STUDIES ON THE FAUNA OF SURINAME
AND OTHER GUYANAS: No. 11.

# DIPLOPODA OF GUIANA (1–5)

by

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## INTRODUCTION

More than ten years ago, I published some notes on the taxonomy of Surinam millipedes. My intention then was to describe and record in a series of papers the material of Diplopoda in the collections of the Amsterdam and Leiden Museums, and to give a survey of the millipede fauna of Surinam.

However, as this work progressed it became evident that the monographs and revisions by the authors of the previous generation were only too often a quite unreliable basis for the project planned, and that descriptions of new species were rather useless if not preceded by at least partial revisions of the nomenclature and systematics of the genera or even families involved.

Moreover, the limited amount of material available, as well as the meagreness of our knowledge of the millipede fauna of Surinam and adjacent parts of South America, made it expedient to extend the geographical range of investigation to British Guiana, French Guiana, and the area to the east of French Guiana, formerly French but now under Brazilian administration, known as Territorio Amapá, in order to obtain a better insight into the systematic status of the Surinam species.

For these reasons the original scope of the project was widened to include, where possible, surveys of the millipede families occurring in GUIANA, whilst, besides the material from SURINAM, collections from BRITISH GUIANA, FRENCH GUIANA and the TERRITORY OF AMAPÁ were also studied.

For reasons of convenience the results will be published in a series of papers, each dealing with a taxonomic unit. Five of these papers – which were completed at the beginning of 1961 – follow here.

No complete treatment of the Diplopoda of Guiana or of any part of that area has ever been published. Descriptions and records of species are scattered over quite a number of publications between 1792 and 1950. I have refrained from giving a bibliography of pertinent literature here, since references will be included in the synonymy of the species. It may, however, be useful to give at the beginning of the present series of papers a check list of the millipedes of British Guiana, Surinam, French Guiana and the territory of Amapá which have been recorded or described to date.

According to this list a total of sixty-five species and one variety have so far been recorded from the entire area. British Guiana accounts for forty-one species, Surinam for forteen species and one variety, French Guiana for eleven species, and the territory of Amapá for one species. Two species have been described from "Guiana" without more precise indication.

LIST OF DIPLOPODA OF THE GUIANAS RECORDED TO DATE

| | British Guiana | Surinam | French Guiana | Amapá |
|---|---|---|---|---|
| Subclass CHILOGNATHA | | | | |
| Superorder PENTAZONIA | | | | |
| Order GLOMERIDESMIDA | | | | |
| Family GLOMERIDESMIDAE | | | | |
| *Glomeridesmus orphnius* Chamberlin 1923 | + | . | . | . |
| Superorder HELMINTHOMORPHA | | | | |
| Order POLYDESMIDA | | | | |
| Family PARADOXOSOMATIDAE | | | | |
| *Onciurosoma acisternum* Silvestri 1932 | + | . | . | . |
| *Orthomorpha coarctata* (Saussure 1860) | + | + | + | . |
| *Orthomorpha watsa* Chamberlin 1950 | + | . | . | . |
| Family EURYURIDAE | | | | |
| *Aphelidesmus albocarinatus* (Peters 1864) | + | . | . | . |
| *Aphelidesmus atratus* (Pocock 1900) | + | . | . | . |
| *Aphelidesmus guianensis* Chamberlin 1923 | + | . | . | . |
| *Aphelidesmus convexus* Jeekel 1950 | . | + | . | . |
| *Aphelidesmus surinamensis* Jeekel 1950 | . | + | . | . |
| Family PLATYRHACIDAE | | | | |
| *Platyrhacus drurii* (Gray 1832) | + | . | . | . |
| *Rhyphodesmus amphelictus* Chamberlin 1923 | + | . | . | . |
| *Rhyphodesmus kartabo* Chamberlin 1950 | + | . | . | . |
| Family CHELODESMIDAE | | | | |
| *Priodesmus acus* Cook 1895 | . | + | . | . |
| *Priodesmus acus* Cook var. *rutilipes* Jeekel 1950 | . | + | . | . |
| *Priodesmus papillosus* Attems 1931 | . | + | . | . |
| *Leptherpum carinovatum* (Attems 1898) subsp. *staheli* Jeekel 1950 | . | + | . | . |
| *Zigwadesmus guiananus* Chamberlin 1923 | + | . | . | . |
| *Zigwadesmus modestus* Chamberlin 1923 | + | . | . | . |
| *"Odontopeltis" macconnelli* Pocock 1900 | + | . | . | . |
| *"Rhacophorus" schomburgkii* (Erichson 1848) | + | . | . | . |
| *"Polydesmus" dentatus* (Olivier 1792) | . | . | + | . |

| | British Guiana | Surinam | French Guiana | Amapá |
|---|---|---|---|---|
| Family CRYPTODESMIDAE | | | | |
| *Leuritus termitophilus* Chamberlin 1923 | + | . | . | . |
| *Stenitus guiananus* Chamberlin 1923 | + | . | . | . |
| *Gasatomus emersoni* Chamberlin 1923 | + | . | . | . |
| *Tidopterus sequens* Chamberlin 1923 | + | . | . | . |
| *Guianonus ectoporus* Chamberlin 1923 | + | . | . | . |
| *Cynedesmus simplex* Loomis 1934 | . | + | . | . |
| *Inodesmus peduncularis* Loomis 1934 | . | + | . | . |
| Family ONISCODESMIDAE | | | | |
| *Agnurodesmus cryptopygus* (Chamberlin 1923) | + | . | . | . |
| Family PANDIRODESMIDAE | | | | |
| *Pandirodesmus disparipes* Silvestri 1932 | + | . | . | . |
| Order STEMMIULIDA | | | | |
| Family STEMMIULIDAE | | | | |
| *Stemmiulus drymophilus* Chamberlin 1923 | + | . | . | . |
| *Stemmiulus labbanus* Chamberlin 1923 | + | . | . | . |
| *Stemmiulus surinamensis* Loomis 1934 | . | + | . | . |
| *Prostemmiulus heterops* Chamberlin 1923 | + | . | . | . |
| Order CAMBALIDA | | | | |
| Family CAMBALIDAE | | | | |
| *Typhlonannolene adaptus* Chamberlin 1923 | + | . | . | . |
| *Hypocambala helleri* Silvestri 1897 | + | . | . | . |
| *Phanolene sima* Chamberlin 1950 | + | . | . | . |
| Family PSEUDONANNOLENIDAE | | | | |
| *Pseudonannolene rugosetta* Silvestri 1897 | . | . | + | . |
| Order SPIROSTREPTIDA | | | | |
| Family SPIROSTREPTIDAE | | | | |
| *Orthoporus poculifer* Silvestri 1897 | . | . | + | . |
| *Orthoporus punctatissimus* Silvestri 1897 | . | . | + | . |
| *Orthoporus cayennophilus* (Silvestri 1897) | . | . | + | . |
| *Orthoporus etholax* Chamberlin 1923 | + | . | . | . |
| *Orthoporus walkeri* Chamberlin 1923 | + | . | . | . |
| *Orthoporus foliatus* Chamberlin 1923 | + | . | . | . |
| *Orthoporus lomonti* Brölemann 1932 | . | . | + | . |
| *Nanostreptus orthacanthus* Chamberlin 1923 | + | . | . | . |
| *Nanostreptus astix* Chamberlin 1923 | + | . | . | . |
| *Nesostreptus oyapokanus* (Attems 1914) | . | . | . | + |
| *"Spirostreptus" surinamensis* (Brandt 1841) | . | + | . | . |
| *"Spirostreptus" walkenaerii* (Brandt 1841) | | Guiana | | |
| *"Spirostreptus" flavicornis* Porat 1876 | . | + | . | . |
| *"Spirostreptus" plananus* Karsch 1881 | | Guiana | | |
| *"Spirostreptus" meracus* Karsch 1881 | + | . | . | . |

| | British Guiana | Surinam | French Guiana | Amapá |
|---|---|---|---|---|
| Order SPIROBOLIDA | | | | |
| Family RHINOCRICIDAE | | | | |
| *Rhinocricus monilicornis* (Porat 1876) | + | + | . | . |
| *Rhinocricus pillaulti* Silvestri 1897 | . | . | + | . |
| *Rhinocricus caudatus* (Newport 1844) | + | . | . | . |
| *Rhinocricus laetus* (Karsch 1881) | + | . | . | . |
| Family TRIGONIULIDAE | | | | |
| *Trigoniulus lumbricinus* (Gerstaecker 1873) | + | + | . | . |
| *Trigoniulus acolastus* Silvestri 1897 | . | . | + | . |
| Incertae sedis | | | | |
| *"Iulus" palmiger* Gervais 1847 | . | . | + | . |
| *"Iulus" leprieuri* Lucas 1849 | . | . | + | . |
| Superorder COLOBOGNATHA | | | | |
| Order POLYZONIIDA | | | | |
| Family POLYZONIIDAE | | | | |
| *Siphonotus purpureus* Pocock 1894 | . | + | . | . |
| *Siphonotus parvus* Chamberlin 1923 | + | . | . | . |
| Family SIPHONOPHORIDAE | | | | |
| *Siphonophora guianana* Chamberlin 1923 | + | . | . | . |
| *Siphonophora corynetes* Chamberlin 1923 | + | . | . | . |
| *Siphonophora relicta* Chamberlin 1923 | + | . | . | . |

Although these numbers are modest enough, the total of species which are really sufficiently known is, in actual fact, considerably smaller. A large proportion of the descriptions are inadequate for taxonomic use, or sometimes even for recognition of the species. Moreover, as will be shown in the subsequent pages, the names of some of the species listed above are actually only synonyms for other species.

The collections reported upon here in the first instance are those of the Zoölogisch Museum, Amsterdam, and the Rijksmuseum van Natuurlijke Historie, Leiden. They consist of valuable though rather scanty material collected in the course of various expeditions to the interior of Surinam during the first half of this century. For a concise account of these expeditions and further references I would refer to Dr. D. C. GEIJSKES' papers on "General entomological research in Surinam up to 1950" (in: *Entomology in the Netherlands and their*

*Overseas Territories*, 1951) and on "The zoological exploration of Suriname" (in these *Studies*, vol. I, 1957).

In more recent years the material from Surinam has been considerably enlarged by the activity of Dr. GEIJSKES, Paramaribo, who, having learnt of my interest in millipedes, paid special attention to this neglected group during his private collecting trips, and the Natural Science Expedition to Suriname in 1948–49 (abbreviated: Sci.Exp.) which was helt under his leadership. For these precious collections I feel very much indebted to Dr. GEIJSKES.

Important material was received on loan from the Paris Museum. Most of this had been collected around the beginning of the present century, partly in French Guiana, partly in the Carsevenne river area (Amapá territory), by collectors who apparently knew what they were looking for. I am greatly obliged to Dr. M. VACHON, Paris, for the loan of this valuable material.

Specimens from British Guiana, including type material of little-known species, were studied during a short visit to the British Museum, London. I take pleasure in expressing here my cordial thanks to Dr. G. O. EVANS, Mr. E. BROWNING, and their collaborators, for their aid and friendly reception.

Study of all this material will result in a considerable increase in the number of known Guiana millipedes. As regards the families of larger-sized species, such as Platyrhacidae, Euryuridae, Chelodesmidae, Spirostreptidae, etc., the present series of papers may give a good impression of which genera occur in the area. Small-sized species such as Polydesmidae, Paradoxosomatidae, Cryptodesmidae, Oniscodesmidae, Pandirodesmidae, etc., were weakly represented or absent. Work will have to be done by specialized collectors before any substantial contribution can be made to the knowledge of these last.

There is good evidence that in some genera speciation occurred in restricted geographical areas in Guiana. We can, therefore, safely assume that further exploration will bring to light many new species and subspecies. It would certainly be no exaggeration to estimate the total of species and subspecies occurring in Guiana at three hundred.

My work on Guiana millipedes was largely made possible by a generous grant from the Netherlands Foundation for the Advancement of Research in Surinam and the Netherlands Antilles (WOSUNA).

GEOGRAPHICAL DISTRIBUTION OF THE DIPLOPODA MATERIAL EXAMINED

| | British Guiana | Surinam | French Guiana | Amapá |
|---|---|---|---|---|
| *Orthomorpha coarctata* (Saussure) | . | × | × | × |
| *Chrondromorpha xanthotricha* (Attems) | . | × | . | . |
| *Mestosoma hylaeicum* n. sp. | . | . | . | × |
| *Onciurosoma crassipes* n. sp. | . | × | . | . |
| *Amplinus subareatus* n. sp. | . | . | . | × |
| *Rhyphodesmus drurii* (Gray) | × | . | . | . |
| *Priodesmus acus* Cook | . | × | . | . |
| – *acus* var. *rutilipes* Jeekel | . | × | . | . |
| – *papillosus* Attems | . | × | . | . |
| – *haematopterus* n. sp. | . | × | . | . |
| – *elegans* (Gray) ? | . | . | . | . |
| – *coralloides* n. sp. | . | . | × | × |
| *Leptherpum geijskesi* n. sp. | . | × | . | . |
| – *staheli* Jeekel | . | × | . | . |
| – *loomisi* n. sp. | . | × | . | . |
| – *carinovatum* (Attems) | × | × | . | . |
| *Brasiloschubartia styliger* n. gen. n. sp. | . | . | × | . |
| *Zigwadesmus guiananus* Chamberlin | × | . | . | . |
| – species A | . | × | . | . |
| – species B | . | × | . | . |
| *Iphyria macconnelli* (Pocock) | × | . | . | . |

# 1. THE FAMILY PARADOXOSOMATIDAE

## (STRONGYLOSOMIDAE AUCT.)

## (POLYDESMIDA)

## **Paradoxosomatidae** Daday

1889 Paradoxosomatidae DADAY, Term. Füz. *12:* 133.
1896 Strongylosomatidae COOK, Proc. U.S. Nat. Mus. *18:* 82.
1898 Polydesmidae, subfam. Strongylosominae ATTEMS, Denkschr. Ak. Wien *67:* 271.
1909 Strongylosomidae POCOCK, Biol. Centr.-Amer., Diplop.: 158.
1916 Strongylosomidae, subfam. Strongylosominae, trib. Strongylosomini, Orthomorphini, Antichiropini & Australiosomini, & subfam. Eviulisominae BROLEMANN, Ann. Soc. Ent. France *84:* 539, 540, 543.

1924 Hylomidae LOOMIS, J. Wash. Ac. Sci. *14:* 104.
1929 Strongylosomidae, subfam. Catharosominae BROLEMANN, Mém. Soc. Zool. France *29:* 23.
1933 Strongylosomidae, subfam. Prionopeltinae, Strongylosominae & Orthomorphinae VERHOEFF, Ark. Zool. *26A* (10): 4, 10.
1936 Prionopeltidae VERHOEFF, Rec. Ind. Mus. *38:* 110.
1937 Strongylosomidae ATTEMS, Tierreich *68:* 24.
1939 Pratinidae SCHUBART, Zool. Anz. *128:* 77.
1941 Strongylosomidae, subfam. Graphisterninae VERHOEFF, in: TITSCHACK, Beitr. Fauna Perus *2:* 20. (1951 ed.)
1941 Strongylosomidae, subfam. Helicopodosominae, Antichiropinae, & Australiosominae VERHOEFF, Lunds Univ. Arsskr. (N.F.2) *36* (17): 4–7.
1941 Strongylosomidae, subfam. Himatiopodinae VERHOEFF, Jenaische Zeitschr. Naturw. *73:* 241.

The above list represents an attempt to bring together all family, subfamily and tribe names which, in the course of time, have been based on genera belonging to the family generally known as Strongylosomidae. From this survey it is apparent that henceforward the name Strongylosomidae should be replaced by Paradoxosomatidae, the oldest available name for the group.

To the Paradoxosomatidae are referable all genera included in the monograph on the Strongylosomidae published by ATTEMS in 1937, with the exception of *Aphelidesmus* Brol., *Iulidesmus* Silv., *Antisoma* Chamb., *Fijiodesmus* Chamb., *Phlyctodesmus* Chamb., *Seminellogon* Chamb. and *Strongylomorpha* Silv. The genera *Aphelidesmus* and *Seminellogon* both belong to the Euryuridae; *Iulidesmus* and *Antisoma* belong to the Sphaerotrichopidae (*Antisoma* seems to be related to or a synonym of *Icosidesmus* Humb.); the position of *Fijiodesmus* and *Phlyctodesmus* is uncertain (the first genus might be identical with *Cylindrodesmus* Poc.); *Strongylomorpha* is referable to the Chelodesmidae.

Both BROLEMANN and VERHOEFF have proposed subdivisions in the family Paradoxosomatidae, but as yet their efforts have not met with general approval and, in fact, appear to have led to sharply defined and more or less homogeneous categories only among the Australian genera. So far, BROLEMANN's system has never received any recognition. So much the more, however, that of VERHOEFF, although it seems that only some of the groups proposed by this author have phylogenetic coherence.

A particularly unfortunate grouping appears to be VERHOEFF's "family" Prionopeltidae (i.e. Pratinidae Schub.), which is separated from the Strongylosomidae auct. because of the relatively high level of the lateral keels of the second segment. As was proved most convincingly by ATTEMS in 1938 (Mém. Mus. Paris (n.s.) *6*: 226), this so-called family is a perfectly artificial unit. Nevertheless the name has been haunting literature with great persistence.

Undoubtedly of greater importance has been the division of the family by VERHOEFF into two subfamilies on account of the solenomerite of the gonopods being either closely applied to and eventually sheathed by the tibiotarsus, or entirely free. However, although it cannot be denied that this differential character has a certain systematic value, it remains to be seen whether the subfamilies Orthomorphinae and Strongylosominae thus distinguished by VERHOEFF actually represent homogeneous categories. VERHOEFF's Strongylosominae seems especially suspicious in this respect, because there is no indication whether the free position of the solenomerite represents a primary or a secondary condition in all the relevant genera. In point of fact, the character seems a primitive one in the Australian Paradoxosomatidae. But it is questionable whether this is also the case in all of the Oriental, Palaearctic and Neotropical genera referable to the Strongylosominae. Indeed, the gonopod structure in at least a number of these genera seems to indicate much more that the condition might be derivative, or, in other words, that some of the genera of the Strongylosominae might well have descended from forms in which the solenomerite was sheathed by the tibiotarsus. Moreover, in view of the morphological diversity among the "Strongylosomine" genera it seems not improbable that an evolutionary tendency in this direction might have occurred along different phylogenetic lines.

In short, the subfamily Strongylosominae Verhoeff is discarded (1) because it is far from certain that the group as a whole developed in one phylogenetic direction and (2) because, even if it did, there is no indication that it was monophyletic.

The other groupings mentioned in the above list are mostly monobasic. Their institution can be explained only by the tendency among taxonomic workers to overestimate the taxonomic value of

certain unique, though non-fundamental, characters occurring at terminating points of evolution. A discussion on the supra-generic taxonomy of the Australian Paradoxosomatidae will be given in a forthcoming paper. Some comments on the subfamilies Eviulisominae Brol., Graphisterninae Verh. and Himatiopodinae Verh. will be made in the discussion on the genus *Onciurosoma* Silv.

In comparison with the rich development of the Paradoxosomatidae in the Oriental region, a development finding its expression in a large number of genera, monotony seems to prevail in the morphology of the South American species. For instance, certain characters, probably of a primitive nature, which are frequently met with in Asian genera, are lacking in the autochthonous American forms. As such, mention may be made here of the strongly developed lateral keels of the metasomites and the distinctly demarcated postfemur of the gonopods, which are not seldom found in Asian genera. The American Paradoxosomatids generally lack even weakly developed lateral keels; usually there are only faint traces of these structures left. In their gonopods the postfemoral region is never sharply demarcated, and often even the tibiotarsus is not sharply set off from the proximal part of the telopodite.

Another feature in the South American Paradoxosomatidae which must be mentioned is the frequent but irregular recurrence of certain morphological characters in the majority of the known genera. Instances of such characters are:

The presence of femoral tubercules in a number of legs of the anterior half of the body of the male.

The modifications of the sternites of the 4th, 5th and 6th segments of the male.

The strong development of the pleural keels.

The presence of two pairs of sternal cones.

The strong development of the terminal tubercules of the tail.

The recurved anal scale.

These characters are, of course, not typical of the Neotropical Paradoxosomatidae. They may occasionally be found in genera outside this region. Nor is their combination a general feature of the American genera. The fact is, however, that two or more of them combined are found, more or less strongly developed, in the majority

of the Neotropical species, and their development seems to be potential in nearly all genera occurring in the region.

As an illustration of this, reference may be made to the species of two genera: *Gonodrepanum* Att. and *Mestosoma* Silv. s.l. In these two genera the gonopods are totally different: in *Gonodrepanum* the sickleshaped or subcircular telopodite consists of a femoral part gradually passing over into a finely tapering solenomerite, whereas in *Mestosoma* the gonopods are of the "normal" type, i.e. the femur gives rise to a solenomerite and a solenophorous tibiotarsus. In spite of these important differences in the structure of the gonopods, however, the external features mentioned above are found, in various degrees of development, in the species of both genera. There can be no doubt that the occurrence of these characters in both genera must be looked upon not as purely accidental but as proof of a close relationship between the "Strongylosomine" genus *Gonodrepanum* and the "Orthomorphine" genus *Mestosoma*. The example given is not incidental, but may be regarded as representative of the majority of the South American Paradoxosomatid genera.

Considering these conditions, the statements seem justified (1) that the American genera of the family Paradoxosomatidae belong to a rather derivative category of the family, and (2) that the greater number of these genera form a comparatively coherent group, notwithstanding important differences in the gonopods.

In his monograph, ATTEMS in 1937 classified the South American species in four genera: *Onciurosoma* Silv., *Habrodesmus* Cook, *Catharosoma* Silv. and *Gonodrepanum* Att. Since that time, however, quite a number of new genera and new species have been added and nomenclatorial emendations proposed, so that now it might be useful to compile a short survey of the known genera and species, and provide a key to the genera.

The most important work of recent years has been done by SCHUBART on Brazilian and by KRAUS on Peruvian Paradoxosomatidae. Both authors have proposed several well-defined new genera which constitute a valuable contribution to our knowledge of the group.

In spite of this, however, a regrettable state of confusion still

exists in the taxonomy of the large category of species previously covered by the generic names of *Catharosoma* and *Habrodesmus*.

After a re-examination of the African type species of *Habrodesmus*, KRAUS in 1956 (Senck. Biol. *37*: 412) proposed reversion to *Mestosoma* Silv. as a generic name for the American species previously referred to that genus. Although it is not yet clear what characters should be used to separate *Mestosoma* from *Habrodesmus*, it may be convenient for practical reasons to follow KRAUS in this respect.

Recent additions of new species to the genus *Mestosoma*, however, have rendered its distinction from *Catharosoma*, *Pernambucosoma* Schub., etc., quite arbitrary. In order to avoid a growing confusion, it seems advisable also to unite under the heading of *Mestosoma* the species previously referred to these genera. Although this step will probably not meet with general approval, it is thought to be the only possible method of achieving a more natural grouping of the species involved.

In the area under consideration the Paradoxosomatidae are represented only by a few species belonging to the genera *Mestosoma* and *Onciurosoma*, and, although the family will probably not be richly represented, future investigations will undoubtedly bring many new species to light.

## KEY TO THE AMERICAN GENERA OF THE FAMILY PARADOXOSOMATIDAE, based on male characters.

1. Lateral keels of metasomites weakly developed to completely absent. (Autochthonous species) . . . . . 2
   Lateral keels of metasomites strongly developed. (Introduced species) . . . . . 15
2. Gonopods without a solenophore: solenomerite free, neither sheathed by nor closely applied to the tibiotarsus, which may be more or less reduced or even completely absent . . 3
   Gonopods with a solenophore: solenomerite sheathed by or closely applied to the tibiotarsus . . . . . 7
3. Telopodite of gonopods without tibiotarsus, processes or dilatations, more or less sickle-shaped or subcircular,

gradually tapering towards the finely acuminate end of the solenomerite. Width: 1.0–1.6 mm. . *Gonodrepanum* Att.
Telopodite of gonopods with a tibiotarsus or with one or more processes or dilatations in the femoral or postfemoral region . . . . . 4

4. Femoral part of gonopods with a large medial dilatation. Solenomerite with a small spiniform process near the end. Width: 0.6 mm. . . . . *Mogyella* Schub.
Femoral part of gonopods without a large dilatation. Postfemoral part with a well-developed tibiotarsus, with two or three processes, or with a triangular dilatation . . 5

5. Telopodite of gonopods simply sickle-shaped as in *Gonodrepanum* but with a triangular dilatation on the lateral side of the postfemoral region. First three pairs of legs with uncate bristles. Width: 0.7 mm. . . . . *Pseudogonodrepanum* Schub.
Telopodite of gonopods not sickle-shaped, more complicated, ending in a solenomerite and a well-developed tibiotarsus or two or three processes in the postfemoral region 6

6. Tibiotarsus of gonopods well developed, simple. Solenomerite more or less broadly truncate or bifid. Sternite of 5th segment with a tongue-shaped process. Width: 1.4 mm. . . . . *Habrodesmoides* Att.
Telopodite of gonopods with two or three processes in the postfemoral region (probably in part remnants of a tibiotarsus). Solenomerite gradually tapering, the end finely acuminate. Sternite of 5th segment of male with two small knobs or without processes. Width: 1.1–3.8 mm. . . . . *Ologonosoma* Silv.

