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STUDIES ON SPIROSTREPTOID MILLIPEDS. VIII.

SUPPLEMENTARY NOTES ON SOME BRASILIAN SPECIES DESCRIBED BY OTTO SCHUBART [1]

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Abstract

The status of five Brasilian species of Spirostreptidae, described by Otto Schubart without illustration of the gonopods, is considered following the examination of the original types. Alloporus (Nesostreptus) unciger *is referred to* Plusioporus *as d doubtfully distinct form in the* oyapokanus-*group.* Spirostreptus (S.) glieschi *appears to be a* Cladostreptus, *closely related to* C. paulistus *and* C. interruptus. Guanabarostreptus triangulatus *certainly represents a distinctive generic type without close known relatives, although the species itself is likely to have been named during the previous century. Exactly the same statement applies to* Collostreptus fulvus, *which although representing a valid genus, is so large and abundant in the vicinity of Rio it must have been taken by early colletors and subsequently described without gonopod illustrations. Finally,* Scaphiostreptus buffalus *is referred to* Orthoporus *as a member of the* cluniculus-*group. Gonopod-drawings are provided for all species, and illustrations of the first pair of legs for most of them.*

The majority of our present knowledge of Brasilian Spirostreptidae derives from the outstanding work of Dr. O. Schubart during the years 1944 through 1960, in which he published as new or redescribed numerous genera and dozens of species. Of his characteristic care and accuracy in both description and illustration, it may be said that Schubart's work sets a high standard of quality to which any student of Diplopoda might aspire.

On only one occasion was Schubart's standard practice of including careful drawings of his new forms abandoned, and it appears that this lapse was occasioned by the desire to quickly validate some new names for the use of other scientists. There is little doubt that the preliminary diagnoses published in a short note in 1960 would have been supplemented by fuller descriptions

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and drawings had not Dr. Schubart's last years been so fully occupied with the completion of his large manuscript on Diplopoda in *South African Animal Life* (1966).

Five new species of Spirostreptidae were diagnosed in the 1960 note, two of them forming the types of two new genera. Since the recognition of species in this family depends so largely upon the comparison of purely qualitative structural features of the gonopods, it seemed highly desireable to make this missing information available to students of South American diplopods. Thanks to the generous and highly appreciated aid of Dr. G. R. Kloss, we have been privileged to restudy the type material of all five species, consisting of both alcoholic specimens and Dr. Schubart's microscope preparations, all of which are now, with the remainder of his collections, the property of the Museu de Zoologia, Universidade de São Paulo.

Alloporus (Nesostreptus) unciger Schubart

(Figs. 1, 2)

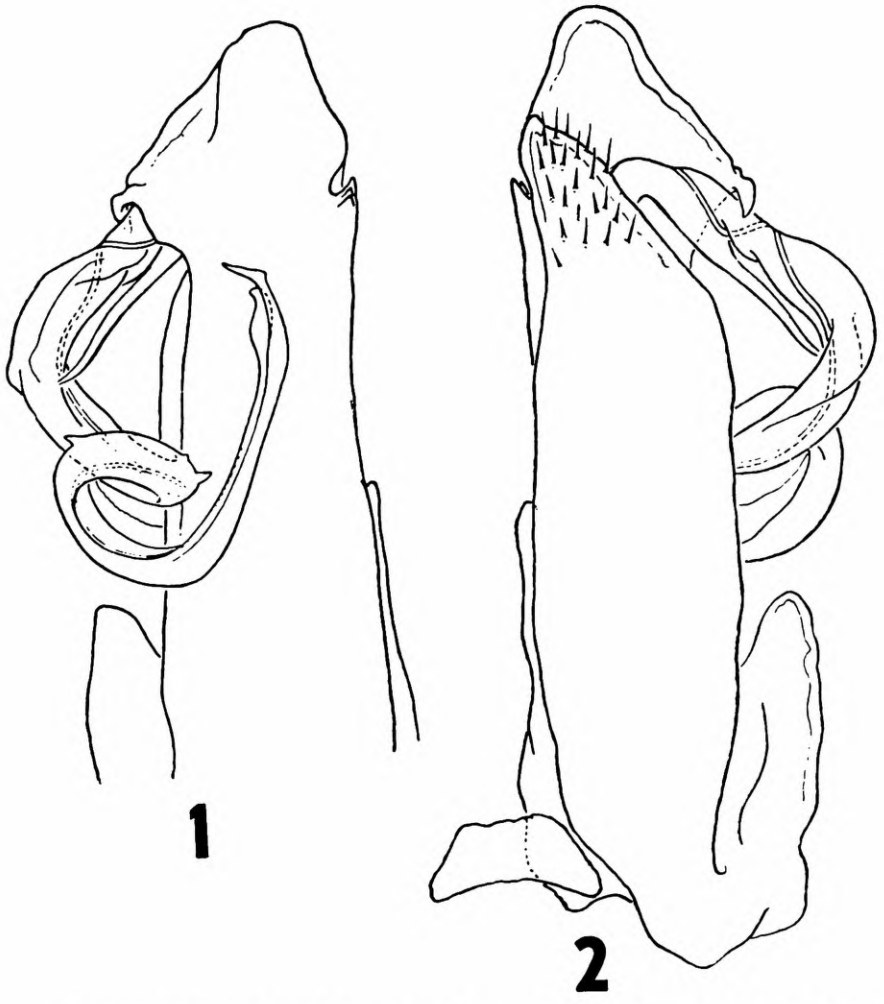
Type locality: Vale do Rio Jacu (Município Domingos Martins), Espírito Santo. Type material collected by A. C. Aguirre, September 25, 1953.

