

## NOTES ON WEST INDIAN MILLIPEDES.

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The descriptions and notes embraced in this article are based chiefly upon material in the collections of the United States National Museum. Occasion is taken to describe also some new forms in the collection of the Museum of Comparative Zoology in Cambridge, Massachusetts, and to illustrate several previously known species. The characters of the male of *Nannolene* are made known for the first time, the genus proving to be a member of the Cambalidae proper.

### Suborder GLOMERIDESMOIDEA.

#### Family GLOMERIDESMIDAE.

##### Genus GLOMERIDESMUS Gervais.

##### GLOMERIDESMUS CONCOLOR Chamberlin.

*Glomeridesmus concolor* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 172.

*Locality*.—Porto Rico: El Yunque, 2,800 feet (C. W. Richmond, February 26, 1900).

The specimen taken at this place is referable with but little doubt to this species, the types of which were taken in Haiti at Jacmel by Dr. W. M. Mann.

### Suborder STEMMIULOIDEA.

#### Family STEMMIULIDAE.

##### Genus PROSTEMMIULUS Silvestri.

##### PROSTEMMIULUS COMPRESSUS (Karsch).

*Stemmiulus compressus* KARSCH, Zeit. naturwiss., 1881, ser. 3, vol. 6, p. 11.

*Localities*.—Porto Rico: El Yunque, 2800 feet (C. W. Richmond, February 26, 1900); Adjuntas (L. Stejneger, April 13, 1900).

## PROSTEMMIULUS NESIDES, new species.

Plate 1, figs. 1-3.

Blackish excepting head and first four tergites, which are of a chestnut cast. A median dorsal pale line. Lower part of sides and the venter paler, more brownish. Legs dusky flavous. Antennae black.

Head with the usual two ocelli on each side of which the inferior one is minute in comparison with the upper one. Antennae slender; sixth article clavate, about twice as long as thick at distal end.

Collum with one deeper sulcus margining it in front and continuing back to caudal margin; below it and on the inflexed portion of the plate are three finer striae parallel with it, these not visible in lateral view.

Second tergite striate only beneath. Striae on succeeding tergites rising progressively higher and first reaching middorsal region on the ninth segment. Setiferous papillae of last tergite as usual.

Sternites of tenth segment as shown in plate 1, figures 2 and 3.

*Length*.—14.5 mm.; width, 1.3 mm.

*Locality*.—Isla de Pinos: Bibijagua. One female (Barbour and Brooks, June, 1918).

*Type*.—Cat. No. 5030, M. C. Z.

## EPINANNOLENOIDEA, new suborder.

Includes the Epinannolenidae, new family, and the Pseudonannolenidae.

## EPINANNOLENIDAE, new family.

The genus *Epinannolene* has heretofore been included in a family Nannolenidae on the assumption of a close relationship to *Nannolene*. However, an examination of the copulatory organs of the male of *Nannolene burkei* Bollman, the genotype, shows this genus clearly to be a cambaloid form close to *Dimerogonus* of Attems and related genera having flagella on the anterior gonopods (pl. 1, figs. 4-10). Thus the name Nannolenidae falls as a synonym of Cambalidae or Cambalinae in the strict sense, for which Attems proposed Mastigocambalinae, a name untenable both because not based upon an included genus and also because it includes the type genus of the family which must accordingly be the basis of the name. Attems's name Glyphiocambalinae for the subbranch including genera not having flagella on the anterior gonopods is also not tenable because not based upon an included genus. It may be replaced by Glyphiulinae, new name.

For *Epinannolene* a new family name must be given; and Epinannolenidae is accordingly here proposed.

## Genus EPINANNOLENE Brolemann.

## EPINANNOLENE TRINIDADENSIS (Chamberlin).

Plate 2, figs. 1-2.

*Nemasoma trinidadensis* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, no. 5, p. 213.

This is a comparatively small form mostly under 18 mm. in length and with most commonly forty-nine segments in the adult, though the number may be several fewer or greater than this. The color varies from light brown to nearly black, with caudal border of segments lighter. The eye consists of two or three transverse series of ocelli, of which the two posterior rows are long, as, for example, 9, 8, 6 and 9, 7, 1. Segments constricted, the sulcus at bottom of constriction marked with imperfect punctae. The gonopods of the male (type) as shown in plate 2, figures 1 and 2.

*Localities*.—Trinidad: Guacharo Cave and Port of Spain. Additional specimens have been examined from these localities.

Porto Rico: San Juan. November, 1899. In the United States National Museum are some female specimens from this locality which are referred to the species with some doubt, though presenting no differences that were detected.

## Suborder SPIROSTREPTOIDEA.

## Family SPIROSTREPTIDAE.

## Genus ORTHOPORUS Silvestri.

## ORTHOPRUS SCULPTURATUS (Karsch).

*Spirostreptus sculpturatus* KARSCH, Zeits. naturwiss., 1881, ser. 3, vol. 5, p. 39.

*Locality*.—Porto Rico: Lares, several specimens (A. Busck, January 25, 1899).

## Suborder SPIROBOLOIDEA.

## Genus NESOBOLUS Chamberlin.

## NESOBOLUS TOROANUS Chamberlin.

Plate 2, figs. 3-4.

*Nesobolus toroanus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 204.

*Locality*.—Cuba: Mount Toro, Nimfilas, Ramona el Mono. San Felipe, Los Hondones, Belona.

The figures were made from the type.

## NESOBOLUS YATERUS, new species.

Plate 2, figs. 5-10.

This species very much resembles *N. toroanus* Chamberlin in its general coloration and structure. The most obvious difference in coloration is that in the present species the legs are yellowish whereas in all the adults of *toroanus* examined they are distinctly ferruginous.

The markings of the somites in general the same, the suture being deeply impressed throughout on the typical tergites; but the suture of the second segment is absent or weakly developed only on the sides. On the contrary, in *toroanus* the suture of the segment is distinct throughout.

Processes of third, fourth, and fifth legs especially prominent, much as in *toroanus* (see pl. 2, figs. 7, 8).

The species may be distinguished by the form of the minor prong of the posterior gonopods. In *toroanus* this is abruptly bent ventrad near its middle and then a little caudad at its tip (pl. 2, fig. 4). On the contrary, in *yaterus* this prong is but weakly evenly curved as shown in plate 2, figure 6. The form of the anterior gonopods is shown in plate 2, figure 5.

Number of segments, 46-48.

Length, up to near 35 mm.; width, 3 mm.

*Locality*.—Cuba: Oriente Province, Yateras, Bella Vinta (May 4, 1907) (Type locality), and Jaguey (April 20, 1907). W. R. Maxon collection.

*Type*.—Cat. No. 858, U.S.N.M.

## NESOBOLUS LIBANONUS, new species.

Plate 2, fig. 11; plate 3, figs. 1-5.

Resembling *toroanus* but the legs pale yellow, not ferruginous. The type differs from those of the other two known species in having the process of the third joint of the fifth legs of male much smaller than those of fourth leg and almost obsolete (see pl. 3, figs. 1-5). The minor prong of the posterior gonopod is bent more than in *yaterus* but obviously less than in *toroanus* (see pl. 2, fig. 11). The minor prong at its end is in contact, or nearly so, instead of being well separated as it is in *yaterus*, as shown in the figure.

Anterior gonopods essentially as in *yaterus*.

Number of segments, 46.

Thickness, 2.5 mm.

*Locality*.—Cuba: Alto de la Union, Mount Libano. May 18, 1913 (C. T. Ramsden).

*Type*.—Cat. No. 5035, M. C. Z.

**CUBOCRICUS, new genus.**

Proposed for a group of species of large size that differ from *Rhinocricus* in having the telopodite of each posterior gonopod simple, and slenderly acuminate, with no trace of branching or bifurcation. Sensory cones of antennae numerous. Anterior legs of male with tarsal pads or thickenings.

*Genotype*.—*Cubocricus suprenans* (Chamberlin).

**CUBOCRICUS SUPRENANS (Chamberlin).**

Plate 3, figs. 6-9.