7. Tibiotarsus of gonopods scarcely curved, pointing in a distal direction. Gonopod femur strongly reduced, shorter than the prefemur. Pregonopodial legs without femoral tubercules . . . . . 8
Tibiotarsus of gonopods more or less strongly curved proximad. Gonopod femur rarely reduced, generally longer

than the prefemur. Pregonopodial legs often with femoral tubercules . . . . . 9

8. Tibiotarsus of gonopods one third of the length of the entire telopodite. Width: 2.1 mm. . . . *Graphisternum* Verh.
Tibiotarsus of gonopods as long as or longer than half the length of the telopodite. Width: 1.2–1.9 mm. . . . . *Onciurosoma* Silv.

9. Tibiotarsus of gonopods consisting of a simple solenophore, without secondary processes, gradually tapering towards the finely acuminate end . . . . . 10
Tibiotarsus of gonopods more complicated, with a large secondary process, or consisting of a solenophore ending in several laminate lobes or spiniform processes . . . . . 11

10. Gonopod femur with a large rounded lamella on the medial side. Tibiotarsus and solenomerite both somewhat reduced, about half as long as the femur. Width: 0.6 mm. . . . . *Mogyosoma* Schub.
Gonopod femur without a medial lappet. Tibiotarsus and solenomerite longer than the femur. Width: 1.1 mm. . . . . *Gonodrepanoides* Schub.

11. Gonopod femur with a large laminate process of irregular shape arising from the medio-anterior side. Tibiotarsus deeply bifurcate. Width: 0.8–1.8 mm. *Porcullosoma* Kraus
Gonopod femur without a large laminate process. Tibiotarsus consisting of a solenophore, or of a solenophore and a large secondary process arising from the base . . . . . 12

12. Tibiotarsus of gonopods with a large secondary branch arising from the base, at either the lateral or the medial side 13
Tibiotarsus of gonopods consisting of a solenophore only, without a large secondary process . . . . . 14

13. Secondary branch of the tibiotarsus arising from the latero-posterior side. Width: 1.0 mm. . . . *Montesecaria* Kraus
Secondary branch of tibiotarsus arising from the medio-anterior side. Width: 1.8–2.1 mm. . *Promestosoma* Silv.

14. Prefemur of gonopods strongly elongate, one and a half

times to twice as long as the femur. Longitudinal axis of both joints in one line. Tibiotarsus of gonopods complicated, composed of four laminae. Width: 1.5 mm. . . . . *Laviusoma* Kraus

Prefemur of gonopods not strongly elongate, usually shorter than the femur; when about as long as or slightly longer than the femur, the longitudinal axes of both joints are not in one line. Width: 0.5–3.8 mm. *Mestosoma* Silv.

15. Metasomites dorsally and laterally densely granular. Sternite of 5th segment with a bituberculate process. Legs of the 4th to the 7th pair with femoral tubercules. Tibiotarsus of gonopods consisting of a solenophore with a basal prong. Width: 1.7–2.0 mm.. . . . . *Chondromorpha* Silv. (*xanthotricha* (Att.) only)

Metatergites not granular. Sternite of 5th segment without process. Legs without femoral tubercules . . . . . 16

16. Tibiotarsus of gonopods consisting of a simple solenophore without secondary processes. Width: 1.9–2.1 mm. . . . . *Orthomorpha* Bollm. (*coarctata* (Sauss.) only)

Tibiotarsus of gonopods consisting of a terminally bifid solenophore and two basal secondary processes. Width: 2.0–2.3 mm. . . . *Oxidus* Cook (*gracilis* (C. Koch) only)

## Survey of the American genera of the family Paradoxosomatidae.

### **Chondromorpha** Silv.

See p. 24.

### **Gonodrepanoides** Schub.

1945 *Gonodrepanoides* Schubart, Arq. Mus. Nac. *38:* 31. (Type species: *G. travassosi* Schub., by original designation).

Brazil (Distr. Federal).

*G. travassosi* Schub. 1945.

In his description Schubart states that the gonopods of *G. travassosi* terminate in a solenomerite and a solenophorous tibiotarsus. Unfortunately, however, the gonopod drawing does not give the necessary evidence for this, and leaves open the possibility that the telopodite merely ends in a solenomerite, as in *Gonodrepanum*, the laminate parts having been mistaken for a tibiotarsus.

### Gonodrepanum Att.

1914 *Gonodrepanum* ATTEMS, Arch. Naturg. *80A* (4): 230. (Type species: *Strongylosoma levisetum* Att., by original designation).

Brazil (Rio de Janeiro, Distr. Federal, São Paulo, Santa Catarina), Argentina.

*G. drepanephoron* (Att. 1898), *G. falciferum* Schub. 1945, *G. furcatum* Schub. 1945, *G. grajahuense* Schub. 1945, *G. levisetum* (Att. 1898), *G. levisetum* var. *coniferum* (Att. 1898), *G. torresae* Schub. 1945.

### Graphisternum Verh.

1941 *Graphisternum* VERHOEFF, in: TITSCHACK, Beitr. Fauna Perus *2:* 20. (1951 ed.) (Type species: *G. pallidus* Verh., by monotypy).

Peru.

*G. ornatum* Kraus 1959, *G. pallidus* Verh. 1941.

### Habrodesmoides Att.

1943 *Habrodesmoides* ATTEMS, Senckenbergiana *26:* 439. (Type species: *H. perturbans* Att., by original designation).
1945 *Carvalhodesmus* SCHUBART, Arq. Mus. Nac. *38:* 28. (Type species: *C. costalimai* Schub., by original designation).

Brazil (Rio de Janeiro, Distr. Federal).

*H. costalimai* (Schub. 1945), *H. perturbans* Att. 1943.

The synonymy of *Carvalhodesmus* with *Habrodesmoides* noticed by KRAUS in 1956 (Senck. Biol. *37:* 404) seems quite correct.

### Laviusoma Kraus

1956 *Laviusoma* KRAUS, Senck. Biol. *37:* 411. (Type species: *Catharosoma laviudae* Kraus, by original designation).

Peru.

*L. laviudae* (Kraus 1955).

## **Mestosoma** Silv.

See p. 27.

## **Mogyella** Schub.

1944 *Mogyella* SCHUBART, Acta Zool. Lilloana *2:* 333. (Type species: *M. nana* Schub., by original designation).

Brazil (São Paulo).

*M. nana* Schub. 1944.

## **Mogyosoma** Schub.

1944 *Mogyosoma* SCHUBART, Acta Zool. Lilloana *2:* 335. (Type species: *M. hamatum* Schub., by original designation).

Brazil (São Paulo).

*M. hamatum* Schub. 1944.

SCHUBART, when describing the genus, ranged it among the "Orthomorphinae", but, just as in the case of *Gonodrepanoides*, one may wonder whether this allocation was correct. Unfortunately the published drawings do not give sufficient proof of the alleged presence of a tibiotarsus sheathing the solenomerite, and leave room for a different interpretation. In point of fact, they rather suggest that the solenomerite is entirely free, and that what SCHUBART took for a tibiotarsus is the lamella containing the spermal channel.

Of course, this theory needs confirmation by actual examination of material. In any case, it may be interesting to point to a certain similarity between the gonopods of *Mogyosoma hamatum* and those of *Gonodrepanum torresae* Schub. The copulatory apparatus of the latter species seems to suggest a more simplified version of that found in *Mogyosoma.*

## **Montesecaria** Kraus

1956 *Montesecaria* KRAUS, Senck, Biol. *37:* 405. (Type species: *Catharosoma nitidum* Kraus, by original designation).

Peru.

*M. nitida* (Kraus 1954).

### Ologonosoma Silv.

1898 *Ologonosoma* SILVESTRI, Ann. Mus. Genova *38:* 649. (Type species: *Strongylosoma sanctum* Silv., by original designation).
1954 *Hemigonodrepanum* SCHUBART, Arq. Mus. Paranaense *10:* 83. (Type species: *H. iguassuense* Schub., by original designation).
1957 *Paitomus* CHAMBERLIN, Lunds Univ. Arsskr. (N.F., 2) *53* (8): 12. (Type species: *P. primus* Chamb., by original designation).

Chile, Paraguay, Brazil (Paraná).

*O. ecarinatum* (Att. 1898), *O. iguassuense* (Schub. 1954), *O. primum* (Chamb. 1957), *O. robustum* (Att. 1898), *O. sanctum* (Silv. 1895).

A comparison of the gonopod drawings of *Strongylosoma sanctum* Silv. and *Hemigonodrepanum iguassuense* Schub. clearly shows that the two species are congeneric. The name *Ologonosoma*, although not accompanied by a description and therefore probably discarded by previous authors, has been validly published, and is to be regarded as a senior synonym of *Hemigonodrepanum*.

The two species described by ATTEMS have long been misplaced among the South American species of the genus *Habrodesmus* Cook now referred to *Mestosoma* Silv. However, both appear to have a free solenomerite, and therefore they cannot be reallocated to *Mestosoma*. They may provisionally find a place in the genus *Ologonosoma*, with the type species of which they certainly have affinities, even though the number of lappets arising from the postfemoral region of the gonopods is three instead of two.

The type species of the monobasic genus *Paitomus* belongs quite obviously to the same generic category as *O. ecarinatum* and *O. robustum*. *Paitomus* is therefore considered to be a synonym of *Ologonosoma*.

### Onclurosoma Silv.

See p. 56.

### Orthomorpha Bollm.

See p. 21.

### Oxidus Cook

1911 *Oxidus* COOK, Proc. U.S. Nat. Mus. *40:* 628. (Type species: *Fontaria gracilis* C. Koch, by original designation).
1914 *Orthomorpha* (*Kalorthomorpha*) ATTEMS, Arch. Naturg. *80A* (4): 191. (Type species: *Fontaria gracilis* C. Koch, by original designation).

Probably the northern part of the Oriental and the eastern part of the Palearctic region. The type species, *O. gracilis*, is widely distributed in the subtropical

parts of the world, and is a common inhabitant of hothouses in the temperate zones.

*O. avia* (Verh. 1937), *O. gracilis* (C. Koch 1847), *O. gracilis* subsp. *gigas* (Att. 1953), *O. obtusus* (Tak. 1954), *O. riukiarius* (Verh. 1940). The exact limits of the genus have yet to be defined.

Unlike *Orthomorpha coarctata* (Sauss.), *Oxidus gracilis* is not a typically Tropical species since most of the open-air localities from which it has been recorded lie at some distance from the equator. It has not been recorded from Guiana, nor was it found in the material under report; its absence may be due to unsuitable climatic conditions.

## **Porcullosoma** Kraus

1956 *Porcullosoma* KRAUS, Senck. Biol. *37:* 411. (Type species: *Catharosoma castaneum* Kraus, by original designation).

Peru.

*P. albipes* Kraus 1959, *P. castaneum* (Kraus 1954), *P. connectens* Kraus 1960, *P. jaujense* (Kraus 1955), *P. mamillatum* (Kraus 1955), *P. muticum* (Kraus 1955).

## **Promestosoma** Silv.

1898 *Promestosoma* SILVESTRI, Ann. Mus. Genova *38:* 673. (Type species: *P. boggianii* Silv., by monotypy).
1956 *Habrodesmella* KRAUS, Senck. Biol. *37:* 418. (Type species: *H. tingomariae* Kraus, by original designation).

Peru, Paraguay.

*P. boggianii* Silv. 1898, *P. tingomariae* (Kraus 1956).

This genus has been brought into the synonymy of *Catharosoma* by ATTEMS. The characters of the type species, however, fully justify a generic separation. Attention should be given to the fact that the gonopod drawing published under the name of *boggianii* by ATTEMS in 1937 does not show the characteristics of *Promestosoma*. This drawing was apparently made from a specimen of a species which is not only specifically but also generically distinct from *boggianii*.

On account of its gonopod characters, the type species of *Habrodesmella* appears to be congeneric with *boggianii*.

**Pseudogonodrepanum** Schub.

1945 *Pseudogonodrepanum* SCHUBART, Arq. Mus. Nac. *38:* 25. (Type species: *P. scitum* Schub., by original designation).

Brazil (Distr. Federal).

*P. scitum* Schub. 1945.

Species incertae sedis

The following species, the male characters of which are not or are insufficiently known, cannot be referred with certainty to any of the above genera. They are enumerated here under the generic names by which they were originally described.

| | |
|---|---|
| *Catharosoma bromelicola* Schub. 1945 | Brazil (Rio de Janeiro) |
| *Orthomorpha festae* Silv. 1897 | Panama |
| *Gonodrepanum flavolineatum* Schub. 1945 | Brazil (Rio de Janeiro) |
| *Polydesmus* (*Strongylosoma*) *glabrum* Pet. 1864 | Colombia |
| *Mestosoma laetum* Silv. 1897 | Bolivia |
| *Mestosoma laterale* Silv. 1897 | Ecuador |
| *Strongylosoma nitidum* Brol. 1902 | Brazil (São Paulo) |
| *Orthomorpha proxima* Silv. 1898 | Colombia |
| *Habrodesmus pumilus* Schub. 1939 | Brazil (Pernambuco) |
| *Strongylosoma pustulatum* Brol. 1902 | Brazil (São Paulo) |

## **Orthomorpha** Bollm.

1859 *Polydesmus* (*Paradesmus*) DE SAUSSURE, Linn. Ent. *13:* 325.
1893 *Orthomorpha* BOLLMAN, Bull. U.S. Nat. Mus. *46:* 159.
1939 *Asiomorpha* Verhoeff, Zool. Anz. *127:* 117.
1944 *Brasilogonopus* Verhoeff, Arq. Mus. Nac. *37:* 274.
1958 *Oxidus* (*Orthomorphina*) Kraus, Senck. Biol. *39:* 100.

Type species. – *Polydesmus beaumontii* Le Guillou, by subsequent designation: POCOCK, 1909 (Biol. Centr.-Amer., Diplop., p. 159). Type species of *Asiomorpha: Polydesmus* (*Paradesmus*) *coarctatus* Sauss., by monotypy; of *Brasilogonopus: B. attemsi* Verh., by monotypy; of *Orthomorphina: Polydesmus* (*Paradesmus*) *coarctatus* Sauss., by original designation).

Oriental region: Burma, Indo-China, Siam, Malaya, Philippine Is., Borneo, Java. The taxonomic boundaries, and consequently the geographical range of the genus, have still to be defined. One species has become distributed throughout the Tropical parts of the world.

The genus is known with certainty to comprise about thirty-five species.

The nomenclatorial and taxonomic problems relating to this genus will be treated in a paper on the Paradoxosomatidae of Borneo which is at present in preparation.

## Orthomorpha coarctata (Sauss.)

1860 *Polydesmus* (*Paradesmus*) *coarctatus* DE SAUSSURE, Mém. Soc. Phys. Hist. nat. Genève *15:* 297, pl. 18 fig. 18 (1)
1887 *Strongylazoma* [!] *poeyi* BOLLMAN, Ent. Amer. *3:* 82. (2)
1889 *Paradesmus p.*, BOLLMAN, Proc. U.S. Nat. Mus. *11:* 336. (3)
1893 *Orthomorpha c.*, BOLLMAN, Bull. U.S. Nat. Mus. *46:* 196. (4)
1893 *Strongylosoma c.*, POCOCK, J. Linn. Soc. London *24:* 512. (5)
1893 *S. c.*, POCOCK, Ann. Mag. Nat. Hist. (6) *11:* 123, 130. (6)
1896 *O. c.*, SILVESTRI, Boll. Mus. Torino *11* (254): 4. (7)
1898 *O. c.*, BROLEMANN, Ann. Soc. Ent. France *67:* 268. (8)
1901 *O. c.*, ATTEMS, Mitt. Naturh. Mus. Hamburg *18:* 85. (9)
1903 *O. c.*, BROLEMANN, Zool. Anz. *26:* 178. (10)
1903 *O. c.*, BROLEMANN, Rev. Mus. Paulista *6:* 78. (11)
1903 *O. c.*, BROLEMANN, Ann. Soc. Ent. France *72:* 139. (12)
1908 *O. c.*, SILVESTRI, Bull. Amer. Mus. Nat. Hist. *24:* 575. (13)
1918 *O. c.*, CHAMBERLIN, Bull. Mus. Comp. Zool. Cambridge *62:* 245. (14)
1920 *O. c.*, CHAMBERLIN, Ann. Ent. Soc. Amer. *13:* 277. (15)
1920 *O. c.*, CHAMBERLIN, Psyche *27:* 63. (16)
1922 *O. c.*, CHAMBERLIN, Proc. U. S. Nat. Mus. *60* (8): 36. (17)
1922 *O. c.*, CHAMBERLIN, Proc. U. S. Nat. Mus. *61* (10): 14. (18)
1922 *O. c.*, CHAMBERLIN, Ent. News *33:* 85. (19)
1924 *O. c.*, CHAMBERLIN, Univ. Iowa Stud. *10* (4): 44. (20)
1933 *O. c.*, LOOMIS, Bull. Mus. Comp. Zool. Cambridge *75:* 361. (21)
1934 *O. c.*, LOOMIS, Smiths. Misc. Coll. *89* (14): 28. (22)
1936 *O. c.*, LOOMIS, Bull. Mus. Comp. Zool. Cambridge *80:* 110. (23)
1938 *O. c.*, LOOMIS, Bull. Mus. Comp. Zool. Cambridge *82:* 457. (24)
1939 *O.* (*O.*) *c.*, SCHUBART, Zool. Anz. *128:* 77. (25)
1941 *O. c.*, LOOMIS, Bull. Mus. Comp. Zool. Cambridge *88:* 49. (26)
1943 *O. c.*, ATTEMS, Senckenbergiana *26:* 434. (27)
1944 *O.* (*O.*) *c.*, SCHUBART, Act. Zool. Lilloana *2:* 345. (28)
1944 *Brasilogonopus attemsi* VERHOEFF, Arq. Mus. Nac. *37:* 275, fig. 28–30. (29)
1945 *O.* (*O.*) *c.*, SCHUBART, Arq. Mus. Nac. *38:* 41, fig. 39–40. (30)
1947 *O.* (*O.*) *c.*, SCHUBART, Arthropoda *1:* 31. (31)
1948 *O. c.*, LOOMIS, J. Wash. Ac. Sci. *38:* 188. (32)
1950 *O. watsa* CHAMBERLIN, Zoologica, New York *35:* 144, fig. 20. (33)
1952 *O. c.*, SCHUBART, Dusenia *3:* 412. (34)
1952 *Asiomorpha c.*, CHAMBERLIN, Ann. Ent. Soc. Amer. *45:* 584. (35)
1954 *O.* (*O.*) *c.*, KRAUS, Senck. Biol. *35:* 308. (36)
1958 *Oxidus* (*Orthomorphina*) *c.*, KRAUS, Senck. Biol. *39:* 101. (37)
1958 *O. c.*, CHAMBERLIN & HOFFMAN, Bull. U.S. Nat. Mus. *212:* 83. (38)
1958 *O. c.*, SCHUBART, Arq. Mus. Nac. *46:* 215, 228. (39)

Previous records: Originating from somewhere in the Oriental region, this species is now widely distributed in the tropical parts of the Oriental, Australian and Ethiopian regions. In the new world it has been recorded from the following countries: U.S.A.: Louisiana, Texas, occasionally in greenhouses elsewhere (38), Bermuda (6, 15), Guatemala (16, imp. in the U.S.A.; 17), El Salvador (36),

Costa Rica (17), Panama (7, 17); Cocos Id. (12); Cuba (2, 3, 14, 18, 21, 24), Isla de Pinos (18), Grand Cayman (14), Jamaica (5, 14, 32), Hispaniola (9, 14, 23, 26, 35), Puerto Rico (13, 14, 18), St. Thomas (9), St. Martin (22), St. Eustatius (22), St. Kitts (22), Antigua (22), Guadeloupe (22), Dominica (5, 22), Martinique (22), St. Lucia (22), Bequia (22), Union (5), Carriacou (22), Grenada (14), Barbados (5, 20), Tobago (14), Trinidad (14, 22); Venezuela (8, 9); Brazil: Amazonas (11), Pará (10), Ceará (31), Paraiba (25), Pernambuco (25), Alagoas (25), Bahia (31), Minas Gerais (29), Espírito Santo (31), Río de Janeiro (9, 31), Distr. Federal (30), São Paulo (28, 31, 34), Goias (39), Mato Grosso (31, 39); Galápagos Is. (37). – Guiana (6); British Guiana: Georgetown (19, imp. in the U.S.A.), Kartabo (33); Surinam (4 ?, 22); French Guiana: Cayenne (1).

SURINAM: Paramaribo (Coll. A. HEYNE, Mus. München), 2 ♀♀; Paramaribo, 2 Sep. 1900 (M. KONING, Mus. Leiden), 1 ♀; without locality, 1907 (D. G. J. Bolten, Mus. Amsterdam), 1 ♀; Paramaribo, 1911 (Jhr. W. C. VAN HEURN, Leiden), numerous ♂♂, ♀♀, juvs.; Groningen, 1911 (VAN HEURN, Leiden), 1 ♀; Groningen, Sep. 1911 (VAN HEURN, Leiden), ♂♂, ♀♀, juvs.; Albina, 25 June 1911 (VAN HEURN, Leiden), 1 ♀; Paramaribo, 1936 (A. SMIT, Leiden), 1 ♀; Paramaribo, Cultuurtuin, May–Aug. 1938 (Dr. D. C. GEIJSKES, Leiden), 1 ♀; Paramaribo, Combé, 21 Mar. 1939 (H. W. C. COSSEE, Leiden), 2 ♀♀; Surroundings of Paramaribo, Nov. 1950, D. PIET, Amsterdam), 2 ♀♀; Paramaribo, Cultuurtuin, coffee garden, forest ground, 30 Aug.–2 Sep. 1950 (GEIJSKES, Amsterdam), numerous ♂♂, ♀♀, juvs.; Paramaribo, Cultuurtuin, in humus layer and on trunks of trees, 15 Nov. 1950 (GEIJSKES, Amsterdam), numerous ♂♂, ♀♀, juvs.; Republiek, 26 Dec. 1950 (GEIJSKES, Amsterdam), 10 ♂♂, 2 ♀♀, 4 juvs.; Paramaribo, Cultuurtuin, Jan.–Feb. 1951 (GEIJSKES, Amsterdam), 1 ♀; Kabel, railway, 31 Aug. 1955 (P. WAGENAAR HUMMELINCK, Sta. 564, Amsterdam), 1 ♀, 1 juv.; Republiek, in tree stump, May 1957 (GEIJSKES, Amsterdam), 1 ♂.

FRENCH GUIANA: Cayenne, 1877 (Coll. MÉLINON, Mus. Paris), 1 ♂, 3 ♀♀; Ile de Cayenne, 1902 (F. GEAY, Paris), 1 ♀; without locality, 1902 (GEAY, Paris), 1 ♂; Mahury, 1902 (GEAY, Paris), 6 ♂♂, 12 ♀♀; Bas Mahury, Feb. 1902 (GEAY, Paris), 1 ♂; Morne, embouchure du Mahury, Feb. 1902 (GEAY, Paris), 2 ♂♂, 1 ♀.

BRAZIL: Amapá: "Riv. Lunier", 1899 (Coll. F. GEAY, Mus. Paris), 1 ♂, 1 juv.; Oyapock, 1900 (GEAY, Paris), 1 ♂, 1 ♀.

Location of type material. – Muséum d'Histoire Naturelle, Genève (?) (*P. coarctatus* Sauss.); U.S. National Museum, Washington (D.C.) (*S. poeyi* Bollm.); Zoologische Sammlung des Bayerischen Staates, München (?) (*B. attemsi* Verh.); American Museum of Natural History, New York (*O. watsa* Chamb.).

In the above synonymic list I have attempted to assemble all references to the distribution of this species in North and South America. According to POCOCK, 1909 (Biol. Centr.-Amer., Diplop., p. 160), it has also been recorded from Paraguay and Chile, but I have not succeeded in tracing the original sources to which these records refer.

*Orthomorpha watsa* is only another synonym of *O. coarctata*. The insignificant differences in the distal end of the tibiotarsus of the gonopods as drawn by CHAMBERLIN are no doubt due to the specimen's having been viewed from a slightly different angle.

## Chondromorpha Silv.

1897 *Chondromorpha* SILVESTRI, Ann. Soc. Ent. Belgique *41:* 356.
1936 *Polydesmopeltis* (*P.* & *Ceylonpeltis*) VERHOEFF, Rec. Ind. Mus. *38:* 111, 113.
1937 *C.*, ATTEMS, Tierreich *68:* 107.
1941 *Dasomus* CHAMBERLIN, Proc. Ent. Soc. Washington *43:* 34.
1948 *Xaymacia* LOOMIS, J. Wash. Ac. Sci. *38:* 187.
1950 *C.*, LOOMIS, J. Wash. Ac. Sci. *40:* 165.