Holotype: Adult male, 45 mm long, 3.6 mm in diameter, with 54 segments. We have examined two microscope preparations made from this specimen and marked "Typus" by Schubart, one contains only the gonopods, the other has an antenna, the gnathochilarium, and some of the anterior legs.

> Original diagnosis: "Espécie do aspecto geral do gênero; adultos entre 40-55 mm de compr., 3,5-4,5 mm de larg. e com 50(-1) até 55(-1) segm. Acinzentado ou pardo acinzentado, às vêzes com faixa mediana ocre (jovem), porém pouco nítida. Cabeça e *collum* denegrido, só o labro e a margem distal do último claro. Metazonitos mais escuros, com faixa distal castanha. Telson denegrido. Antenas castanhas denegridas, pernas de um roxo avermelhado.
>
> Na morfologia, semelhante as demais espécies. Metazonitos com pontilhado forte e riscos irregulares.
>
> Os gonopódios porém distinguem a espécie fàcilmente. Na formação do telocoxito e do paragonocelo grande semelhança com *A. maranguapensis* Schub., mas o telocoxito possui no ângulo interno um pequeno porém nítido processo unciforme. A parte distal do paragonocelo é mais apontada e menor que o telocoxito, neste caráter concordando com *A. recifensis* Schub. Exospermito com fino e comprido espinho basal."

Remarks: This occasion is taken to reaffirm that despite Dr. Schubart's spirited opposition to its recent revival, *Plusioporus* Silvestri, 1895, is the correct name for this genus. It now appears, moreover, that the concept of *Plusioporus* published by Hoffman in 1955 is somewhat too narrow, and that the genus in all probability will embrace the species currently referred to *Trichogonostreptus* and *Ptenogonostreptus*. A more detailed study of this general group is now in progress.

Within *Plusioporus* in the present restricted extent, *unciger* falls into the group composed of *novarae* Attems, 1927; *maranguapensis* Schubart, 1945; *recifensis* Schubart, 1950; *carinulatus* Attems, 1950, and doubtless also *oyapokanus* Attems, 1914. These nominal species are distinguished by rather small and subjective differences in size, segment number, and gonopod structure, and it is quite likely that all will prove to be only local races of a widespread polytypic species. As a matter of fact, Jeekel (1950) has already suggested that *novarae* and *maranguapensis* are synonyms. The drawing of the gonopod of *carinulatus* is so vague that it is difficult to evaluate but certainly represents a specimen taken from this particular group of the genus. Most likely Brölemann's early records of *setiger* from Bahia were based on similar material, related to but not actually conspecific with the true *setiger* of São Paulo.



Alloporus (*Nesostreptus*) *unciger* Schubart: 1, left gonopod, aboral aspect; 2, left gonopod, oral aspect. Drawn from type preparation.

The range of this "*oyapokanus*" group extends from Amapá (the Oyapok River) south along the coastal region to Guanabara. According to Schubart, *unciger* "...está muito freqüente em quin-

tais, jardins de todos os bairros..." in various localities in that state. One must therefore not overlook the possibility that some much earlier name proposed by Mikan, Porat, or Humbert & de Saussure may have priority over *unciger*.

