on the Bar de l'Isle above Castries, St. Lucia, February 2, 1932.

Family POLYDESMIDAE

AETHEANDRA, n. gen.

Type.—*Aetheandra multiplex*, n. sp.

Diagnosis.—The relationship of this genus may be close to *Polydesmus*—at least the females suggest this possibility—but the males exhibit more diverse secondary sexual characters than previously associated with this family, such as the greatly broadened labrum, the posterior productions of segments 2 and 3, and the expanded joints of legs 2 and 3. In remarkable contrast to the diversity of the secondary characters, the gonopods show a degree of simplicity probably not equaled by any other member of the order.

Description.—Small, very agile millipeds with the body of the proportions of a small *Polydesmus*. Number of segments 20. Lateral carinae horizontal, marked off from the body proper by a broad longitudinal depression; a more definite, transverse depression across the dorsum. Dorsum and lateral margins of the keels with a few thickened setae, but lacking any polygonal areas or tubercles, the surface finely granular. Pores in the usual sequence, opening on the dorsal surface from the base of the produced posterior angles. Males exhibiting unusual secondary sex characters in various parts of the body.

Head with the antennae long and slender; joints 2 to 6 subequal in length but joint 6 suddenly widened on the outer side beyond the small base. Vertex medianly impressed, glabrous behind, but in front to the upper limits of the antennal sockets it is finely pubescent. Males with a prominent transverse tubercle on the front just below the antennae; also with a continuous ridge connecting the lateral angles of the head; on each side the ridge begins at the angle and passes in front of the antenna and curves up between it and the frontal tubercle, joining the ridge from the other side high on the vertex where it is less prominent; labrum broadened, the front margin nearly straight

or slightly emarginate from the abruptly angled lateral corners (fig. 19, *a*); the labrum of the female of the usual narrowed polydesmid type.

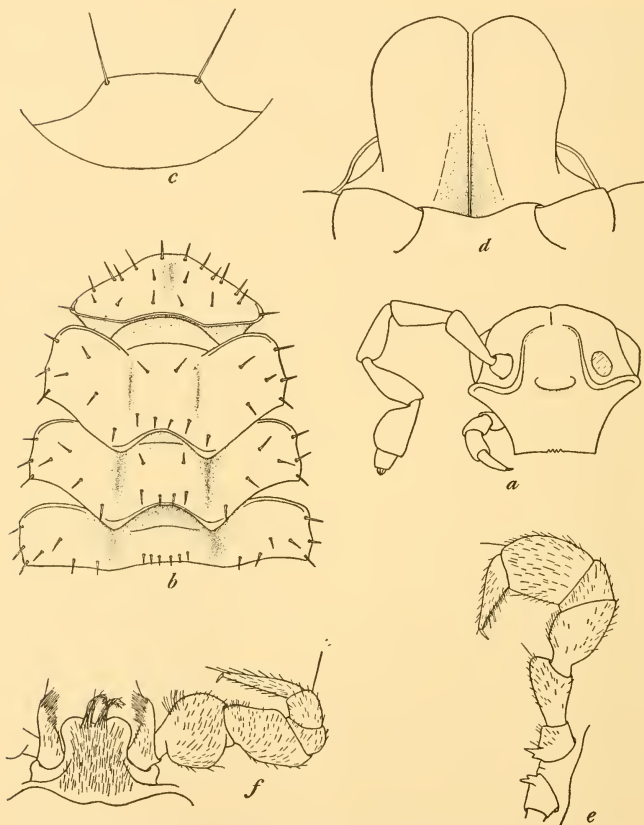


FIG. 19.—*Actheandra multiplex*. *a*, head and antenna of male, anterior view; *b*, segments I to 4 of male, dorsal view; *c*, preanal scale; *d*, gonopods; *e*, sternum and second male leg, anterior view; *f*, sternum and third male leg, anterior view.

First segment subsemicircular, broadly depressed along the middle; surface with 20 erect thickened setae.

Second segment longer than any other; the keels produced forward, lateral margins each with 3 thickened setae, the dorsal surface of the

segments including the keels with 14 erect thickened setae. Setae similarly disposed on the other segments. Males with the lateral keels more sharply produced forward, the posterior margin of the segment carried back on either side of the middle into a broadly triangular lobe extending over the next segment (fig. 19, *b*). The third male segment also has two similar lobes extending over segment 4. The fourth male segment with the dorsum very short, depressed below the level of the segments on either side of it, the keels strongly ascending, the six setae between the keels in a single row along the posterior margin instead of there being two in front and four behind as on the other segments.

Ensuing segments similar in the sexes, the posterior ones narrowing gradually, the posterior angles increasingly more produced to segment 17, after which they decrease in size and are scarcely apparent on segment 19. The setae along the posterior margin of segment 19 are about double the length of those on the other segments.

Last segment small, ending in a short, horizontal, truncated cone; sides emarginate.

Anal valves strongly convex, with thin, raised margins.

Preanal scale broad at base, the sides emarginate, the apex broadly truncated with a seta at each corner (fig. 19, *c*).

Gonopods exceedingly simple, consisting of two broad, thin, erect, apically rounded plates resembling tiny tombstones, the basal portion of each broadened; the plates oblique-transverse and in contact along their mesial sides (fig. 19, *d*). The opening in the segment through which the gonopods project is widest in front, with the posterior margin raised into a high rim.

First male legs smaller than those of the female.

Second male legs with each coxal joint bearing a small tubercle near the base; second joint somewhat produced at the apex posteriorly; joints 3, 4, and 5 thin but greatly expanded vertically; joint 6 thickened at the base, narrowing distally, with a comb of fine hairs along the ventral side (fig. 19, *e*).

Third male legs with each coxal joint produced into a high process with long hairs behind and along the inner side to the tip; joints 2 and 3 thin but greatly expanded vertically; the three distal joints nearly normal, the terminal one lacking a ventral comb of hairs; sternum very greatly elevated transversely into a broad, thin, posteriorly concave prominence, very woolly in front and topped by two locks of long, twisted hairs; the posterior concave face of the elevation is glabrous and shining (fig. 19, *f*).

AETHEANDRA MULTIPLEX, n. sp.

Plate 2, figs. 4 and 5

Three males, four females, and four young were collected in the heavy forest near the top of the ridge back of Kings Bay, Tobago, February 20, 1932. They were found among very moist, decaying sheaths and leaves from a huge cabbage palm, and on being disturbed ran rapidly for shelter.

Description.—The living color was bright light brick-red and the thickened hairs were quite apparent in spite of the rather small size of the animals. The largest specimen was 9 mm long and 1.5 mm broad. Structural characters have been sufficiently set forth in the generic description.

This is a very remarkable milliped in several particulars. The females are not strikingly different from many other small polydesmids, but the males differ from them so much that had the sexes been collected separately they would have been considered as distinct species, or even as representing different genera, for the secondary sexual modifications of the male not only greatly affect the anterior legs and sterna, but the shape of the head and anterior segments is changed in a very unusual manner. Outstanding differences of the head and dorsum are not expected between male and female in the Polydesmidae, but this species is exceptional in these particulars, for the head and first four segments are very dissimilar in the sexes. Although it is usually found that some of the legs in advance of the gonopods differ from the corresponding female legs in this family, the modifications seldom are as extreme or numerous as those of the second and third male legs of *A. multiplex*, and the sternum between the latter legs is remarkably developed. In view of the many secondary modifications it is surprising not to find complex gonopods as a corollary, but instead they are of a simplicity not paralleled in any other member of the family and probably not even surpassed within the order Merocheta.

Type.—U.S.N.M. no. 1099.

AGENODESMUS, n. gen.

Type.—*Agenodesmus reticulatus*, n. sp.

Diagnosis.—The general appearance of the animal is that of a small polydesmid, and although the dorsum lacks tubercles or broad, convex areas, the setae are rather typical. The shape of the first and last segment and of the lateral carinae, the dorsally placed pores, and the structure of the gonopods are definitely suggestive of the smaller Poly-

desmidae, but the tiny, 18-segmented body distinguishes it from all other forms except the 18-segmented *Hexadesmus*, which has the dorsal setae slender instead of definitely clavate.

Description.—Body very small, about eight times as long as broad; composed of but 18 segments; dorsum lacking tubercles or convex areas but definitely reticulated and with transverse series of strongly clavate setae.

Head with no median furrow evident, the surface reticulated and with many tiny, erect bristles, those of the vertex shorter than elsewhere. Cardo of each mandible with short bristles similar to those of the vertex. Antennae strongly clavate, with joint 6 longest and broadest; joints 4, 5 and 6 each with a very long extremely fine hair on the outer side near the end.

First segment oval; narrower than the head or the ensuing segments; surface relatively coarsely reticulated, as is the surface of all the other segments; a series of 10 large, clavate bristles along the anterior margin, and behind this is a median series of 4 similar bristles, and a third row of bristles along the posterior margin.

Second segment with the lateral carinae a little longer than those of the next two segments, distinctly produced forward, the carinae of the ensuing segments decreasingly so; anterior and posterior corners of all carinae rounded, except on the three segments preceding the last, which have the posterior corners acute and moderately produced backward; lateral margins simple, convex in outline.

Posterior subsegments moderately convex, with a distinct transverse depression; surface reticulated; the lateral carinae slightly depressed, not very strongly produced. Along the anterior margin of each segment is a series of 10 erect, strongly clavate setae, and a series of 8 similar ones along the posterior margin, the bristles of both series directed forward. On the four segments in front of the last some of the bristles of the anterior row are moved back and form a submedian row. Penultimate segment with six very long, slightly clavate hairs projecting straight back from the posterior margin.

Last segment as long or longer than the penultimate segment; definitely produced into a slightly down-curved, papillate mucro.

Repugnatorial pores large, rimless, opening from the top of a slight conic swelling of the dorsal surface close to the posterior corner of segments 5, 7, 9, 10, 12, 13, 15, 16, and 17.