Type species. – *C. severini* Silv., by monotypy. (Type species of *Polydesmopeltis: Polydesmus Kelaarti* Humb., by original designation; of *Ceylonpeltis: Prionopeltis xanthotrichus* Att., by original designation; of *Dasomus: D. bicolor* Chamb., by original designation; of *Xaymacia: X. granulata* Loom., by original designation).

Indian peninsula, Ceylon; one species has an erratic distribution throughout the Ethiopian, Indo-Australian and Neotropical regions.

Number of species uncertain; apart from *C. xanthotricha* (Att.), eleven species, subspecies and varieties referable to *Chondromorpha* remain to be evaluated.

Judging from the opinions expressed by various authors, the definition of specific boundaries within the genus *Chondromorpha* is attended by much difficulty. Doubtless it is this which has brought about the present state of confusion in the infrageneric nomenclature.

Since the genus is of Oriental origin and is represented in Guiana by an introduced form only, elaborate discussion of its taxonomy falls beyond the scope of the present paper. The justification of the generic synonymy is given below.

## Chondromorpha xanthotricha (Att.)

1898 *Prionopeltis xanthotricha* ATTEMS, Denkschr. Ak. Wien *67:* 359. pl. 5 fig. 115. (1)
1913 *Orthomorpha granosa* ATTEMS, Denkschr. Ak. Wien *89:* 683, pl. 9 fig. 1–3. (2)
1920 *Prion. clarus* CHAMBERLIN, Bull. Mus. Comp. Zool. Cambridge *64* (1): 131. (3)
1926 *Anoplodesmus x.*, CARL, in: SARASIN & ROUX, Nova Caledonia *4:* 371. (4)
1931 *Chondr. g.*, BROLEMANN, Arch. Zool. Expér. Gen. *72:* 295. (5)
1936 *Polydesmopeltis* (*Ceylonpeltis*) *x. hirsutus* VERHOEFF, Rec. Ind. Mus. *38:* 114, pl. 7 fig. 14–15. (6)
1936 *Polyd.* (*Ceyl.*) *x. h.*, VERHOEFF, Rec. Ind. Mus. *38:* 508, pl. 16 fig. 11–12.

1937 *Chondr. x. & Chondr. x. h. & Chondr. g.*, ATTEMS, Tierreich *68:* 111, 112, fig. 146–148.
1941 *Dasomus bicolor* CHAMBERLIN, Proc. Ent. Soc. Washington *43:* 34, fig. 4. (7)
1948 *Xaymacia granulata* LOOMIS, J. Wash. Ac. Sci. *38:* 187, fig. 3–6. (8)
1953 *Chondr. x.*, WANG, Ent. News *64:* 3. (9)

Previous records: Ethiopian region: Mauritius (1); Oriental region: Ceylon (1, 6); Philippine Is.: Luzon (9); Australian region: New Caledonia (4, 5); Fiji Is. (3); Samoa Is. (2, 3); Neotropical region: Jamaica (7, 8).

SURINAM: Paramaribo, Cultuurtuin, May–Aug. 1938 (Coll. Dr. D. C. GEIJSKES, Mus. Leiden), 1 ♀; Paramaribo, Cultuurtuin, coffee garden, forest ground, 30 Aug.–2 Sep. 1950 (GEIJSKES, Amsterdam), numerous ♂♂, ♀♀, and juvs; Paramaribo, Cultuurtuin, in humus layer and on trunks of trees, 15 Nov. 1950 (GEIJSKES, Amsterdam), numerous ♂♂, ♀♀ and juvs; Paramaribo, Nov. 1950 (D. PIET, Amsterdam), 1 ♀.

Location of type material. – Naturhistorisches Museum, Wien (*P. xanthotrichus* Att., *O. granosa* Att.); Museum of Comparative Zoölogy, Cambridge (*P. clarus* Chamb.); Zoologische Staatssammlung, München (*P. x. hirsutus* Verh.); University of Utah, Salt Lake City (*D. bicolor* Chamb.); U.S. National Museum, Washington (*X. granulata* Loom.).

The major problem in connection with the status of *xanthotricha* is its distinction from *C. kelaarti* (Humb.). In this respect, interpretations by CARL on the one hand and VERHOEFF on the other have been extremely divergent.

In 1932, CARL (Rev. Suisse Zool. *39*: 461), in his treatment of a fairly large amount of material from a variety of localities in southern India, came to the conclusion that *kelaarti* and *xanthotricha* could not be separated specifically. According to CARL, his material showed a great deal of variation in size, in the outline of the lateral keels, in the sculpture and pubescence of the metatergites, and in the details of the gonopods – a variation which did not appear to be in any way correlated with geographical distribution.

An entirely opposite opinion regarding the relationship of the two species was held by VERHOEFF, who in 1936 went so far as to separate *xanthotricha* from *kelaarti* subgenerically.

In accordance with the scope of the "Tierreich", the treatment of *Chondromorpha* by ATTEMS in 1937 is largely a compilation of previous literature. Although extremely useful because of its completeness, it unfortunately lacks consistency in dealing with the work of

CARL and VERHOEFF. *C. kelaarti* and *xanthotricha* are kept separate by ATTEMS, and the rather exaggerated subspecific divisions of both species as proposed by VERHOEFF are accepted. The broad interpretation of *kelaarti* as supported by CARL, however, has been admitted in the distributional data of that species. Of course, ATTEMS was perfectly right in discarding VERHOEFF's subgenera.

In his key, ATTEMS separates *xanthotricha* from *kelaarti* on the grounds of smaller size and coarser sculpture of the metatergites. However, it may be doubted whether ATTEMS' interpretation of *kelaarti* was correct, since his gonopod drawing for that species notably differs from the one CARL made from the type material of the species. The gonopods of the type material of *kelaarti* do, in fact appear to be in close agreement with those of *xanthotricha*. Therefore, when I first discovered the records from the Neotropical region of a species of *Chondromorpha*, hidden under the generic names of *Dasomus* and *Xaymacia*, I tended to follow CARL in regarding *xanthotricha* as a synonym of *kelaarti*, in spite of the differences in size between the two, and advised Mr. LOOMIS accordingly for his synonymic note of 1950. Consequently, *Dasomus bicolor* Chamb. and *Xaymacia granulata* Loom. were brought into the synonymy of *C. kelaarti* (Humb.) by LOOMIS.

However, a more careful review of pertinent literature and actual study of the material in hand, have convinced me that it may be more convenient to preserve *xanthotricha* as a distinct species. A close comparison of the notes and descriptions relating to the occurrence of *Chondromorpha* outside the original range of that genus reveals clearly that all these records refer to a single species, the characters of which most satisfactorily match the description of *C. xanthotricha* (Att.), in particular as regards its small size. To avoid confusion it seems best to keep this small form specifically separate from the larger *C. kelaarti* (Humb.), irrespective of the subspecific relationship which may ultimately prove to exist between the two.

The lamentably extensive synonymy of *C. xanthotricha* has obviously been caused by its erratic distribution not having been recognized for many years.

The description of *C. granosa*, long misplaced in the genus *Orthomorpha*, contains scarcely anything to distinguish it from

*xanthotricha*. The probability that the two are identical is enhanced by the fact that two authoritative writers such as CARL and BROLEMANN both recorded a species of *Chondromorpha* from the same locality in New Caledonia under the respective names of *xanthotricha* and *granosa*. In the key to the species of *Chondromorpha* in the "Tierreich", *granosa* was brought under the wrong paragraph of the first couplet, which is possibly an indication why ATTEMS kept it separate from *xanthotricha*.

From the description it is evident that *P. clarus* is a species of *Chondromorpha*. Unfortunately, information on the measurements of this form has been omitted. Since, however, *P. clarus* has been recorded by its author from Samoa, which happens to be the type locality of *granosa*, there can be little doubt as to its identity with *xanthotricha*.

VERHOEFF's description of the subspecies *hirsutus* of *xanthotricha* from Ceylon was obviously prompted by an erroneous interpretation of the original gonopod drawing for *xanthotricha* published by ATTEMS in 1898.

Finally, introduction of the monotypic genera *Dasomus* and *Xaymacia* for material undoubtedly belonging to *C. xanthotricha* can be easily explained by the fact that both CHAMBERLIN and LOOMIS were unaware of the Oriental origin of the species.

It may be of interest to note that no material of *xanthotricha* from the Western Hemisphere has been recorded previously to 1938, whereas the similarly synanthropical *Orthomorpha coarctata* was described from Cayenne by SAUSSURE as far back as 1860. It therefore seems likely that the introduction of *C. xanthotricha* into the American fauna is of much more recent date than that of *O. coarctata*.

## **Mestosoma** Silv.

1897 *Mestosoma & Leiosoma* SILVESTRI, Boll. Mus. Torino *12* (283): 3.
1897 *Catharosoma* Silvestri, Abh. Mus. Dresden *6* (9): 12.
1929 *Eucatharosoma* Brolemann, Mém. Soc. Zool. France *29:* 21.
1938 *Habrodesmus* (*Broelemannopus*) Verhoeff, Zool. Jahrb. Syst. *71:* 14.
1939 *Pernambucosoma* Schubart, Zool. Anz. *128:* 82.
1941 *Titschackia, Hylaiopus & Perusoma* Verhoeff, in: TITSCHACK, Beitr. Fauna Perus *2:* 21. (1951 ed.)

1952 *Nearctoma* Chamberlin, Ann. Ent. Soc. America *45:* 582.
1959 *Paracatharosoma* Kraus, Senck. Biol. *40:* 263.

Type species. – *Strongylosoma Salvadorii* Silv., by original designation. (Type species of *Leiosoma* (nom. praeocc.) and *Catharosoma: Strongylosoma paragayense* Silv., by original designation; of *Eucatharosoma: E. taeniatum* Brol., by original designation; of *Broelemannopus: Strongylosoma apex-galeae* Brol., by monotypy; of *Pernambucosoma: P. marthae* Schub., by original designation; of *Titschackia: T. andina* Verh., by subsequent designation: KRAUS, 1956 (Senck. Biol. *37:* 405); of *Hylaiopus: H. sphinx* Verh., by monotypy; of *Perusoma: P. recurvatum* Verh., by monotypy; of *Nearctoma: N. cuzconum* Chamb., by original designation; of *Paracatharosoma: P. unicum* Kraus, by original designation).

Peru, Ecuador, Colombia, Venezuela, Brazil (Amapá, Pará, Ceará, Pernambuco, Alagoas, Distr. Federal, São Paulo, Mato Grosso, Paraná, Santa Catarina, Rio Grande do Sul), Bolivia, Paraguay, Uruguay, Argentina; Dominica.

Number of species: seventy-three.

As was advocated in the discussion of the family, it will be best for the present to unite under *Mestosoma* all genera mentioned in the above synonymic account. A more specified justification may follow here.

The characters used for distinction between *Catharosoma* and *Mestosoma* appear to have always been somewhat arbitrary. Originally it was the absence of lateral swellings in the metasomites of the 3rd to the 19th segments. Later, this character was dropped by ATTEMS and replaced by the presence of processes on the sternite of the 6th segment of the males. For the distinction of natural generic categories, however, both these characters are of at most secondary importance, and, indeed, their consistent application by ATTEMS and, later, by SCHUBART has led to somewhat artificial groups.

In 1956 KRAUS (Senck. Biol. *37*: 406) examined the type species of *Catharosoma* and gave a somewhat emended diagnosis of the genus, in which the following characters stand out as the most important: prefemur of gonopods large, about half as long as the entire telopodite; femur more of less club-shaped, medially excavated. Certainly, *Catharosoma*, thus characterized and restricted to contain seven species, constitutes a natural grouping. The diagnosis by KRAUS, however, seems rather useless, since it does not indicate a sharp disjunction, and, indeed, there are some species closely related to the group but not falling within the characterization.

Nothing need be said regarding the status of *Eucatharosoma* Brol., since this genus has already been brought into the synonymy of *Catharosoma* by ATTEMS.

*Broelemannopus* Verhoeff may have some justification as a species group, or perhaps as a subgenus. The species which form this group will be mentioned below.

Creation of the genus *Pernambucosoma* Schub. may have been a little premature. According to SCHUBART this genus contains two species which are indeed closely related. However, judging by the structure of the gonopods, a *"Habrodesmus" alagoanus* Schub. 1950, described later, appears to belong to the same category, or may perhaps be regarded as an annectant form between *Pernambucosoma* and the remainder of *Mestosoma*.

It is now sufficiently well-known that VERHOEFF, in the course of his occasional excursions into the taxonomy of tropical millipedes, used to indulge in the creation of, often monotypical, new genera. It seems to me that, under the present conditions, i.c. in the middleof a period of merely inventorial work, a somewhat wider generic concept should be adopted in classifying the millipedes of these regions. At the moment I cannot see more than species groups in what VERHOEFF regarded as genera, and *Titschackia, Hylaiopus* and *Perusoma* Verh. should therefore be withdrawn into *Mestosoma*.

*Nearctoma* Chamb. was apparently based on the same characters as was *Mestosoma* in the original sense.

The proposition of a distinct genus for *Paracatharosoma unicum* Kraus does not seem justified. KRAUS compares it with the species of *Catharosoma* as defined by him, from which it quite obviously differs. In my opinion *unicum* must be quite closely related to *Mestosoma differens* Kraus, and therefore is not satisfactorily separable from the main body of *Mestosoma*, at any rate at present.

According to the present concept the genus *Mestosoma* embraces the following species:

*M. acollae* (Kraus 1955) Peru

KRAUS, 1956, considers this species to be identical with *M. punae* (Chamb.), a conclusion based on topotypical material. In view of the discrepancies in the descriptions of the two species, it seems best to keep them distinct until re-examination of CHAMBERLIN's type specimen has verified the point.

| | |
|---|---|
| *M. alagoanum* (Schub. 1950) | Brazil (Alagoas) |
| *M. albipes* (Verh. 1941) | Peru |
| *M. alticola* (Att. 1931) | Bolivia |
| *M. andinum* (Verh. 1941) | Peru |
| *M. andresense* Kraus 1957 | Peru |
| *M. apex-galeae* (Brol. 1902) | Brazil (São Paulo) |
| *M. araguanum* (Chamb. 1952) | Venezuela |
| *M. balzanii* (Silv. 1895) | Bolivia |
| *M. bicolor* Silv. 1898 | Paraguay, Brazil (Mato Grosso) |
| *M. boliviae* (Chamb. 1957) | Bolivia |
| *M. borellii* (Silv. 1895) | Argentina |
| *M. camerani* (Silv. 1895) | Argentina |
| *M. carioca* (Schub. 1945) | Brazil (Distr. Federal) |
| *M. consocius* (Chamb. 1955) | Peru |
| *M. contumum* (Chamb. 1955) | Peru |

This species has been redescribed by KRAUS, 1956, but his gonopod drawing differs rather considerably from the one given by CHAMBERLIN, and the identity of *contumum* s. KRAUS with the species described by CHAMBERLIN seems a bit doubtful.

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|---|---|
| *M. curitibense* (Schub. 1954) | Brazil (Paraná) |
| *M. cuzconum* (Chamb. 1952) | Peru |
| *M. derelictum* (Silv. 1895) | Bolivia |
| *M. differens* Kraus 1956 | Bolivia |
| *M. digitale* (Schub. 1954) | Brazil (Paraná) |
| *M. escaramucense* (Schub. 1944) | Brazil (São Paulo) |
| *M. ethophor* (Chamb. 1955) | Peru |

Under this name KRAUS, 1956, redescribed a species which seems not to be the same as the one named by CHAMBERLIN. In CHAMBERLIN's paper the number of figure 68 has been omitted, but obviously the middle drawing of the upper row on page 38 ought to bear that number. This drawing, however, does not tally with the gonopod drawing published by KRAUS, and, unless it is assumed that the numbers on the drawings of CHAMBERLIN's paper do not correspond with the text, *ethophor* s. KRAUS must be a different species.

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|---|---|
| *M. ethophorina* Kraus 1959 | Peru |

| | |
|---|---|
| *M. femorale* (Schub. 1943) | Brazil (Mato Grosso) |
| *M. flavius* (Chamb. 1955) | Peru |
| *M. forsteri* Kraus 1956 | Bolivia |
| *M. frater* (Chamb. 1955) | Peru |
| *M. glabratum* (Schub. 1945) | Brazil (Distr. Federal) |
| *M. hoffmani* (Kraus 1956) | Paraguay |
| *M. huallagae* (Chamb. 1955) | Peru |
| *M. hylaeicum* nov. spec. | Brazil (Amapá, Pará) |
| *M. ibitiense* (Schub. 1945) | Brazil (São Paulo) |
| *M. intermedium* (Carl 1902) | Brazil (Rio Grande do Sul) |

According to CARL, 1914, this species is the same as "*Strongylosoma*" *glabrum* Peters 1864. Since *glabrum* was described from Colombia and was, moreover, based on a female specimen, this identity seems extremely improbable.

| | |
|---|---|
| *M. kalliston* (Att. 1898) | Brazil (Rio Grande do Sul) |
| *M. llaguenicum* (Kraus 1954) | Peru |
| *M. luctuosum* Silv. 1897 | Bolivia |
| *M. lugubre* Silv. 1897 | Argentina, Uruguay |

*Strongylosoma parvulum* Att. 1898 is almost without doubt a synonym for *lugubre*, and has indeed been treated as such by SILVESTRI, 1902, and ATTEMS, 1937. However, whereas ATTEMS describes the presence of postfemoral tubercules in the first eight pairs of legs, according to SILVESTRI these tubercules are absent in the first two pairs. Moreover, the postgonopodial leg as illustrated by ATTEMS, 1898, has no postfemoral tubercule but a well-developed femoral protuberance!

| | |
|---|---|
| *M. maquisi* Kraus 1956 | Peru |
| *M. marthae* (Schub. 1939) | Brazil (Pernambuco, Alagoas, Ceará) |
| *M. mediatum* Silv. 1897 | Ecuador |
| *M. mesorphinum* (Att. 1898) | Brazil (Santa Catarina) |
| *M. mesoxanthum* (Att. 1898) | Brazil (Santa Catarina) |
| *M. mixtum* (Kraus 1956) | Brazil (Santa Catarina) |
| *M. montanum* (Silv. 1895) | Bolivia |
| *M. myrmekurum* (Att. 1898) | Brazil (Santa Catarina) |
| *M. orobium* Kraus 1960 | Peru |

| | |
|---|---|
| *M. palmatum* (Schub. 1954) | Brazil (Paraná) |
| *M. palustre* (Schub. 1943) | Brazil (Mato Grosso) |
| *M. paraguayense* (Silv. 1895) | Paraguay, Argentina |
| *M. peraccae* (Silv. 1902) | Paraguay |
| *M. perfidum* (Schub. 1943) | Brazil (São Paulo) |
| *M. pirassununguense* (Schub. 1944) | Brazil (São Paulo) |

*M. pseudomorphum* (Silv. 1895) Paraguay

The material described under this name by CARL, 1902, is almost without doubt specifically identical, although an examination of the type material of SILVESTRI is needed in order to settle some small discrepancies between CARL's and SILVESTRI's descriptions.

*M. pulvillatum* (Att. 1898) Paraguay

According to SILVESTRI, 1902, this species is identical with *M. salvadorii* (Silv.), but here too a re-examination of the type material is needed to verify the point. CARL, 1914, recorded *pulvillatum* from Colombia. Doubtless his material will prove to be specifically distinct from the typical specimens. It may be noted that the gonopod drawing published by ATTEMS in 1937 is considerably different from the one given in 1898. One may wonder whether *pulvillatum* was based on more than one species.

| | |
|---|---|
| *M. punae* (Chamb. 1955) | Peru |
| *M. rayanum* (Chamb. 1957) | Peru |
| *M. recurvatum* (Verh. 1941) | Peru |
| *M. salvadorii* (Silv. 1895) | Paraguay, Argentina |
| *M. schindleri* Kraus 1956 | Bolivia |
| *M. semirugosum* (Poc. 1888) | Dominica |
| *M. shuaro* Kraus 1956 | Peru |
| *M. sphinx* (Verh. 1941) | Peru |
| *M. spinulosa* Kraus 1959 | Peru |
| *M. taeniatum* (Brol. 1929) | Brazil (Santa Catarina) |
| *M. taulisense* (Kraus 1955) | Peru |

*M. titicacaense* (Kraus 1954) Peru, Bolivia

According to KRAUS, 1956, this species is identical with *M. alticola* (Att.). Since the male of *alticola* has femoral tubercles in the 3rd to 5th pairs of legs, and KRAUS states that the legs in *titicacaense* have no particular features, the two forms seem at least subspecifically distinct.

| | |
|---|---|
| *M. tricuspis* (Verh. 1938) | Paraguay |

This species is likely to be a synonym of *M. pseudomorphum* (Silv.), but examination of the type material is necessary in order to settle the point definitely.

| | |
|---|---|
| *M. truncatum* (Schub. 1943) | Brazil (Mato Grosso) |
| *M. unicum* (Kraus 1959) | Peru |
| *M. venezuelanum* (Verh. 1938) | Venezuela |
| *M. vittatum* (Att. 1898) | Paraguay |
| *M. yamango* Kraus 1956 | Peru |

There would not be much sense in grouping these species in one genus if no attempt is made simultaneously to give a preliminary outline of the classification of the species within the genus. A tentative analysis of the groups of species to be distinguished is therefore given here.

I. – This group largely corresponds with the genus *Catharosoma* according to the concept of ATTEMS, 1937, but differs in excluding *apex-galeae* (Brol.), *alticola* (Att.), and, of course, *Promestosoma boggianii* Silv. The present concept is wider than that of *Catharosoma* in the sense of KRAUS, 1956, in that the group also includes the species with a more slender gonopod femur. At present it is difficult to trace a single decisive character binding the species together, but the group appears to be characterized by the combination of the following, mostly male, characters:
Prefemur of gonopods large, about as long as the femur. The latter generally broadly expanded, and bent cephalad at the base. Postgonopodial sternites with two pairs of cones. The coxae of the 2nd pair of legs usually with a distal, more or less uncate process. The tibiae of the legs generally conspicuously ventrally inflated; the femora without tubercules. Body segments from the 5th onwards without a trace of lateral keels; the metatergites without a transverse furrow. Sternites of the 5th and 6th segments both modified. In the sternite of the 5th segment the largest process is situated between the anterior pair of legs.

According to the conformation of the tibiotarsus of the gonopods,

*curitibense* (Schub.) seems somewhat disjunct from the other species, and may be a transitional form to other groups. Moreover, *curitibense* and *intermedium* (Carl) differ from the other species in their more slender gonopod femur. *M. digitale* (Schub.), on the other hand, differs from all the other species of the group in the large triangular expansion of its gonopod femur.

The group contains thirteen species with a decidedly southern distribution: its species have been recorded from the Brazilian states of Mato Grosso, Paraná, Santa Catarina and Rio Grande do Sul; the northern part of Argentina; and Paraguay.

On account of the gonopod structure, the species may be tentatively arranged as follows:

1. a. *M. hoffmani* (Kraus), *M. mesoxanthum* (Att.), *M. myrmekurum* (Att.), *M. palustre* (Schub.), *M. paraguayense* (Silv.).
   b. *M. digitale* (Schub.).

2. a. *M. mesorphinum* (Att.), *M. mixtum* (Kraus), *M. palmatum* (Schub.), *M. taeniatum* (Brol.).
   b. *M. intermedium* (Carl).

3. *M. curitibense* (Schub.).

An additional species is probably *M. peraccae* (Silv.), the gonopods of which have, unfortunately, not been depicted.

II. – This group virtually coincides with the subgenus *Broelemannopus* proposed by VERHOEFF. The species apparently agree in their characters with those of the previous group, but the coxae of the 2nd pair of legs are distally rounded, and the tibiae have no ventral inflations. In the sternite of the 5th segment the largest process is situated between the posterior legs. The group contains four closely related species; the fifth species, *ibitiense* (Schub.), is placed here tentatively. It differs in various characters from the other four, for instance in the absence of a process between the anterior legs of the sternite of the 5th segment, the finely acuminate tail, the small size, etc.

The species of this group are confined to the southeastern part

of Brazil, and have been recorded from the state of São Paulo and the Federal District.

a. *M. apex-galeae* (Brol.), *M. escaramucense* (Schub.), *M. glabratum* (Schub.), *M. pirassununguense* (Schub.).
b. *M. ibitiense* (Schub.).

III. – When describing the genus *Pernambucosoma*, SCHUBART compared it with *Catharosoma*. It seems, however, that the type species of the genus has more affinities to the species previously referred to *Habrodesmus*, at least through *Pernambucosoma perfidum* Schub., added later. The modifications of the pregonopodial sternites of the males do not seem to have generic importance, and the present group is a clear instance of this. It tallies with the genus *Pernambucosoma* of SCHUBART, to which *Habrodesmus alagoanus* Schub. has been added.