Spirostreptus (Spirostreptus) glieschi Schubart

(Figs. 3-6)

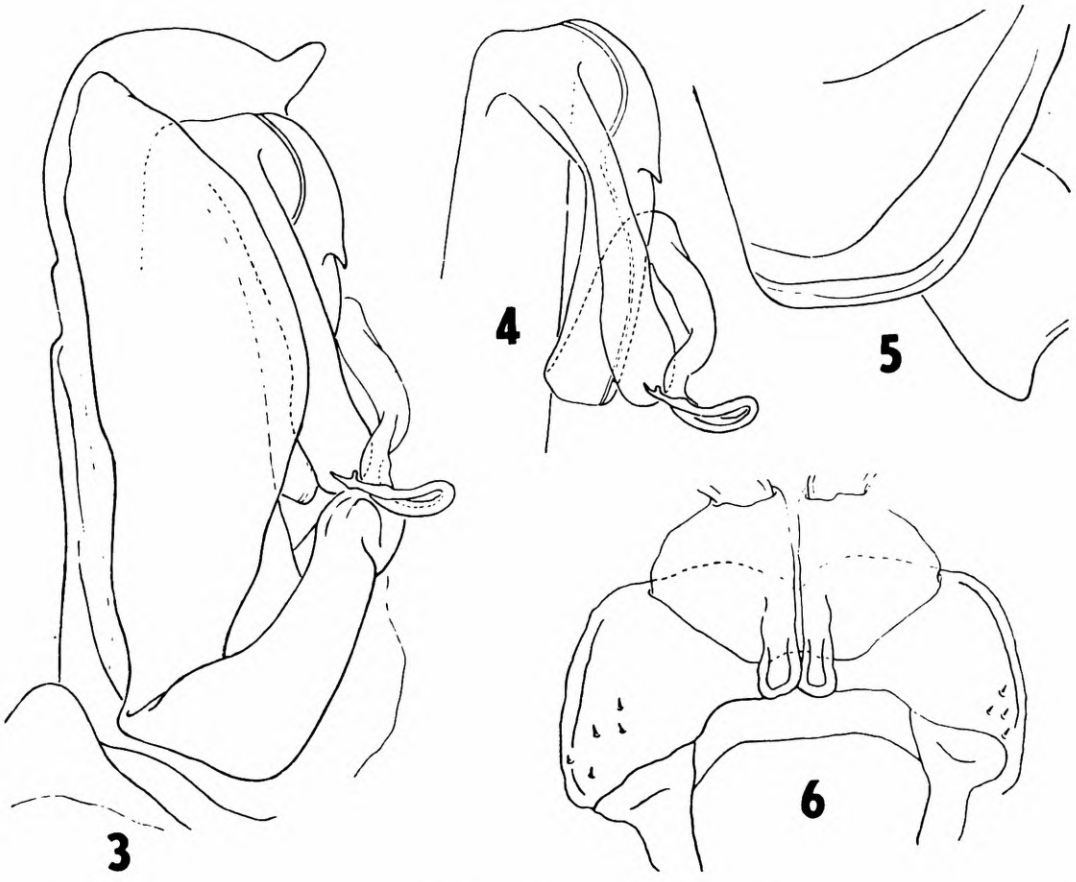
Type locality: Iraí (Município Iraí), Rio Grande do Sul. Specimens of both sexes collected by R. Gliesch in October, 1953.

Holotype: Adult male, posterior third of body missing, greatest diameter about 3.1 mm. We have examined this specimen, as well as two microscope preparations made from it and marked "Male a. Typus" by Schubart.

> Original diagnosis: "♂ ♀ 34-42 de compr., 2,8-3,3 mm de larg., 54(-1) até 58(-2) segm. Como *typus* foi escolhido 1 ♂ quebrado.
>
> Castanho pardacento, sendo os prozonitos pardos amarelados, os metazonitos marron pardos com uma faixa posterior parda acinzentada. Antenas pardas, pernas amarelas. *Collum* em ambos os sexos truncado, com 2 sulcos laterais. Prozonas com 8 finas estrias transversais. Metazonitos lisos, com muito fino pontilhado. As finas estrias longitudinais só nos primeiros segmentos atingindo a altura do poro, já no 10º limitadas ao lado ventral. Póros 1/5 até finalmente 1/3 do comprimento do metazonito distante da sutura.
>
> No 1º par de pernas do ♂ [Fig. 6] o processo basal do prefêmur truncado, paralelo ao do outro lado. Gonopódios com coxito grande. Telecoxito largo, arredondado na parte distal, com muito pequeno cone lateral, dirigido obliquamente para cima. Paragonocelo mais curto que o telocoxito. O exospermito que se estreita de repente na parte distal, com grande espinho basal, levemente claviforme [Fig. 4]."

Remarks: We must disagree entirely with the generic position as originally assigned. There is first no reason to assume that the African genus *Spirostreptus* occurs in South America (it must be remembered that the characters of the type species of *Spirostreptus* are still quite unknown). Secondly, all of the gonopodal characters indicate a clear relationship with species of the genus *Cladostreptus*, particularly *C. paulistus* and *C. interruptus* of Brölemann (1902). *Cladostreptus glieschi* (Schubart) (new combination), resembles the firstmentioned in form of the telocoxite, and the second in configuration of the telopodite, especially the elongated, subspatulate process.