Anal valves moderately convex, with raised margins.

Preanal scale long, rounded-triangular.

Sterna wider than the length of the first joint of a leg; crossed each way by a deep median depression.

Gonopods with basal joints large, galeate; each apical joint rather small, biramous at tip, curving outward and backward from the inner side of the basal joint.

AGENODESMUS RETICULATUS, n. sp.

A male (type) and several females were collected at Fond des Negre, Haiti, June 28, 1927, and on the same date two females were found between Petit Goave and Leogane, by O. F. Cook and H. F. Loomis. A female that does not differ strikingly from the more southern specimens was collected at Le Borgne, on the north coast of Haiti on March 26, 1930, by O. F. Cook. A mature female and a younger specimen were collected on the north slope of Mount Misery, St. Kitts, January 24, 1932. Four mature females were found on the Bar de l'Isle, above Castries, St Lucia, February 2, 1932, and two young were found at Roseau, Dominica; and two others from near Grand Etang, Grenada, the same year. These specimens do not differ among themselves or from Haitian specimens.

Description.—Length of the largest specimen 2 mm, width .25 mm. Number of segments 18.

Living color white with a slight tinge of pink.

Head large, strongly convex; surface distinctly reticulated and hirsute, vertex without a median furrow. Antennae strongly clavate, joints 2 and 3 subequal, each longer than joint 4; joint 5 broader than long, about the same length as joint 2 or 3, considerably shorter than joint 6, which also slightly exceeds it in thickness; joints densely hairy, especially the outer ones; joints 4, 5, and 6 each with a long and extremely fine hair on the outer side distally.

First segment about twice as wide as long, with a broad, transverse depression at middle, otherwise as given in the generic description.

Ensuing segments with characters as given in the generic description.

Last segment as long or longer than the penultimate segment, the apex produced into a slightly downcurved papillate mucro, the lateral margin on each side with three setae; dorsal surface with a transverse row of four long, erect bristles near the middle, and between this row and the mucro are two additional bristles.

Gonopods with each basal joint galeate, the surface somewhat hispid; apical joint arising from an opening in the inner surface of the basal joint near the front and curving upward and backward, the joint rather simple, terminating in two branches subequal in length but with

the anterior one heavy and definitely foliate near the apex, the posterior branch slender, attenuated (fig. 20).

Anterior male legs without lobes or other secondary specializations.

The discovery of this tiny species was of particular interest because of its having only 18 segments, a condition never before observed in the Merocheta, no mature member of which had previously been found with more than 20 or less than 19 segments.

Another closely related 18-segmented millipede was later found in Cuba and given the name of *Hexadesmus lateridens*.⁸ This species is now known from Haiti, St. Kitts, and Carriacou of the Grenadines.



FIG. 20.—*Agenodesmus reticulatus*. Gonopods.

With the exceptions of the Oniscomorpha, in which 13 segments is the maximum, and the Limacomorpha with 20 or 21 segments, none of the remaining orders of Chilocheta contains animals with so few segments as in the Merocheta. In the Merocheta, species with only 19 segments are the exception rather than the rule, by far the largest number having the full complement of 20 segments. In some of the small forms, such as *Brachydesmus* and *Bactrodesmus*, the possession of only 19 segments is believed to be a depauperate condition, and this view seems to be supported and supplemented by *Agenodesmus* and *Hexadesmus*.

Not only is *A. reticulatus* nearly the shortest of all known millipeds, but it is decidedly more slender and delicate than any other yet discovered, the proportions of a polydesmid having been closely maintained in spite of the greatly reduced length.

Type.—U.S.N.M. no. 1100.

HEXADESMUS LATERIDENS Loomis

Hexadesmus lateridens Loomis, Bull. Mus. Comp. Zool., vol. 75, pp. 362, 363, illus., 1933.

Four female specimens, two of which are young, were collected beneath rocks on the grassy hills south of Basse Terre, St. Kitts,

⁸ Bull. Mus. Comp. Zool., vol. 75, pp. 362, 363, illus., 1933.

January 23, 1932. They were in company with two other species of millipeds, *Dilophops bullatus* Loomis and *Psochodesmus granulofrons* (Chamberlin). Two mature (18-segmented) females were collected also near Hillsborough, Carriacou Island, February 8, 1932. A young specimen was collected at Petite Riviere de Artibonite, Haiti, July 1927, by H. F. Loomis.

CHILAPHRODESMUS, n. gen.

Type.—*Chilaphrodesmus rubellus*, n. sp.

Diagnosis.—Relationship to the 19-segmented African genus *Bactrodesmus* is shown by the structure of the gonopods; in both genera the basal joint is large and hollowed out to receive the apical joint, much as in the Stiodesmidae or Chytodesmidae. The dorsum in *Chilaphrodesmus*, however, is not definitely tuberculate; the repugnatorial pores open from the side of the posterior angle of the keel rather than from the dorsal surface of the keel; and the posterior margin of the penultimate segment is straight between the produced angles of the keels, not toothed as in *Bactrodesmus*.

Description.—Body about 7 times as long as broad, with 20 segments; dorsum flattened, slightly convex; lateral carinae projecting as in *Polydesmus*.

Head large, greatly exposed from above; surface quite densely hairy, the hairs of the vertex shorter than elsewhere; groove of the vertex fine and faint. Antennae rather slender, scarcely clavate, densely hirsute, especially the three outer joints; joint 6 broadest but not exceeding joint 3 in length; next in order of length come joints 2, 5, and 4, with 1 and 7 the shortest and subequal, each half as long as joint 2.

First segment oval, much narrower than the head or the adjacent segments; anterior margin with a thin, raised rim extending from one lateral angle to the other; behind this rim is a series of 10 very long erect setae arising from tiny, inconspicuous swellings or granules; behind this series are two others, the median containing four setae, the posterior six setae; surface elsewhere definitely reticulated, as is the surface of all the other segments.

Second segment with the carinae longer than those of the segments immediately following, especially segments 3 and 4.

Second and ensuing segments with an anterior row of four long erect setae and a posterior row of six smaller setae arising from granules similar to those on the first segment; each granule being in the center of an indefinite low, convex area; all segments except the first and last with six setae projecting horizontally backward from

the posterior margin, their length intermediate between the two dorsal series; in the male the setae are on small marginal teeth which are obsolete on the last few segments; the females with teeth indefinite or lacking. Beginning with the second segment the posterior margin of each segment has a broad triangular sinus or emargination on each side adjacent to the carina, causing the posterior angle of each carina to appear definitely produced backward, whereas on only the last segments do the corners of the carinae extend farther back than the median portion of the posterior margin of the dorsum and on these segments the sinus is reduced or lacking and the margin straight from side to side. All nonporiferous segments, except the first and last, have the lateral margin on each carina tridentate, each tooth bearing a long seta; poriferous segments with four setiferous teeth on the lateral margin of the carinae and the pore opens outward and backward from the margin of the posterior angle between the last two teeth. Pores on the customary segments; posterior angles of segment 19 much shorter than those of segment 20.

Last segment with a transverse median row of six setae and two setae near the papilliform apex which is short and almost horizontal.

Anal valves strongly convex; the margins thinly elevated.

Preanal scale rather long, triangular.

Sterna wide, about as in *Polydesmus*.

Basal joint of each gonopod large, subtriangular, hollowed to receive the long, curved apical joint. When the apical joints are exerted, one crosses the other, and each is directed toward the opposite side of the body.

In the male specimen the outer joints of the anterior legs are missing, but the coxal joints are present and show no specializations distinguishing them from the coxae of the legs farther back. The sterna between the seventh and eighth pair of legs are not definitely wider than the adjacent sterna.

This is an active little creature, apparently of much the same habit as *Bactrodesmus*, running swiftly for shelter when disturbed, with the antennae held nearly parallel in front of it. Because of the small size and rapid movements several specimens escaped in the litter of leaves; the ones collected were found on the underside of a stone which was upturned, and from which they were unable to escape.

CHILAPHRODESMUS RUBELLUS n. sp.

Plate 2, fig. 6

A male (type) and two females were collected near the road on the summit of Morne Pilboreau, above Ennery, Haiti, July 24, 1927,

by H. F. Loomis. A 17-segmented female was collected from the same locality, March 21, 1930, by O. F. Cook. Two females were collected within the Citadel, Cape Haitien, Haiti, March 27, 1932.

Description.—Length of the largest specimen, a female, 5.5 mm, width .8 mm.

Living color definitely pink.

Head with the three teeth of the labrum small but acute; the surface of the labrum and clypeus less hirsute and more distinctly shining than the rest of the head; antennae as shown in figure 21, *a*.

Behind segment 4 the seta at each end of the posterior row is usually reduced in size or is entirely lacking, leaving only the four inner setae. On the poriferous segments a small seta rises from the top of the posterior projection of the lateral margin of each carina above and just behind the pore. The entire dorsal surface of all the segments



FIG. 21.—*Chilaphrodesmus rubellus*. *a*, antenna; *b*, gonopod.

is rather coarsely reticulated as seen with high magnification, with the bottom of each cell strongly shining.

Gonopods with each basal joint large and strongly convex, subtriangular, hollowed and apparently capable of receiving the outer joint when retracted. In the type these outer joints are projected laterally, one crossing the other and hiding much of it. Each outer joint is moderately stout, evenly curved, with a very large, acutely triangular lobe at the middle of the inner side; outer portion of the joint more slender, subspatulate, the apex rather thin and rather broadly emarginate (fig. 21, *b*).

The two females collected in Christoph's Citadel, are each 8 mm long, and although considerably larger than the specimens from the type locality, they agree very well in other particulars; however, examination of males from near the Citadel might show that they represented a second species.

Type.—U.S.N.M. no. 1101.