The character by which the species of this group are distinguished from the other species of *Mestosoma* is the stem-like basal constriction of the tibiotarsus of the gonopods. Otherwise the species are closely related to those of the following groups. Metasomites with lateral swellings and a dorsal transverse furrow. In the postgonopodial sternites small cones are present. Some of the legs in the anterior half of the body have femoral tubercules.

The group apparently has a southeastern distribution, the three species having been recorded from the Brazilian states of Pernambuco, Alagoas and São Paulo. On account of the structure of the tibiotarsus of the gonopods, the species may be arranged as follows:

a. *M. marthae* (Schub.).
b. *M. alagoanum* (Schub.), *M. perfidum* (Schub.).

IV. – A distinguishing feature taken for this group is the condition that the gonopod femur is rather sharply bent in a posterior direction before its distal end, so that solenomerite and tibiotarsus appear to arise from the posterior side of the distal end of the femur. In other characters the species of the group show a rather great diversity. It certainly contains *alticola* (Att.), *rayanum* (Chamb.), *schindleri* Kraus and *titicacaense* (Kraus), quite probably also

*boliviae* (Chamb.) and *borellii* (Silv.). I also tend to include *luctuosum* Silv. in this group, in particular because of the similarity of the gonopod drawing given by SILVESTRI to the one for *alticola* (recte *titicacaense*) published by KRAUS in 1956. The same applies more or less to *M. montanum* (Silv.), although the similarity here is a little less obvious.

On account of the conformation of the distal end of the gonopod femur, a second category of species is subjoined here. These species differ in lacking the lamellar expansion at the base of the tibiotarsus which is present in the species of the first category. However, close comparison of the gonopods of species such as *yamango* Kraus and *shuaro* Kraus with those of *alticola* (Att.), etc., shows some similarities which probably indicate a close relationship between the species of the two categories.

Whereas in the species of the first category the relative proportions of the various parts of the gonopods appear to be rather constant, these proportions are rather variable in the species of the second category, and in particular the tibiotarsus may be strongly elongated.

Geographically the group as a whole ranges from Peru, through Bolivia, to the northwestern part of Argentina. On account of the gonopods, the species may be arranged as follows:

1. *M. alticola* (Att.), *M. boliviae* (Chamb.), *M. borellii* (Silv.), *M. luctuosum* Silv., *M. montanum* (Silv.), *M. rayanum* (Chamb.), *M. schindleri* Kraus, *M. titicacaense* (Kraus).

2. a. *M. acollae* (Kraus), *M. ethophorina* Kraus, *M. yamango* Kraus, *M. consocius* (Chamb.)?, *M. punae* (Chamb.)?
   b. *M. andinum* (Verh.), *M. albipes* (Verh.), *M. shuaro* Kraus, *M. spinulosa* Kraus.

V. In this last group the remaining species of *Mestosoma* are brought together, not because they constitute a homogeneous assemblage but rather because no sharp disjunctions appear to exist between the various categories which may be distinguished. Moreover, the distinction between the species of this group and the previous one, though probably significant, is rather weak, and

consists only in the absence of a sharp bend in the distal portion of the gonopod femur.

The group may be subdivided into a number of smaller categories, which will be discussed below.

1. A category of seven species recorded from Ecuador, Peru and Bolivia, in which the tibiotarsus has a more or less triangular, distinctly projecting lamella about halfway down its lateral side. Anteriorly, the end of the femur of the gonopods is sharply demarcated from the tibiotarsus by a ridge.

In one subcategory the end of the tibiotarsus is obliquely truncate and has a minute triangular lappet in the middle of the distal margin. The presence of the lateral lappet of the tibiotarsus is uncertain in *frater* (Chamb.), although the conformation of the distal end of the tibiotarsus proves that the species belongs to this subcategory.

In a second subcategory the end of the tibiotarsus has a small uncate, somewhat recurved lappet. In addition to *sphinx* (Verh.), two species described by SILVESTRI seem referable to this group, although the gonopod drawings published are insufficient to justify a more definite statement.

1. a. *M. cuzconum* (Chamb.), *M. ethophor* (Chamb.) s. Kraus, *M. frater* (Chamb.), *M. huallagae* (Chamb.).
   b. *M. balzanii* (Silv.), *M. mediatum* Silv., *M. sphinx* (Verh.).

2. This category is rather weakly characterized, and should perhaps have been united with the previous one. Species such as *llaguenicum* (Kraus) and *maquisi* Kraus, in particular, apparently have a close affinity to the species of subcategory 1a. In the gonopods the triangular lateral lamella of the tibiotarsus is absent, or perhaps sometimes weakly indicated. In the species of the first and second subcategories the end of the gonopod femur is generally marked by a ridge. The species of the second subcategory are further characterized by the presence of a sternal process in the 4th segment. The species of the third subcategory are characterized in particular by the strong development of the medial lamellar expansion of the gonopod femur. These expansions are also present in the species of the first subcategory, although less strongly developed.

The species of the present category are confined to Peru, with the exception of *bicolor* Silv., which has been recorded from Paraguay and the Brazilian state of Mato Grosso.

2. a. *M. bicolor* Silv., *M. contumum* (Chamb.) s. Kraus; *M. orobium* Kraus; *M. contumum* (Chamb.)?
   b. *M. llaguenicum* (Kraus), *M. maquisi* Kraus, *M. taulisense* (Kraus).
   c. *M. andresense* Kraus, *M. differens* Kraus, *M. forsteri* Kraus, *M. unicum* (Kraus).

Quite arbitrarily *M. camerani* (Silv.) and *M. flavius* (Chamb.), the gonopods of which are insufficiently known, may also find a place in this category.

3. This category consists of nine species and is homogeneous. The species appear to be related most closely to those of subcategory 2a, and are characterized especially by the structure of the tibiotarsus, which is difficult to describe but is elucidated in the gonopod drawings given in the present paper for *hylaeicum* nov. spec. One of the characteristics of the group consists in the gonopod femur and tibiotarsus being curved so as to form an almost complete circle. The distal end of the tibiotarsus is obliquely and straightly truncate in the species of the first two subcategories, and bilobate in those of the third subcategory. The species of the first subcategory have a medially expanded femur.

This category, considering its homogeneity, has a remarkably large geographical distribution, ranging from the West Indian island of Dominica in the north, through Venezuela, the Brazilian states of Amapá, Pará and Mato Grosso, to Bolivia, Paraguay and northern Argentina in the south.

3. a. *M. derelictum* (Silv.), *M. femorale* (Schub.), *M. hylaeicum* nov. spec.
   b. *M. pulvillatum* (Att.), *M. salvadorii* (Silv.) *M. truncatum* (Schub.), *M. venezuelanum* (Verh.)
   c. *M. araguanum* (Chamb.), *M. semirugosum* (Poc.).

4. This category consists of two species only which may be related to those of category 2, and indeed have few characteristic features. *M. lugubre* (Silv.), the only known species in the genus, has postfemoral tubercules in a number of anterior legs, but these are apparently absent in *carioca* (Schub.), although the latter species must be extremely closely related to *lugubre* (Silv.), according to the gonopod structure. The two species have been recorded from the Brazilian Federal District, Uruguay and northeastern Argentina.

4. *M. carioca* (Schub.), *M. lugubre* (Silv.).

5. – The remaining species of *Mestosoma* have been assigned to this category, either because they appear to have no special affinities to the species of the previous categories or because their descriptions do not allow a determination of their proper relationships.

5. a. *M. pseudomorphum* (Silv.), *M. tricuspis* (Verh.)
   b. *M. vittatum* (Att.)
   c. *M. kalliston* (Att.)
   d. *M. recurvatum* (Verh.)
   e. *M. ethophor* (Chamb.)

## KEY TO THE SPECIES OF *Mestosoma*, based exclusively on characters of the males [1]).

**In view of the inadequacy of many of the descriptions, it is practically impossible to provide a reliable key to the species of *Mestosoma*. The present one may serve as a guide to the published descriptions.**

1. Sternites of the 5th and 6th segments with processes different from those which may occur in the postgonopodial sternites . . . . . 2
   Sternites of the 5th or the 6th segment, or of both, without processes different from those which may occur in the postgonopodial sternites . . . . . 27

[1]) It should be realized that the location in the key of a number of species may be affected by the inadequacy of their descriptions. This applies in particular to the species which have been described by ATTEMS, CHAMBERLIN, SILVESTRI and VERHOEFF.

2. Sternite of 5th segment with two pairs of diverging horns, without a median process. Sternite of 6th segment with two pairs of smaller horns. 8th pair of legs with femoral tubercules. Width: 1.5–1.6 mm. . . . . *M. marthae* (Schub.)
Sternite of 5th segment with a well-developed median process between the anterior or the posterior legs, or between both . . . . . 3

3. Sternite of 5th segment with a large process between the posterior pair of legs, and a smaller process or no process at all between the anterior pair. Legs without femoral tubercules . . . . . 4
Largest process of sternite of 5th segment situated between the anterior pair of legs . . . . . 9

4. Sternite of 5th segment with a process only between the posterior pair of legs. Sternite of 6th segment with an anterior and a posterior process. Legs without tibial or tarsal brushes. Tail finely acuminate, the end a little recurved. Width: 0.5 mm. . . . . *M. ibitiense* (Schub.)
Sternite of 5th segment with an anterior and a posterior process. Legs with tibial and tarsal brushes at least in the anterior half of the body. Tail truncate or bifid. Width: 1.5–2.5 mm. . . . . 5

5. Metasomites with a deep transverse furrow and with lateral swellings. Postgonopodial sternites without cones. Postgonopodial legs without prefemoral processes. Width: 1.5–1.7 mm. . . . . *M. carioca* (Schub.)
Metasomites without transverse furrow and without lateral swellings. Postgonopodial sternites each with two pairs of cones. Postgonopodial legs each with a distal prefemoral process (not known for *apex-galeae*) . . . . . 6

6. Sternite of 4th segment with a medially deeply incised process ending in two diverging horns. Width: 2.3–2.5 mm. 7
Sternite of 4th segment with an undivided laminate process 8

7. Sternite of 6th segment with a large process between the anterior pair of legs, which is distally finely acuminate . . . . . *M. apex-galeae* (Brol.)
Sternite of 6th segment with a medially incised anterior, and a larger undivided posterior process . . . . . *M. glabratum* (Schub.)

8. Anterior process of sternite of 6th segment mammiform. Distal end of tibiotarsus of gonopods divided into two large lobes. Width: 2.5 mm. . . . *M. escaramucense* (Schub.)
Anterior process of sternite of 6th segment medially incised. Distal end of tibiotarsus of gonopods not divided into two large lobes. Width: 1.6–2.2 mm. . . . . *M. pirassununguense* (Schub.)

9. Postgonopodial sternites each with two pairs of cones. Legs without femoral tubercules, but generally with strongly ventrally inflated tibiae. Legs of 2nd pair with the coxae usually distally uncate. Prefemur of gonopods large, usually as long as the femur. The latter generally very broad, its longitudinal axis approximately at right angles to that of the prefemur. Metasomites without lateral swellings . . . . . 10
Postgonopodial sternites without cones (not definitely known for *boliviae, consocium* and *rayanum*). Tibiae of legs not inflated. Coxae of 2nd pair of legs not uncate. Prefemur of gonopods shorter than the femur. The latter rather slender, and not at right angles to the prefemur. Lateral swellings of metasomites generally present, dorsally demarcated by a well-developed longitudinal furrow . . . 21

10. Sternite of 6th segment with an undivided process between the anterior pair of legs . . . . . 11
Sternite of 6th segment with a medially incised process or with two processes between the anterior pair of legs . . . 14

11. Gonopod femur distally produced in a very large triangular

process. Anal scale recurved. Width: 2.6–2.9 mm. . . . .
. . . . . *M. digitale* (Schub.)
Gonopod femur without a very large distal process . . . . 12

12. Anal scale recurved *M. myrmekurum* (Att.)
Anal scale not recurved . . . . . 13

13. Width: 3.0 mm. . . . . *M. mesorphinum* (Att.)
Width: 2.2 mm. . . . . *M. mixtum* (Kraus)

14. Gonopod femur with a medial fingerlike process near the base. Coxae of 2nd pair of legs distally produced in a mammiform process. Width: 1.3 mm. . . . . .
. . . . . *M. curitibense* (Schub.)
Gonopod femur without a fingerlike process near the base. Width: 1.7 mm. or more . . . . . 15

15. Anal scale recurved . . . . . 16
Anal scale not recurved . . . . . 18

16. Sternite of 5th segment with a pair of diverging horns behind the median process. Dorsum brown with two paramedian longitudinal bands of yellowish colour. Width: 2.3 mm. . . . . *M. taeniatum* (Brol.)
Sternite of 5th segment without a pair of horns behind the median process. Dorsum yellowish with two brown paramedian bands . . . . . 17

17. Gonopod femur slender, not widening distally. Near the base of the tibiotarsus, at the medial side, a curved, bifid, spiniform process directed proximad. Terminal tubercules of tail small. Width: 2.6 mm. . . *M. intermedium* (Carl)
Gonopod femur strongly widened distally, without spiniform process at the medial side near the base of the tibiotarsus. Terminal tubercules of tail elongate, acuminate, recurved. Width: 2.8 mm. . . . *M. mesoxanthum* (Att.)

18. Sternite of 5th segment with a swelling behind the anterior process . . . . . 19
Sternite of 5th segment with a pair of swellings or a medially incised process behind the anterior process . . . . . 20

19. Distal end of tibiotarsus with three small spiniform processes apart from a large sickle-shaped lamella. Width: 2.0 mm. . . . . *M. paraguayense* (Silv.)
Distal end of tibiotarsus with only one spiniform process apart from a large sickle-shaped lamella. Width: 2.6 mm. . . . . *M. hoffmani* (Kraus)

20. Tibia of 10th leg scarcely longer than wide, ventrally strongly inflated. Behind the anterior process of the sternite of the 5th segment a pair of swellings. Width: 1.7 mm. . . . . *M. palmatum* (Schub.)
Tibia of 10th leg much longer than wide, ventrally weakly inflated. Behind the anterior process of the sternite of the 5th segment a smaller, medially incised process. Width: 1.9 mm. . . . . *M. palustre* (Schub.)

21. Sternite of 6th segment with two low subconical processes. Gonopod femur without medial lobe or basal tubercule. Width: 3.0 mm. . . . . *M. consocius* (Chamb.)
Gonopod femur with a more or less strongly developed medial lobe or with a small basal tubercule. Width: 1.0–2.3 mm. . . . . 22

22. Gonopod femur with a triangular tubercule on the medial side, near the base . . . . . 23
Gonopod femur without a triangular tubercule near the base, but with a more or less strongly developed medial lamella more distally. Width: about 1.7 mm. . . . . 26

23. Dorsum with a continuous yellowish median band. Width: 2.3 mm. . . . . *M. schindleri* Kraus
Dorsum unicoloured, without yellowish band. Width: 1.0–1.25 mm. . . . . 24

24. Sternite of 6th segment with process distally "gently convex" . . . . . *M. rayanum* (Chamb.)
Sternite of 6th segment with a bilobate process . . . . 25

25. Legs of the 3rd to the 5th pair with femoral tubercules . . . . . *M. alticola* (Att.)
Legs without femoral tubercules *M. titicacaense* (Kraus)

26. Dorsum with a continuous yellowish median band. Gonopod femur with a small lobe on the medial side near the distal end . . . . . *M. boliviae* (Chamb.)
Dorsum unicoloured, without yellowish band. Gonopod femur with a large medial lobe near the distal end . . . . . *M. forsteri* Kraus

27. Sternite of 6th segment with a process or processes, sternite of 5th segment without processes . . . . . 28
Sternite of 6th segment without processes, sternite of 5th segment with or without processes . . . . . 36

28. Metasomites without lateral swellings, the sides without longitudinal furrows. Legs without femoral tubercules . . 29
Metasomites with well developed lateral swellings, dorsally demarcated by a sharp longitudinal furrow . . . . . 30

29. Sternite of the 6th segment with a pair of processes at the anterior border. Legs without tibial or tarsal brushes. Width: 2.5 mm. . . . . *M. differens* Kraus
Sternite of the 6th segment with a median lamellate process between the anterior legs. Legs, especially in the anterior part of the body, with dense tibial and tarsal brushes. Width: 1.65 mm. . . . . *M. unicum* (Kraus)

30. Width: 2.7–3.0 mm. Legs from the 3rd to the 4th or 5th pair with femoral tubercules. Dorsum dark brown, unicoloured . . . . . 31
Width: 1.35–2.0 mm. Sternite of 6th segment with a single process. Dorsum particoloured . . . . . 34

31. Sternite of 6th segment with an anterior pair of cones. Ventral femoral tubercules present in the 3rd and 4th pairs of legs . . . . . 32
Sternite of 6th segment with a single, sometimes bilobate process . . . . . 33

32. Gonopod femur with a slender conical process near the middle of the posterior side. Posterior margin of metasomites without particulars . . . . . *M. shuaro* Kraus
Gonopod femur without a conical process. Posterior margin of metasomites finely ciliate . . . . *M. spinulosa* Kraus

33. Ventral femoral tubercules present in the 3rd, 4th and 5th pairs of legs . . . . . *M. ethophorina* Kraus
Ventral femoral tubercules present in the 3rd and 4th pairs of legs only . . . . . *M. ethophor* (Chamb.)

34. Legs of 3rd and 4th pairs with femoral tubercules. Tibiae and tarsi with brushes. Colour reddish brown, the prosomites yellow, the metatergites with a yellowish-brown transverse zone . . . . . *M. acollae* (Kraus)
Legs of 3rd and 4th pairs without femoral tubercules . . . 35

35. Colour light chestnut, the posterior border of the metatergites yellow, a middorsal series of reddish spots. Legs yellow . . . . . *M. flavius* (Chamb.)
Colour similar, with a reddish-brown middorsal band, and a reddish-brown zone on each side. Legs pale, the tibiae and tarsi brown . . . . . *M. orobium* Kraus

36. Tibiotarsus of gonopods long and slender, so strongly curved as to describe two thirds or three quarters of a circle, the end pointing distad. Legs of 3rd and 4th pairs with femoral tubercules. Sternite of 5th segment without processes between the anterior pair of legs . . . . . 37
Tibiotarsus of gonopods not so strongly curved, usually shorter and less slender. The end not pointing distad . . . 38

37. Tibiotarsus of gonopods describing three quarters of a circle. Coxae of 2nd pair of legs produced into a triangular process. Length: 27 mm. . . . . *M. albipes* (Verh.)
Tibiotarsus of gonopods describing two thirds of a circle. Coxae of 2nd pair of legs without process. Sternite of 5th segment with a pair of processes between the posterior pair of legs. Length: 15–16 mm., width: 2.0 mm. . . . . *M. andinum* (Verh.)

38. Dorsum with one or a pair of yellowish or pale longitudinal bands, or with one or two series of yellowish spots, or entirely pale in contrast with the darker sides . . . . . 39
Dorsum more or less dark-brown, unicoloured [1]) . . . . . 50

39. Sternite of 5th segment with a process between the anterior pair of legs . . . . . 40
Sternite of 5th segment without process . . . . . 42

40. Dorsum with a single series of yellowish spots. Sternite of 5th segment with a small knob. Width: 2.8 mm. . . . . *M. pseudomorphum* (Silv.) s. Carl
Dorsum with two yellowish bands or series of spots. Sternite of 5th segment with a larger process. Width: 1.7–1.9 mm. . . . . 41

41. Dorsum with two paramedian bands. Legs with tibial and tarsal brushes. Sternite of 5th segment with a bilobate process . . . . . *M. vittatum* (Att.)
Dorsum with two series of spots. Legs without tibial or tarsal brushes. Sternite of 5th segment with a laminate process. Tibiotarsus of gonopods with three spines at the distal end . . . . . *M. montanum* (Silv.)

[1]) See also, however, *M. salvadorii* (Silv.), in which the pale dorsal band may be indistinct or even absent.
The colour of two species, ***venezuelanum*** and ***sphinx***, has been described as yellowish throughout. Presumably the specimens upon which these species have been based had either freshly moulted or became bleached during preservation. Here the two species have been grouped under the second paragraph of this couplet.

42. Lateral side of tibiotarsus of gonopods with a rather large, separately projecting lamella in the middle. Width: 2.2–2.5 mm. . . . . 43
Tibiotarsus of gonopods without such a lamella . . . . . 44

43. Dorsum chocolate-coloured with a series of yellowish deltoid spots. Legs yellowish . . . *M. huallagae* (Chamb.)
Dorsum with a broad white median band, interrupted along the posterior border of each metatergite by a chestnut stripe. Legs chestnut . . . . . *M. cuzconum* (Chamb.)

44. End of tibiotarsus of gonopods with two or three spiniform processes. . . . . 45
End of tibiotarsus of gonopods rounded or more or less triangular, without spiniform processes . . . . . 47

45. Dorsum entirely pale-reddish, the sides dark brown. Tibiotarsus of gonopods about as long as the femur, the end with two spiniform processes. Gonopod femur comparatively slender. Width: 2.0 mm. . . . *M. mediatum* Silv.
Dorsum with median yellowish spots on the prosomites and on the metatergites in front of the transverse furrow. Tibiotarsus of gonopods scarcely half as long as the femur, the end with three spiniform processes. Gonopod femur conspicuously broad . . . . . 46

46. Sternite of 4th segment with a pair of tubercules. Legs from the 4th to the 7th pair with femoral tubercules. 7th pair of legs with a medio-distal coxal process. Length: 20–24.5 mm. . . . . *M. tricuspis* (Verh.)
Length: 25 mm., width: 2.8 mm. . . . . *M. pseudomorphum* (Silv.)

47. Dorsum with a rather faint yellowish or pale longitudinal band. Tibiotarsus of gonopods strongly curved proximad, the end almost in contact with the base of the femur. Width 2.5–3.2 mm. . . . . 48

Dorsum with a series of conspicuous yellowish spots. Tibiotarsus of gonopods not so strongly bent proximad, not reaching to the base of the femur. Width: 2.0 mm. . . . . 49

48. Colour of the two distal joints of the legs yellowish, contrasting with the darker proximal joints. End of tibiotarsus of gonopods triangular. Width: 3.2 mm. . . . . *M. salvadorii* (Silv.)
Legs unicoloured. End of tibiotarsus of gonopods deeply emarginate, the end thereby consisting of two rounded lobes. Width: 2.5 mm. . . . . *M. semirugosum* (Poc.)

49. Dorsum with yellowish median spots on the prosomites and on the metatergites behind the transverse furrow . . . . . *M. camerani* (Silv.)
Dorsum with yellowish median spots in the middle of the metatergites only. Legs from the 4th pair onwards with a femoral tubercule, which gradually disappears in the post-gonopodial legs . . . . . *M. kalliston* (Att.)

50. Sternite of 5th segment with a single process . . . . . 51
Sternite of 5th segment with one or two pairs of cones or tubercules, or without process . . . . . 53

51. Width: 2.0 mm. Sternite of 5th segment with a sub-quadrate, short process. End of tibiotarsus of gonopods bifid . . . . . *M. balzanii* (Silv.)
Width: 1.3–1.8 mm. . . . . 52

52. Metatergites without a transverse furrow. Sternite of 5th segment with a long rectangular process. Tibiotarsus of gonopods very broad in comparison with the slender femur, the end simply rounded . . . . . *M. borellii* (Silv.)
Metatergites with a distinct transverse furrow. Sternite of 5th segment with a short conical process. Legs of the first eight pairs with a postfemoral (!) tubercule. Tibiotarsus not much wider than the femur . . . *M. lugubre* Silv.

53. Sufficiently described species . . . . . 54
Species inquirendae . . . . . 66

54. Sternite of 4th segment with a well-developed linguiform process curving cephalad . . . . . 55
Sternite of 4th segment without a linguiform process . . . 57

55. Femoral tubercules present in the legs from the 3rd to the 12th pair, more strongly developed in the legs from the 4th to the 7th pair. Tibiotarsus of gonopods semicircular, the end with two small spiniform processes. Width: 2.8 mm. . . . . *M. taulisense* (Kraus)
Femoral tubercules present in the legs from the 4th to the 7th pair only. Tibiotarsus of gonopods not curving so strongly . . . . . 56

56. Tibiotarsus of gonopods ending in two opposite processes. Solenomerite exposed freely in the basal half. Width: 3.0 mm. . . . . *M. maquisi* Kraus
Tibiotarsus of gonopods without distinct processes in the end. Solenomerite completely concealed by the laminae of the tibiotarsus. Width: 2.4 mm. *M. llaguenicum* (Kraus)

57. Lateral side of tibiotarsus of gonopods with a rather large, triangular, freely projecting lamella in the middle. Sternite of 5th segment with one or two pairs of knobs between the posterior pair of legs . . . . . 58
Tibiotarsus of gonopods without such a lamella. Sternite of 5th segment without knobs differing from those which may occur on the postgonopodial sternites . . . . . 59

58. Femoral tubercules present in the legs from the 4th to the 7th pair. Sternite of 5th segment with one pair of tubercules between the posterior pair of legs. Lamella in the middle of the tibiotarsus of the gonopods bifid. Metasomites without lateral swellings, and without pleural keels. Length: 20–21.5 mm. . . . . *M. sphinx* (Verh.)