We feel that *C. glieschi* has in fact only a remote relationship with the two species postulated by Schubart, *splendidus* and *lobulatus* Attems, both of which belong in some endemic genus and not to *Spirostreptus* where they have been assigned. Possibly they may be referred to *Brasilostreptus* Verhoeff.



Spirostreptus (*Spirostreptus*) *glieschi* Schubart: 3, left gonopod, oral aspect; 4, telopodite of left gonopod, drawn as would be seen on removal from gonocoel, oral aspect, to show the absence of torsion and the large femoral process; 5, lateral end of collum and base of mandible; 6, sternum, syncoxa, and prefemora of first pair of legs, oral aspect. Drawings from holotype and preparations made to different scales.

Guanabarostreptus triangulatus Schubart

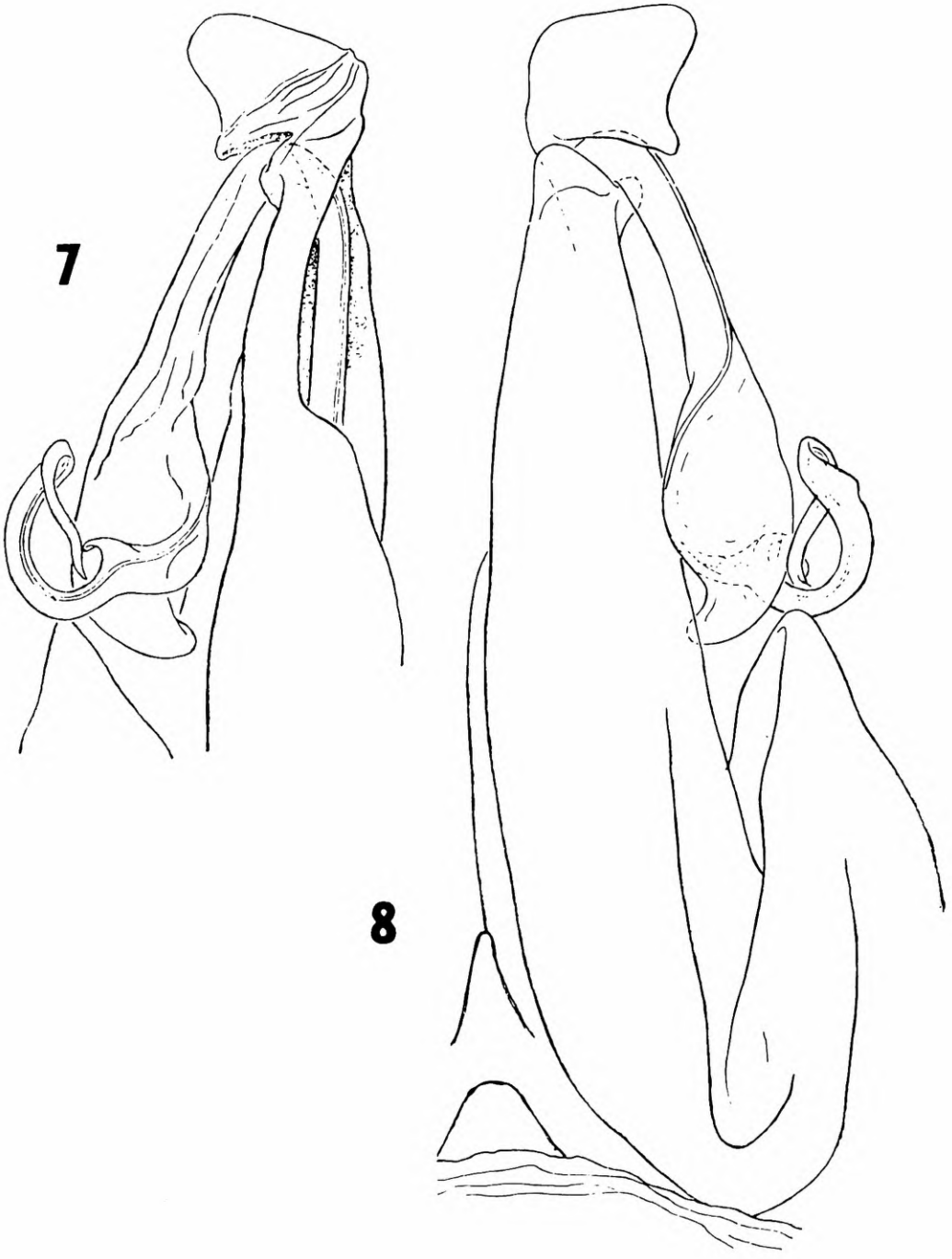
(Figs. 7-8)

Type locality: Paineiras, Rio de Janeiro, Guanabara. Type material collected by Prof. L. Travassos on February 1, 1959.