Family CHYTODESMIDAE

DOCODESMUS HAITIENSIS Chambe lin

Plate 3, figs. 1 and 2

Docodesmus haitiensis Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 216, 1918.

A number of specimens were found within the walls of Christoph's Citadel, near Cape Haitien, Haiti, March 27, 1932.

DOCODESMUS SCULPTURATUS, n. sp.

Plate 4, fig. 1

Many specimens, including the male type, were collected in a "banana hole" 3 or 4 miles from Nassau, New Providence, Bahama Islands, January 3, 1932.

Diagnosis.—This is the smallest and relatively the most coarsely sculptured of the genus. The dorsal tubercles are large and conspicuous and the sulci in the margins of the segments are particularly apparent; the posterior margins of the segments, especially segments 18 and 19, are strongly scalloped.

Description.—Length varying from 5 to 7 mm, width from 1 to 1.3 mm.

Living color cinnamon-brown above, lighter beneath.

Body more convex than in the other species and the sculpturing coarser; the sulci between the areas of the front margin of the first segment and the lateral and posterior margins of the other segments are particularly deep; the transverse convex areas on the dorsum of the body segments are not especially evident but the tubercle at the center of each area is large and high. Lobation of the lateral carinae as in the other species.

Head with a slightly elevated, granular area on the vertex, crossed by a median depression; clypeus continuous with the front.

First segment relatively longer at the middle than in the other species, the posterior margin on each side of the median portion directed forward more obliquely, surface with 10 large tubercles in 2 rows, with additional finer granulations.

Ensuing segments with four longitudinal rows of large tubercles, apparently three tubercles in each row, but in reality the third elevation is formed by an enlarged elevated area of the margin, immediately behind the row; the other marginal areas are smaller and project as distinct scallops. Between each pair of the enlarged areas of the posterior margin there are two smaller areas on all but the last three segments; on segments 18 and 19 the posterior margin is wholly occu-

pied by the four large areas, which are even more conspicuous than on the preceding segments. Anterior rim of the subsegments conspicuous on the carinae but less evident across the dorsum. Posterior angles of the carinae not definitely produced backward until segment 16 or 17.

Last segment with two prominent dorsal tubercles.

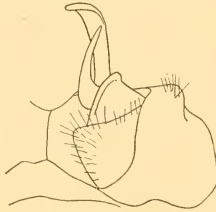


FIG. 22.—*Docodesmus sculpturatus*. Gonopod.

Gonopods as shown in figure 22, the basal joint large, hemispherical.

Legs of the males without special modifications except that the sternum between the fourth legs bears two tiny rounded tubercles.

Females with the anterior ventral margin of segment 3 elevated for a long distance into a very prominent ridge directed obliquely backward, the median portion thin-edged, the lateral angle on each side higher and several times as thick.

Type.—U.S.N.M. no. 1102.

DOCODESMUS TRINIDADENSIS Chamberlin

Plate 4, fig. 2

Docodesmus trinidadensis Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 219, 1918.

Specimens were collected in Trinidad at Sangre Grande, in the Aripo Valley, and in the Arena Forest area; others were found at Scarborough and Man-of-War Bay, Tobago.

The largest specimen was 12 mm long and 2.2 mm wide. The living color ranged from black with the carinae deep reddish-brown to entirely black with the exception of a narrow reddish area along the front margin of segment 1.

Body moderately convex; rather coarsely sculptured but relatively less prominent than *D. sculpturatus*; the transverse convex polygonal areas of the dorsum are more pronounced and there are more fine, irregular granulations in addition to the large tubercles. The areas separated by sulci along the posterior margin of the segments project

as faint crenulations but are produced into acute projections only on segment 19.

Head with a deep median impression across the coarsely granular area of the vertex which is separated from the front of the head by a deep channel just above the antennae; clypeal region elevated above and separated from the front by a deep furrow, especially evident on the sides.

Segments with raised anterior rim strongly evident on the carinae and adjacent dorsum but broken into erect crenations across the middle of the dorsum.



FIG. 23.—*Docodesmus trinidadensis*. Gonopod.

Gonopods as shown in figure 23, the basal joint relatively small, subangularly compressed, not forming an almost true hemisphere.

Males with the sternum between the fourth legs bearing two small, rounded tubercles. First joint of the fourth legs with a rounded setiferous tubercle in front, the second joint with the distal anterior corner continued into an acute lobe.

Females with the anterior ventral margin of segment 3 carried up into a high, thin, slightly reflexed ridge, highest at the middle and without prominent lateral angles.

In spite of the fact that my specimens are smaller, it seems evident that this is Chamberlin's species, although few distinctive characters were given in its description.

DOCODESMUS ROBUSTUS, n. sp.

Plate 4, fig. 3

A male (type) and a female were found at Kings Bay, Tobago Island, February 20, 1932.

Diagnosis.—Besides being much shorter in proportion to its width than any other species of *Docodesmus*, the irregular, cuspidate tuberculation of the dorsum and the lack of series of large tubercles make this the most easily recognized member of the genus. It may be remotely related to *D. trinidadensis*, as the structure of the head and the gonopods seem to indicate.

Description.—Body elongate-oval and less than four times as long as broad; both specimens measuring 13 mm in length and 3.7 mm in width. Dorsum strongly convex, much more so than in *trinidadensis*, and the lateral carinae descend more obliquely.

The living animals were dull black above throughout, lighter beneath.

Head with a very pronounced, broad, deep furrow just above the antennae separating the frontal region from the raised, medianly furrowed, granular vertex; clypeal region suddenly elevated above the frontal region, smooth and shining.

First segment about a third narrower than the midbody segments; anterior margin evenly rounded, the surface behind the marginal areas with densely scattered small granules.



FIG. 24.—*Docodesmus robustus*. *a*, last 2 segments, anal valves and scale, ventral view; *b*, side view of a gonopod from above and slightly behind.

Ensuing segments without longitudinal or transverse lines dividing the surface into large polygonal areas, and without any definite series of large tubercles; instead, the dorsal surface, except the usual smooth sulcate areas of the posterior margin and the lateral carinae, is densely scattered with small tubercles of various sizes, the median ones somewhat rounded but those on the sides of the dorsum and adjacent carinae are definitely cuspidate and each is surmounted by a very tiny and very short seta. Posterior marginal areas at the middle of the dorsum very short, not projecting beyond the margin as crenations except on several of the last segments. Anterior raised rim continuous across the dorsum, where its apex is slightly undulated.

Last segment with two large appressed, triangular tubercles above. Lateral lobes large, the median one broad, rounded-transverse behind. Ventrally, the four apical setae are protected on each side by a strong conic tubercle which projects backward (fig. 24, *a*).

Anal valves flattened, with moderately raised margins; disk of each valve with an angular fold or ridge extending upward from the lateral corner of the scale. Preanal scale triangular, the setiferous tubercles exceeding the median angle.

Gonopods shaped somewhat like those of *D. trinidadensis*, but the median portion of the long inner arm is expanded just below the distal half (fig. 24, *b*).

Males with the fourth sternum bearing two rounded, finely hispid tubercles; first joint of each fourth leg with a tubercle of about the same size.

Females with the anterior ventral margin of the third segment gradually raised from each side to form a low ridge or rim, which is highest at the middle of the body.

Type.—U.S.N.M. no. 1103.

IOMOIDES, n. gen.

Type.—*Iomoides hispidus*, n. sp.

Diagnosis.—This genus seems to be closely related to *Iomus* Cook, but is more convex and more compact; the lateral carinae are not as broad or as deeply incised, although with the same number of marginal lobes. The rows of large dorsal tubercles converge caudad instead of diverging or running parallel, and the third joint of the legs is longer than the last joint.

Description.—Body very compact, about four times as long as wide, the dorsum very strongly arched; lateral carinae broad, exceeding the legs, the anterior corners lower than the bottom of the body cavity. Surface of the carinae and the dorsum roughened, including the four longitudinal rows of large tubercles. Segments 2 to 5 inclusive gradually widening, the ensuing segments to the sixteenth of uniform width, after which they narrow rapidly. The posterior subsegments are abruptly raised high above the anterior subsegments, the face of the elevation being distinctly recessed, receiving the posterior edge of the foregoing segment when the body is held straight; anterior margin of the segments with a definite scallop between the outer and inner row of tubercles on each side, and two other scallops between the inner rows of tubercles.

Head quite convex, completely hidden beneath the first segment; surface between and above the antennae elevated and roughened, below the antennae the surface is somewhat shining and hispid. Antennae strongly clavate, geniculate, joint 5 broadest and longest.

First segment subhexagonal, greatly exceeding the head in front, narrower than the second segment, twice as broad as long; central

portion sharply raised above the broadly expanded anterior margin, which is divided by radiating lines into 10 elongate areas; disk with two transverse rows of large tubercles, entire dorsal surface, including the tubercles and the expanded margin, very finely roughened.

Second segment with the lateral margin of the carinae half again as long as segment 3, divided into three lobes by two very long, narrow, usually dirt-filled slits; front lobe of each keel raised; its anterior margin partly covering the oblique posterior margin of the first segment; middle lobe depressed below the level of the others.

Dorsum of segments 2 to 19 inclusive with four longitudinal rows of slightly convex, transverse areas, there being two such areas in each row and in the center of each area is a large, rounded-conic tubercle. The two rows of tubercles on each side of the faintly indicated median line extend obliquely mesad toward the back of each segment, especially the outer row. On the antepenultimate segment the last tubercle in each inner row is larger than the tubercles on any other segment and projects up and back, slightly exceeding the posterior margin. The lateral margin of each carina has a deep, narrow incision; the anterior and posterior margin each with three sublageniform incisions; these incisions, and particularly the one in the lateral margin, usually filled with dirt. Pores very inconspicuous, apparently present on segments 5, 7, 9, 10, 12, 13, 15-18, near the posterior corner of the carina.