Femoral tubercules present in the legs of the 4th pair only. Sternite of 5th segment with two pairs of tubercules between the posterior pair of legs. Lamella in the middle of the tibiotarsus of the gonopods not bifid. Metasomites with distinct lateral swellings, and with pleural keels. Length: 26 mm., width: 2.2 mm. *M. ethophor* (Chamb.) s. Kraus

59. Postgonopodial sternites each with two pairs of cones. Solenomerite makes a wide loop from its base, only the distal half sheathed by the tibiotarsus. Tibiotarsus very slender at its base . . . . . 60
Postgonopodial sternites without cones. Solenomerite does not make a wide loop, closely applied to the tibiotarsus from very near its base . . . . . 61

60. Femoral tubercules present in the legs of the 8th and 9th pairs only. Width: 1.9–2.0 mm. . . *M. perfidum* (Schub.)
Femoral tubercules vestigially present in the legs from the 4th to the 7th pair. Width: 1.5 mm. . . . . *M. alagoanum* (Schub.)

61. Femoral tubercules present in the legs of the 3rd and 4th pairs only. Width: 2.9 mm. . . . . *M. yamango* Kraus
Femoral tubercules present in the legs from the 4th to the 7th pair. . . . . 62

62. Solenomerite abruptly bent at the base. Prefemur of gonopods rather strongly produced caudad . . . . . 63
Solenomerite weakly curved at the base. Prefemur of gonopods only weakly produced posteriorly. Width: 1.9–2.4 mm. . . . . 65

63. Femur of gonopods not widening distad. Width: 3.8 mm. . . . . *M. truncatum* (Schub.)
Femur of gonopods strongly widening distad. Width: 2.0–2.8 mm. . . . . 64

64. Sides of metasomites with two yellowish spots. Width: 2.0–2.1 mm. . . . . *M. femorale* (Schub.)
Sides of metasomites without yellowish spots. Width: 2.3–2.8 mm. . . . . *M. hylaeicum* n. sp.

65. Femur of gonopods strongly widening distad, becoming about twice as broad as at the base . . . . . *M. contumum* (Chamb.) s. Kraus
Femur of gonopods scarcely widening distad . . . . . *M. andresense* Kraus

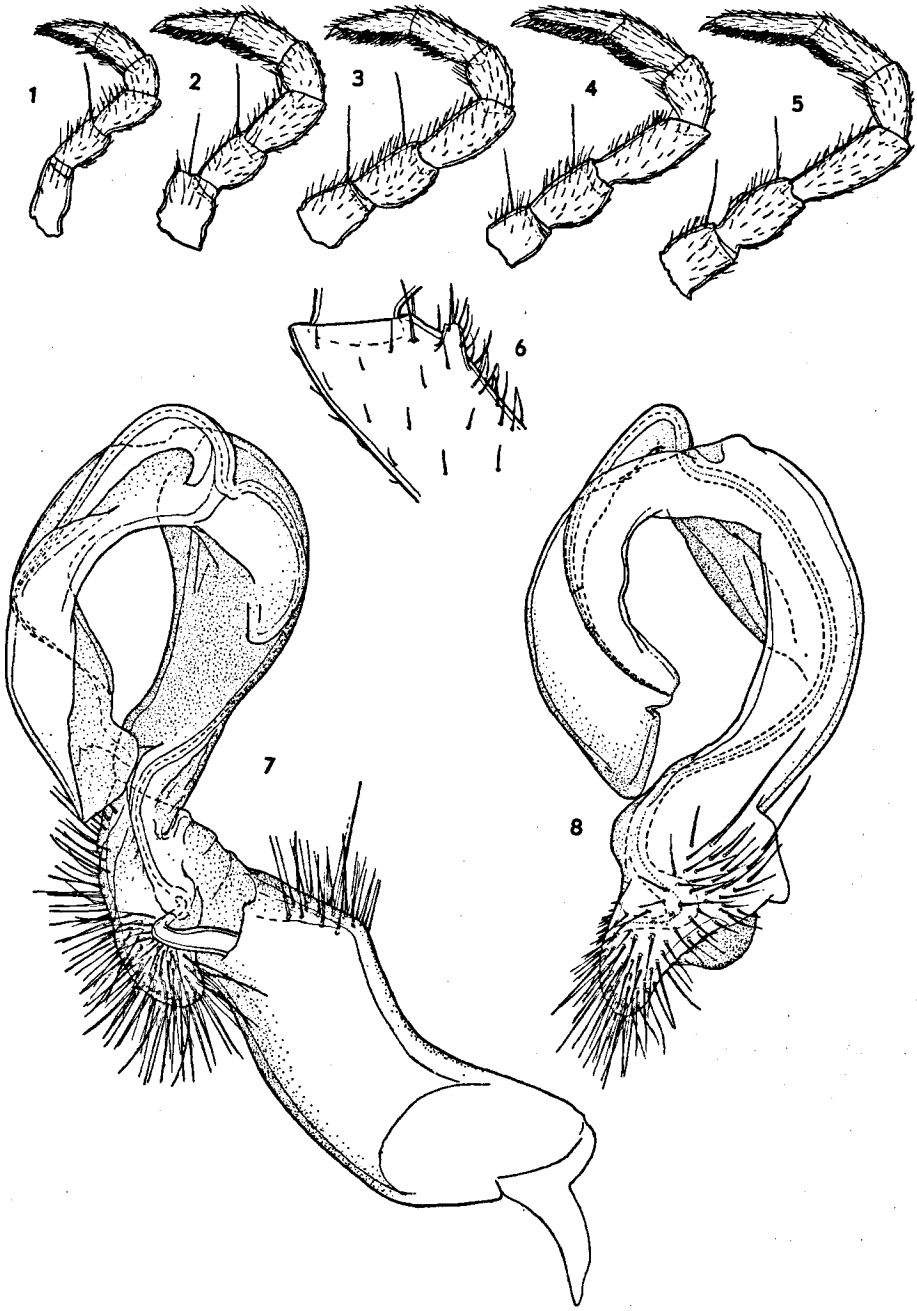
66. Femoral tubercules present in a number of pregonopodial legs . . . . . 67
Femoral tubercules absent, or their presence unknown . . 68

67. Tibiotarsus of gonopods ending in a large triangular lobe. Length: 22 mm. . . . . *M. venezuelanum* (Verh.)
Tibiotarsus of gonopods ending in a more or less pentagonal lobe. Length: 17.5 mm. . . . . *M. recurvatum* (Verh.)

68. Metatergites without transverse furrow. Width: 3.0 mm. . . . . *M. luctuosum* Silv.
Metatergites with a transverse furrow, or presence unknown . . . . . 69

69. Sternite of 5th segment with a pair of short conical processes. Width: 2.0 mm. . . . . *M. frater* (Chamb.)
Sternite of 5th segment without processes, or their presence unknown . . . . . 70

70. Tibiotarsus of gonopods very narrow at the base, widening distad to become about three times as broad. Width: 2.0 mm. . . . . *M. bicolor* Silv.
Tibiotarsus not conspicuously narrow at the base and not widening distad so strongly . . . . . 71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71. Tibiotarsus of gonopods ending in a large triangular lobe, or bilobate . . . . . *M. araguanum* (Chamb.), *M. derelictum* (Silv.), *M. pulvillatum* (Att.)
Terminal end of tibiotarsus more complicated . . . . . *M. contumum* (Chamb.), *M. punae* (Chamb.)

## **Mestosoma hylaeicum** nov. spec.

BRAZIL: Amapá: "Bas Carsevène, 1899" (Coll. F. GEAY, Mus. Paris), 1 ♂ (holotype), 3 ♂♂, 1 ♀; Brazil: Pará: Mexiana, 1906 (Coll. HAGMANN, Mus. Strasbourg), 1 ♂, 1 ♀; Without label, but probably from the same locality (Strasbourg), 12 ♂♂, 6 ♀♀.

Colour. – Dark brown, the head slightly paler. Antennae pale brownish to yellowish brown.

Width. – ♂♂: 2.3–2.8 mm (holotype: 2.3 mm; other ♂♂ from Amapá: 2.3–2.5 mm; ♂ from Mexiana: 2.4 mm; ♂♂ of unknown provenance: 2.5–2.8 mm). ♀♀: 2.8–3.1 mm (♀ from Amapá: 2.9 mm; ♀ from Mexiana: 2.8 mm; ♀♀ of unknown provenance: 2.9–3.1 mm).

Head and antennae. – Labrum moderately widely and moderately deeply emarginate, tridentate. Clypeus weakly convex, moderately impressed towards the labrum, with a weak transverse depression below the frontal region, and a weak depression on each side below the antennal sockets. Lateral margins widely emarginate. Headplate smooth and shiny, moderately densely setiferous in the clypeal part, more dispersedly setiferous in the frontal region up to just above the level of the antennal sockets. Vertex with two setae. Antennal sockets separated by about one and a half times the diameter of one socket, or by about three quarters of the length of the 2nd antennal joint. Postantennal groove moderately developed, the wall in front rather prominent. Vertex moderately convex, not demarcated from the frontal area. Sulcus rather weakly impressed, running downward to just between the antennal sockets. Antennae of moderate length, not particularly slender. 3rd, 4th and 5th joints of subequal length, the 6th slightly shorter, about as long as the 2nd. Antennae weakly clavate, the 5th and 6th joints the thickest. Pubescence moderate to, distally, rather dense.

Collum. – Scarcely wider than the head, oblong reniform in dorsal outline. Anterior margin widely rounded. Posterior margin broadly and very weakly emarginate in the middle, slightly convex laterally. Lateral sides rather narrowly rounded. A fine marginal rim at the lateral and latero-anterior borders, fading away towards the middle of the anterior border. Surface smooth and shiny, sometimes a little irregularly uneven, rather weakly convex in the middle, somewhat more so towards the sides. A few hairs may be present along the anterior border and in the middle.

Fig. 1–8. *Mestosoma hylaeicum* nov. spec., holotype ♂. — 1: first leg. — 2: second leg. — 3: third leg. — 4: fourth leg. — 5: leg of 7th segment. — 6: distal end of the femur of the fourth leg. — 7: right gonopod, medial view. — 8: telopodite of left gonopod, posterior view.

Body segments. – Weakly constricted by a dorsally rather narrow, laterally somewhat widening, waist without sculpture. Prosomites dulled by fine cellular structure. Metatergites shinier, smooth or faintly uneven, sometimes, mostly in the anterior segments, with some hairs immediately behind the waist. A fine, rather sharply but weakly impressed, transverse furrow present from about the 7th to the 18th segment, in most segments extending laterad to about two thirds of the distance between the middle and the dorsal delimitation of the lateral keels. Sides of metasomites somewhat rugulose, up to the 4th segment also subgranulose. Pleural keels rather strongly developed, represented by narrow, somewhat granulose crests, curving a little upwards caudally. From the 4th to about the 7th segment they are produced posteriorly into a small lappet. From about the 16th segment the pleural keels are obsolete.

Lateral keels. – Weakly developed. 2nd segment slightly narrower than the collum. The keels are distinctly below the level of those of the 3rd segment, and are represented by low, rather thin crests. 3rd and 4th segments of equal width, narrower than the 2nd. The keels reduced to a dorsally concave furrow. 5th segment distinctly wider than the 4th. From the 5th segment onwards the keels are represented by two furrows, subparallel in the poreless segments, converging in the poriferous segments. In the poreless segments the dorsal furrow is very weakly concave dorsally, and ends at some distance from the waist. The lower furrow is somewhat shorter than the upper. In the poriferous segments the upper furrow is straight or even a little convex dorsally. The lower furrow converges with the upper in an angle of about 30° and bends a little more in dorsal direction before meeting the upper. In poriferous segments the area between the furrows is a little prominent. Pores rather large, in a slight excavation somewhat nearer the ventral furrow, situated at three quarters to four fifths of the distance from the waist to the posterior border of the segments.

Sternites and legs. – Sternites of middle segments about as long as broad, moderately setiferous. Cross impressions well developed. Sternite of 4th segment without particular features. Sternite of 5th segment without a process. Transverse furrow distinct. The part between the anterior pair of legs slightly raised, without longitudinal furrow. The part between the posterior legs with a weak longitudinal furrow. Sternite of 6th segment widely transversely concave between the anterior legs, much more so between the posterior legs and scarcely raised above the ventral surface of the metasomal ring there. Transverse furrow weakly impressed. Sternites of 7th and 8th segments without particular features. Legs (Fig. 1–6) of moderate length and somewhat incrassate, especially the prefemora and femora in the anterior part of the body. Legs moderately setiferous, in the anterior part of the body somewhat more densely so. Tarsi and the distal end of the tibiae with dense ventral brushes, thinning out and disappearing in the last four pairs of legs. Legs of the 4th to the 7th pair with a caudo-ventral tubercule near the distal end of the femora.

Anal segment. – Tail rather long and thick, the sides weakly convergent, with each a small lateral setiferous tubercule, the end cylindrical and rather broadly truncate. Valves with rather narrow marginal rims, the setae on small tubercules. Scale triangular, the sides almost straight, posterior angle slightly obtuse, narrowly rounded. The setae on small tubercules which do not project behind the margin.

Gonopods. – (Fig. 7–8) Coxa rather long and slender, cylindrical, with a sharp bend just distad of the middle. Distal end with an anterior setiferous area. Coxal hook sigmoid. Prefemur of moderate size, rather strongly produced posteriorly. Femur rather strongly developed, laterally sharply demarcated from the prefemur,

the demarcation transverse on the axis of the femur. Femur widening distad, especially at the anterior side, curving rather strongly towards the medial side. Spermal channel running along the medial and medio-anterior side of the femur. Solenomerite arising from the medio-anterior side of the distal end of the femur, characteristically abruptly bent at the base, long and slender, gradually tapering. Tibiotarsus strongly developed, not distinctly demarcated from the femur, strongly bent proximad, the end almost in contact with the prefemur. The whole acropodite forms an almost complete circle. Tibiotarsus sheathes the distal half of the solenomerite.

Female. – Generally distinctly wider than the males. Differing furthermore, apart from the usual sexual characters, in having the antennal sockets separated by one and two thirds of the diameter of one socket or by nearly the length of the 2nd antennal joint. 2nd body segment as wide as the collum. Sternites of middle segments $1\frac{1}{4}$ times as wide as long. Cross impressions more weakly developed. Anterior sternites without modifications. Legs with the prefemora and femora not incrassate, without modifications or brushes.

Considering that the nearest localities are in Venezuela, Mato Grosso and Pernambuco, the present record fills an enormous gap in the distributional data of the genus *Mestosoma*. There is little doubt left now that the species of this genus also occur in the intermediate areas.

As has been indicated already, the species described here belongs to category 3 of group V and is most closely related to *M. derelictum* (Silv.) from Bolivia and *M. femorale* (Schub.) from Mato Grosso, the relation probably being of a subspecific nature.

*M. femorale* differs in having two yellowish spots on the lateral sides of the metasomites and in its somewhat smaller size: width of male 2.0 to 2.1 mm against 2.3 to 2.8 mm, width of female 2.4 mm against 2.8 to 3.1 mm. Furthermore, the tibiotarsus of the gonopods in *femorale* is decidedly smaller as compared with the femur than in *hylaeicum*; the tibiotarsus does not reach as far proximad as in *hylaeicum*; and the circle formed by femur and tibiotarsus is smaller.

On account of the brevity of its description, *M. derelictum* can hardly be distinguished from *hylaeicum*, but the gonopods seem to be more similar to those of *femorale*. Of course, the wide separation of the type localities of *derelictum* and *hylaeicum* makes their identity practically impossible.

## Onciurosoma Silv.

1932 *Onciurosoma* SILVESTRI, Am. Mus. Novit. *565:* 1.
1937 *O.*, ATTEMS, Tierreich *68:* 56.

Type species. – *O. neotropicum* Silv., by original designation.

Venezuela, British Guiana, Surinam.

Number of species: four.

Up to now this genus has been thought to include only the two species originally referred to it by SILVESTRI: *O. neotropicum* Silv. from Mt. Duida, Venezuela, and *O. acisternum* Silv. from British Guiana. However, a third species of *Onciurosoma* was described long before the proposal of the genus, and has apparently been overlooked by all previous workers. The name of this species is:

**Onciurosoma cumbrense** (Brol.)

1898 *Strongylosomum cumbrense* BROLEMANN, Ann. Soc. Ent. France *67:* 267, 306.
1900 *S. c.*, BROLEMANN, Mem. Soc. Zool. France *13:* 125, pl. 8 fig. 120–121.

Venezuela: La Cumbre; San Esteban.

The gonopod drawings published by BROLEMANN clearly indicate the close relationship between his species and *O. neotropicum.*

An additional species of *Onciurosoma* might be the Paradoxosomatid described as *Orthomorpha festae* Silvestri 1896 (Boll. Mus. Torino *11* (254): 4, fig. 4). The outline of the gonopods of this Panamanian species as depicted by SILVESTRI resembles that met with in *Onciurosoma,* but unfortunately the drawing is inadequate for a more definite conclusion.

A few words on the taxonomic affinities of *Onciurosoma* may be added here, the more so since SILVESTRI, when describing the genus, remained silent on this point.

In the "Tierreich" ATTEMS located the genus between two Oriental genera, viz. *Kronopolites* Att. and *Annamina* Att., which shows that he, apparently misled by SILVESTRI's gonopod drawings, assigned *Onciurosoma* to the group of genera in which the solenomerite is not sheathed by the tibiotarsus. However, on the evidence of the drawings published here it becomes clear that the drawings of

SILVESTRI give a wrong idea of the gonopod structure, and that the solenomerite in its natural position is almost entirely sheathed by the lamellae of the tibiotarsus.

Among Neotropical genera *Onciurosoma* seems to stand rather isolated, since it does not belong either to the genera with a strongly curved, almost circular gonopod telopodite or to those in which the solenomerite is entirely free. A reduced femur and a course of the spermal channel as found in *Onciurosoma* appear to exist only in the genus *Graphisternum* Verh. VERHOEFF attributed an importance to the first character which led him to create a separate subfamily for *Graphisternum*. On the other hand, the course of the spermal channel was not described in this genus. It was, however, indicated in the gonopod drawing by an interrupted line. Although this line does not show exactly the course taken by the spermal channel in the femoral portion of the gonopod, the fact that the solenomerite arises from the lateral side implies a fundamental similarity to the condition found in *Onciurosoma*. A close relationship of the two genera therefore seems undeniable.

The combination of the two characters mentioned above is also found in a group of African Paradoxosomatid genera for which BROLEMANN in 1916 proposed his subfamily Eviulisominae, to which he originally assigned the genus *Eviulisoma* Silv. and later added *Duseviulisoma* Brol. and *Boreviulisoma* Brol. Apparently BROLEMANN, when placing the Eviulisominae opposite the entire remainder of the Paradoxosomatidae, somewhat overestimated the importance of its distinguishing characteristics. It might be better to lower the rank of the group to that of a tribe, in view of the nature of the characters on which it is based and because a proper subdivision of the rest of the family still seems quite impracticable at present.

The recognition of *Onciurosoma* and *Graphisternum* as members of the Eviulisomatini establishes a new and interesting link between the Paradoxosomatidae of the Ethiopian and Neotropical regions, a link which is obviously paralleled by the closely related genera *Mestosoma* and *Habrodesmus*.

Besides the subfamily Graphisterninae, another subfamily created by VERHOEFF appears to be a synonym of the Eviulisomatini. The subfamily concerned, Himatiopodinae Verh. 1941, was based solely

on the genus *Himatiopus* Verh. 1941. VERHOEFF proposed this monotypical genus apparently in ignorance of *Eviulisoma;* his *H. iuloideus* quite obviously belongs to the latter genus.

LOOMIS, 1934 (Smiths. Misc. Coll. *89* (14): 28) had already recorded the occurrence in Surinam of *Onciurosoma*, on account of some juvenile specimens collected 70 km south of Paramaribo along the railway to Kabelstation. The present collection (Mus. Leiden) contains fragments of two specimens from Paramaribo, which obviously belong to this genus and are characterized by a broad yellowish median band, and therefore not referable to the new species described below.

## KEY TO THE SPECIES OF *Onciurosoma*,
## based chiefly on characters of the male gonopods.

**(The characters between parentheses are not known for *cumbrense*.)**

1. Lateral keels weakly developed, but ending in a small acute posterior edge, at least in middle segments. Tibiotarsus of gonopods consisting of a solenophore only, without secondary lamella. Anterior legs of male not incrassate . . . . . *O. acisternum* Silv.
   Lateral keels small or obsolete, without an acute posterior edge. Tibiotarsus of gonopods complicated, consisting of a solenophore and a secundary lamella. (Anterior legs of male incrassate.) . . . . . 2

2. Secondary lamella of tibiotarsus of gonopods reaching to about two thirds of the entire length of the solenophorous part. Sternites with conical processes at the base of each leg. Process of the sternite of the 5th segment of the male linguiform, not widening distad . . . . . *O. crassipes* n. sp.
   Secondary lamella of tibiotarsus of gonopods reaching about halfway down the length of the solenophore. (Sternites without conical processes. Sternite of the 5th segment of the male with a distally widening process.) . . . . . 3

3. Solenophorous part of tibiotarsus of gonopods with a triangular lobe in its distal half. Tail bifid . . . . . *O. neotropicum* Silv.
Solenophorous part of tibiotarsus of gonopods without a lobe. Tail truncate . . . . . *O. cumbrense* (Brol.)

## **Onciurosoma acisternum** Silv.

1932 *Onciurosoma acisternum* SILVESTRI, Am. Mus. Novit. *565:* 4, fig. 2. (1)
1937 *O. a.*, ATTEMS, Tierreich *68:* 57, fig. 73.

British Guiana: mouth of Meamu River (1).

Location of type material. – American Museum of Natural History, New York.

Owing to the absence of a secondary lamellate process of the tibiotarsus, and other characters mentioned in the key, this species appears rather disjunct from the three others. Perhaps it will be necessary to separate it subgenerically or even generically from *Onciurosoma* in the future.

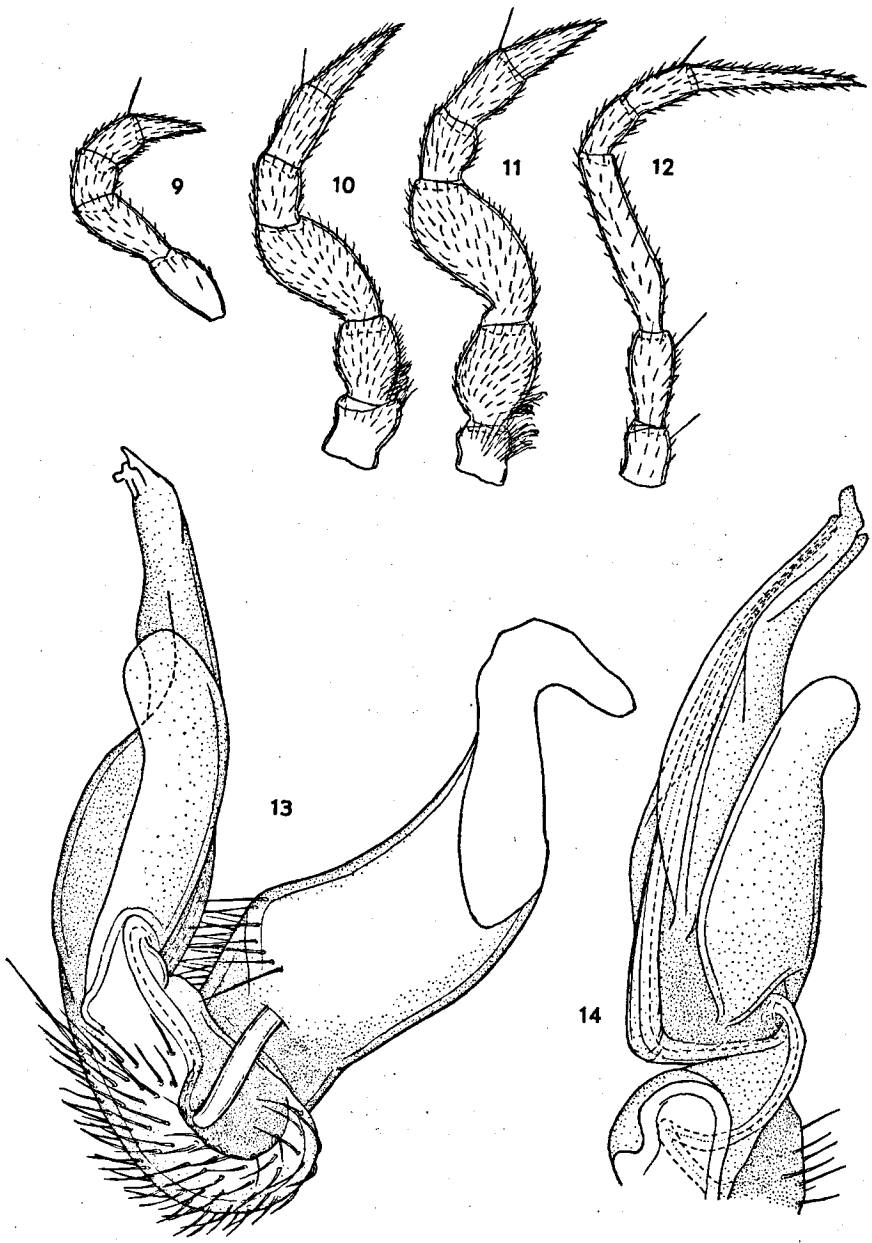
## **Onciurosoma crassipes** nov. spec.