Holotype: Adult male, 95 mm. in length and 7.6 mm. in diameter, with 56 segments. We have examined this specimen as well as Schubart's two microscope preparations (one with the gonopods, the other with various legs).

Original diagnosis: "*Collum* e prozonitos castanhos claros, margem posterior do *collum* e metazonitos castanhos escuros, como o telson; corpo nìtidamente anellado. Antenas e pernas castanhas amareladas. Faces do ♂ arredondadas. *Collum* nos lados mais estreito, truncado, com 2 sulcos além do sulco marginal. Nos demais caracteres concordando com a diagnose genérica."

"Poros começam no 6º segm. Prozonitas estriadas transversalmente. Mesozonas e metazonitos com forte rugosidade. Estrias longitudinais dos metazonitos só na parte anterior do corpo quase atingindo a altura dos poros. Sutura lisa, encurvada na frente dos poros. Margem distal das válvulas elevada, lisa. 1º par de pernas do ♂ com lobo basal no prefêmur que forma junto com



Guanabarostreptus triangulatus Schubart: 7, distal half of left gonopod, aboral aspect, to show reduction of the telocoxite and exposure of the endospermite; 8, left gonopod, oral aspect. Drawings from type preparation.

êste, um triângulo. Palmilhas potfemoral e tibial só em vestígios na parte anterior do corpo.

Gonopódios com coxito oval comprido, cabendo 2 vêzes no comprimento do gonopódio. Telocoxito na parte distal estreitado num colo e depois terminando num lobo retangular, sem cone lateral. Paragonocelo estreito, sua largura cabe 6 vêzes no seu comprimento, com poucas cerdas curtas na parte interna, terminando numa ponta ovalada. Exospermito sem espinho basal. O grande lobo tibiotarsal na mesma direção da parte basal do exospermito; no lado interno tem origem o próprio solenomerito, possuindo um pequeno lobo ou saliência perto da base."

Remarks: Dr. Schubart believed that *Guanabarostreptus* might be classified in the vicinity of the genera *Paulistostreptus* and *Caicarostreptus*. These two nominal genera are certainly close to each other and perhaps are synonyms; in any case the exospermite is spirally twisted just beyond the geniculum as usual in Spirostreptidae whereas in *G. triangulatus* there seems to be no torsion of that region whatever. An intriguing structural peculiarity about the gonopod in *triangulatus* is the distal reduction of the telocoxite (see fig. 7), its inner edge is cut back so much as to expose part of the endospermite and this condition seems not to be recorded for any other spirostreptid. It was not observed by Schubart who probably did not turn the preparation over to see the aboral side of the gonopods.

In any event, *Guanabarostreptus* does not appear to us to have any close relative in the Brasilian fauna. The genus is certainly a singular and valid one, although it seems antecedently improbable that so large and common a milliped would have gone undescribed until 1960. Yet we are unable to reconcile the species exactly with those named from the vicinity of Rio by Karsch, Porat, and de Saussure. In the 1881 paper of Karsch, *G. triangulatus* keys out (with some difficulty) to *Spirostreptus biplicatus*, based upon a female from "Brasilia", and agrees fairly well with the short description in respect to color, sulcation of the collum, and other points. Possibly it was among the five juliform diplopods very briefly diagnosed in 1834 by Mikan.

Collostreptus fulvus Schubart

(Figs. 9-11)

Type locality: Grajaú, Rio de Janeiro, Guanabara. Type material collected by H. Lopes on August 14, 1954.

Holotype: Adult male, 70 mm. in length and 4.6 mm. in diameter, with 77 segments. The body of this specimen could not be located; we have examined two microscope preparations of legs and gonopods, labeled "Typus" by Schubart and with the same autopsy number (13110) as cited in the description. Dr. Kloss sent two female paratypes, and we have also seen fresh topotypic material.

Original diagnosis: "Espécie relativamente rica em segmentos, porém de dimensões menores. Bruno, sendo os prozonitos acinzentados e a parte anterior do corpo como as antenas e pernas castanhas. Mesozonas e metazonitos fina e densamente pontilhados. As estrias longitudinais atingem na frente do corpo quase a altura do póro, ficando pouco abaixo nos demais metazonitos.

Nos outros caracteres vida (*sic*) a diagnose genérica."