Penultimate segment with the outer margins of the carinae converging backward very sharply, the posterior margin of each carina very short, the posterior corner only slightly produced, exceeded by the two projecting median tubercles of the dorsum.

Last segment almost or entirely hidden by the penultimate segment; posterior margin with three rounded, setiferous tubercles on each side; the papilliform process beneath the apical margin. Ventral margin on each side with a conic tubercle opposite the middle of the valve.

Anal valves slightly convex, margins broad and slightly elevated.

Preanal scale truncated at apex, a setiferous tubercle at each angle of the truncation.

Legs not reaching beyond the lateral carinae; joint 3 equaling or exceeding joint 6. No secondary sexual differences noted in the legs.

Sterna narrower than the length of a basal joint of a leg, crossed in each direction at middle by a deep furrow; without special modifications in either sex.

Gonopods with a large, clypeate basal joint opening inward, the terminal joint with an enlarged base supporting an erect process below which, on the inner side, a sicklelike blade projects backward, the tip turned upward.

Females with a very short ventral crest on the third segment just behind the second pair of legs.

IOMOIDES HISPIDUS, n. sp.

Plate 3, figs. 3 and 4

Two males, one the type, and two females were collected beneath a mango tree on the lower slope of Morne Brigand, near Bayeux, Haiti, July 16, 1927, by H. F. Loomis. The animals were sluggish in their movements, usually remaining motionless for a while after being exposed and were very difficult to see except when turned on their backs, thus exposing the light-colored ventral surfaces. Other specimens were collected at Le Borgne, Haiti, March 26, 1930, by W. H. Jenkins and O. F. Cook.

Description.—Length of the largest specimen, a female, 9 mm, width 2.2 mm.

In living specimens the dorsum is dull coal-black and usually somewhat incrustated with dirt; the under side of the posterior subsegments also is dark-colored to the sterna, and the elevated portion of the head between and above the antennae is coal-black; the remainder of the head, the antennae, the legs, sterna, anal valves, preanal scale, papilliform apex of the last segment, and the entire anterior subsegments are uniformly white or uncolored.

Head with an inconspicuous median furrow on the vertex. Antennae with joints 1, 2, and 3 gradually increasing in length; joint 4 about as long as joint 2, joint 5 twice as thick as joint 3 and somewhat longer, equaling joints 6 and 7 together, of which the latter is the shortest. In figure 25, *a*, the head and first two segments are shown in ventral view.

First segment with the median anterior margin nearly straight across, the sides extending obliquely outward and backward; lateral portions of the back margin directed inward and backward to the straight, transverse median margin. Central area of the segment subglobular, very abruptly raised above the greatly expanded anterior border, with an anterior row of four large conic tubercles and a posterior row of six smaller ones, each tubercle surmounted by a long seta in addition to the many tiny, erect setae scattered over the entire surface of the segment. A small seta in the middle margin of each of the areas of the expanded anterior margin.

On the ensuing segments the dorsal surface, including the large tubercles, is hispid with each of the large tubercles supporting a long bristle.

The outer lobes of the keels, to just in front of the middle of the body, each have a single seta in the margin; the outer lobes of the keels of the remaining segments each have two setae in the margin. Posterior margin of the keels with the incisions deeper than those of the front margin and with the outer incision more remote from the base of the keel than that of the front margin. On the posterior margin the lobe adjacent to the one at the outer corner contains a conic, bristle-tipped tubercle. Close to the base of each carina on segment 2 is a bristle-tipped tubercle; similar tubercles are found on the

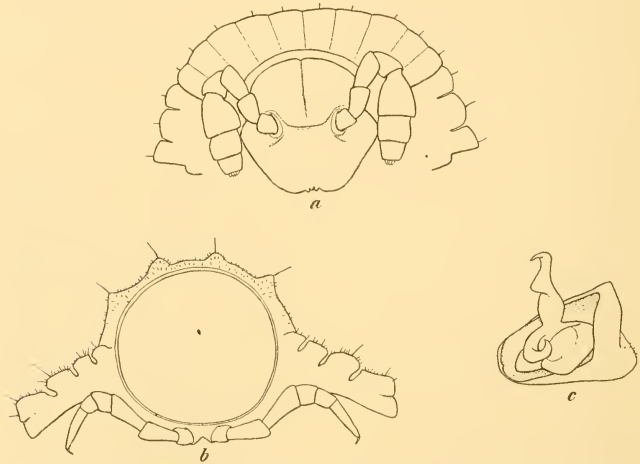


FIG. 25.—*Iomoides hispidus*. *a*, head and first 2 segments, ventral view; *b*, eighth segment, posterior view; *c*, gonopod, meso-posterior view.

carinae of segments 3 and 4, but increasingly farther removed from the base of the carinae, and on segments 6, 8, 11, and 14 the tubercles are near the middle of the carinae, poriferous segments without such tubercles. Posterior view of segment 8 shown in figure 25, *b*.

Penultimate segment with the tubercles reduced in size, especially those of the outer rows, the last tubercle in each inner row projecting a little way behind the back margin.

Last segment with the two apical marginal tubercles very close together.

Gonopods as shown in figure 25, *c*.

Type.—U.S.N.M. no. 1104.

IOMOIDES GLABRA, n. sp.

Plate 3, fig. 5

A male (type) and a female were collected at Christoph's Citadel, Cape Haitien, Haiti, March 27, 1932.

Diagnosis.—This species may be instantly distinguished from *I. hispidus* by the complete lack of hairs on the dorsum or along the outer margins of the segments. The tubercles of segment I are relatively larger and more distinct. In addition the following differences occur:

The body is smaller and narrower, the male being 5.5 mm long and 1.2 mm broad, the female 7 mm long and 1.5 mm broad. The incisions of the keels are narrower and dirt-filled in both specimens.



FIG. 26.—*Iomoides glabra*. Gonopod.

Segment I has the anterior margin more definitely rounded although still somewhat subhexagonal. Of the anterior row of four tubercles, the inner two are double the size of the outer ones. There are but four tubercles in the posterior row, the outer ones of the same size as the corresponding ones in front but the inner two half the size of the outer, hence contrasting very strikingly in size with the pair in front.

The gonopods show further differences, as seen in figure 26.

Type.—U.S.N.M. no. 1105.

PSOCHODESMUS Cook

Psochodesmus Cook, Brandtia, p. 25, 1896.

Xerodesmus Chamberlin, Proc. California Acad. Sci., vol. 12, p. 403, 1923.

Tidopterus Chamberlin, Zoologica, New York Zool. Soc., vol. 3, no. 21, p. 420, 1923.

Dominicodesmus Chamberlin, Proc. Biol. Soc. Washington, vol. 36, p. 189, 1923.

After examining a number of specimens of *Psochodesmus crescentis* Cook from the type locality in Florida, and comparing them with descriptions, illustrations, or specimens representing the above genera, it is apparent that all these genera are synonyms of *Psochodesmus*. Specimens of *Dominicodesmus geophilus* from many Haitian localities

are obviously congeneric with *P. crescentis*, and in comparison with the paratype specimens of *Treseolobus granulofrons* Chamberlin no specific differences whatever were discovered. As the description of this latter species outranks *Dominicodesmus geophilus* in time of publication, the Haitian species must now stand as *Psochodesmus granulofrons* (Chamberlin). The following generic notes were made from specimens of the Florida and Haitian species:

Head with the granular area of the vertex traversed by a distinct median furrow. First segment somewhat flattened, much less strongly convex than the next segment and with the margin and lateral angles notably higher than the keels of that segment. Segments 2, 3, and 4 slightly shorter at the middle than segment 5. As viewed from the side the keels of the segments do not reach below the ventral third of the body. Anal valves distinctly convex and with thin, raised margins. Sterna narrower than the diameter of the basal joint of the leg on either side and with a definite median groove.

Inasmuch as the original description of *P. crescentis* is extremely brief, the following characterization has been prepared in order to place it on a comparable basis with the other species.

PSOCHODESMUS CRESCENTIS Cook

Psochodesmus crescentis Cook, *Brandtia*, p. 25, 1896.

Numerous specimens with 19 segments were collected between Crescent City and Palatka, Florida, May 16, 1927, by O. F. Cook. One 20-segmented male and three females were collected at Vero Beach, Florida, April 22, 1933, by H. F. Loomis. Other specimens



FIG. 27.—*Psochodesmus crescentis*. *a*, first segment, dorsal view; *b*, keels of segments 9 and 10, dorsal view.

have been collected at the United States Plant Introduction Garden, Coconut Grove, Florida, by O. F. Cook and H. F. Loomis.

First segment with the scalloped anterior margin broadly rounded, the scallops short and broad, not separated by incisions (fig. 27, *a*); surface with numerous small indistinct granules and two transverse rows of round tubercles, four in the anterior row and six in the posterior row.

Second segment with the lateral margin of each keel but little longer than the margins of the keels of the next two segments, the marginal lobes not conspicuously larger than on those segments.

All segments from the second to the penultimate inclusive with four longitudinal rows of large rounded tubercles, three tubercles of subequal size in each row; surface elsewhere covered with rather indefinite granules, those in the interval between the inner rows of tubercles in two longitudinal rows.

Nonporiferous segments in front of segment 15 with three lateral lobes on each keel, segments 16-19, with the keels 4-lobed; segment 5 with a single lobe in front of the pore process, all other pore-bearing segments with two lobes in front of the process, which projects from the posterior corner of the keel (fig. 27, *b*). Segments 2 to 18 with two lobes on the posterior margin laterad of the outer row of large dorsal tubercles, the outer lobe the largest and slightly elevated.

Last segment with a long tubercle on each side of the middle bent caudad and slightly exceeding the posterior margin.

Females with scarcely any crest on the ventral side of the third segment immediately behind the second pair of legs.