SURINAM: Lucie Rivier, 1 Dec. 1910 (Corantijn Exped. 1910–1911, Coll. K. M. HULK, Mus. Leiden), 1 ♂ (holotype).

Colour. – Castaneous, the suture lines and sulci darker. Venter and legs paler brownish to brownish yellow.

Width. – 1.3 mm.

Head and antennae. – Labrum moderately widely and moderately deeply emarginate, tridentate. Clypeus moderately convex, rather weakly impressed towards the labrum. Lateral margins straight or very weakly convex. Headplate smooth and shiny, moderately densely setiferous in the clypeal and frontal parts, dispersedly setiferous in the vertex. Antennal sockets separated by one and one third times the diameter of one socket, or by slightly less than the length of the 2nd antennal joint. Postantennal groove moderately developed, the wall in front rather weakly prominent. Vertex moderately convex, not demarcated from the frontal area. Sulcus weakly impressed, running downward to between the antennal sockets. Antennae of moderate length, moderately slender. 2nd to 6th joint scarcely decreasing in length. Joints of subequal width, except the 6th, which is subconical and conspicuously wider. Pubescence moderate to, distally, rather dense.


9
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Collum. – Somewhat narrower than the head, subtrapezoidal in dorsal outline. Anterior margin almost straight in the middle, widely rounded towards the lateral sides. Posterior margin straight, very weakly convex laterally. Lateral sides narrowly rounded. Marginal rim along the lateral and latero-anterior borders very fine, fading away towards the middle of the anterior border. Surface smooth and shiny, rather weakly convex in the middle, more so towards the sides. A few hairs are present along the anterior border and in the middle.

Body segments. – Rather weakly constricted by a rather narrow waist which dorsally is finely and weakly longitudinally striate. Prosomites dulled by a fine cellular structure. Metatergites a little shinier, smooth, with a few hairs behind the waist in some segments. Transverse furrow, present from about the 6th to about the 18th segment, weakly but sharply impressed, in most segments running to near the upper furrow of the lateral keels. Pleural keels strongly developed in the anterior segments, posteriorly not produced into a posterior lappet but curving upward near the posterior margin of the metasomite, paralleling it before fading away. In the middle of the body the pleural keels become less strongly developed; they disappear in the posterior segments.

Lateral keels. – Weakly developed. 2nd segment a little narrower than the collum, the keels reduced to a fine ridge below the level of the keels of the following segments. 3rd and 4th segments of equal width, narrower than the 2nd and 5th segments. Lateral keels of the 5th and following segments represented by weak swellings, dorsally demarcated by a straight longitudinal furrow, ventrally by a furrow curving upwards and converging towards the upper furrow, which it meets at an angle of about 45°. Posterior edges hardly prominent.

Sternites and legs. – Sternites of middle segments about one and one third times as broad as long, moderately setiferous. Cross impressions moderately developed. At the base of each leg, but more strongly developed at the bases of each posterior pair, a small cone directed caudad. These sternal cones are more strongly developed in the posterior segments. Sternite of the 4th segment raised a little between the coxae of the legs, densely set with rather long, distally curved hairs. Sternite of the 5th segment with a tongue-shaped process arising from between the anterior pair of coxae, about twice as long as wide at the base, directed cephalad and a little ventrad. Behind the process a deep transverse furrow. Sternite of the 6th segment scarcely raised above the ventral surface of the metasomite, without cross impression but only with a weak transverse furrow. Legs (Fig. 9–12) of the first pair normal. Those of the 2nd to the 7th pairs incrassate, gradually increasing in length. Legs of the subsequent pairs normal, but those of the 10th pair weakly incrassate on the ventral side of the femur. Tarsal brushes totally absent, pubescence of legs moderate. On the anterior legs, the ventral side of the coxa and the basal part of the prefemur are densely covered with fine, curved hairs.

Anal segment. – Tail strongly developed, with the two characteristic terminal unci.

Gonopods. – (Fig. 13–14) Coxa cylindrical, of moderate length, with a sharp bend near the distal end. Lateral and anterior sides of the distal end setiferous.

Fig. 9–14. *Onciurosoma crassipes* nov. spec., holotype ♂. — 9: telopodite of first leg. — 10: second leg. — 11: third leg. — 12: second leg of 8th segment. — 13: right gonopod, medial view. — 14: telopodite of left gonopod, anterior view.

Coxal hook slender. Prefemur comparatively strongly developed, rather dispersedly setiferous. Spermal groove very wide. Femur obsolete; the spermal channel runs transversely along the anterior side of the base of the acropodite towards the lateral side, from where the solenomerite arises. Tibiotarsus proportionally strongly developed, sheathing the solenomerite for the greater part. On the medial side the tibiotarsus has a large separate secondary lamella.

Female. – Unknown.

In the conformation of the gonopods this new species comes nearest to *O. cumbrense* (Brol.), which, however, differs in particular in the distinctly shorter secondary lamella of its tibiotarsus. *O. crassipes* is also related to *O. neotropicum* Silv., but in this species the secondary lamella of the tibiotarsus is also shorter and the distal end of the tibiotarsus bears an uncate process at the posterior side.

The rather poor state of preservation of the single type specimen accounts for some deficiencies in the present description of *crassipes*.

## 2. THE GENUS AMPLINUS ATT., WITH NOTES ON THE FAMILY EURYURIDAE (POLYDESMIDA)

The family Euryuridae appears to be richly represented in the area under report by species of the genus *Aphelidesmus* Brol., which may be regarded as one of the dominant milliped genera of Guiana.

In the present paper a species of *Amplinus* Att. is described from the Amapá territory. In connection with this the still rather confused taxonomy of the family, and of the genus in particular, had to be revised. The genus *Aphelidesmus* will be treated in a subsequent paper.

### Euryuridae Poc.

1898 Trachelorhachidae SILVESTRI, Boll. Mus. Torino *13* (324): 5.

1909 Platyrachidae, subfam. Euryurinae POCOCK, Biol. Centr.-Amer., Diplop., p. 147.

1916 Platyrhacidae, subfam. Platyrhacinae, tribe. Euryurini, & subfam. Aphelidesminae BROLEMANN, Ann. Soc. Ent. France *84:* 550.
1954 Euryuridae, subfam. Aphelidesminae, Euryurinae & Amplininae HOFFMAN, J. Wash. Ac. Sci. *44:* 49, 57.

Inasmuch as there appears to be no unanimity amongst various authors regarding the exact boundaries of this family, some comments on the matter are required.

In my belief the Euryuridae [1]) is a strictly American family embracing, apart from forms described later, the species which ATTEMS in the "Tierreich" (1937, 1938) referred to the genera *Eutheatus* Att., *Pycnotropis* Carl, *Polylepiscus* Poc., *Amplinus* Att., *Protaphelidesmus* Brol., *Aphelidesmus* Brol. and *Seminellogon* Chamb. In the "Tierreich" most of these genera were located by ATTEMS in the Platyrhacidae, whereas *Aphelidesmus* and *Seminellogon* found a place, curious enough, in the "Strongylosomidae". However, even though other German authors have followed ATTEMS' taxonomic ideas concerning these genera, there can be no doubt that the Euryuridae deserve treatment as a group disjunct from the Platyrhacidae. As regards the status of *Aphelidesmus*, its location amongst the "Strongylosomidae" must seem utterly bizarre to anyone who has seen material of this and other Euryurid genera.

The present concept of the Euryuridae is largely the one initiated by POCOCK in 1909 and followed by American authors, but differs in the exclusion of the Indo-Australian forms referred to *Polyleporella* Att. and *Adontodesmus* Silv. in the "Tierreich".

The reference to the Euryuridae of these Indo-Australian genera has obviously been brought about by an erroneous interpretation of the structure of the margins of the lateral keels in the species of these genera.

As is well known, the repugnatorial pores in the majority of the Platyrhacidae are surrounded by a rather small, smooth, more or less sharply demarcated area, and are situated on the dorsal surface of the keels, more or less removed from the lateral margin, or in the

[1]) The name Trachelorhachidae is not available for this family since it was derived from *Trachelorhachis* Silv., a senior synonym of *Aphelidesmus* Brol., which is, however, preoccupied.

lateral margin itself. The lateral margins of the keels are undulate or tuberculate, and generally lack a definite marginal rim. However, in some of the Indo-Australian Platyrhacidae, and apparently also in the Neotropical *Nanorrhacus luciae* (Poc.), the crater-like structure around the pores is absent, and the pores are located near the lateral margin of the keels in some sort of marginal thickening, which may be homologous to, but is quite different from, the sharply marked-off marginal swellings found in the Euryuridae. This is not the place in which to describe the structure in detail, but it must be emphasized that little more than subgeneric value can be attributed to it. Moreover, the character appears in different places of the system of the Indo-Australian Platyrhacidae. Evidence of the close relationship between certain species of *Polyleporella* and *"Platyrhacus"* s.l. will be found after comparison of the gonopod drawings given by Attems in the "Tierreich". For instance, there can be no doubt that species like *"Platyrhacus" postumus* Att., *"P." tetanotropis* Att. and *"P." sarasinorum* Carl are congeneric with *Polyleporella xestoloma* (Att.) and *P. erythrokrepis* (Att.), a conclusion strengthened by the occurrence of these forms in Celebes and the Sangi Islands. A similar relationship seems to exist between *Polyleporella solomonis* (Poc.), a species certainly quite disjunct from the group of species mentioned above, and some species of *"Platyrhacus"* described from the Solomon Islands.

The genus *Adontodesmus* is known only in the female sex. It certainly does not belong to the family Euryuridae, and even its reference to the Platyrhacidae s. str. seems doubtful. A re-examination of the type material of the single species of this genus might well reveal that it is merely a species of the African genus *Oxydesmus* Humb. & Sauss.! In that case, of course, the locality given – Timor – would be erroneous. There were, however, more wrong labels in the collection in which SILVESTRI found *Adontodesmus*.

Recently, two valuable papers on the Euryuridae have been published by HOFFMAN (1951, 1954), in which a survey of the genera and species of the group was given and an attempt was made to revise its taxonomy and nomenclature. As far as the North and Central American species are concerned, this attempt has met with considerable success. As regards the South American forms, or

rather those occurring south of Nicaragua, conditions are still not quite satisfactory, a fact fully realized by HOFFMAN.

These South American Euryuridae, though scarcely more numerous, undeniably show a far greater diversity in their gonopod characters than do their Central and North American relatives, and it therefore seems probable that quite a number of genera will be distinguishable after a more thorough exploration of South America. However, in the light of our present incomplete knowledge of the milliped fauna of that continent, any generic arrangement of the species is extremely difficult, and may prove to be entirely artificial in the future. Under existing conditions it is often entirely impossible to determine the proper correlations between gonopod characters and the characters of the external morphology and, in consequence, to locate the proper phylogenetic disjunctions among the known species.

In his key to the Euryurid genera, HOFFMAN in 1954 predominantly used gonopod characters. In some cases, however, he made use of external characters such as the shape of the anal scale or the development of the subantennal swellings. There is, of course, no reason at all for rejecting such characters beforehand as having no generic value. But the fact is, they are likely to combine unrelated forms when they are not correlated with the characters of the gonopods. In a genus such as *Pycnotropis* Carl, for instance, no gonopod character can be found correlating with the presence of subantennal swellings. The genus has therefore been withdrawn into *Amplinus* Att. here. Further emendations to HOFFMAN's taxonomic outline of the Euryuridae are discussed in the abbreviated survey of the family given below. As regards the concept of the genera *Auturus* Chamb., *Euryurus* Koch, *Polylepiscus* Poc., *Pseudamplinus* Hoffm. and *Aphelidesmus* Brol., I fully agree with HOFFMAN.

In his paper of 1954, HOFFMAN proposed a subdivision of the Euryuridae into three subfamilies: the Euryurinae, with the genera *Euryurus* Koch and *Auturus* Chamb.; the Aphelidesminae, with *Aphelidesmus* Brol., *Protaphelidesmus* Brol. and *Varyomus* Hoffm.; and the Amplininae, comprising the remaining genera. These subfamilies were characterized as follows:

Euryurinae: No definite solenomerite. Tibiotarsus present or

rudimentary. Telopodite of gonopod simple, the tibiotarsal joint not set.off by a conspicuous articulation.

Amplininae: Solenomerite present, long and slender, arising from the base of the tibiotarsus. Tibiotarsus long, very seldom broadened, never forming a protective element for the solenomerite. Telopodite of gonopod with a definite joint or line of separation between femur and tibiotarsus.

Aphelidesminae: Tibiotarsus of gonopod substantially expanded into a broad sheath, which shields or actually encloses the solenomerite and often has one or more small processes of its own.

In the development of the gonopods, a certain parallel exists between Euryuridae and Paradoxosomatidae. In some genera, a minority in the Euryuridae but by far the greater part of the Paradoxosomatidae, the solenomerite is sheathed by the tibiotarsus. In other genera there is no connection between solenomerite and tibiotarsus, and both branches project freely. In this case the tibiotarsus is generally comparatively reduced, being more slender and not seldom shorter than the solenomerite. Actually, the reduction of the tibiotarsus may go as far as the complete absence of this branch, and this condition is found in a number of Paradoxosomatid genera and in the Euryurid genus *Singuliurus* Causey.

As was discussed in the previous paper of this series, the relation between solenomerite and tibiotarsus has led to subdivision of the family Paradoxosomatidae into "Strongylosominae" and "Orthomorphinae", a subdivision which, however, is clearly artificial, and consequently is to be rejected.

Personally, I have no experience of the genera referred to the Euryurinae by HOFFMAN; perhaps the gonopod characters mentioned by him are correlated with other characters. As regards the distinction between the Amplininae and Aphelidesminae, this is entirely based on the same sort of characters as used by VERHOEFF for discrimination of the "Strongylosominae" and "Orthomorphinae". The three genera united by HOFFMAN under the name of Aphelidesminae do not form a monophyletic unity over against the Amplininae, as careful examination of the pertinent gonopod drawings will show.

Perhaps it will be possible to maintain a subfamily Aphelidesmi-

nae for the genus *Aphelidesmus* only, since the gonopods in this genus have some very peculiar characters. On the whole, however, a subdivision of the Euryuridae seems premature.

KEY TO THE GENERA OF THE FAMILY EURYURIDAE,
based on gonopod characters.

1. Solenomerite very long, flagelliform, arising from the latero-anterior side of the distal end of the femur, curving along the lateral and posterior sides towards the medial side where it bends distad, the end being more or less completely sheathed by the lamellae of the tibiotarsus. Prefemur usually rather short, the femur distinct and about as long as or much longer than the prefemur. . . . . *Aphelidesmus* Brol.
   Solenomerite not conspicuously elongate, arising from the medio-anterior or medial side of the end of the femur, not making the complicated loop as described for *Aphelidesmus*, nearly always entirely free from the tibiotarsus. Prefemur usually strongly elongate and generally much longer than the femoral division . . . . . 2

2. Solenomerite as long as or longer than the tibiotarsus, characterized by the presence of a small spiniform process near its distal end. Tibiotarsus a slender, distally acuminate prong . . . . . *Thrinoxethus* Chamb.
   Solenomerite without a small accessory branch near its distal end . . . . . 3

3. Solenomerite and tibiotarsus both abruptly bent cephalad at their base and both curving more or less semicircularly distad and caudad . . . . . *Colomborus* Chamb.
   Solenomerite and tibiotarsus not abruptly bent cephalad at their base . . . . . 4

4. Tibiotarsus deeply split into two subsimilar, slender, distally acuminate branches. Solenomerite entirely free

from the tibiotarsus . . . . . *Polylepiscus* Poc.
Tibiotarsus generally simple, undivided; when more complicated the branches are lamellar, broad and distally rounded or truncate. . . . . 5

5. Tibiotarsus well developed or somewhat reduced, but not shorter than about one third the length of the prefemur . . 6
Tibiotarsus strongly reduced, many times shorter than the prefemur, or absent . . . . . 9

6. Solenomerite closely applied to the tibiotarsus over the entire length, arising from the medio-anterior side of the distal end of the femur, curving along the medial side towards the posterior side of the tibiotarsus, and pointing in a latero-distal direction. Tibiotarsus consisting of a transverse lamella, about twice as long as broad. Prefemur strongly elongate, femur almost completely eliminated . . . . . *Protaphelidesmus* Brol.
Solenomerite either entirely free from the tibiotarsus or only its distal portion sheathed by the tibiotarsus . . . . 7

7. Tibiotarsus broadly laminate, complicated by secondary processes, the end truncate or widely rounded. Solenomerite arising from the medial side of the femoral portion, its end sometimes concealed by the lamellae of the tibiotarsus . . . . . *Varyomus* Hoffm.
Tibiotarsus generally an elongate slender prong, usually distally acuminate, sometimes rather broadly laminate, but never with secondary processes. Solenomerite arising from the medio-anterior side of the distal end of the femur, entirely free from the tibiotarsus . . . . . 8

8. Prefemur at least one and a half times as long as the acropodite . . . . . *Pseudamplinus* Hoffm.
Prefemur as long as or shorter than the acropodite . . . . . *Amplinus* Att.

9. Acropodite almost completely eliminated: at the end of the elongate prefemur, a short uncate solenomerite and a short rounded tibiotarsus arise, both scarcely longer than they are broad at their base . . . . . *Auturus* Chamb.
Acropodite not so strongly reduced, about half as long as the elongate prefemur. Solenomerite straight. Tibiotarsus weakly developed or absent . . . . . 10

10. Tibiotarsus present . . . . . *Euryurus* C. Koch
Tibiotarsus absent . . . . . *Singuliurus* Caus.

## SURVEY OF THE GENERA OF THE FAMILY EURYURIDAE.

### **Amplinus** Att.

See p. 73.

### **Aphelidesmus** Brol.

This genus will be treated in a future paper of the present series.

### **Auturus** Chamb.

See HOFFMAN 1951.

### **Colomborus** Chamb.

1952 *Colomborus* CHAMBERLIN, Ann. Ent. Soc. America *45:* 578. (Type species: *C. martanus* Chamb., by original designation).

Colombia.

*C. colombiensis* (Chamb. 1923) (syn. *C. martanus* Chamb. 1952), *C. polygonatus* (Gerv. 1847).

As against the genus *Amplinus* in the broad sense adopted here, the characters of *Colomborus* do not seem to be very significant. It is maintained mainly because the tibiotarsus and solenomerite of the gonopods are abruptly bent cephalad at their base, a character apparently correlating with the presence of sternal cones on some of the pre-gonopodial sternites.

*Colomborus* has so far been taken for a monotypical genus. But in the emended

sense it includes *polygonatus* too, the latter obviously being more closely related to *colombiensis* than to any of the species assigned to *Amplinus*.

### Euryurus C. Koch

See HOFFMAN 1951.

### Polylepiscus Poc.

See HOFFMAN 1954.

### Protaphelidesmus Brol.

1916 *Protaphelidesmus* BROLEMANN, Ann. Soc. Ent. France *84:* 599. (Type species: *Platyrrhachus ligula* Brol., by original designation).

Venezuela.

*P. ligula* (Brol. 1898).

For a long time this genus remained monotypical, and it was not until 1944 that a second species was added: *P. levigatus* Att. In his treatment of the Euryuridae, HOFFMAN in 1951 classified both *ligula* and *levigatus* under the generic heading of *Protaphelidesmus*, but in his second paper he brought *Ptyxogon* Chamb. into the synonymy of *Protaphelidesmus*, thus adding a third species, *incus*, to the genus.

It seems to me, however, that the reference to *Protaphelidesmus* of *levigatus* as well as of *incus* is erroneous. In *P. ligula* the prefemoral division of the gonopods is pronouncedly elongate, and the tibiotarsus and solenomerite are comparatively short. In general aspect they are strongly reminiscent of the gonopods found in two species referred to *Pseudamplinus*, namely *P. abstrusus* (Karsch) and *P. cylindroides* (Chamb.). It is thought that *ligula* is related most closely to these species, the peculiar course of the solenomerite in *ligula* being apparently the most important character in determining their separation.

It was apparently because of the peculiar position of the solenomerite that BROLEMANN, when proposing *Protaphelidesmus*, thought the genus to be intermediate between *Aphelidesmus* and the other Euryuridae. His opinion, however, was based on an erroneous interpretation of the gonopods of *Protaphelidesmus*.

In the gonopods of the species of *Aphelidesmus*, the solenomerite arises from the latero-anterior side of the distal end of the femur; makes the loop characteristic of the genus along the lateral and posterior sides of the end of the femur; and, having arived at the medial side, turns distad to become sheathed by the lamellae of the tibiotarsus.

In *Protaphelidesmus* the solenomerite, according to BROLEMANN'S drawings, arises from the medio-anterior side of the femoral end, curves along the medial side towards the posterior side of the tibiotarsus, and runs along this posterior side in an oblique latero-distal direction. Hence in *Protaphelidesmus* the solenomerite follows a course entirely opposite to that of the solenomerite in *Aphelidesmus*.

On consideration of this and other discrepancies between the two genera, it becomes quite clear that there is no close relationship between *Protaphelidesmus* and *Aphelidesmus*, and that the first cannot be regarded as intermediate between the latter and the other Euryurid genera.

*P. levigatus* Att. has a quite different gonopod structure, and certainly has no close relationship to *ligula*; it has been referred tentatively to *Varyomus* Hoffm. The genus *Ptyxogon* I regard as a synonym of *Amplinus*.

### **Pseudamplinus** Hoffm.

See HOFFMAN 1954. – To the species enumerated by HOFFMAN must be added *P. cylindroides* (Chamb. 1923) from Colombia, and *P. ater* (Pet. 1864) sensu BROLEMANN 1898, from Venezuela. The latter species apparently comes very close in appearance to *P. abstrusus* (Karsch 1881) and *P. beebei* (Chamb. 1950), both also from Venezuela.

In the gonopods this genus is rather difficult to separate from *Amplinus*, but it is said to be easily distinguished by the straight or even concave posterior margin of the anal scale. It is, however, not entirely certain that this character is present in all the species referred to *Pseudamplinus*.

### **Singuliurus** Caus.

1955 *Singuliurus* CAUSEY, Proc. Biol. Soc. Washington *68:* 23. (Type species: *S. missisippiensis* Caus., by original designation).

U.S.A. (Mississippi).

*S. missisippiensis* Caus. 1955.

This genus is distinguished from *Euryurus* Koch only by the absence of what has been regarded here as the tibiotarsus of the gonopods. It may be, however, that the small lappet of the acropodite present in *Euryurus* is not a tibiotarsus but a lateral expansion of the solenomerite proper. In any case, the genus *Singuliurus* is extremely closely related to *Euryurus*, and had probably better be withdrawn.

### **Thrinoxethus** Chamb.

1941 *Pycnotropis* (*Cyclotropis*) VERHOEFF, in: TITSCHACK, Beitr. Fauna Perus *2:* 34 (III. 1941) (1951 ed.) (Type species: *P.* (*C.*) *peruanus* Verh., by monotypy). (preoccupied)

1941 *Thrinoxethus Chamberlin*, Bull. Amer. Mus. Nat. Hist. *78:* 498. (20.XI.1941) (Type species: *T. hermosus* Chamb., by original designation).

Peru.

*T. bombonus* Chamb. 1941, *T. hermosus* Chamb. 1941, *T. lamprus* Chamb. 1941, *T. paucartambo* (Kraus 1956), *T. peruanus* (Verh. 1941), *T. pichitaensis* (Kraus

1959), *T. verhoeffi* (Kraus 1956). Possibly also the following species based on female specimens: *T. cainarachus* Chamb. 1941, *T. iquitus* Chamb. 1941, *T. nitens* Chamb. 1941, *T. phanotypus* Chamb. 1941, *T. ucayalus* Chamb. 1941.

As was shown by KRAUS in 1959, *Thrinoxethus* Chamb., although a younger name than *Cyclotropis* Verh., must be used because *Cyclotropis* is preoccupied twice.

The gonopod drawings given by VERHOEFF and KRAUS reveal that in this genus it is the solenomerite which bears a small accessory branch near its distal end, and not the tibiotarsus as HOFFMAN apparently inferred from CHAMBERLIN's sketches. This condition is of significance because it renders the difference between *Thrinoxethus* and *Amplinus* of greater systematic importance. For the rest, *Thrinoxethus* appears to be very closely related to *Amplinus* according to the rather wide conception of it held at present.

### **Varyomus** Hoffm.

1954 *Varyomus* HOFFMAN, J. Wash. Acad. Sci. *44:* 56. (Type species: *Aphelidesmus confluens* Chamb., by original designation).

Venezuela, Ecuador.

*V. confluens* (Chamb. 1950), *V. devillei* (Silv. 1897), *V. levigatus* (Att. 1944).