*Rhinocricus suprenans* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 193.

This is the largest of the known West Indian spiroboloids. It is superficially recognizable in having each segment with a posterior border of ferruginous color and the legs light olive, lighter than body. Surface of segments smooth, the sulcus along segmental suture weak; no distinct secondary sulci. Collum weakly notched behind above lower end. In the male distinct tarsal pads are present only on the legs of the anterior region (pl. 3, fig. 9). Gonopods of male as figured (pl. 3, figs. 7-8). Number of segments, typically 46 or 47. The maximum specimen studied has a diameter of 18 mm.

*Locality*.—Cuba: Baracoa.

Additional specimens from this locality are in the United States National Museum collection. They were secured by Palmer and Riley, January 30, 1902.

**CUBOCRICUS DUVERNOYI (Karsch).**

*Spirobolus (Rhinocricus) duvernoyi* KARSCH, Zeits. naturwiss., 1881, ser. 3, vol. 6, p. 77.

Contrasting in color with the preceding species in that the caudal border of segment is of a darker color—typically deep olive—than the rest of the segment instead of lighter and ferruginous; also in the much darker olive color of the legs, these not lighter than body. The tergites are ordinarily marked on dorsum with numerous longitudinal furrows across caudal part and commonly show three encircling furrows, one along suture and one on each side of this, these commonly well marked with the anterior one often deepest. Male with tarsal pads on all legs except those of most caudal pairs. Gonopods very similar to those of *suprenans*. Number of segments, 49-53, 49 or 50 being most common. Maximum diameter noted is 15 mm.

*Localities*.—Cuba: Santiago de las Vegas; Guantanamo; Pinar del Rio; Guanajay (in a cave, May 5, 1900, Palmer and Riley).

## Genus RHINOCRICUS Karsch.

The following key, based upon the one by Pocock,<sup>1</sup> will aid in separating the West Indian species of *Rhinocricus* on the more superficial characters.

## KEY TO WEST INDIAN SPECIES OF RHINOCRICUS.

- a.*<sup>1</sup> Clypeus very deeply excised.....*R. excisus* Karsch.  
*a.*<sup>2</sup> Clypeus lightly and normally excised.
- b.*<sup>1</sup> Somites with no second transverse groove in front of the ordinary sulcus (not always strictly true of *arboreus*).
- c.*<sup>1</sup> At least some of the anterior somites with posterior border bisinuate above the scobina.
- d.*<sup>1</sup> A distinct longitudinal pale stripe along each side of the dorsum; somites forty-two; length under 40 mm.  
*R. newtonianus* Chamberlin.
- d.*<sup>2</sup> No longitudinal pale stripes; the color fuscotestaceous or black; somites forty-six or more.
- e.*<sup>1</sup> Pores scarcely above the middle of the side; scobina reaching only to the twelfth somite.....*R. parvus* Karsch.
- e.*<sup>2</sup> Pores well above the middle of the side; scobina reaching to or beyond the twenty-fourth somite.
- f.*<sup>1</sup> Body distinctly annulate with lighter or darker color.
- g.*<sup>1</sup> Transverse suture distinct across dorsum throughout.  
*R. electus* Chamberlin.
- g.*<sup>2</sup> Suture obscure or absent dorsally in middle and posterior regions.....*R. mediator* Chamberlin.
- f.*<sup>2</sup> Color uniform black.
- g.*<sup>1</sup> Collum marginate below; scobina reaching twenty-ninth or thirtieth somite; legs and antennae light brown or ferruginous.  
*R. guadeloupensis* Chamberlin.
- g.*<sup>2</sup> Collum not marginate below; scobina reaching twenty-fourth somite; legs and antennae shining black.  
*R. holomelanus* Pocock.
- c.*<sup>2</sup> None of the tergites with posterior border bisinuate.
- d.*<sup>1</sup> Anal tergite not surpassing the vales.
- e.*<sup>1</sup> Number of somites only forty to forty-four.
- f.*<sup>1</sup> Sulcus deep and sharply defined entirely across dorsum; width typically 5 mm. or over.....*R. liparus* Chamberlin.
- f.*<sup>2</sup> Sulcus weak or obsolete dorsally, disappearing in an obscure furrow; width under 3.5 mm.
- g.*<sup>1</sup> Anal valves red; median plate of male gonopods distally rounded with lateral margins below bisinuate.  
*R. solitarius* Pocock.
- g.*<sup>2</sup> Anal valves solid black; median plate of gonopods not of this form.
- h.*<sup>1</sup> Collum black with narrow ferruginous borders; number of somites forty; median plate of gonopods, acute distally with evenly concave and diverging sides...*R. parvior* Chamberlin.
- h.*<sup>2</sup> Collum light with black borders; number of somites forty-three or forty-four; median plate of gonopods distad of base in the form of a long, slender, parallel-sided tongue.  
*R. furcianus* Chamberlin.

<sup>1</sup> Journ. Linn. Soc., 1894, vol. 24, p. 486.

*e.*<sup>2</sup> Number of somites forty-six or more.

*f.*<sup>1</sup> Large species, from 75 to 170 mm. long.

*g.*<sup>1</sup> Antennae long, reaching the third segment.

*R. domingensis* Saussure.

*g.*<sup>2</sup> Antennae short, scarcely surpassing the collum.

*h.*<sup>1</sup> Length only to near 75 mm.; width under 8 mm.; somites banded along posterior border with flavous or ferruginous.

*R. maltzani* Pocock.

*h.*<sup>2</sup> Length above 125 mm.; width near 13 mm. or more; color black or deep brown without bands of lighter color.

*R. haitensis* (Gervais).

*f.*<sup>2</sup> Smaller species under 60 mm. in length.

*g.*<sup>1</sup> Transverse suture strongly marked entirely across dorsum. Somites ferruginous behind suture. (Haiti.)

*R. curtior* Chamberlin.

*g.*<sup>2</sup> Transverse suture weak or obsolete above on most segments.

*h.*<sup>1</sup> A series of black transverse bands along the middorsum and on each side of this a longitudinal reddish or ferruginous stripe. (Jamaica)-----*R. heteroscopus* Chamberlin.

*h.*<sup>2</sup> With no such longitudinal stripes each side of a series of middorsal black marks.

*i.*<sup>1</sup> Somites above level of pores uniform dark brown or black, not bordered caudally with lighter band; width 3 mm. or scarcely more-----*R. nigrescens* Chamberlin.

*i.*<sup>2</sup> Somites dorsally as well as laterally banded with light color along caudal border; width 4.5 mm. or more. (Posterior male gonopods distally strongly bifurcate, the prongs equal in length, the ventral one evenly curved, abruptly expanded at distal end where there are two mucra with convex edge between.)-----*R. socius* Chamberlin.

*d.*<sup>2</sup> Anal tergite surpassing the valves.

*e.*<sup>1</sup> Segments forty to forty-two.

*f.*<sup>1</sup> Legs long; antennae reaching the fourth somite.

*R. gracilipes* Karsch.

*f.*<sup>2</sup> Legs short; antennae not reaching to fourth somite.

*R. grenadensis* Pocock.

*e.*<sup>2</sup> Segments fifty or more.

*f.*<sup>1</sup> Posterior part of the segments not elevated.

*R. arboreus* Saussure.

*g.*<sup>1</sup> Legs dark, uniform or nearly so.

*R. arboreus arboreus*, forma typica.

*g.*<sup>2</sup> Tarsi of legs reddish or orange.

*h.*<sup>1</sup> Body light gray; usually a series of dorsal red spots; tarsi orange-----*R. arboreus gundlachi* Karsch.

*h.*<sup>2</sup> Body darker; no dorsal spots; tarsi reddish.

*R. arboreus krugii* Karsch.

*f.*<sup>2</sup> Posterior part of segments elevated.

*g.*<sup>1</sup> Caudal process long-----*R. macropus* Pocock.

*g.*<sup>2</sup> Caudal process short, but little exceeding valves.

*R. modestior* Silvestri

*b.*<sup>2</sup> Somites with a second sulcus in front of the ordinary one.