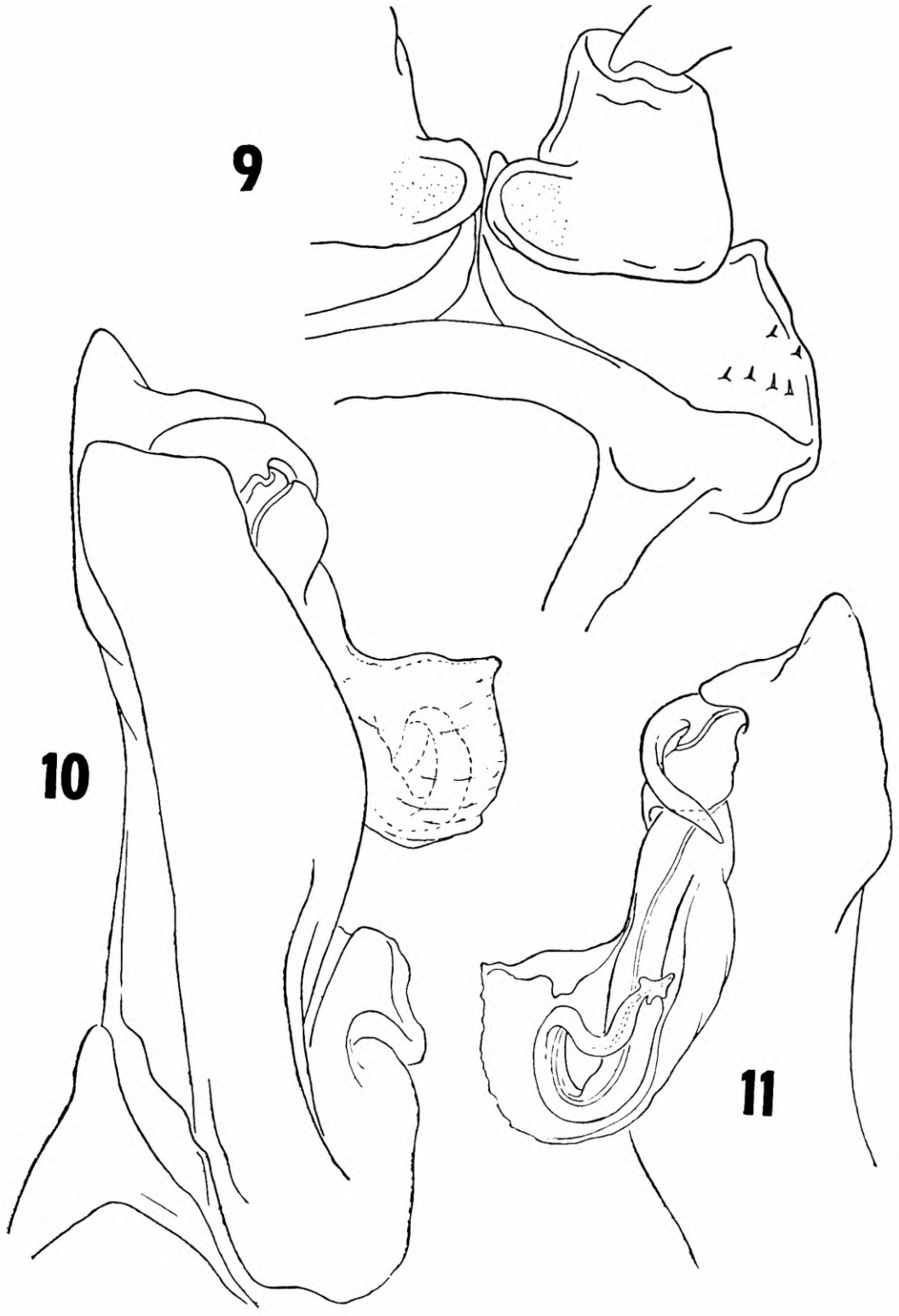
"Poros começam no 6º segmento. *Collum* nos lados largo, truncado e levemente angulado, dirigido para trás, só com um sulco marginal. Mesozonas e metazonitos com pontilhado nítido; com estrias longitudinais que atingem a altura do póro na parte anterior do corpo. Sutura com fina canelação. Telson com segmento preanal engrossado. Válvulas com margem elevada em forma de crista.

1º par de pernas do ♂ com lobo basal do prefêmur recurvado para cima [Fig. 9]. Palmilhas postfemoral e tibial do 4º par em diante. Gonopódios com coxito alto, oval, cabendo 2 1/2 vêzes no comprimento dos gonopódios. Telocoxito estreito, na parte distal formando um colo estreito, terminando num lobo oval e com cone lateral, semelhante. Paragonocelo pouco bojudo, sua largura quase 4 vêzes no comprimento, a parte distal pouco mais estreita, curvada para fora e terminando truncada. Exospermito curto, lentamente se dilatando numa concha comprida, na qual se encontra o solenomerito; o espinho basal fino."