On the evidence of the quite characteristic gonopod structure of the type species, erection of this genus was fully justified. The course of the spermal channel, and the position of the solenomerite and its relation to the tibiotarsus, as well as the complicated laminate tibiotarsus itself, render it quite distinct from all other known Euryuridae. The laminate expansions of the tibiotarsus invite a comparison with the genera *Protaphelidesmus* and *Aphelidesmus*. However, such a comparison does not yield the slightest indication of a close relationship. In fact, the only character common to the gonopods of the three genera is the condition that the solenomerite is applied to, or more or less sheathed by, the tibiotarsus; but, considering the many discrepancies in other respects, I cannot attribute the slightest taxonomic significance to this.

*Protaphelidesmus levigatus* Att. and *Pycnotropis devillei* (Silv.) are tentatively referred to *Varyomus*. Judging from the gonopod drawings given by ATTEMS and SILVESTRI, both representing little more than mere outlines, the two species are closely related to *V. confluens* rather than to any other known Euryurid. Reexamination of the type material, however, is needed to prove the correctness of this reference.

### Species incertae sedis.

*"Polylepiscus" roreri* Chamb. 1918, from Trinidad, based on a female specimen, probably does not belong to the genus *Polylepiscus* in the current concept. It may be referable to the genus *Pseudamplinus* and related to the Venezuelan species referred to that genus.

## Amplinus Att.

1899 *Pachyurus* (*Amplinus*) ATTEMS, Denkschr. Ak. Wien *68:* 281.
1914 *Pycnotropis* Carl, Mem. Soc. neuchâteloise Sci. Nat. *5:* 932.
1933 *Seminellogon* Chamberlin, Pan-Pac. Ent. *9:* 18.
1941 *Phinotropis, Ptyxogon & Amydrinus* Chamberlin, Bull. Amer. Mus. Nat. Hist. *78:* 499, 500.
1951 *Sigmogonotropis* Hoffman, Proc. U.S. Nat. Mus. *102:* 240.

Type species. – *Pachyurus* (*Amplinus*) *kalonotus* Att., by subsequent designation: POCOCK 1909 (Biol. Centr.-Amer., Diplop., p. 148). (Type species of *Pycnotropis: Polydesmus* (*Euryurus*) *taenia* Pet., by original designation; of *Seminellogon: S. chitarianus* Chamb., by original designation; of *Phinotropis: P. tidus* Chamb., by original designation; of *Ptyxogon: P. incus* Chamb., by original designation; of *Amydrinus: A. pongus* Chamb., by original designation; of *Sigmogonotropis: S. serratus* Hoffm., by original designation).

Costa Rica, Panama, Colombia, Ecuador, Peru, Brazil (Amazonas, Amapá).

Number of species: eigtheen.

All the species brought under the heading of *Amplinus* here have long been misplaced in what seem to be a number of quite artificial generic groups. For instance, in the treatment of the Polydesmida by ATTEMS in the "Tierreich", 1938, the majority were referred to *Pycnotropis* Carl, and some to *Polylepiscus* Poc.

In his recent studies, however, HOFFMAN has shown that the South American species hitherto referred to *Polylepiscus* are not congeneric with the Central American species of that genus. Accordingly, use of the name *Phinotropis* Chamb. was proposed, to cover the South American forms. In his second paper HOFFMAN pointed out that the name *Amplinus* had been used incorrectly for the dominant Central American Euryurid genus, and that this name, in accordance with POCOCK's type designation, had to replace *Phinotropis*. A new name, *Pseudamplinus*, was proposed for the Central American genus.

The two genera, *Amplinus* in the emended sense and *Pycnotropis*, were kept separate by HOFFMAN on account of the absence of subantennal swellings in the species of the latter genus. It seems to me, however, that this character is of little systematic value since it is not correlated with any substantial difference in the gonopods. On the contrary, comparison of the gonopod drawings for "*Pycnotropis*"

*flavocarinata* (Silv.) and *Amplinus kalonotus* (Att.), or for "*Pycnotropis*" *haenschi* Carl and *Amplinus acuticollis* (Att.), etc., clearly shows that the distinction between *Amplinus* and *Pycnotropis* was purely artificial.

The monotypical genus *Phinotropis* Chamb. was brought into the synonymy of *Amplinus* by HOFFMAN in 1954. The similarly monotypical *Amydrinus* was regarded by him as synonymous with *Pycnotropis* in 1951, although CHAMBERLIN did not mention the absence or presence of subantennal swellings. In fact, CHAMBERLIN distinguished *Amydrinus* from *Phinotropis* only by the weaker development of the polygonal areas on the metatergites, a character to which not more than specific value can be attributed. The gonopods of the type species of the two genera are extremely similar.

There seems to be no justification for keeping *Seminellogon* and *Sigmogonotropis* separate from *Amplinus*. HOFFMAN in 1954 expressed doubt regarding the validity of these two genera and of *Colomborus* Chamb. and *Thrinoxethus* Chamb., adding that "very little in the way of annectant forms would be required to necessitate consolidation of all these nominal genera back into *Amplinus*." In my opinion, *Colomborus* Chamb. and *Thrinoxethus* Chamb. may be retained as distinct genera, since they appear to be well-marked or at least distinguishable groups. As for *Seminellogon* and *Sigmogonotropis*, if the narrow concept of these two genera were to be generally adopted, *Amplinus* would fall apart in about as many genera as there are species known.

The monotypical genus *Ptyxogon* Chamb. was accepted as such by HOFFMAN in 1951, but referred to the synonymy of *Protaphelidesmus* Brol. in 1954. I cannot find any evidence for a close relationship of *Ptyxogon incus* Chamb. with *Protaphelidesmus ligula* (Brol.). However, the species appears to have some affinity to *Amplinus mammatus* Att., and hence *Ptyxogon* can more appropriately be united with *Amplinus*.

Apart from the addition of the species of *Seminellogon*, *Phinotropis*, *Ptyxogon*, *Amydrinus* and *Sigmogonotropis*, the present concept of *Amplinus* is in conformity with the genera *Pycnotropis* and *Amplinus* in the sense of HOFFMAN, from which *Pycnotropis polygonata* (Gerv.) and *P. devillei* (Silv.) have been excluded and referred respectively to *Colomborus* Chamb. and *Varyomus* Hoffm.

Hence, *Amplinus* now consists of the following species:

| | | | |
|---|---|---|---|
| *A. achiraensis* (Kraus 1959) | Peru | *A. latzeli* (Att. 1931) | Panama |
| *A. acuticollis* (Att. 1899) | Brazil (Amazonas) | *A. mammatus* Att. 1931 | Ecuador |
| | | *A. melanostigma* (Silv. 1898) | Colombia |
| *A. braueri* (Carl 1918) | Ecuador | *A. nitidus* (Kraus 1959) | Peru |
| *A. cerroazulensis* (Hoffm. 1954) | Panama | *A. pongus* (Chamb. 1941) | Peru |
| *A. chitarianus* (Chamb. 1933) | Costa Rica | *A. serratus* (Hoffm. 1951) | Panama |
| *A. flavocarinatus* (Silv. 1898) | Colombia | *A. subareatus* nov. spec. | Brazil (Amapá) |
| *A. haenschi* (Carl 1918) | Ecuador | | |
| *A. incus* (Chamb. 1941) | Peru | *A. taenia* (Pet. 1864) | Colombia |
| *A. kalonotus* (Att. 1899) | Brazil (Amazonas) | *A. tidus* (Chamb. 1941) | Peru |

In the present broad concept the genus *Amplinus* is not particularly homogeneous, and it may therefore be convenient to distinguish some groups of species within the genus. Unfortunately, the interrelationship of the species is often difficult to ascertain, since many of the available descriptions leave us ignorant of important points in the morphology. Moreover, the drawings and descriptions of the gonopods are generally insufficient for the purpose.

The type species of the genus, *A. kalonotus*, is particularly characterized by the long solenomerite of the gonopods, a character which it shares with *A. flavocarinatus* only and which renders these two species rather disjunct from the others. The tibiotarsus in both species is relatively reduced in size, being not longer than about half the length of the solenomerite.

In this respect the opposite extreme is found in *A. acuticollis*, *A. pongus*, *A. tidus* and the newly described *A. subareatus*. These species have a short solenomerite combined with an elongate tibiotarsus which is about twice the length of the solenomerite. The tibiotarsus in these four species is a slender prong which is bent in several directions.

The same relative proportions of tibiotarsus and solenomerite are found in *A. braueri*, *A. haenschi* and *A. taenia*. *A. braueri*, although it has gonopods very similar to those of the four preceding species, has a very characteristic sculpture of the collum and metatergites which distinguishes it at once from all the other species of *Amplinus*. In *A. haenschi* the tibiotarsus differs mainly by being broader than in *braueri* or the species of the *acuticollis* group.

In *A. taenia* the tibiotarsus differs a little more in shape from that of the other species previously mentioned and, although its solenomerite is about half as long as the tibiotarsus, it seems more closely related to the species of the next group, in particular because of the course followed by the spermal channel before entering the solenomerite.

*A. melanostigma*, known only in the female sex, was regarded by CARL in 1914 as being a mere colour variety of *taenia*. Since an almost complete identity of female specimens does not imply conspecificity, I prefer to give *A. melanostigma* specific rank until the male has been studied.

In the following group of species the solenomerite and the tibiotarsus are of about equal length. The group includes *A. cerroazulensis*, *A. chitarianus*, *A. serratus*, *A. achiraensis*, *A. latzeli*, *A. nitidus*, *A. incus* and *A. mammatus*.

After comparison of the pertinent gonopod drawings, it is clear that *cerroazulensis*, *chitarianus* and *serratus* are extremely closely related species. The course of the

spermal channel has been clearly indicated in the drawing which HOFFMAN gave for *serratus*. Near the base of the solenomerite it apparently curves laterad before entering the solenomerite. The solenomerite appears to be twisted longitudinally for about 180° immediately at its base. This condition, which may be of considerable importance for establishment of the relationship of the species within the genus *Amplinus*, deserves far more attention than it has received as yet. The structure is entirely different from that found in *A. subareatus* nov. spec., where the solenomerite is not twisted and the course of the spermal channel is more or less straight.

*A. latzeli* may come nearest to the three species mentioned above, and to *taenia* as well, being more or less intermediate. The solenomerite appears to be somewhat shorter than the tibiotarsus. The course of the spermal channel shows a similar curvature at the base of the solenomerite as in *serratus*.

*A. nitidus* and *A. achiraensis*, recently described by KRAUS, were compared by him with *A. tidus*, with which, however, they have no close relationship. The two come near to *A. latzeli*, which resembles them in the gonopods and many other characters.

*A. mammatus* and *A. incus* seem closely related, on the evidence of the general aspect of their gonopods. Unfortunately, CHAMBERLIN's drawing does not permit detailed comparison; but his species is certainly distinguished from *mammatus* by an apparently somewhat broader tibiotarsus. The course of the spermal channel has been indicated only for *mammatus*, by ATTEMS; it seems to be comparable with that found in *serratus* and *latzeli*.

Summarizing, the following groups may be distinguished:

1. *A. flavocarinatus* (Silv.), *A. kalonotus* (Att.).

2. a. *A. acuticollis* (Att.), *A. pongus* (Chamb.), *A. subareatus* nov. spec., *A. tidus* (Chamb.).
   b. *A. braueri* (Carl).
   c. *A. haenschi* (Carl).

3. a. *A. cerroazulensis* (Hoffm.), *A. chitarianus* (Chamb.), *A. serratus* (Hoffm.).
   b. *A. achiraensis* (Kraus), *A. latzeli* (Att.). *A. melanostigma* (Silv.), *A. nitidus* (Kraus), *A. taenia* (Pet.).
   c. *A. incus* (Chamb.), *A. mammatus* Att.

## KEY TO THE SPECIES OF *Amplinus*, based chiefly on male characters.

1. Solenomerite of the gonopods much longer than the tibiotarsus . . . . . 2

Solenomerite of the gonopods about as long as or shorter than the tibiotarsus . . . . . 3

2. Dorsum dark brown to almost black, with a continuous bright-yellow median band, which is broadest on the metatergites. Vertigial sulcus anteriorly furcate. Middle portion of metatergites with weak areas. No process at the base of the solenomerite. . . . . *A. kalonotus* (Att.)
Dorsum transversely banded: prosomites and anterior border of the metasomites blackish brown, the rest of the metasomites light reddish-brown. Vertigial sulcus not furcate. Middle portion of metatergites smooth. At the base of the solenomerite a small triangular process . . . . . *A. flavocarinatus* (Silv.)

3. Metatergites densely rugose and with three transverse series of tubercules. On the 2nd to the 4th segments these tubercules are large and subcontiguous, and on the collum they are arranged close together, separated by narrow furrows and resembling a pavement. Sternite of the 6th segment of the male with a pair of elongate conical processes, directed obliquely forward, on its anterior border. Colour black . . . . . *A. braueri* (Carl)
Metatergites and collum without larger tubercules, smooth or finely rugulose, or with polygonal areas in the centre of which is often a small granule . . . . . 4

4. Solenomerite of the gonopods about half as long as the tibiotarsus . . . . . 5
Solenomerite about as long as the tibiotarsus or at least distinctly longer than half the length of the tibiotarsus . . 11

5. Ground colour yellow, with a blackish-brown longitudinal band laterodorsally, or a series of spots on each side of the prosomites . . . . . 6
Ground colour light brown to blackish brown . . . . . 7

6. Body segments with a continuous latero-dorsal band of blackish-brown colour on each side . . . *A. taenia* (Pet.)
Body segments with a blackish-brown spot on the latero-dorsal side of the prosomites only. *A. melanostigma* (Silv.)

7. Tibiotarsus of gonopods comparatively broad, ribbon-like, the end bearing some fine teeth. Colour olive brown, head and the 6th antennal joint brown, rest of antennae, lateral keels, legs and the tail dull yellow . . *A. haenschi* (Carl)
Tibiotarsus of gonopods slender, finely acuminate towards the end . . . . . 8

8. Width of males 8.2 to 9.5 mm. Polygonal areas present only on upper surface of the lateral keels, sometimes also very weakly indicated on the middle portion of the metatergites. Colour very dark brown, with the antennae, lateral keels and legs yellow . . . . . *A. subareatus* nov. spec.
Width of males 5.6 to 7.0 mm. . . . . 9

9. Middle portion of metasomites and the keels light brown, the prosomites and a stripe along each side adjacent to keels darker. Antennae and legs nearly yellow. Polygonal areas almost wholly absent on collum. Posterior border of keels of collum and of the 2nd segment very widely convex or straight . . . . . *A. pongus* (Chamb.)
Colour different. Polygonal areas at least distinct on the lateral sides of the collum . . . . . 10

10. Colour dorsally and laterally brown, the lateral keels similar or scarcely lighter. Antennae and legs light brown. Middle portion of collum and metatergites smooth . . . . . *A. tidus* (Chamb.)
Dorsum pale castaneous, the lateral keels, antennae and legs pale yellowish. Polygonal areas visible also on the middle portion of the collum and the metatergites. Posterior border of lateral keels of 2nd segment concave . . . . . *A. acuticollis* (Att.)

11. Width of male 10.0 mm. Colour black, antennae and legs brown. Tibiotarsus of gonopods broad, laminate, widening distad and broadly truncate at the end, without small teeth . . . . . *A. incus* (Chamb.)
Width of male 6.0 to 7.0 mm. Colour as far as known brown to almost blackish, with at least the lateral keels yellow. Tibiotarsus of gonopods more elongate and slender, more or less acuminate in the end or ending with some small teeth . . . . . 12

12. Sternites of the 7th and the 8th segments of the male bearing, one and two pairs of strong cones, respectively; the sternite of the 9th segment with two pairs of smaller cones. Legs of the 10th pair of the male longer and thicker than the others and with a very long and slender tarsus. Colour castaneous, the lateral keels, the antennae and legs yellowish . . . . . *A. mammatus* Att.
Sternites of the male without strong cones. Legs normal . 13

13. Tibiotarsus of gonopods ending in three small teeth . . . . . *A. serratus* (Hoffm.)
Tibiotarsus acuminate distally, without small teeth . . . 14

14. Dorsum brown, with a broadly serrate median band and the lateral keels yellow. Lateral sides of metasomites smooth. Solenomerite of gonopods longer than the prefemoral and femoral divisions together . . . . . 15
Dorsum castaneous to blackish brown, the lateral keels bright yellow. Lateral sides of the metasomites granular. Solenomerite of gonopods shorter than the prefemoral and femoral divisions together . . . . . 16

15. Tibiotarsus of gonopods slender, but with a prominent broadening near its base . . . *A. cerroazulensis* (Hoffm.)
Tibiotarsus ribbon-like, almost parallel-sided over its entire length, without broadening at its base . . . . . *A. chitarianus* (Chamb.)

16. Tibiotarsus of gonopods from a medial view not widening distad of its base . . . . . *A. nitidus* (Kraus)
Tibiotarsus from a medial view with a bluntly triangular dilatation just distad of the middle . . . . . *A. achiraensis* (Kraus), *A. latzeli* (Att.)

## **Amplinus subareatus** nov. spec.

BRAZIL: Amapá, "Placers de Carsevenne, 1899" (Coll. F. GEAY, Mus. Paris), 1 ♂ (holotype), 4 ♂♂, 2 ♀♀; "riv. Lunier, 1899" (GEAY, Paris), 1 ♂; "Haut Carsevenne, 1897" (GEAY, Paris), 66 juv. ♂♂ and ♀♀.

Colour. – Very dark brown to blackish. The labral region of the head and the ventral side of the body segments paler brown. Lateral keels of collum and subsequent segments pale yellow to brownish yellow; the demarcation between the pale and dark colours in poriferous keels running from the anterior side of the pore callus obliquely inward to the base of the keel posteriorly. Anal segment, including the tail, of dark colour. Antennae, sternites and legs pale yellow to brownish yellow.

Width. – ♂♂: 8.2–9.5 mm (holotype: 8.7 mm, other ♂♂: 9.5, 9.3, 8.5 and 8.2 mm, and 8.4 mm). ♀♀: 9.9–10.1 mm. Juv. ♂♂ with 19 segments: 5.2–6.2 mm (measurements of six specimens). Juv. ♀ with 19 segments: 6.3 mm. Juv. ♂ with 18 segments: 3.7 mm. Juv. ♀♀ with 18 segments: 3.8–4.0 mm (measurements of four specimens). Juv. ♀ with 17 segments: 2.6 mm.

Head and antennae. – Labrum very weakly and very widely emarginate, tridentate. Clypeus very weakly convex, rather weakly impressed towards the labrum. Headplate polished, with some slight irregular wrinkles, especially in the vertigial region. Above the labrum a transverse row of six tufts of setae; more laterally on each side above this row, two similar tufts; and medio-orad of the antennal sockets on each side, a less distinct tuft of setae. Headplate otherwise hairless. Lateral margin of clypeus widely rounded. Antennal sockets separated by about one and a half times the diameter of a socket or by about one and a quarter times the length of the 2nd antennal joint. Postantennal groove well developed, the wall in front rather strongly inflated and medio-anteriorly marked off by a furrow. Vertex moderately convex, not demarcated from the frontal region. The sulcus rather deeply impressed anteriorly, becoming rather weakly impressed near the anterior border of the collum, running downward to between the antennal sockets. Antennae of moderate length and width. The length of the joints almost equal, but the 5th and 6th joints each a little shorter than the 2nd, 3rd and 4th. Width of the 2nd to 5th joints subequal, the 6th a little thinner. Pubescence weak in the proximal joints, becoming rather dense in the distal joints.

Collum. – (Fig. 15) Much wider than the head. The anterior border straight, widely rounded only near the latero-posterior edge. Posterior border widely emarginate in the middle, widely rounded more laterally; the posterior border of the lateral keels very weakly concave. Latero-posterior edge about rectangular, very narrowly rounded. Surface of collum moderately convex in the middle, flat and

strongly sloping downward laterally. Surface polished, on the lateral sides with some well-impressed sulci, corresponding with those forming polygonal areas in the subsequent body segments. One of these sulci more or less parallels the latero-anterior border, and the area laterad is a little inflated. Marginal rim present along the anterior border, though very weak and almost obsolete in the middle, widening a little near the latero-posterior edge. Posterior border of keels very weakly rimmed.

Body segments. – Moderately constricted by a narrow waist, which is not sharply demarcated from either pro or metasomites and has no sculpture or an extremely weak longitudinal striation. Prosomites and metatergites polished.

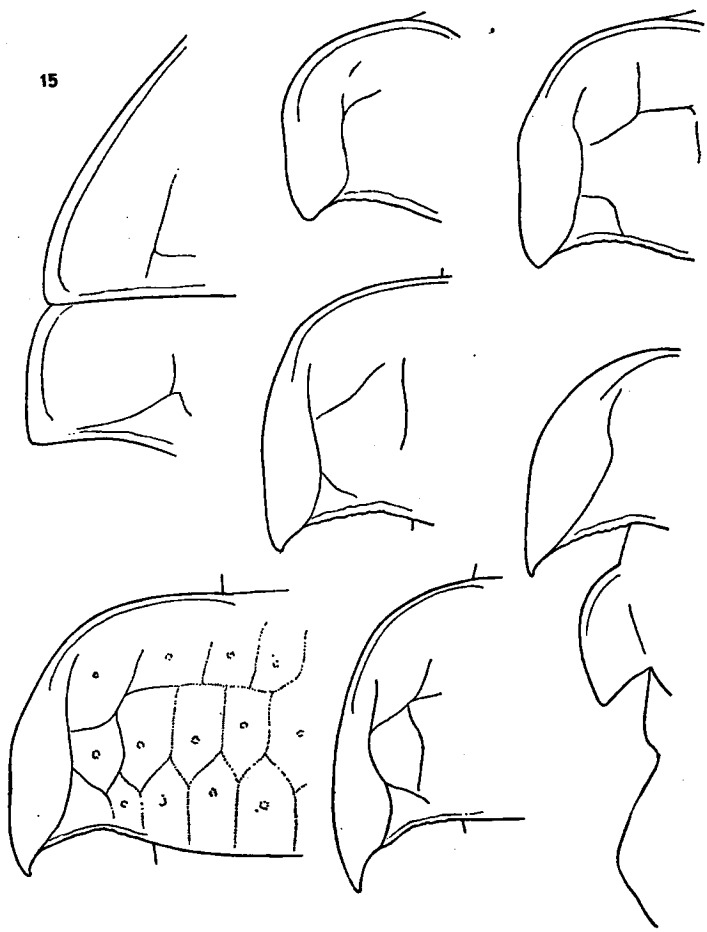



Fig. 15. *Amplinus subareatus* nov. spec., holotype ♂. — Lateral keels of the 1st, 2nd, 4th, 5th, 7th, 12th, 14th, 18th and 19th segments, dorsal view.

Laterally towards the keels of the anterior segments pentagonal or hexagonal areas, arranged in three transverse rows, become visible. From the 5th segment onwards, these areas may also be visible, though extremely faintly, in the middle portion of the metatergites. The sulci are sharply impressed only on the dorsal surface of the keels. A small granule in the centre of each area, though distinct only on the upper surface of the keels. In most of the segments the surface of the areas has a fine network of very weak meandering sulci. All tergites without transverse impression or furrow. Sides finely granular up to the 4th segment. From the 5th segment onwards the sides are finely rugulose and subgranulose, somewhat dull, and, in the anterior half of the body, have a fine granulation on the ventral surface of the posterior part of the lateral keels and near the posterior margin of the segments. Pleural keels or swellings wholly absent.

Lateral keels. – (Fig. 15) Width of the body segments from the collum to the 5th segment gradually slightly increasing. Keels on a moderately high level, at some distance above the middle of the segments. Those of the anterior segments directed rather strongly ventrad, with the keels of the 2nd segment reaching a little more ventrad than those of the collum. Keels of the 3rd and 4th segments each a little more horizontal. In the 5th and subsequent segments the keels reach a horizontal level. Keels of the 2nd to 4th segments with widely rounded anterior borders, scarcely shouldered at the base. The latero-anterior edges obtuse and rather widely rounded, not marked by a tooth. Lateral borders very widely rounded, almost straight or even a little incurved. Near the posterior edges the lateral borders curve inwards a little in the 3rd and, especially, in the 4th segments. Posterior border widely emarginate in the 2nd segment, becoming more strongly concave in the 3rd and 4th segments. Latero-posterior edges about rectangular in the 2nd segment, becoming a little acute in the 3rd and 4th segments. The edges very narrowly rounded. Marginal rim narrow but distinct along the anterior and latero-anterior borders, widening a little laterally. The premarginal furrows do not reach the posterior margins of the keels, but end at some distance from them, in the 4th segment just before the middle of the keels. Instead of being parallelled by the premarginal furrow, the lateral borders are paralleled by a furrow more remote from the margin, which ends at the posterior margin somewhat mesad of the latero-posterior edge. Posterior borders with a fine and weak rim. Keels from the 5th segment onwards well developed. The anterior margins scarcely shouldered at the base, rather widely rounded, and without a distinct latero-anterior edge. Lateral margins very widely rounded or straight, in the poriferous segments a little incurved in the pore area. Posterior margins widely emarginate, finely serrate from the 4th to the 19th segment. Latero-posterior edges acutely angular and generally pointed, the edges curving inwards a little. The edges project behind the posterior margins of the metasomites in all segments from the 3rd onwards. Marginal rims anteriorly and latero-anteriorly narrow but distinct. The premarginal furrows ending usually just behind the latero-anterior edges. As in the keels of the anterior segments, the broad lateral rims are medially marked off by a furrow which is not continuous with that of the anterior border. Poriferous keels thicker than the poreless. The pores lateral, n a distinct lateral excavation of the rim.