*c.*<sup>1</sup> The posterior transverse sulcus complete dorsally, at least on segments in middle of body.

*d.*<sup>1</sup> Anterior sulcus weak and often interrupted, the posterior weaker, anal tergite not surpassing the valves, and not acutely produced; black with brown legs-----*R. leptopus* Pocock..

*d.*<sup>2</sup> The two transverse sulci complete and deep on nearly all the segments.

*e.*<sup>1</sup> Larger species near 140 mm. or more in length and 13 mm. or more in diameter.

Scobina extending to posterior region of body.

*R. thomsonianus* Chamberlin..

*e.*<sup>2</sup> Smaller species near 60 mm. and under in length.

*f.*<sup>1</sup> Anterior transverse sulcus arising on each side from the lateral portion of the posterior sulcus considerably below the pore; color black, with on each segment a median dorsal flavous spot and a lateral flavous spot over each pore.

*g.*<sup>1</sup> Anal tergite surpassing the valves. (Dominica).

*R. leucostigma* Pocock.

*g.*<sup>2</sup> Anal tergite clearly exceeded by the valves.

*R. martiniquensis* Chamberlin..

*f.*<sup>2</sup> Anterior transverse sulcus arising on each side in front of and on a level with the pore; segments distinctly flavo- or ferruginocingulate.

*g.*<sup>1</sup> Caudal process considerably surpassing the valves; the area of the segments behind the posterior sulcus flavous.

*R. monilicornis* Porat.

*g.*<sup>2</sup> Caudal process scarcely or not at all surpassing the valves.

*h.*<sup>1</sup> Length up to 60 mm. with width 5 mm. or more (somites forty-seven or forty-eight)-----*R. juxtus* Chamberlin.

*h.*<sup>2</sup> Length near 35 mm., and width near 3 mm.

*i.*<sup>1</sup> Segments narrowly ferruginocingulate along caudal borders; median plate of male gonopods with sides straight.

*R. consociatus* Pocock.

*i.*<sup>2</sup> Segments not bordered with ferruginous; median plate of gonopods with sides convex proximally and conspicuously incurved or concave distad of middle.

*R. tobagoensis* Chamberlin.

*c.*<sup>2</sup> The posterior transverse sulcus obsolete dorsally on all or most of the segments.

*d.*<sup>1</sup> Anal tergite acutely angled posteriorly.

*e.*<sup>1</sup> Transverse sulcus conspicuous laterally; color as in *monilicornis*. flavo-cingulate-----*R. anguinus* Pocock.

*e.*<sup>2</sup> Transverse sulcus obsolete, or nearly so, on most segments; upper surface of segments dark, with a flavous spot on each side of the middle line.

*f.*<sup>1</sup> Segments forty-eight to fifty-two-----*R. serpentinus* Pocock..

*f.*<sup>2</sup> Segments forty to forty-three-----*R. grammostictus* Pocock..

*d.*<sup>2</sup> Anal tergite not acutely produced, rounded.

*c.*<sup>1</sup> Posterior portion of segments flavo- or ferruginocingulate.

*f.*<sup>1</sup> Anal tergite clearly surpassing the valves.

*R. mimeticus* Chamberlin.

*f.*<sup>2</sup> Anal tergite surpassed by the valves.

*g.*<sup>3</sup> Anal segment black; segments distinctly punctulate or striolate-----*R. vincenti* Pocock.

*g.*<sup>2</sup> Anal valves flavous or lurid or ferruginous; segments smooth and polished, at least dorsally.

*h.*<sup>3</sup> Each ordinary segment encircled about its middle with a brown or bluish-brown band, the anterior and posterior border ferruginous; anal valves ferruginous.

*R. bruesi* Chamberlin.

*h.*<sup>2</sup> Each segment flavous on posterior side as far forward as the suture; a black mark in middorsal region, often with the others giving the effect of a median dorsal black stripe; anal valves flavous or lurid-----*R. cockerelli* Pocock.

*e.*<sup>2</sup> General color yellow with a median dorsal black band and also a black band on each side at level of pores----*R. sabulosus* Pocock.

#### RHINOCRICUS ARBOREUS (Saussure).

*Julus arboreus* SAUSSURE, *Linnaea ent.*, 1859, vol. 13, p. 331.

*Locality.*—Culebra (A. Busck, February, 1899).

The specimens are darker than those seen from St. Thomas, but the legs do not have the reddish tarsi present in the following Porto Rican form.

#### RHINOCRICUS ARBOREUS KRUGII Karsch.

*Julus arboreus* SAUSSURE, *Linnaea ent.*, 1859, vol. 13, p. 331.

*Spirobolus (Rhinoericus) arboreus, var. krugii* KARSCH, *Zeits. naturwiss.*, 1881, ser. 3, vol. 6, p. 9.

*Localities.*—Porto Rico: Near El Yunque (C. W. Richmond, February 22, 1900); Rio Piedras.

This variety is very close to the typical form as it occurs on St. Thomas, the type locality. I have examined a considerable number of specimens from the latter locality and find them to lack the abruptly lighter, ordinarily reddish, tarsi characterizing adults of the Porto Rican form. The difference in the depth of coloration of the body pointed out by Karsch is not so constant. Mr. R. Cotton reports this form as feeding on the purple scale (*L. beeki*) of citrus trees.

#### RHINOCRICUS ARBOREUS GUNDLACHII Karsch.

*Spirobolus (Rhinoericus) gundlachii* KARSCH, *Zeits. naturwiss.*, 1881, ser. 3, vol. 6, p. 9.)

*Localities.*—Porto Rico: Near Pueblo Viejo (L. Stejneger and C. W. Richmond, February, 1899); El Yunque, on Catalina plant (February 2, 1900. L. Stejneger); Manati (December, 1899); Vega Baja (December, 1899).

In this light grey form the tarsi are quite uniformly orange-colored and there is typically a middorsal series of red spots. The dorsal spots are darker, brown or blackish, instead of reddish, and may be wholly absent.

**Genus CUBOBOLUS Chamberlin.**

This genus embraces a group of mostly small spiroboloids closely related to *Rhinocricus*, into which it may have to be withdrawn. It is retained, for the present, for the West Indian *Rhinocricus*-like species that lack scobina. A new species is here added to the group. The following key will aid in placing the species:

- a.*<sup>1</sup> Body with a longitudinal light band along each side and one each side of middorsal line.....**C. cinchonanus**, new species.
- a.*<sup>2</sup> Body with no longitudinal light bands.
  - b.*<sup>1</sup> Transverse sulcus of segments complete and distinct dorsally.
    - c.*<sup>1</sup> Anal tergite acutely angled; black, with a median dorsal series of pale spots.....**C. ramagei** (Pocock).
    - c.*<sup>2</sup> Anal tergite rounded behind; body with no median dorsal series of pale spots.
      - d.*<sup>1</sup> Area of segments behind the transverse sulcus widely and completely flavous.....**C. mandevillei** (Pocock).
      - d.*<sup>2</sup> Area of segments behind the transverse sulcus dark chestnut.
        - C. beliganus** Chamberlin.
    - b.*<sup>2</sup> Transverse sulcus of segments obsolete or very weak dorsally.
      - c.*<sup>1</sup> Collum with border weakly or obscurely marginate.
        - d.*<sup>1</sup> Segments 39 or 40; length under 30 mm. (color black excepting a fine pale caudal border).....**C. townsendi** Pocock.
        - d.*<sup>2</sup> Segments 44 to 47; length 45 mm. or more.
          - e.*<sup>1</sup> Second tergite flattened below; light band of segments extending to suture.....**C. gossei** (Pocock).
          - e.*<sup>2</sup> Second tergite not flattened below; light band very narrow dorsally, much short of attaining the suture.
            - C. rarior** (Chamberlin).

**CUBOBOLUS CINCHONANUS, new species.**

Plate 3, figs. 10-11.

A small form characterized by a peculiar color pattern. Along the dorsum a light band traversed on the median line by a series of black marks consisting of a T-shaped figure with a dot above it on each segment, the longitudinal piece of the T thick. A narrow pale stripe along each at the middle of the height. Legs yellow. Antennae brown.