Remarks: Dr. Schubart made no comment whatever on the systematic position of this genus and species; the labels of his preparations carry the name "Scaphiostreptus fulvus". Admittedly the laminate character of the exospermite at first suggests the terminal expansion of *Orthoporus* (= *Scaphiostreptus*), but as shown in fig. 11, it is really quite different and extends nearly to the basal area of torsion, forming an elongated sheath. The entire gonopods are unusually long and strongly curved caudoventrad, and seem quite distinct from any previously-known types.

In shape of the collum and of the first pair of legs, there is considerable similarity with the form characteristic of the genus *Hemigymnostreptus* Schubart. Almost certainly, however, these points of resemblance must be due to convergence. In *C. fulvus* the distal edges of the periprocts are set off by very deep and prominent submarginal grooves, and the epiproct is not medially compressed.

We have examined a male and female of this species taken by Dr. A. C. M. Perissé in the Instituto Oswaldo Cruz, Rio de Janeiro. Schubart records it from Grajaú, Silvestre, and Pedra Branca in Guanabara, and São Gonçalo and Caxias in Rio de Janeiro. Although it seems unlikely that such a large and apparently common Rio milliped would go undescribed until 1960, we have not been able to match *fulvus* up with any of the previously published names of earlier workers.



Collostreptus fulvus Schubart: 9, sternum, coxa, and prefemur of first pair of legs, oral aspect, to show medially-directed prefemoral lobes; 10, left gonopod. oral aspect; 11, distal half of left gonopod, aboral aspect. Drawings from type preparation.

Scaphiostreptus buffalus Schubart

(Figs. 12, 13)

Type locality: Maicuru, Monte Alegre, Pará. 62 specimens collected by Prof. L. Travassos on March 4, 1960.

Holotype: Adult male, 65 mm. long, 5.1 mm. in diameter, with 63 segments. We have examined the microscope preparation made from this specimen, containing the gonopods, anterior legs, and one antenna; this preparation carries Schubart's number 2030, and is marked *"Typus"* by him. The body of the specimen could not be located but Dr. Kloss sent for examination three topoparatypes from the original Travassos collection.

> **Original diagnosis: "Espécie lisa, grande. Marron denegrido nos prozonitos e marron escuro nos metazonitos. Antenas marrons, pernas marron avermelhadas. *Collum* do ♂ com pequeno lobo anterior, na ♀ truncado, ambos com 4 sulcos laterais. Prozonas com 7 estrias transversais, mesozonas pontilhadas, como os metazonitos. Estrias longitudinais no 6º segmento atingindo a altura do póro, em seguida se afastando e limitadas aos flancos inferiores. Válvulas anais com alta e lisa margem distal.**
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> **Processo basal do prefêmur no 1º par de pernas do ♂ largo, coniforme e escamoso. Coxosternito com 3 cerdas no lado. Gonopódios com pequeno e truncado coxito. Telocoxito largo, com margem distal truncada, pouco convexo e muito saliente acima do paragonocelo. Êste com margem distal oblíqua, coberto com cerdas miudas nas partes interna e distal. Exospermito terminando numa concha estreita, o espinso (*sic*) basal curto."**

Remarks: Schubart quite correctly noted the similarity of the gonopods of this form to those of *Scaphiostreptus cluniculus,* and distinguished between the two on the basis of differences in size and segment number.