From the description and the drawings of *P. sequens* (Chamberlin) it is evident that it is closely related to *P. crescentis* but is of larger size; the basal joints of the gonopods of the 19- and 20-segmented specimens of *P. crescentis* are broader than long, but in *P. sequens* the basal joints are distinctly longer than broad; apical joint of the gonopods not showing in the immature Florida specimens and broken in the mature one.

Specimens of *P. granulofrons* (Chamberlin) have been found in several localities in Haiti, and a description has been prepared from them, which allows comparison with *P. crescentis*.

PSOCHODESMUS GRANULOFRONS (Chamberlin)

Treseolobus granulofrons Chamberlin, Bull. Mus. Comp. Zool., vol. 62, p. 221, 1918.

Dominicodesmus geophilus Chamberlin, Proc. Biol. Soc. Washington, vol. 36, p. 189, 1923.

Examination of the paratypes of *T. granulofrons* showed it to be a species of *Psochodesmus* and, furthermore, in comparison with specimens of *D. geophilus* it was obvious that but a single species was involved. The type of *T. granulofrons* seems to be no longer in the Museum of Comparative Zoology, Cambridge, Mass.; hence the examination had to be from the paratype material.

Numerous specimens, all of which are females with not more than 19 segments, were collected by O. F. Cook and H. F. Loomis in the following localities in Haiti; Thor, near Port-au-Prince; Ennery; near Plaisance; Petite Riviere de Artibonite; and on Morne Pilboreau. Armour Expedition localities include Orangetown, St. Eustatius; Basse Terre, St. Kitts; Boggy Peak, Antigua; St. Claude above Basse Terre, Guadeloupe; Arena Forest, Trinidad.

Length of the largest specimen 5 mm, width .7 to .8 mm.

Living color light pink to buffish-pink or light brownish-red.

First segment with the anterior margin more nearly straight across than in *P. crescentis*, with the usual 10 lobes or scallops separated from each other by deep incisions, except the two outer lobes on each side, which are very shallowly separated or not at all (fig. 28, *a*). Surface with the 10 tubercles larger and higher than in *P. crescentis*, the granules also larger and more definite in shape.



FIG. 28.—*Psochodesmus granulofrons*. *a*, first segment, dorsal view; *b*, keels of segments 9 and 10, dorsal view.

Second segment with the lateral margin of each keel half again as long as the margins of the keels of either the third or fourth segment, and the marginal lobes conspicuously larger.

Ensuing segments with the large tubercles in the dorsal rows higher and more definitely shaped than in *P. crescentis*, the middle tubercle in each row a little smaller than the one on either side of it; remainder of the surface covered with sharply defined granules of various sizes, those in the interval between the inner rows of tubercles irregularly disposed except on several of the anterior segments, the interval itself wider than that in *P. crescentis*.

Nonporiferous segments with the keels lobed as in *P. crescentis*, although behind segment 15, the keels may appear 3-lobed; all the poriferous segments with a single lobe in front of the pore process, which projects outward and slightly backward from near the middle of the lateral margin and apparently replaces both the middle and posterior lobes (fig. 28, *b*). On each segment the posterior margin

laterad of the outer row of large tubercles has three lobes, of which the outer one is much the largest, conspicuously elevated, and is close to the posterior corner of the keel. Lateral keels not projecting as far from the sides of the body as in *P. crescentis* and placed somewhat higher on the side of the body.

Last segment with the two dorsal tubercles narrower than those of *P. crescentis*.

Females with a definitely raised, back-curving crest on the ventral side of the third segment in front, immediately behind the second pair of legs.

Just how this species differs from *P. sequens* (Chamberlin) is not known, for aside from the characters of the gonopods, no characters are mentioned for *P. sequens* that allow it to be distinguished from the Haitian species.

Family STIODESMIDAE

HOMODESMUS PARVUS Chamberlin

Homodesmus parvus Chamberlin, Bull. Mus. Comp. Zool., vol. 62, pp. 222, 223, 1918.

A male, similar in all particulars to specimens of this species from Haiti, was collected in the crater of the extinct volcano known as "The Quill" near Orangetown, St. Eustatius, January 22, 1932.

Chamberlin has reported this species from Puerto Rico. It is abundant in Haiti, from which country it may have been dispersed to these other islands in comparatively recent times, as it has not been found there in numbers.

GASATOMUS EMERSONI Chamberlin

Plate 3, fig. 6

Gasatomus emersoni Chamberlin, Zoologica, New York Zool. Soc., vol. 3, pp. 417-419, 1923.

A male was collected in the Maracas Valley, Trinidad, February 13, 1932.

It coincides in all particulars with Chamberlin's description and illustration except in size, for it is 6.5 mm long and 1.3 mm broad.

The anterior legs and sterna show no secondary sexual modifications. The sterna behind the gonopods, however, are strongly elevated, narrow, deeply depressed in each direction, and the posterior sternum of each segment is produced behind on each side into a rounded lobe.

The gonopods are somewhat of the type of those of *Cynedesmus simplex* Loomis, but the inner piece of each is shorter, heavier, and more simple.

CYNEDESMUS Cook

This genus was erected to accommodate a species from Grand Canary, and later *Cryptodesmus ornamentatus* Karsch, from Cuba, was added to it. Several West Indian species described under *Treseolobus* by Chamberlin were reallocated by him in *Cynedesmus*, but it now appears that none of them belongs in this genus. His assumption that *Lophodesmus* Pocock is a synonym of this genus does not appear justified after a careful review of the characters of the two genera. The statement that no description of the type of *Cynedesmus* has been published is erroneous, as *C. formicola* was described in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1896, page 267.

One difference between *Lophodesmus* and *Cynedesmus* is that the outer margins of the keels of segments 3 to 19 inclusive are bilobed in *Lophodesmus*, whereas in *Cynedesmus* some of the keels have three or even four distinct lobes. The dorsal tuberculation in both genera is of specific rather than generic value, for in each genus there are species with two dorsal rows of large tubercles, and others have four rows. In *Lophodesmus* the apical structure of each gonopod is enclosed within the hollowed, hemispherical basal joint, whereas in *Cynedesmus* the basal joint is smaller and the apical structure is less crassate and rises above the base.

CYNEDESMUS SIMPLEX, n. sp.

A single male was collected about 70 kilometers from Paramaribo, Dutch Guiana, March 3, 1932, beside the railway to the Cable Station.

Diagnosis.—The smaller size differentiates this species from the others. None of the nonporiferous segments after the first has more than three lobes on the keels, and the keels of the penultimate segment are reduced in size and without sulci forming lateral lobes as on the other segments.

Description.—Length 5 mm, width .8 mm.

Head with the apex of the vertex smooth, but the anterior part is coarsely and irregularly granular to the upper limits of the antennal sockets. Antennae with joint 5 longest and broadest.

First segment with 10 scallops of equal size along the front margin; surface of the disk with 10 high, rounded tubercles arranged in a transverse ellipse, the rest of the surface somewhat granular.

Ensuing nonporiferous segments to segment 17 with the lateral keels 3-lobed; on segment 18 the lobes are indistinct, and the keels of segment 19 are small and without any semblance of lobes. Keels of

segments 5, 7, 9, 10, 12, 13, 15, and 16 with two distinct, equal lobes in front of the pore tubercle. Surface of the segments with four longitudinal rows of four high, rounded tubercles; on the caudal segments the lateral rows of tubercles are reduced in size, and the median rows are increased; surface elsewhere indistinctly granular, the gran-



FIG. 29.—*Cynedesmus simplex*. Gonopod, lateral view.

ules nowhere in regular series. The entire surface of the animal is more or less dirt-incrusted.

Last segment without dorsal tubercles, the posterior margin 6-lobed. Gonopods shown in lateral view in figure 29.

Anterior legs and sterna of the male without special modifications.

Type.—U.S.N.M. no. 1106.

CYNEDESMUS sp.

An 18-segmented female 3.5 mm long and .7 mm broad was found on the Aripo Savannah, Trinidad, February 14, 1932.

Although several characters appear to distinguish this animal from other species of the genus, mature specimens should be seen before it is assigned a specific name.

LOPHODESMUS CARAIBIANUS (Chamberlin)

Treseolobus caraibianus Chamberlin, Bull. Mus. Comp. Zool. vol. 62, pp. 220-221, 1918.

One female specimen, which in comparison with Haitian specimens of this species showed no striking differences other than being slightly more slender, was collected under a stone near the Grantstown section of Nassau, New Providence, January 3, 1932.

Family HERCODESMIDAE

DILOPHOPS, n. gen.

Type.—*Dilophops bullatus*, n. sp.

Description.—Body very strongly arched; keels projecting downward and outward for a moderate distance, their extremities almost on a level with the basal joints of the legs, margins with a heavy, thickened rim.

Head with a distinct median depression on the vertex, on either side of which there is a high, very broad, rough, longitudinal ridge rising just above and mesad of the antenna, the upper half split and forming two diverging smaller ridges. Antennae short and moderately clavate; joints 1, 3, and 4 subequal in length, broader than long; joint 2 nearly as long as joints 3 and 4 together; joint 5 broadest and not quite half again as long as the two preceding joints together, approximately twice as long as joint 6; joint 7 half as wide as 6, slightly longer than broad.

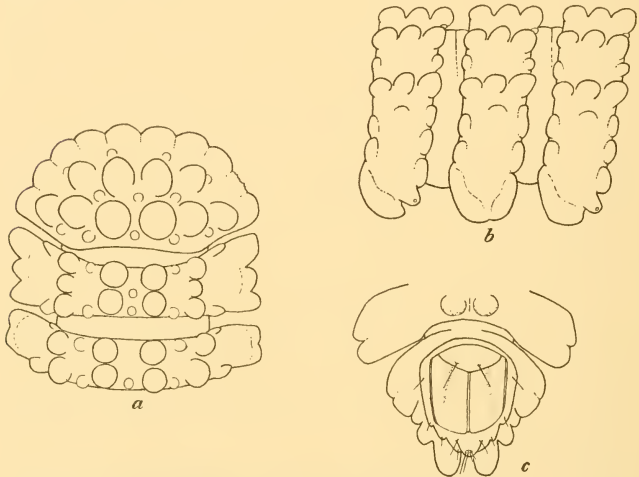


FIG. 30.—*Dilophops bullatus*. *a*, first 3 segments, dorsal view; *b*, segments 13 to 15, oblique lateral view; *c*, last 3 segments, anal valves and scale, ventral view.