Collum with a margining sulcus below, this curving upward a short distance at its anterior end where it is deepest. Surpassed by the second tergite below.

Segmental suture absent or traceable only near pore. Segments smooth, weakly constricted about middle. Segments striate beneath and on the anterior and median segments with a series of short, curved, impressed lines in the constricting furrow below level of pore on each side. No scobina present.

Anal tergite exceeded by the valves, rounded behind. Anal valves moderately compressed. Anal scale broadly triangular, apically rounded.

Gonopods as represented in plate 3, figures 10 and 11.

Number of segments, 39.

*Length*.—About 27 mm., width 2 mm.

*Locality*.—Jamaica: Cinchona. One male. (C. T. Brues, January, 1912.)

*Type*.—Cat. No. 5031, M. C. Z.

#### Genus MICROSPIROBOLUS Silvestri.

This South American and West Indian genus is likely to prove heterogenous, though our present knowledge is too incomplete to furnish grounds for division. The West Indian species now known to belong to this group are *M. marmoratus* Silvestri, *M. insularis* Silvestri, *M. belonanus* Chamberlin, *M. fontis*, Chamberlin, *M. lineatus* Chamberlin, and the three new species described below.

#### MICROSPIROBOLUS FONTIS Chamberlin.

Plate 4, figs. 1, 2.

*Microspirobolus fontis* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 208.

*Locality*.—Cuba: San Diego de los Baños.

The figures are made from the type.

#### MICROSPIROBOLUS BELONANUS Chamberlin.

Plate 4, figs. 3, 4.

*Microspirobolus belonanus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 207.

*Locality*.—Cuba: Belona Oriente.

#### MICROSPIROBOLUS LINEATUS Chamberlin.

Plate 4, figs. 5, 6.

*Microspirobolus lineatus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 209.

*Locality*.—Haiti: Diquini.

## MICROSPIROBOLUS EREMUS, new species.

Plate 4, figs. 7-10.

Deep brown or black, a narrow pale ferruginous caudal border on each segment and the covered portion of prozonite also paler, the pale bands sometimes expanding in ventral region adjacent to legs. In the lighter colored specimens the repugnatorial glands show as a lateral series of black spots, particularly in the posterior half of the body. Legs ferruginous or brick red.

Head smooth. Labral pores 4+4. Eyes widely separated, sub-circular; ocelli in four or five transverse series in which the ocelli are but weakly convex and often indistinct.

Collum narrowly rounded beneath on each side; deeply margined below and up the anterior border to level of eye.

Segments striate only beneath, elsewhere wholly smooth. The segmental suture sharply impressed throughout, widely but weakly angled opposite the pore which is somewhat less than half-way from the suture to caudal margin.

Anal tergite broadly rounded behind, a little surpassing the valves. Anal valves wholly smooth, not compressed or margined. Anal scale broadly triangular.

With conspicuous subconical processes on coxae of third to fifth pairs of legs in the male, the coxae of sixth and ninth pairs not produced (see pl. 4, figs. 9, 10).

For gonopods see plate 4, figures 7 and 8. Posterior pair very small.

Number of segments, 44-46.

*Locality*.—Cuba: Soledad. Ten specimens taken in 1917-18 by Thomas Barbour.

*Type*.—Cat. No. 5032, M. C. Z.; paratypes, Cat. No. 5033, M. C. Z.

## MICROSPIROBOLUS MIMUS, new species.

Plate 5, figs. 4, 5.

Segments typically black or nearly so dorsally but paler, testaceous, caudad of suture below level of pores and especially ventrally, and with a narrow pale caudal border as in *eremus*. Legs ferruginous.

Eyes widely separated, with ocelli in five series; as for example, 8, 7, 7, 4, 3: Clypeal foveolae 3+3 or 4+4.

Collum rounded and margined below as in the *eremus*.

Segmental suture distinct throughout, excised opposite the pore. Segments striate beneath and also with short striae running from suture a little ways caudad part way up the side.

Anal tergite rounded behind, equalling the valves. Anal valves weakly margined and with a few weak longitudinal striae ectad of

the margining one. Anal scale broad and short, the caudal angle very obtuse. Processes of coxae of legs of male as usual.

Gonopods as shown in plate 5, figures 4 and 5.

Number of segments, fifty-four.

Length, about 30 mm., width, 2.5 mm.

*Locality*.—Cuba: San Diego de los Baños. One male. (April 17, 1900, Palmer and Riley.)

*Type*.—Cat. No. 859, U.S.N.M.

**MICROSPIROBOLUS RICHMONDI**, new species.

Plate 5, figs. 1-3.

General color greyish black, the color sometimes deeper caudally just in front of the pale edge. A series of light ferruginous spots on each side of the dorsum, these sometimes obscure. Legs and antennae ferruginous.

Eyes widely separated with ocelli in four or five transverse series; e. g., 5, 4, 4, 2, 1. Clypeal foveolae 4+4.

Collum deeply margined below and up to end of eye in front; lower corners rounded, with the intervening margin weakly convex. Segmental sulcus distinctly impressed; on the sides at and below level of pore consisting of a series of united short curved lines with concavity caudad, but not openly angled or curved at level of pore. A series of short striae just caudad of and united with the sulcus, these succeeded below by larger striae reaching from sulcus to caudal margin.

Caudal angle of last tergite rounded, exceeded by the valves. Anal valves smooth, mesal border evenly protruding but not set off by margining sulcus or furrow. Anal scale broad, the caudal margin convex.

Gonopods as shown in plate 5, figures 1-3.

Number of segments, thirty-nine to forty-five.

Length of female, 25 mm.; width, 2.6 mm. Width of male, 2.2 mm.

*Locality*.—Porto Rico: El Yunque, 2,800 feet. (February 26-27, 1900, C. W. Richmond.)

*Type*.—Cat. No. 860, U.S.N.M.

**Genus SPIROSTROPHUS** Saussure and Zehntner.

Myriapodes Madagascar, 1902, p. 150. (As subgenus of *Spirobolus*.)

*Glosselus* COOK, Proc. U. S. Nat. Mus., 1911, vol. 40, p. 163.

*Cairibolus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 209.

Examination of more ample material shows that the writer previously misinterpreted the posterior gonopods of the species placed under *Cairibolus* and that they are trigoniulids rather than allies of *Microspirobolus*. They conform to the East Indian *Spirostrophus*,

as do also the forms described as *Trigoniulus frater*, *remotus*, and *garmani*. This leaves *T. lumbricinus* (Gerstaecker) as the only species of *Trigoniulus sens. str.* known to occur in the West Indies.

## Suborder POLYDESMOIDEA.

### Family STRONGYLOSOMIDAE.

#### Genus ORTHOMORPHA Bollman.

##### ORTHOMORPHA COARCTATA (Saussure).

*Polydesmus coarctata* SAUSSURE, Mem. Soc. Phys. Genève, 1860, p. 39, fig. 18.

*Localities.*—Cuba: Isla de Pinos, Bibijagua (June, 1918, T. Barbour and W. S. Brooks); Habana (August 5, 1900, Palmer and Riley); Baracoa (January 30, 1902, Wm. Palmer); Cabañas (June 4, 1900, Palmer and Riley); Yateras, Bella Vista, Oriente Prov. (May 4, 1907, W. R. Maxon); El Guama (Palmer and Riley, March 6, 1900).

Porto Rico: San Juan (November 5, 1899); Vieques (L. Stejneger, March 28, 1900).

### Family LEPTODESMIDAE.

#### Genus AMPHELICTOGON Chamberlin.

##### AMPHELICTOGON DOLIUS, new species.

The middorsal region dark brown, the keels and a varying area of the contiguous part of dorsum dull yellowish white, the light area on each side commonly broader than the median brown area, the latter sometimes greatly reduced on posterior segment. Keels under lens showing dense area of small darker spots. The collum yellowish over keels and along caudal border and in a small lunate spot at anterior border, or this spot sometimes absent. Prozonites dark brown above, uniformly paler or testaceous below. Anal valves dark brown or blackish, uniform, contrasting with the pale anal scale. The last tergite dark only across base.