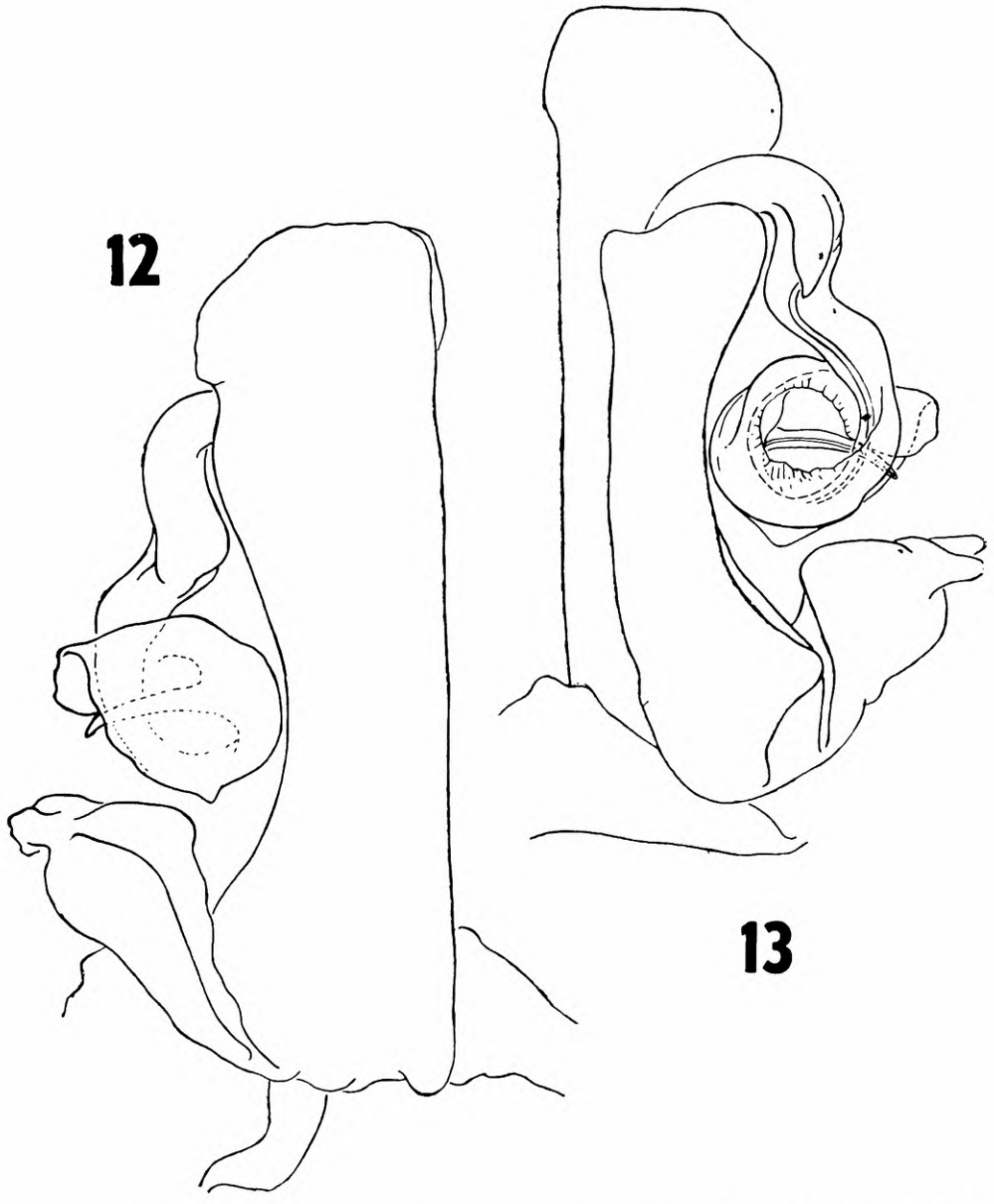
There are, however, some other named forms occurring in the same general part of South America having virtually identical gonopod structure and these might also be introduced for comparison:

Species	Locality	Length	Width	Segments
S. cluniculus (H. & S.)	Manaus	101-117 mm	6.0-7.0 mm	74-85
S. buffalus Schubart	Pará	55-95 mm	5.0-6.9 mm	55-63
S. etholax Chamberlin	[British] Guyana	ca. 90 mm	6.5 mm	54-55
S. punctatissimus Silv.	French Guiana	60 mm	5.2 mm	44

The same group of species is likewise represented in the Andean region as shown by the names introduced by Chamberlin (1941), Verhoeff (1941), Kraus (1955) and Silvestri (1897). Un-

questionably there are more names than valid species and considerable synonymy is to be expected.

The generic name *Orthoporus* (Silvestri, 1897) was in fact based upon a member of this species-group — *O. diaporoides* Silvestri from Bolivia — and has obviously five years priority over *Scaphiostreptus* (Brölemann, 1902) which is the name commonly adopted by European workers for these forms. *Orthoporus* likewise has priority (one page!) over *Diaporus* (Silvestri, 1897), a generic name based upon *Alloporus americanus* Silvestri and set up to include species in which the ozopore series begins on the 5th segment. But we concur in the opinion first expressed by Brölemann and later by Pocock as well, that the place of origin



Scaphiostreptus buffalus Schubart: 12, left gonopod, aboral aspect; 13, left gonopod, oral aspect. Drawings from type preparation.

of the pore series is a relatively trivial character and certainly unsuitable for the separation of so-called "genera" whose species may agree closely in every other character. The species under discussion must for the present be referred to *Orthoporus* until its relative taxonomic status is clarified as *Orthoporus buffalus* (Schubart), new combination.

Reference

Schubart, Otto

1960. Novas espécies brasileiras das famílias Spirostreptidae e Pseudonannolenidae (Diplopoda, Opisthospermophora). *Atas Soc. Biol. Rio de Janeiro* 4(6):74-77.