First segment very strongly convex, completely covering the head from above; the narrow horizontal margin slightly higher than the margin of the keels of the second segment, with 10 marginal scallops; surface almost entirely occupied by two transverse rows of very large and high tubercles, four tubercles in the anterior and six in the posterior row; in addition, there are a few small granules arranged in three transverse rows with the rows separated by the rows of larger tubercles. Segments 1, 2, and 3 are shown in figure 30, *a*.

Ensuing segments with four longitudinal rows of large tubercles which are considerably smaller than the tubercles of the first segment. On segment 2 there are three tubercles in each outer row and two

tubercles in each inner row, whereas on segments 3 and 4 there are but two tubercles in any row, and on the segments following these there are three tubercles in each row. One or two small granules are present between each pair of rows of large tubercles.

Second segment with the lateral margin of each keel 3-lobed and over half again as long as the margin of the keels of segment 3 or 4. Nonporiferous segments, from the third to the nineteenth inclusive, with the outer margin of the keels weakly bilobed, the anterior lobe usually the largest except on segments 3 and 4, where the lobes are equal. Poriferous segments with two lobes in addition to the poriferous tubercle, which separates the two lobes and projects from near the posterior corner of the keel, the posterior lobe small and more nearly on the posterior margin of the keel than on the lateral margin. Segments 13, 14, and 15 are shown in figure 30, *b*. Pores present on segments 5, 7, 9, 10, 12, 13, 15, and 16.

Nineteenth segment considerably longer than those preceding it, completely concealing the last segment from above. Surface with the large tubercles of the inner rows almost completely coalesced to form two high ridges, in each of which the last tubercle is produced far behind the posterior margin; each outer row of tubercles reduced in size but not coalesced, the last tubercle in each row projecting slightly behind the margin; between this tubercle and the lateral keel is a small granule also projecting beyond the margin. Posterior corner of the lateral keel on each side reaching about half way to the apex of the produced median ridge. Ventral view of segments 18, 19, 20, anal valves and scale are shown in figure 30, *c*.

Last segment small and completely hidden from above by the penultimate segment; posterior margin with three small setiferous lobes on each side; under the apex there is a large setiferous cone almost obscuring the two apical lobes.

Anal valves lacking definitely raised margins; median portion of each valve somewhat depressed longitudinally, on each side of which the surface is slightly convex.

Preanal scale subtriangular, with the customary two setae.

Sterna very narrowly separating the legs.

Third segment of the females very short behind the second pair of legs and slightly more elevated than the fourth segment but without a separate, definitely delimited crest.

DILOPHOPS BULLATUS, n. sp.

Plate 4, fig. 4

A single female (type) was collected from beneath a log an eighth of a mile from the beach at Bayeux, Haiti, July 15, 1927, by H. F.

Loomis. A mature female and one with 19 segments were collected on Morne Pilboreau, March 21, 1930, by O. F. Cook. A female was collected under a rock with specimens of *Psochodesmus granulofrons* (Chamberlin) on one of the grassy hills south of Basse Terre, St. Kitts, January 23, 1932.

Description.—Length 4.5 mm, width .7 mm.

Living colors recorded as dirty white throughout.

In addition to the characters given in the generic description the following features are of value.

On the first segment in front of each large tubercle of the anterior series there is a small, rounded granule or tubercle, and a similar granule is located just behind each interval between the tubercles of both rows; thus there are three granules behind the anterior row and five behind the posterior row.

On the ensuing segments there usually is a small granule on the anterior and posterior border between the outer and inner row of tubercles on each side, and another lower, less conspicuous granule laterad of the median tubercle of the outer row. On the median line of these segments there is a small granule close to the posterior margin, and on segment 2 there is also another half way to the anterior margin. These segments also with two low, transverse prominences on the anterior and posterior margin between the outer row of large tubercles and the keel, those on the posterior margin projecting farther beyond the margin than those in front.

Type.—U.S.N.M. no. 1107.

Family STYLODESMIDAE

BOTRYDESMUS, n. gen.

Type.—*Botrydesmus lutosus*, n. sp.

Diagnosis.—This genus is rather closely related to the African *Napodesmus* Cook but is smaller and does not have the penultimate segment produced and hiding the last segment from above; and probably the body is much more convex.

Description.—Body slender, very convex; composed of head and 19 segments, of which the last is not obscured from above by the penultimate segment; keels low on the sides of the body, descending almost to the level of the legs (fig. 31, a); dorsal surface incrustated with dirt; pore formula normal.

Head with the vertex slightly elevated above the front from a point between the bases of the antennae, the surface coarsely granular, depressed at middle.

First segment with the produced anterior margin divided into four large, scalloped, widely separated lobes, the two middle ones most widely separated and the anterior margin of each divided into three scallops, the lateral lobes each with two scallops on the anterior margin. Disk with 10 prominent conic tubercles. The dorsal surface and all the margins are incrustated with dirt (fig. 31, *b*).

Second segment with four narrow longitudinal ridges, the apex of each being divided into three sections; all margins of the segment

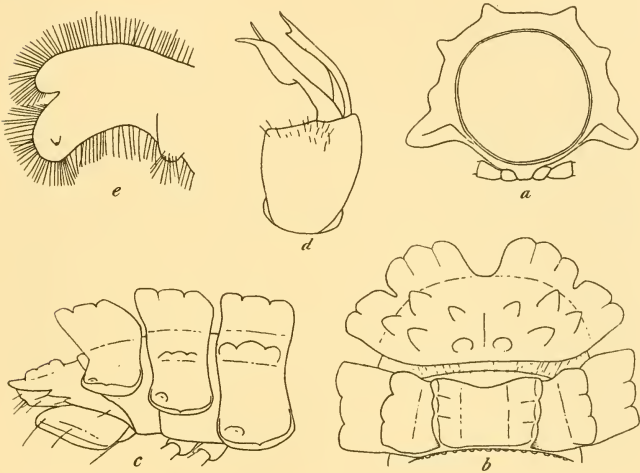


FIG. 31.—*Botrydesmus lutosus*. *a*, segment from near middle of body, end view; *b*, first 2 segments, dorsal view; *c*, last 4 segments and valves, lateral view; *d*, gonopod, lateral view; *e*, keel of segment 7 with coating of dirt removed, dorsal view.

elevated, thin, especially on the keels; lateral margin of the keels 3-lobed.

Ensuing segments with the dorsal surface and raised margins as on the second segment; the keels all 2-lobed; the actual surface sculpturing of the segments is obliterated by the very general incrustation of dirt. As the posterior end of the body is approached, the two median ridges increase in height and each lateral ridge decreases until on the penultimate segment the lateral ridges are not evident but the dorsal ones are very high, though not greatly produced backward (fig. 31, *c*).

Last segment fully exposed from above; the dorsum with two ridges; the posterior margin widely rounded at middle and with two lateral lobes, of which the lowest is the largest.

Anal valves slightly convex, with rather broad, low margins; surface sparsely and minutely hispid.

Preanal scale triangular, the surface also minutely hispid.

Gonopods as shown in figure 31, *d*.

Sterna narrow and similar in the sexes.

Third male legs with the middle joints slightly more swollen than those of the adjacent legs.

The incrustation of dirt on the dorsum is removed with difficulty, but when this is accomplished, the surface of the segment is shown to be strongly shining and with a faintly impressed median line present. The dorsal ridges in reality are each seen to be composed of three separate tubercles tipped with numerous fine setae; and the raised margins of the segments are formed of closely placed hairs which catch and hold dirt; these hairs are longest on the lateral keels (fig. 31, *e*). The tubercles of segment 1 are hispid at the apex, and the margins of the anterior lobes have a continuous series of long hairs similar to the margins of the keels of the ensuing segments. Pores opening from tiny conic prominences on the posterior lobe of the keels; this lobe is longer and broader than the anterior lobe; the posterior margin of the keel is deeply emarginate, and there is a lobe or tubercle on the posterior margin of the dorsum at the base of each keel.

BOTRYDESMUS LUTOSUS, n. sp.

A single male and over a score of females were found on the under side of a log in a clearing of the Arena Forest, Trinidad, February 16, 1932.

Description.—Length from 4 to 4.5 mm, width from .5 to .6 mm.

The living animals were buff-colored, the color being derived from the incrustation of earth rather than from any pigment in the body, which probably was pure white as in the cleaned alcoholic specimens.

Other characters given in the generic description.

Type.—U.S.N.M. no. 1108.

Family COMODESMIDAE

INODESMUS Cook

Lasiodesmus Silvestri, Bull. Amer. Mus. Nat. Hist., vol. 24, pp. 575, 576, 1908.

INODESMUS PEDUNCULARIS, n. sp.

Plate 4, figs. 5 and 6

Over a score of female specimens were found on the under side of a log near Paramaribo, Dutch Guiana, March 1, 1932.

Description.—Length 7 mm, width .6 mm.

Living animals white and remaining so in alcohol.

Head exposed from above; densely beset with short hairs to the clypeal region; vertex with a median furrow; front crossed by a deep transverse furrow just below the antennal sockets; clypeal region elevated, smooth, with four long setae near base and about eight others along the margin; antennae separated by a distance equal to the diameter of one of the sockets.

First segment narrower than the head or ensuing segments, oval in shape.