Second, third, and fourth keels each with a distinct tooth at the antero-lateral corner. Caudal margin of keels somewhat convex and wholly without teeth. Processes of nineteenth tergite small, rounded; those of eighteenth tergite about equalling those of seventeenth but a little more rounded. Processes of other tergites weak.

*Length.*—32 mm.; width, 4.5 mm.

*Locality.*—Cuba: Punta de Judas, 40 miles east of Caibarien (T. Barbour, 1917-18.)

*Type.*—Cat. No. 5024, M. C. Z.; paratypes Cat. No. 5025, M. C. Z.

In the great relative width of the light areas of keels and adjacent portion of dorsum differing in color from the other known species.

**AMPHELICTOGON PINETORUM**, new species.

Plate 5, fig. 6.

When in full color the dorsum is chocolate brown to black, with the keels yellowish white, the mesal edge of each light area running from anterior inner end of keel obliquely caudoectad to near middle of caudal edge of keel. Under the lens each keel is seen to be marked with numerous small dark dots. Sides also dark, uniform, the venter light brown to nearly yellow. Last tergite dark, excepting the projecting cauda. Antennae and legs dark red.

The second to fourth keels with a small lateral tooth. None of the keels with tooth or projecting nodules on caudal margin. Processes of keels all short; those of nineteenth small and rounded, much shorter than those of eighteenth which are longer than those of the seventeenth.

Lower branch of gonopods without tooth at point where it narrows into style; the latter proximally with a strong sigmoidal flexure and curled into a circle at tip. Blade of upper or anterior branch bent in a semi-circle, acute, with a single subapical tooth (see pl. 5, fig. 6).

*Length*.—26-30 mm.; width of male 3 mm., of female 3.5 mm.

*Locality*.—Isla de Pinos: Bibijagua. (Barbour and Brooks, June, 1918), (Type locality).

Cuba: San Diego de los Baños. (April 23, 1900. Palmer and Riley.)

*Type*.—M. C. Z. 5,026; paratypes 5,027.

**RICODESMUS**, new genus.

Closely related to *Chondrodesmus*, but the superior branch of gonopods slender, distally styliform, not sheathing the inferior branch, which is also slender, and suggests that of *Chondrodesmus*. Keels of middle and posterior regions narrower than in the latter genus.

*Genotype*.—*Ricodesmus stejnegeri*, new species.

**RICODESMUS STEJNEGERI**, new species.

Plate 5, fig. 7; plate 6, figs. 1, 2.

Chestnut in a band across prozonite and anterior portion of metazonite, the caudal part of metazonite covered by a lighter, sometimes flavous, band that extends also along lateral border of keel, the flavous band commonly broad, embracing most of metatergite. Legs and antennae flavous.

Dorsum of segments convex; smooth, showing neither tubercles nor polygonal areas, and also with no transverse sulcus. All keels narrow, even the anterior ones being longer than broad, while in the posterior ones the anterior portion in front of the pore-body is represented only by a simple ridge or swelling on the side of the tergite. Anterior corners of keels rounded, the posterior curve in general only weakly produced even on posterior tergites.

Sternites without tubercles or processes in male.

Pleural keels present on first nine segments.

Gonopods as shown in plate 6, figures 1 and 2.

Length, to about 25 mm.; width, to 4 mm.

*Localities*.—Porto Rico: El Yunque. (L. Stejneger; C. W. Richmond 1900), (Type locality); La Munda (November, 1899, G. P. Goll); Lares (A. Busck, 25, January, 1899).

Type.—Cat. No. 861, U.S.N.M.

### Family CYCLODESMIDAE.

#### Genus CYCLODESMUS Humbert and Saussure.

##### CYCLODESMUS HAITIANUS Chamberlin.

Plate 6, fig. 3.

*Cyclodesmus haitianus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 215.

*Locality*.—Haiti: Diquini and Petionville.

##### CYCLODESMUS BRUESI Chamberlin.

Plate 6, fig. 6.

*Cyclodesmus bruesi* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 215.

*Locality*.—Jamaica: Liguanea Plain.

##### CYCLODESMUS PINETORUM, new species.

Plate 6, figs. 4, 5.

With a broad pale band along middorsal region, the sides below it being dusky but with a vertical light mark inclosed on each keel. Usually the dusky color of the sides extends across dorsum in a narrow band along the caudal border of each segment. The usual middorsal dark line showing through in posterior region.

The third keel not expanded below as much as in *C. porcellanus*, being but little broader below than dorsal region of the tergite, nearly as in *C. haitianus*. It is most readily distinguished from the latter species by the form of the fourth keel, which at the lower end is more broadly rounded and lacks the notch on caudal side as shown in figure 4, with which compare plate 6, figure 4. In the

form of this keel much more nearly approaching *C. bruesi* of Jamaica. Keels of posterior region not notched on caudal side.

The gonopods of male as shown in plate 6, figure 5.

*Length*.—13 mm.; width, 4 mm.

*Locality*.—Isla de Pinos: Bibijagua. Barbour and Brooks, June, 1918. Four specimens.

*Type*.—Cat. No. 5028, M. C. Z.; paratypes, Cat. No. 5029, M. C. Z.

Most resembles *C. bruesi* Chamberlin, of Jamaica, but differs in form of gonopods as well as in certain details of the keels, as shown in the figures.

## Family CRYPTODESMIDAE.

### Genus HOMODESMUS Chamberlin.

#### HOMODESMUS PARVUS Chamberlin.

*Homodesmus parvus* CHAMBERLIN, Bull. Mus. Comp. Zool., 1918, vol. 62, p. 222.

*Locality*.—Porto Rico: San Juan (5 Nov., 1899).

A single male taken at this locality agrees fully with the types, which are from Manneville, Haiti.

## EXPLANATION OF PLATES.

### PLATE 1.

#### *Prostemmiulus nesides*, new species.

- FIG. 1. Collum and adjacent parts, lateral view.  $\times 33$ .  
 2. Anterior sternite of eleventh segment.  $\times 33$ .  
 3. Posterior sternite of eleventh segment.  $\times 33$ .

#### *Nannolene burkei* Bollman.

4. Gnathochilarium of male.  $\times 33$ .  
 5. Gonopods of male, anteroventral view.  $\times 33$ .  
 6. Gonopods of right side, mesal view.  $\times 33$ .  
 7. Left posterior gonopod, mesal view, more enlarged.  
 8. First leg of male.  $\times 33$ .  
 9. Sixth leg of male (first joint omitted).  $\times 33$ .  
 10. Seventh leg of male.  $\times 33$ .

### PLATE 2.

#### *Epinannolene trinidadensis* (Chamberlin).

- FIG. 1. Left gonopod of male, subectal view.  
 2. Distal portion of right gonopod, caudal view.

#### *Nesobolus toroanus* Chamberlin.

3. Anterior gonopods, anterior view.  $\times 33$ .  
 4. A posterior gonopod.  $\times 33$ .

*Nesobolus yaterus*, new species.

- FIG. 5. Anterior gonopods, anterior view.  $\times 33$ .  
 6. A posterior gonopod.  $\times 77$ .  
 7. Fourth right leg of male.  $\times 77$ .  
 8. Fifth right leg of male.  $\times 77$ .  
 9. Sixth right leg of male.  $\times 77$ .  
 10. Eleventh right leg of male.  $\times 77$ .

*Nesobolus libanonus*, new species.

11. A posterior gonopod.  $\times 77$ .

## PLATE 3.

*Nesobolus libanonus*, new species.

- FIG. 1. Third left leg of male.  $\times 77$ .  
 2. Fourth right leg of male.  $\times 77$ .  
 3. Fifth right leg of male.  $\times 77$ .  
 4. Sixth right leg of male.  $\times 77$ .  
 5. Seventh right leg of male.  $\times 77$ .

*Cubocricus suprenans* (Chamberlin).

6. Position of repugnatorial pore with reference to sutures, left side of an anterior segment.  $\times 19.5$ .  
 7. Anterior gonopods, anterior view.  $\times 7$ .  
 8. A posterior gonopod.  $\times 7$ .  
 9. Tarsus of seventh leg of male in outline.  $\times 14$

*Cubobolus cinchonanus*, new species.

10. Anterior gonopods, anterior view.  $\times 48$ .  
 11. A posterior gonopod.  $\times 48$ .

## PLATE 4.

*Microspirobolus fontis* Chamberlin.

- FIG. 1. Anterior gonopods, anterior view.  $\times 33$ .  
 2. A posterior gonopod.  $\times 77$ .

*Microspirobolus belonanus* Chamberlin.

3. Anterior gonopods, anterior view.  $\times 33$ .  
 4. A posterior gonopod.  $\times 77$ .

*Microspirobolus lincatus* Chamberlin.

5. Anterior gonopods, anterior view.  $\times 33$ .  
 6. A posterior gonopod.  $\times 77$ .

*Microspirobolus eremus*, new species.

7. Anterior gonopods, anterior view.  $\times 66$ .  
 8. A posterior gonopod.  $\times 77$ .

- FIG. 9. Third leg of male.  $\times 48$ .  
 10. Seventh leg of male.  $\times 48$ .

## PLATE 5.

*Microspirobolus richmondi*, new species.

- FIG. 1. Posterior gonopod of male.  $\times 77$ .  
 2. Anterior gonopods, anterior view.  $\times 33$ .  
 3. Anterior gonopods of a smaller paratype.  $\times 33$ .

*Microspirobolus mimus*, new species.

4. Anterior gonopods, anterior view.  $\times 33$ .  
 5. A posterior gonopod.  $\times 77$ .

*Amphelictogon pinctorum*, new species.

6. Ventral view of right gonopod.  $\times 33$ .

*Ricodesmus stejneri*, new species.

7. Fourteenth and fifteenth left heels in outline.  $\times 19.5$ .

## PLATE 6.

*Ricodesmus stejneri*, new species.

- FIG. 1. Mesal view of gonopod of male.  $\times 77$ .  
 2. Ventral view of the same.  $\times 77$ .

*Cyclodesmus haitianus* Chamberlin.

3. Third, fourth, and fifth tergites, view slightly dorsal of lateral.

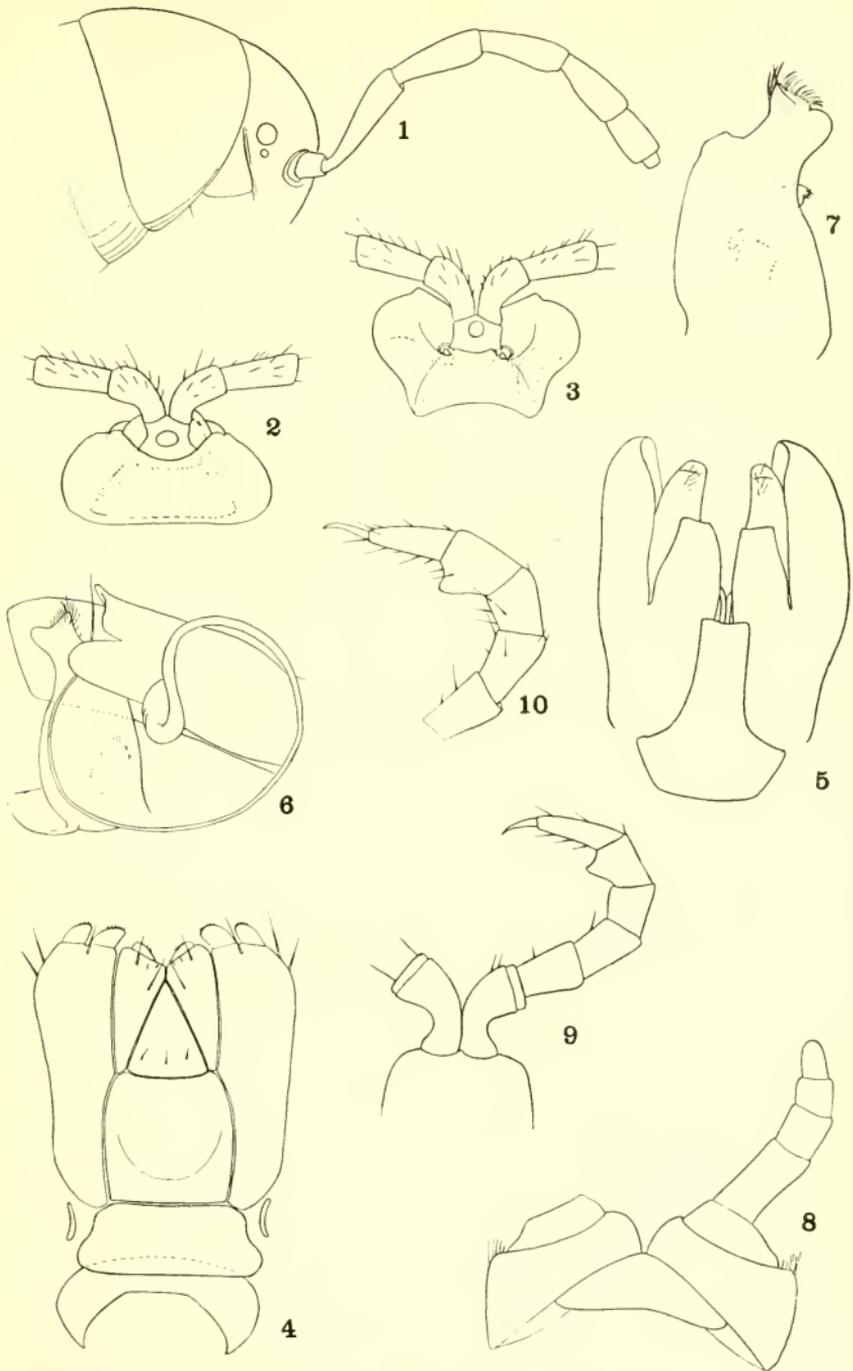
*Cyclodesmus pinctorum*, new species.

4. First five tergites, lateral view.  $\times 19.5$ .  
 5. Ectal view of a gonopod.  $\times 77$ .

*Cyclodesmus brucei* Chamberlin.