Ensuing segments without any definite projecting lateral carinae, these being indicated by rather prominent shoulders on the anterior segments which become less obvious toward the back end of the body. Dorsal surface of the segments finely granular and beset with long, erect, but flexuous hairs.

Second segment extending farther ventrad than any other segment; the sides in front produced forward and covering the posterior lateral margin of segment 1. There is a definitely produced, rounded prominence at the posterior corner, opposite the lateral limit of segment 3.

Segment 5 with a definitely pedunculate pore on each side close to the anterior margin of the subsegment. On the other segments the pores are on smaller peduncles and are near the middle of the segments.

Last segment with a deflexed mucro surpassing the valves except when they are open.

Other characters given by Silvestri in the generic description of *Lasiodesmus* are exhibited by this animal.

Type.—U.S.N.M. no. 1110.

After comparing the present species, from a generic standpoint, with Silvestri's description of *Lasiodesmus* and with the brief characterization of *Inodesmus* Cook,⁹ there appears to be no reason for maintaining Silvestri's genus. Chamberlin's assumption that *Lasiodesmus* belongs to the Strongylosomidae¹⁰ is erroneous. The question of the distinctness of *Inodesmus jamaicensis* Cook and *I. caraibicus* (Silvestri) cannot be decided until comparison is made of the types or of specimens undoubtedly similar to the types.

⁹ Brandtia, p. 25, 1896.

¹⁰ Bull. Mus. Comp. Zool., vol. 62, p. 246, 1918.

From the descriptions of *I. jamaicensis* and *I. caraibicus* the following inferences are possible: *I. peduncularis* differs from both in having stalked pores, the first of which is adjacent to the front margin

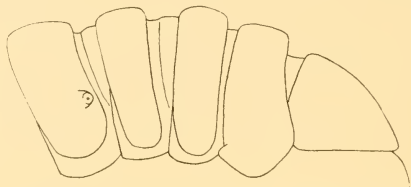


FIG. 32.—*Inodesmus peduncularis*. First 5 segments, lateral view.

of segment 5; it differs further from *I. caraibicus*, as shown in Silvestri's illustration, in the shape of the second segment, which overlaps the posterior-lateral part of the first segment and which also has a produced lobe or tubercle on the posterior angle (fig. 32).

Family CYRTODESMIDAE

CYLIOCYRTUS OCREATUS, n. sp.

Plate 3, fig. 7

About 15 specimens were collected in the Maracas Valley and the Arena Forest, Trinidad, February 13, 1932.

Diagnosis.—Apparently differing from *C. asper* (Peters) in having the first segment entirely concealed from the side by the expanded sides of segment 2; and there are no large tubercles on the dorsum of the segments as shown in Cook's drawing.¹¹ It is possible that the radiating lines seen on the lateral lobes of segment 2 in this species also are present in *C. asper*, in which case they are a generic character; otherwise they constitute a specific difference.

Description.—Length 10 mm, width 2 mm.

Living animals dull black; the anterior subsegments black posteriorly, white anteriorly, the dividing line very definite, biarcuate. Head black to between the antennae, which, with the anterior part of the head, are white. Legs, anal valves, and preanal scale also white.

Head with the vertex eroded-granular, not hispid; two ridges above the antennae and most prominent near them; vertex and front joined at the same level; antennae strongly geniculate at the fourth joint (fig. 33, a).

¹¹ Proc. U.S. Nat. Mus., vol. 21, pp. 451-468, 1898.

First segment semicircular or somewhat crescentic; with the front margin transverse and slightly emarginate, the median third low and simple, the outer third on each side occupied by three elevated lobes, the outer of which is twice as broad as the two subequal inner ones combined; disk broadly depressed along the middle, finely erose-granular and hispid, each side somewhat inflated and coarsely granular, erose, and hispid but with some of the setae longer than those on the middle of the disk.

Second segment completely concealing the first segment from the side; the median portion of the dorsum depressed, the sides somewhat inflated; sculpturing of the dorsum similar to that of segment 1; expanded lateral lobes with the surface coarsely granular-erose, hispid, the granulations separated into definite triangular sections by de-



FIG. 33.—*Cyliocyrtus ocreatus*. *a*, antenna; *b*, gonopods.

pressed lines radiating from a central point of the lobe and extending to the raised rim of the anterior and lateral margins of the lobe and terminating in slight incisions of the rim, which give it a faintly scalloped appearance.

Ensuing segments coarsely granular-erose and strongly hispid with short and long setae intermixed, the entire surface usually with a moderate incrustation of dirt which hides the pores. There are no large tubercles present on the dorsum as shown in Cook's illustration of *C. asper*. The outer margin of the keels, following the second segment, is simple and sharply rounded, becoming more broadly rounded on the middle segments, where it is indistinctly 2-lobed, and on the posterior segments it finally becomes indistinctly 3-lobed. On the anterior subsegments the dark posterior portion is uniformly pitted, the surface including the pits very finely granulated; white anterior portion of the subsegment minutely honeycombed.

Last segment broadly rounded behind, the median third of the margin simple, each lateral third occupied by two lobes.

Gonopods with each enlarged basal joint continued at the apex of the inner side into a long, erect lobe nearly equaling the tip of the inner joint and guarding it on the outer side. Inner joint coarsely serrate along its outer margin, the tip acute (fig. 33, *b*).

Legs similar in both sexes. Males with the coxae of the sixth legs moderately separated; those of the seventh legs twice as widely separated, the sternum flat; legs following the gonopods moderately separated, the sternum bearing two round tubercles.

Type.—U.S.N.M. no. 1109.

Although the following species of millipeds were not collected by the expedition of 1932 it seems advisable to call attention to them here, inasmuch as they were not mentioned by Chamberlin in his list of the diplopods of the West Indies.¹²

SPIROBOLUS BAHAMENSIS Bollman

Spirobolus bahamensis Bollman, U.S. Nat. Mus. Bull. 46, p. 192, 1893.

Known only from the original collection from the island of San Salvador. This species may belong to the genus *Arctobolus*, as the number of clypeal foveolae apparently exclude it from the genus *Rhinocricus*. *Arctobolus* is common throughout the eastern United States, but no species are known from any of the Bahama or West Indian Islands.

RHINOCRICUS MODESTIOR Silvestri

Rhinocricus modestior Silvestri, Bull. Amer. Mus. Nat. Hist., vol. 24, p. 570, 1908.

Known only from Puerto Rico.

RHINOCRICUS SERPENTINUS Pocock

Rhinocricus serpentinus Pocock, Journ. Linn. Soc. London, vol. 24, pp. 501, 502, 1894.

Known only from St. Lucia.

INODESMUS JAMAICENSIS Cook

Inodesmus jamaicensis Cook, Brandtia, p. 25, 1896.

Known only from the original collection from Jamaica.

¹² Bull. Mus. Comp. Zool., vol. 62, no. 5, 1918.

EXPLANATION OF PLATES

PLATE I

- FIG. 1. *Lophoproctus comans*, female, dorsal view. $\times 13$.
 FIG. 2. *Glomeridesmus trinidadensis*, male, latero-ventral view. $\times 10$.
 FIG. 3. *Siphonocybe harti*, female, dorsal view. $\times 5$.
 FIG. 4. *Amphelictogon bidens*, male, dorsal view. $\times 5$.
 FIG. 5. *Belonodesmus thaxteri*, head and first six segments of male, dorsal view.
 $\times 10$.
 FIG. 6. *Aphelidesmus divergens*, male, dorsal view. $\times 4$.
 FIG. 7. *Nanorrhacus luciae*, male, dorsal view. $\times 4$.

PLATE 2

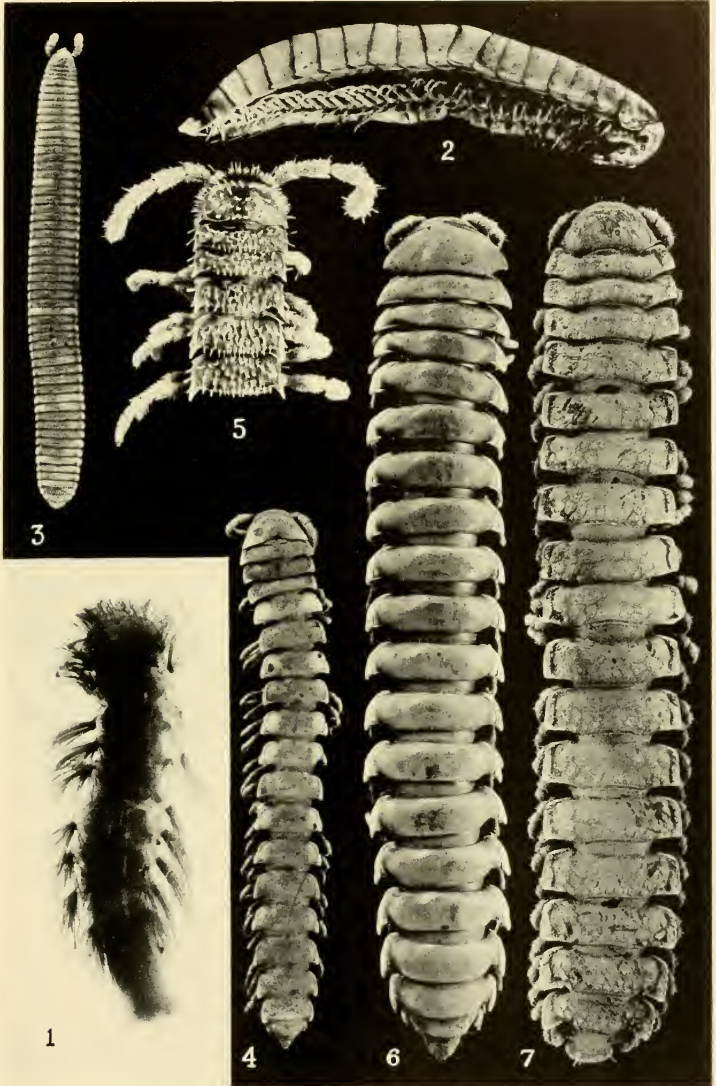
- FIG. 1. *Azygobolus tumidus*, male, lateral view. $\times 7$.
 FIG. 2. *Azygobolus tumidus*, another male, ventral view. $\times 7$.
 FIG. 3. *Priodesmus acus*, 19-segmented female, dorsal view. $\times 7\frac{1}{2}$.
 FIG. 4. *Aetheandra multiplex*, male, dorsal view. $\times 10$.
 FIG. 5. *Aetheandra multiplex*, female, dorsal view. $\times 13$.
 FIG. 6. *Chilaphrodesmus rubellus*, female, dorsal view. $\times 10$.