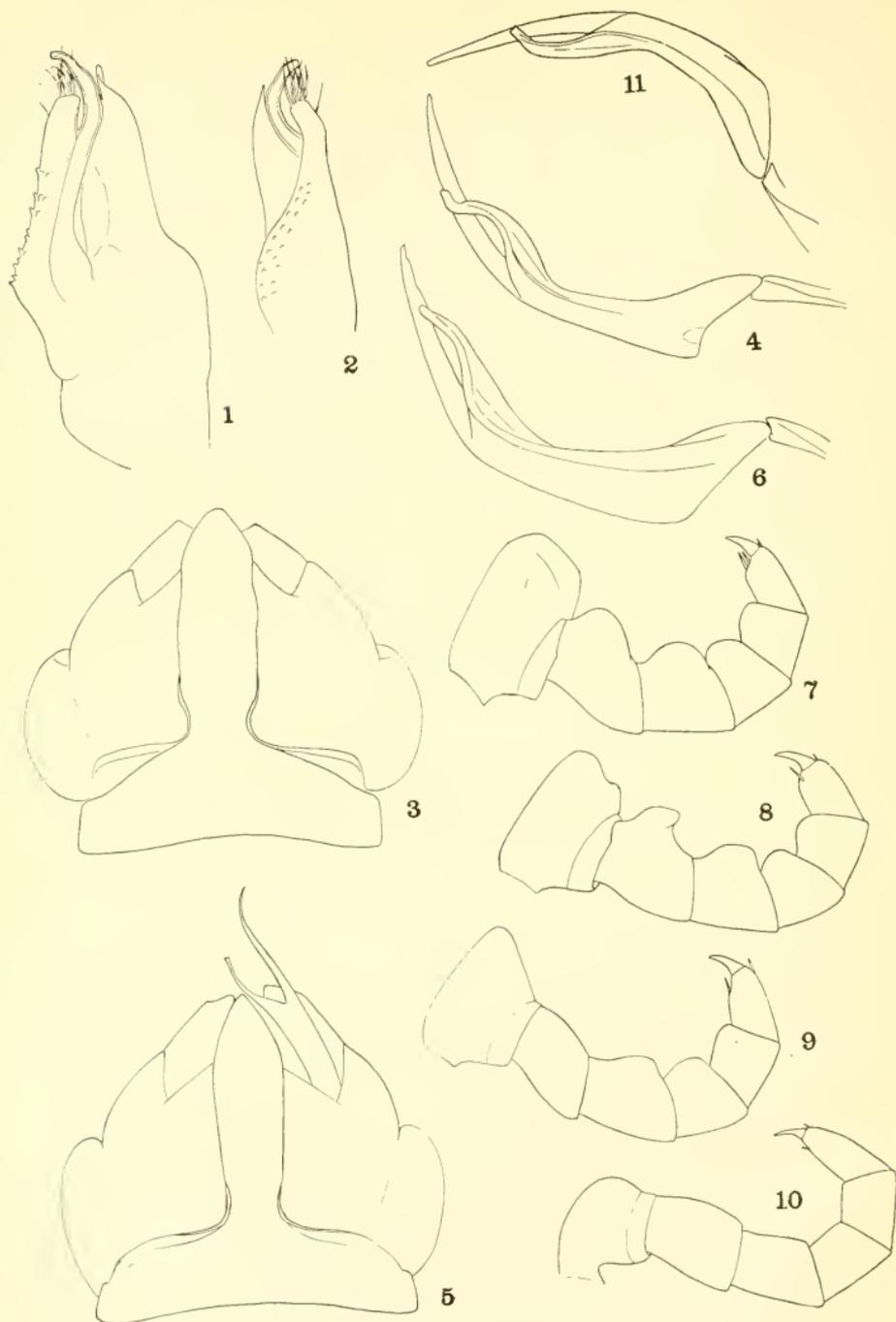
6. Ectal view of gonopod.  $\times 77$ .





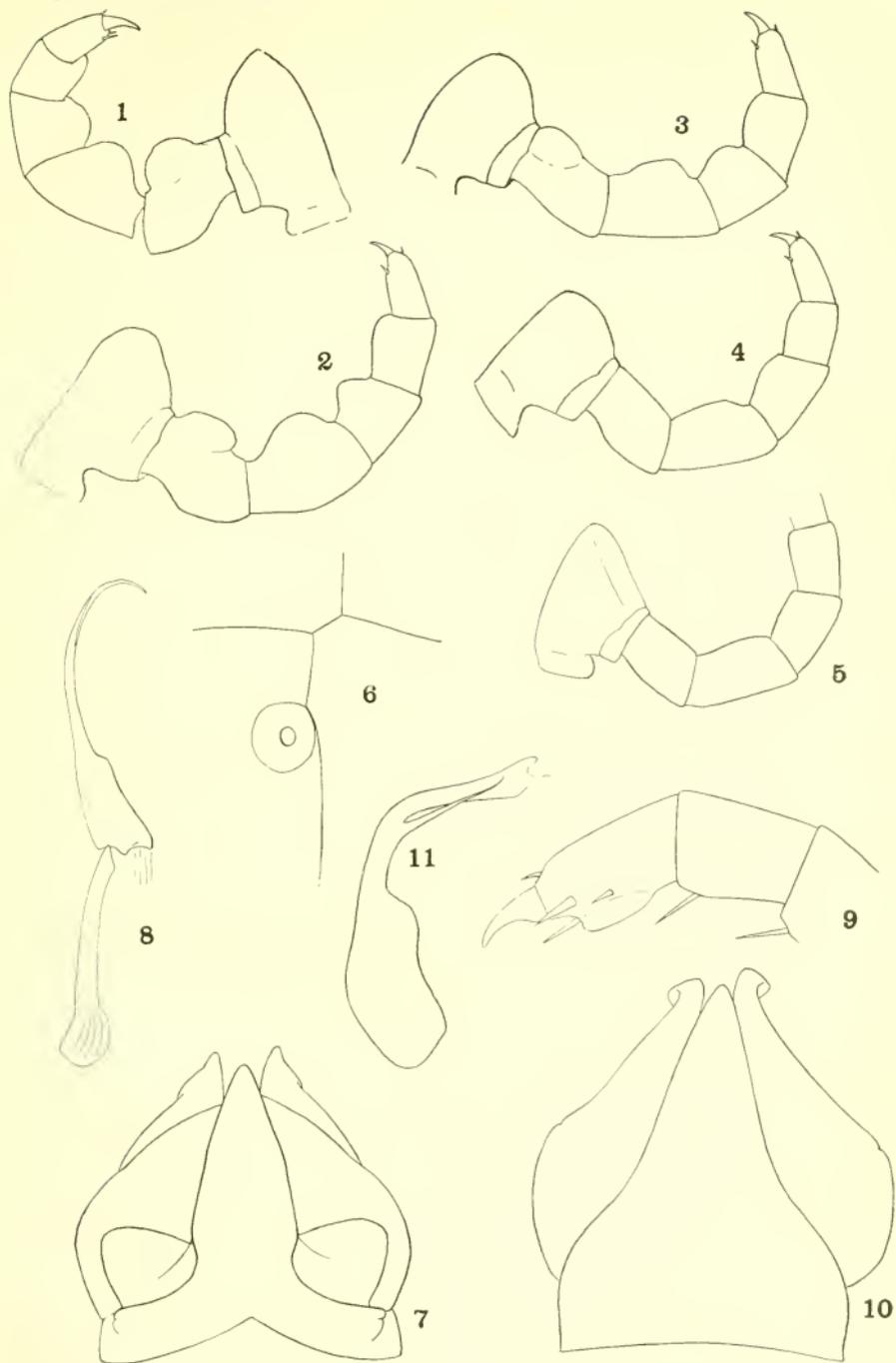
WEST INDIAN MILLIPEDES.

FOR EXPLANATION OF PLATE SEE PAGE 17.



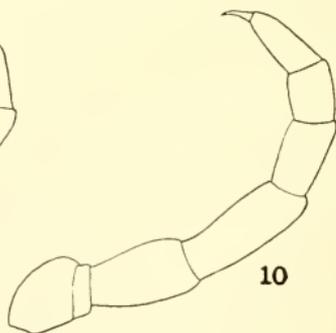
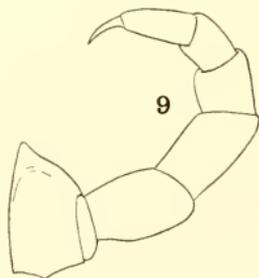
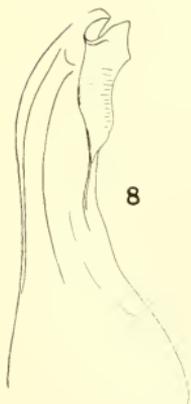
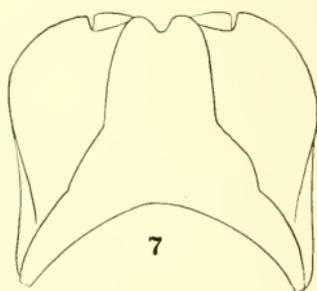
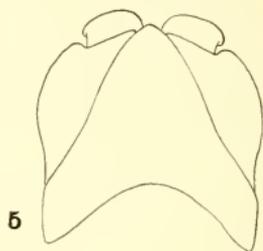
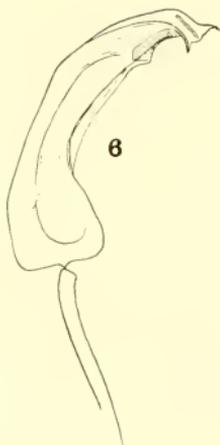
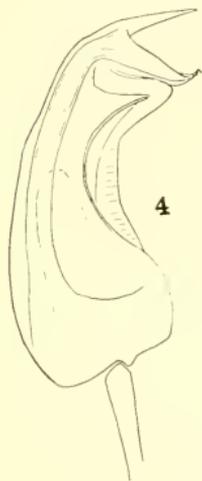
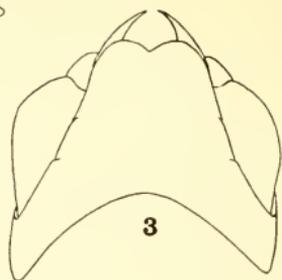
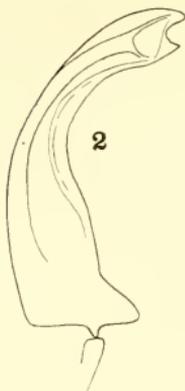
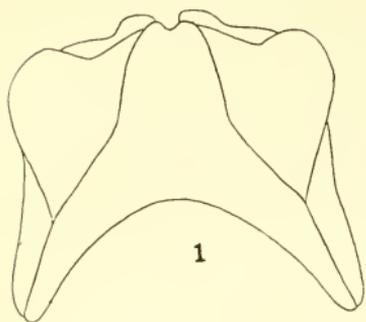
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FOR EXPLANATION OF PLATE SEE PAGES 17 AND 18.



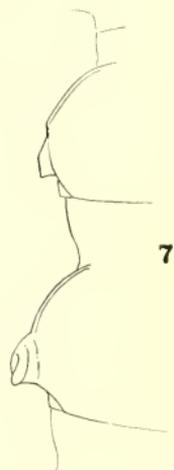
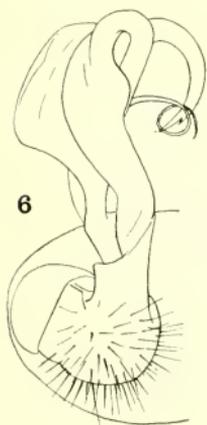
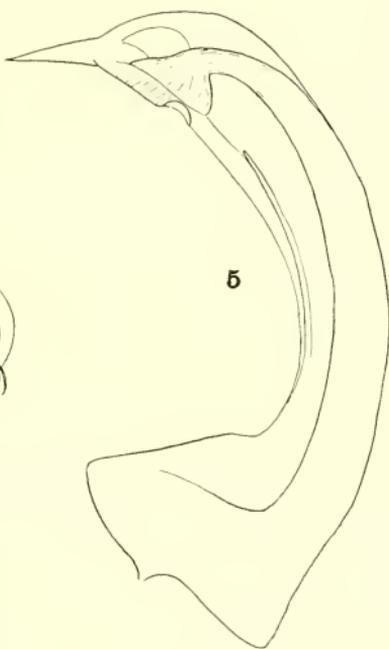
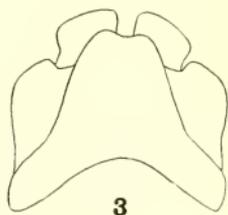
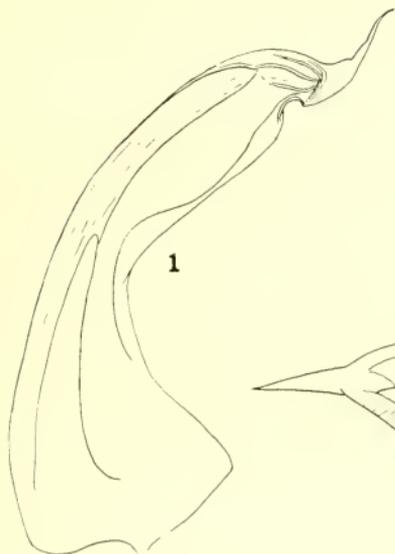
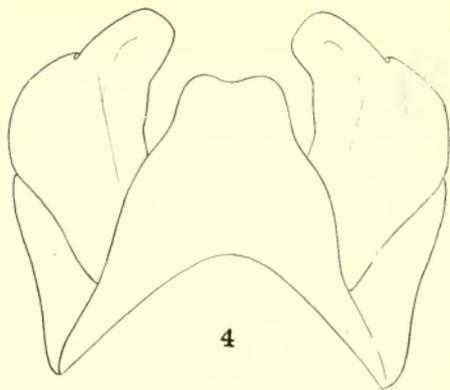
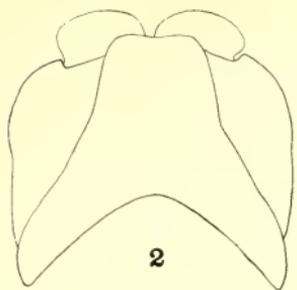
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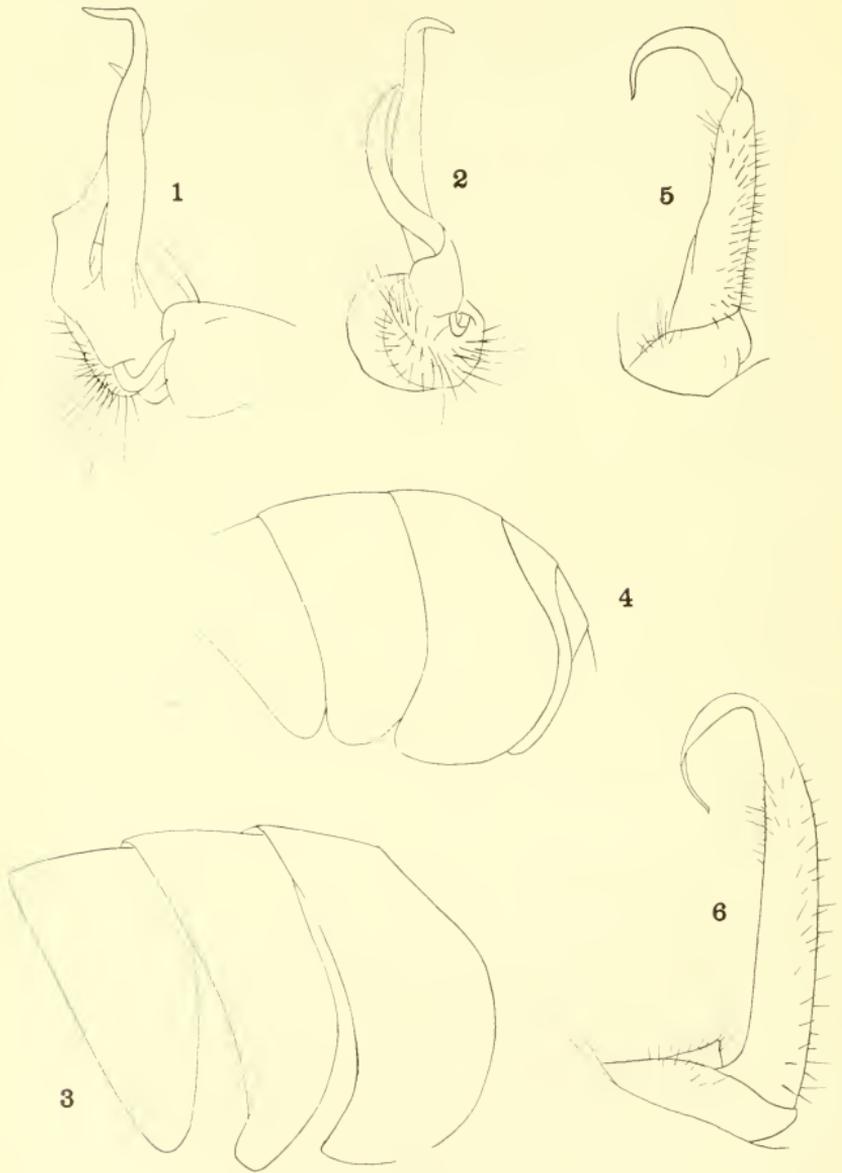
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FOR EXPLANATION OF PLATE SEE PAGES 18 AND 19.



WEST INDIAN MILLIPEDS.

FOR EXPLANATION OF PLATE SEE PAGE 19



WEST INDIAN MILLIPEDS.

FOR EXPLANATION OF PLATE SEE PAGE 19.