PLATE 3

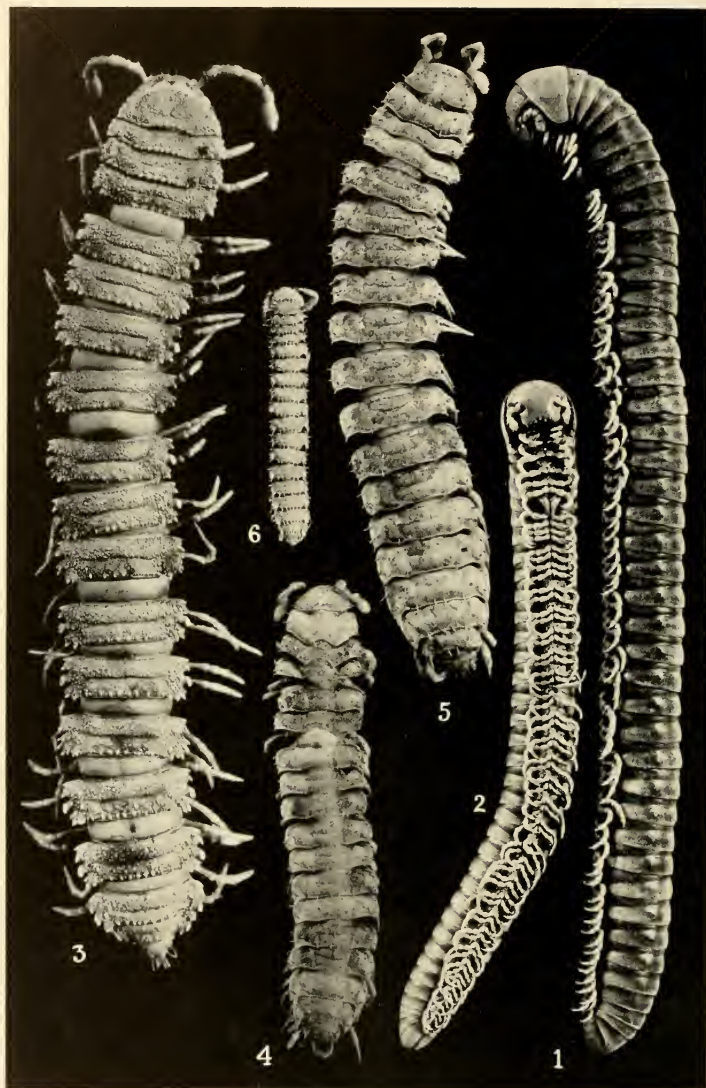
- FIG. 1. *Docodesmus haitiensis*, female, dorsal view. $\times 7\frac{1}{2}$.
 FIG. 2. *Docodesmus haitiensis*, male, ventral view. $\times 7\frac{1}{2}$.
 FIG. 3. *Iomoides hispidus*, female, dorsal view. $\times 10$.
 FIG. 4. *Iomoides hispidus*, male, ventral view. $\times 10$.
 FIG. 5. *Iomoides glabra*, female, dorsal view. $\times 10$.
 FIG. 6. *Gasatomus emersoni*, male, dorsal view. $\times 13$.
 FIG. 7. *Cylioxyrtus ocreatus*, loosely curled female, lateral view. $\times 13$.

PLATE 4

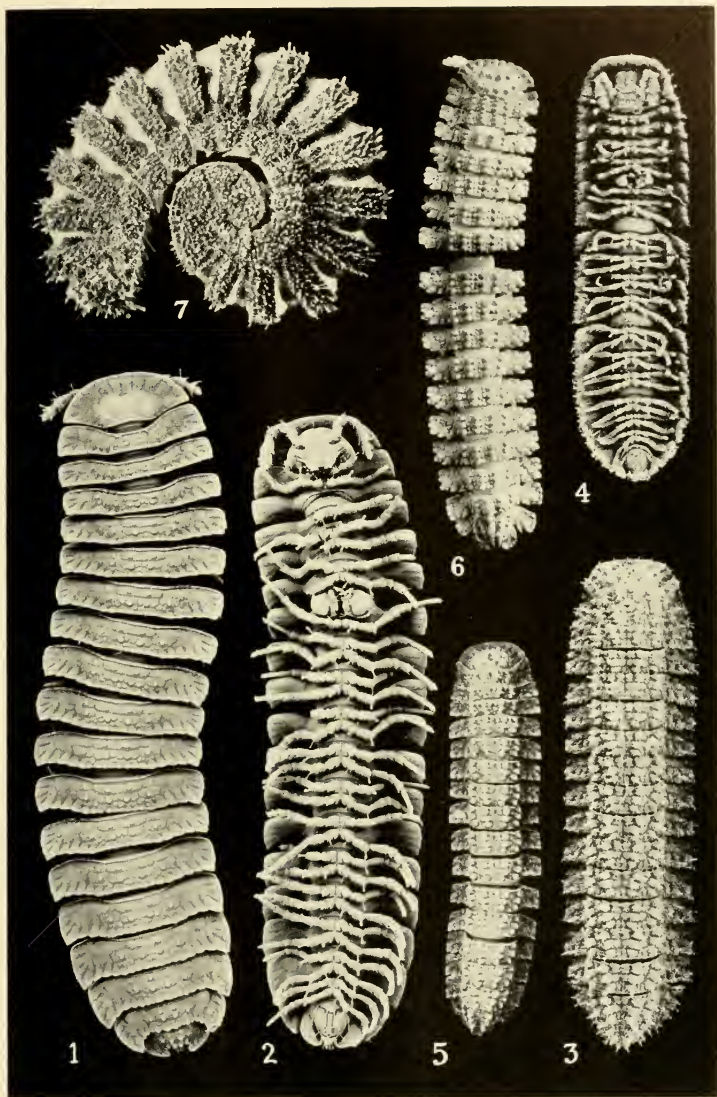
- FIG. 1. *Docodesmus sculpturatus*, male, dorsal view. $\times 13$.
 FIG. 2. *Docodesmus trinidadensis*, female, dorsal view. $\times 13$.
 FIG. 3. *Docodesmus robustus*, male, dorsal view. $\times 13$.
 FIG. 4. *Dilophops bullatus*, female, dorsal view. $\times 13$.
 FIG. 5. *Inodesmus peduncularis*, male, dorsal view. $\times 13$.
 FIG. 6. *Inodesmus peduncularis*, female, lateral view. $\times 13$.



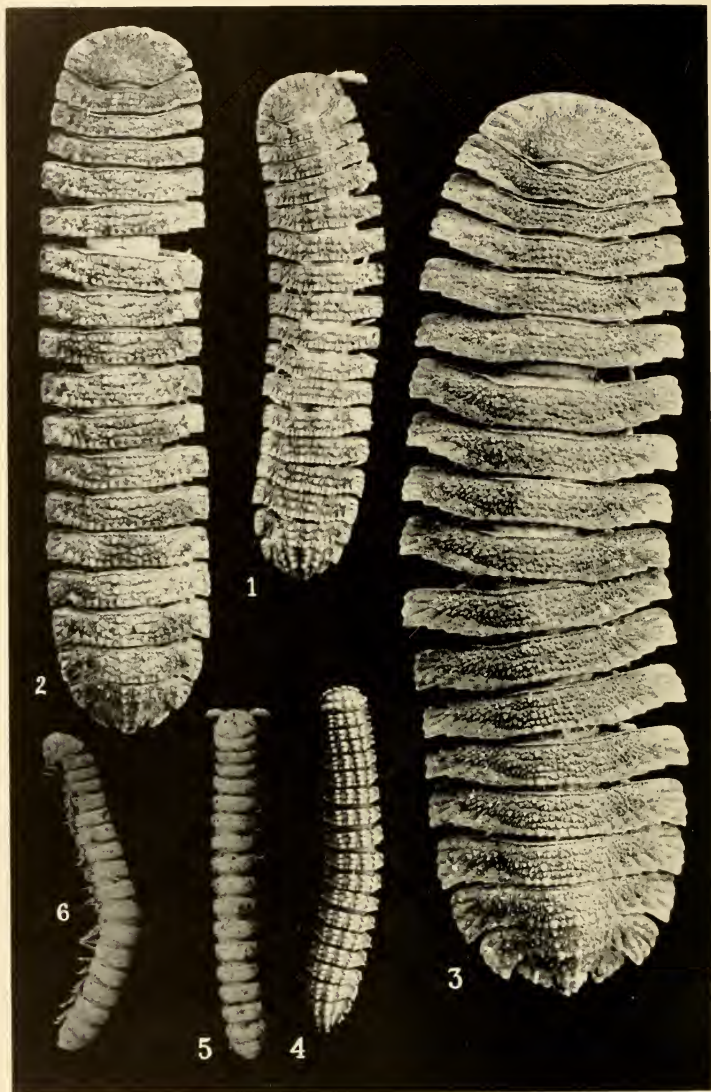
MILLIPEDS COLLECTED BY THE ALLISON V. ARMOUR EXPEDITION
(For explanation, see page 69.)



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