Sternites and legs. – Sternites of middle segments one and a half times as long as broad; hairless. Cross impressions very well developed, the transverse furrow a little deeper than the longitudinal. Sternites without distinct cones, but there are sometimes indications of these, namely an anterior and a posterior, very low and

bluntly rounded tubercule, separated by a slight impression, at the base of each leg. Anterior sternites without distinguishing features. Legs (Fig. 16) of moderate length and width. Length of joints: 3 > 6 > 5 = 2 > 4. The 6th joint about four fifths as long as the 3rd and about one and a half times as long as the 5th. Pubescence very sparse, consisting of the usual ventro-terminal hairs in the proximal joints. The tibiae and tarsi dorsally moderately setiferous, their ventral side sparsely setiferous. Only in a few anterior legs is the pubescence of the proximal joints more strongly developed.

Anal segment. – Tail of moderate length, subquadrate. The sides parallel, widely rounded. The posterior margin also widely rounded and with some weak scallops. Dorsal surface of tail wrinkled, the lateral borders with a weak premarginal impression. Valves rugulose. The marginal rims rather narrow and rather low. Scale

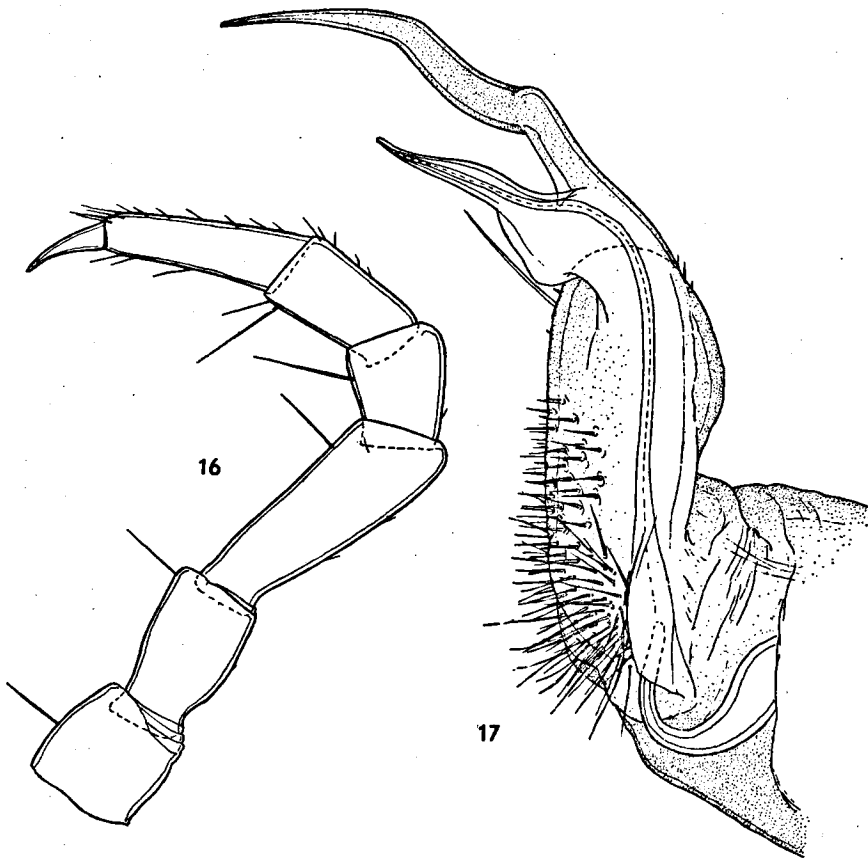



Fig. 16–17. *Amplinus subareatus* nov. spec., holotype ♂. — 16: leg of the 7th segment. — 17: right gonopod, medial view.

smooth, broadly triangular, with the lateral sides widely rounded and the posterior edge pointed and obtusely angular. Setiferous tubercules obsolete.

Gonopods. – (Fig. 17) Coxa comparatively large, widening a little towards the distal end. Tracheal stalk very long. Coxa hairless. Prefemur elongate, densely set with rather short setae, especially laterally. Acropodite arising from the medial side of the distal end of the prefemur. The femoral portion short, curving a little in a caudal direction. Solenomerite rather short, rather broad at the base but gradually tapering while curving slightly laterad. Tibiotarsus about twice as long as the solenomerite, curving outward first and then, more distally, inward. The end pointing more or less straight distad. Tibiotarsus slender, the end finely acuminate. Spermal channel running along the medial or medio-anterior side of the femur.

Female. – Apart from the usual sexual differences, the females have slightly shorter antennae than the males, so that the antennal sockets are separated by about one and a third times the length of the 2nd antennal joint. The anterior margin of the collum is very weakly incurved behind the postantennal groove. Body segments scarcely less constricted than in the males, and the keels hardly less developed than in the males. The dorsum of the metatergites a little more convex. Sternites about one and a third times as longer as broad. The cross impressions somewhat less impressed. Sternal tubercules totally absent. Legs comparatively a little shorter and a little more slender. Pubescence scarcely different from that of the males. Anal segment with the sides of the tail a little converging. The scale a little broader and almost semicircular, without a distinct posterior edge.

Juveniles. – The juvenile specimens, with 19 segments, essentially resemble the females. The areas are, however, visible only on the dorsal surface of the lateral keels. The keels are less developed than in the adults, and do not reach a horizontal level. In the younger specimens the characters are more weakly developed.

This new species obviously belongs in a group with *A. acuticollis* (Att.), *A. pongus* (Chamb.) and *A. tidus* (Chamb.), which have more or less the same gonopod structure. *A. subareatus* differs from these three species in its larger size. Moreover, it may be distinguished from *A. acuticollis* by the gonopods. In *acuticollis* these have a longer femur, which is about as long as the solenomerite and scarcely shorter than the prefemur. Furthermore, in *acuticollis* the sculpture of the collum and the metatergites appears to be more distinct, the areas being clearly visible also in the middle portion of the tergites. In *acuticollis* the end of the tail is more rounded and apparently without distinct edges.

*A. pongus* differs from *subareatus* in that the middle of the metatergites is paler brown; the posterior edges of the lateral keels of the collum and other segments are less pointed; and there are no distinct edges in the tail.

In *tidus* the lateral keels are scarcely paler than the rest of the somites. It apparently also differs from *subareatus* in the more

rounded edges of the collum. The prefemur of the gonopods in *pongus* seems to be much more slender than in *subareatus*.

It is extremely interesting to note that the geographically nearest relatives of the new species described here are in Peru and the extreme western part of the Amazon basin. Related forms doubtless occur in the lower part of the Amazon basin; but even so, the geographical distribution of this group of species within the range of *Amplinus* is noteworthy.

## 3. THE FAMILY PLATYRHACIDAE

### (POLYDESMIDA)

### **Platyrhacidae** Poc.

1895 Platyrhacidae POCOCK, Ann. Mus. Genova *34:* 788.
1909 Platyrachidae, subfam. Platyrachinae POCOCK, Biol. Centr.-Amer., Diplop., p. 138.
1916 Platyrhacidae, subfam. Platyrhacinae, tribe Platyrhacini BROLEMANN, Ann. Soc. Ent. France *84:* 550.

In 1896 COOK (Brandtia *12*: 51) gave a synoptic table of nine new American Platyrhacid genera. Seven of these were based on type species which were also new and which have never been described separately; the extremely short diagnoses must therefore be regarded as combined generic-specific descriptions.

Until recently COOK's arrangement of the Platyrhacidae had received little or no recognition. Prominent European authors of the last fifty years generally maintained a conservative attitude towards the taxonomy of the family by adhering to the use of *Platyrhacus* as a generic name for all the American and most of the Indo-Australian species. Moreover, ATTEMS, in particular, apparently held the opinion that the majority of COOK's generic names were invalid because the type species had not been described.

A few years ago, HOFFMAN (1953, J. Wash. Acad. Sci. *43*: 299, and 1953, Proc. Ent. Soc. Wash. *55*: 251) pointed out that, although COOK's generic concept might have been too narrow, the gonopod

structure of the American Platyrhacidae makes them referable to a number of well-defined genera which had already been recognized by COOK in 1896.

One of the main problems to be solved in the taxonomy of the American Platyrhacidae concerns the status of the genus *Platyrhacus*. KOCH, in 1847, based this genus on three species, namely on *Polydesmus scaber* Perty and two new species: *Platyrhacus rufipes* Koch, of uncertain provenance but supposedly from Brazil, and *Platyrhacus fuscus* Koch from Java. The type species was designated by SILVESTRI in 1896 as *Platyrhacus scaber* Koch.

Unfortunately, the identity of the three species originally included under *Platyrhacus* is uncertain, although perhaps it will be possible to identify *P. fuscus* with one of the Javan Platyrhacidae described later. As regards the status of the type species, difficulties are enhanced by the fact that, whereas the Brazilian species described by KOCH is undoubtedly a Platyrhacid, *Polydesmus scaber* Perty, from the Brazilian state of Minas Geraes, is not a species of this family but most probably belongs to the family Chelodesmidae.

For a solution of this problem, several possibilities are open. If, in strict accordance with the International Code, the nominal species *Polydesmus scaber* Perty is accepted as type of the genus, *Platyrhacus* will probably rest in oblivion among the doubtful genera of the Chelodesmidae for a long time to come.

However, to keep the genus within the family to which it has given its name, it seems more convenient to follow another course. In the first place, it might be possible to discard KOCH's synonymy and designate *Platyrhacus scaber* Koch and not *Polydesmus scaber* Perty as type species of *Platyrhacus*. This was, in fact, done by SILVESTRI in 1896, though probably not deliberately. The same solution was proposed by HOFFMAN in 1953 and in 1956 (Proc. Biol. Soc. Washington *69:* 46). Since, however, the identity of *Platyrhacus scaber* Koch is about as obscure as that of *Polydesmus scaber* Perty, the taxonomic position is not clarified by such an action. To circumvent this difficulty, HOFFMAN suggested application of the name *Platyrhacus* to "that genus which is most numerous in species and has the widest range." In itself this suggestion seems quite arbitrary, but it may be accepted provisionally, since all of the better-known Brazilian

Platyrhacidae happen to belong to this category. It must, however, be realised that an eventual rediscovery of *Platyrhacus scaber* Koch might make the stability reached quite illusory.

Perhaps the best way of reaching nomenclatorial stability would be to reject the type designation by SILVESTRI and select *P. fuscus* Koch as type species. This proposal would at least facilitate restriction of the genus, since there can be hardly any doubt that *fuscus* is closely related to, if not identical with, *Platyrhacus flavisternus* Poc. 1894 from Java.

Until one of the possibilities has been internationally legalized, I shall adhere to the concept of *Platyrhacus* initiated by HOFFMAN.

In his two papers HOFFMAN in 1953 enumerated the species referable to the genera *Psammodesmus* and *Platyrhacus*. However, no complete survey of the American Platyrhacidae has been published since ATTEMS' treatment of the family in 1938. In order to settle the generic nomenclature, a list of the American genera with their species is published here, together with a tentative key to the genera.

In the area under report the family is represented only by a single species belonging to the monotypic genus *Rhyphodesmus*, which appears to be fairly common in British Guiana but so far has not been found elsewhere.

KEY TO THE AMERICAN GENERA OF THE FAMILY PLATYRHACIDAE, based on gonopod characters.

1. Solenomerite and tibiotarsus both slender, gradually tapering and finely pointed; at least one of them strongly curved into almost a circle cephalad . . . . . 2
   Tibiotarsus more or less laminate, broader than the solenomerite. Neither bent into a circle . . . . . 3

2. Solenomerite and tibiotarsus paralleling each other; the solenomerite much longer than the tibiotarsus. Metatergites densely granular, without polygonal areas marked by furrows . . . . . *Rhyphodesmus* Cook

Solenomerite and tibiotarsus widely divaricate, of subequal length. Most of the metatergites without distinct granulation, but with polygonal areas marked by furrows . . . . . *Nanorrhacus* Cook

3. Femoral division of the gonopods proximad of the base of the solenomerite curving abruptly in a medio-anterior direction; the distal portion of the acropodite forming approximately a right angle with the proximal portion . *Nyssodesmus* Cook
   Femoral portion of the gonopods straight or weakly curved 4

4. Solenomerite pointing in a medio-posterior direction. Tibiotarsus also directed more or less caudad, distinctly demarcated from the femur by a constriction or chitinous line. Tibiotarsus broad, about one and a half times as long as wide . . . . . *Psammodesmus* Cook
   Solenomerite pointing in a medio-anterior and more or less distal direction. Tibiotarsus generally not distinctly demarcated from the femur, directed distad and usually cephalad, usually several times as long as broad . . . . . 5

5. Tibiotarsus broad, about one and a half times as long as broad. Lateral keels winglike, the latero-anterior edge very widely rounded . . . . . *Tirodesmus* Cook
   Tibiotarsus slender, several times as long as broad. Lateral keels generally more rectangular, the latero-anterior edge narrowly rounded or pointed . . . . . *Platyrhacus* Koch

## SURVEY OF THE AMERICAN GENERA OF THE FAMILY PLATYRHACIDAE.

### Nanorrhacus Cook

1896 *Nanorrhacus* COOK, Brandtia *12:* 52. (Type species: *Platyrhacus luciae* Poc., by original designation).

St. Lucia.

*N. luciae* (Poc. 1893).

### Nyssodesmus Cook

1896 *Nyssodesmus* Cook, Brandtia *12:* 53. (Type species: *N. alboalatus* Cook, by original designation).

Nicaragua, Costa Rica.

*N. alboalatus* Cook 1896, *N. antius* (Chamb. 1914), *N. bivirgatus* (Carl 1902), *N. fraternus* (Carl 1902), *N. limonensis* (Att. 1899), *N. mimus* Chamb. 1922, *N. montivagus* (Carl 1902), *N. nicaraguanus* Chamb. 1922, *N. nigricaudus* Chamb. 1922, *N. tristani* (Poc. 1909). The following two species probably belong to this genus, although the characters of the male are not known: *N. python* (Pet. 1864), *N. valerii* Chamb. 1933.

This genus was revalidated incidentally by Hoffman in 1953. To the six species he mentioned, *montivagus, nicaraguanus* and *nigricaudus* must be added, the latter two having probably been inadvertently omitted. *N. montivagus* and *N. fraternus* have been located in the genus *Platyrhacus* s. str. by Hoffman, but an examination of the gonopod drawings published by Carl leaves no doubt as to the correctness of the present reference. It is quite astonishing that the Costa Rican *fraternus* should have been placed in the synonymy of *Platyrhacus tenebrosus* (Silv.) by Attems in 1938. *P. tenebrosus* was described from Ecuador, and now proves to be generically distinct!

According to Hoffman, *N. valerii* may be identical with *N. montivagus.*

### Platyrhacus C. Koch

1847 *Platyrhacus* C. Koch, Syst. der Myriap., p. 58. (Type species: *P. scaber* C. Koch, by subsequent designation: Silvestri, 1896 (Ann. Mus. Genova *36:* 191)).

1896 *Barydesmus* Cook, Brandtia *12:* 53. (Type species: *B. kerri* Cook, by original designation).

1941 *Aymaresmus & Dynesmus* Chamberlin, Bull. Amer. Mus. Nat. Hist. *78:* 494, 497. (Type species of *Aymaresmus: A. tapichus* Chamb., by original designation; of *Dynesmus: D. iquitus* Chamb., by original designation).

Costa Rica, Panama, Colombia, Ecuador, Peru, Brazil (Amazonas).

*P. acanthosternus* Brol. 1900, *P. acompus* Chamb. 1941, *P. aequatorialis* (Silv. 1897), *P. aequinoctius* Att. 1914 (syn. *P. aequatorialis* Brol. 1900, not of Silvestri 1897, syn. *P. cyrtorhabdus* Brol. 1919), *P. azulae* Kraus 1956, *P. balsapuertus* Chamb. 1941, *P. bifasciatus* Silv. 1897, *P. broelemanni* Att. 1914 (syn. *P. mexicanus* Att. 1899, not of Lucas 1840), *P. celinus* (Chamb. 1941), *P. chapini* Hoffm. 1953, *P. chuncho* Chamb. 1941, *P. contayus* Chamb. 1941, *P. dunalii* (Gerv. 1847), *P. gualaquizensis* (Silv. 1897), *P. helophorus* Att. 1899, *P. iquitus* (Chamb. 1941), *P. javarynus* Schub. 1950, *P. kerri* (Cook 1896), *P. leucus* (Chamb. 1941), *P. loretus* Chamb. 1941, *P. mansericlus* Chamb. 1941, *P. obscurus* Kraus 1955, *P. orellanus* (Chamb. 1941), *P. pococki* Brol. 1911 (syn. *P.*

*stenopterus* Poc. 1909, not of BROLEMANN 1905), *P. propinquus* Carl 1902, *P. riparius* Carl 1902, *P. socius* Chamb. 1941, *P. strenuus* Silv. 1897, *P. tampocus* (Chamb. 1952), *P. tapichus* (Chamb. 1941), *P. tenebrosus* (Silv. 1898), *P. trichopygus* Chamb. 1941. The following species, the male characters of which are not or are insufficiently known, may belong in this genus, with varying degrees of probability: *P. affinis* Brol. 1919, *P. atratus* Chamb. 1947, *P. bombonus* Chamb. 1941, *P. brunnior* (Chamb. 1941), *P. clathratus* (Gerv. 1847), *P. fuscatus* (Chamb. 1941), *P. incus* Chamb. 1941, *P. medius* (Chamb. 1941), *P. retentus* Chamb. 1941, *P. rufipes* C. Koch 1847, *P. scaber* C. Koch 1847, *P. stenopterus* Brol. 1905, *P. utoquinus* Chamb. 1941, *P. zygethus* Chamb. 1941.

The concept of this genus here is slightly wider than that of HOFFMAN in 1953, and the species of *Barydesmus*, *Aymaresmus* and *Dynesmus* have been included. Of the genera described by COOK in 1896, *Barydesmus* seems to correspond most closely to *Platyrhacus* in the present interpretation of that genus. The genera *Aymaresmus* and *Dynesmus* were distinguished from *Platyrhacus* on account of the shape of the lateral keels; but as the differences are not correlated with differences in the gonopods, these genera seem to represent nothing more than groups of species.

It seems unquestionable that in *Platyrhacus*, as well as in the other generic groups distinguished here, many of the forms described as species will prove on closer study to be geographical races.

### **Psammodesmus** Cook

1896 *Psammodesmus* COOK, Brandtia *12:* 52. (Type species: *P. cos* Cook, by original designation).

1941 *Ernostyx* Chamberlin, Bull. Amer. Mus. Nat. Hist. *78:* 497. (Type species: *E. moyobambus* Chamb., by original designation).

Panama, Colombia, Ecuador, Peru.

*P. cainarachus* (Chamb. 1941), *P. calius* (Chamb. 1952), *P. camerani* Silv. 1897, *P. chuncho* (Chamb. 1941), *P. cos* Cook 1896, *P. dasys* (Chamb. 1941), *P. fasciolatus* Silv. 1898, *P. moyobambus* (Chamb. 1941), *P. schmitti* Loom. & Hoffm. 1953.

This genus was treated by HOFFMAN in 1953, and I have nothing to add except that the Colombian *Platyrhacus calius* Chamb. (the spelling "*callius*" is obviously a misprint) belongs in the same category.

### **Rhyphodesmus** Cook

See p. 92.

### **Tirodesmus** Cook

1896 *Tirodesmus* COOK, Brandtia *12:* 53. (Type species: *Polydesmus* (*Stenonia*) *fimbriatus* Pet., by original designation).

Nicaragua, Costa Rica, Panama.

*T. biolleyi* (Carl 1902) (syn. *Nyssodesmus albomarginis* Chamb. 1933), *T. fimbriatus* (Pet. 1864).

## Doubtful genera.

### **Arcydesmus** Cook

1896 *Arcydesmus* Cook, Brandtia *12:* 54. (Type species: *A. comptus* Cook, by original designation).

Colombia.

*A. comptus* Cook 1896, *A. ologona* Silv. 1898.

Judging from the description of the gonopods given by Cook, *A. comptus* might well belong to the genus *Platyrhacus* according to the present concept. If Silvestri's statement that the telopodite of the gonopods in *ologona* is unbranched is correct, this species may prove to belong to an unknown genus.

### **Cyphorrhacus** Cook

1896 *Cyphorrhacus* Cook, Brandtia *12:* 52. (Type species: *C. andinus* Cook, by original designation).

Ecuador.

*C. andinus* Cook 1896, *C. festae* Silv. 1897.

With both species apparently based on female specimens, any speculation on the status of the genus seems useless.

### **Proaspis** Loom.

1941 *Proaspis* Loomis, J. Wash. Acad. Sci. *31:* 193. (Type species: *P. aitia* Loom., by original designation).

Hispaniola.

*P. aitia* Loom. 1941.

In this genus, too, the male characters are unknown. According to Loomis, *P. aitia* differs from other American genera in a combination of characters. However,

the main diagnostic feature, the triangular production of the anterior part of the anal scale ventrad of the posterior margin of the 20th segment, also occurs in *Rhyphodesmus* and, according to HOFFMAN, in *Psammodesmus schmitti* Loom. & Hoffm. The condition has apparently been generally overlooked, and does not seem to have generic value. *Proaspis* may be related to *Rhyphodesmus* and *Nanorrhacus*, but the male will have to be found before anything more positive can be said.

### **Spilodesmus** Cook

1896 *Spilodesmus* COOK, Brandtia *12:* 54. (Type species: *S. exsul* Cook, by original designation).

Range unknown.

*S. exsul* Cook 1896.

The description of the gonopods of the type species does not match the conditions found in any of the better-known American Platyrhacids, and examination of the type is necessary to elucidate the status of the genus.

Species incertae sedis.

*"Platyrhacus" bilineatus* (Luc. 1840) and *"Platyrhacus" mexicanus* (Luc. 1840) were both described from Mexico, and have not been rediscovered since. The material described by ATTEMS under the name of *bilineatus* came from Brazil, and therefore probably belongs to another species. *"Platyrhacus" venezuelanus* Brol. 1898 was based on a female specimen; it may belong to *Rhyphodesmus*.

## **Rhyphodesmus** Cook

1896 *Rhyphodesmus* COOK, Brandtia *12:* 52.
1923 *R.*, CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 45.

Type species. – *R. terminalis* Cook, by original designation.

British Guiana.

Number of species: one.

When describing this genus COOK did not mention a locality for the type species. His reason for treating *Rhyphodesmus* as an American Platyrhacid genus is therefore somewhat obscure. However, the description corresponds perfectly with the species occurring in

British Guiana, and the interpretation of *Rhyphodesmus* as given by CHAMBERLIN in 1923 seems quite correct.

On the evidence of the gonopods, *Rhyphodesmus* seems to occupy a rather isolated position among the American Platyrhacidae. It appears to be related most closely to *Nanorrhacus;* but it resembles certain species of *Platyrhacus* occurring in the Oriental region much more than it resembles any of the American Platyrhacidae. In particular, the gonopods of species such as *"Platyrhacus" andersonii* Poc., *"P." moebiusi* Att., etc., are strongly suggestive of those found in *Rhyphodesmus*. A close relationship between the latter and these species seems probable.

A potential species of *Rhyphodesmus* is *"Platyrhacus" venezuelanus* Brol. 1898 from Venezuela, but unfortunately this species was based on a female specimen. *Proaspis aitia* Loom. 1941 from Hispaniola may possibly prove to be congeneric with *Rhyphodesmus*, but this species, too, is known only in the female sex.

## **Rhyphodesmus drurii** (Gray)

1832 *Polydesmus Drurii* GRAY, in: GRIFFITH, Animal Kingdom, Insecta, Vol. *1*, pl. 135 fig. 7–7a.
1844 *P. D.*, NEWPORT, Ann. Mag. Nat. Hist. *13:* 266. (1)
1848 *P. D.*, ERICHSON, in: SCHOMBURGK, Reisen in Britisch-Guiana, Vol. *3*, p. 552. (2)
1864 *P. (Stenonia) Druryi*, PETERS, Mon.ber. Ak. Berlin *1864:* 544. (2)
1896 *Rhyphodesmus terminalis* COOK, Brandtia *12:* 52.
1899 *Platyrrhacus Druryi*, ATTEMS, Denkschr. Ak. Wien *68:* 332, pl. 14 fig. 336. (2)
1923 *R. amphelictus* CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 44, pl. 18 fig. 117–118. (3)
1938 *Platyrhacus (Platyrhacus) druryi*, ATTEMS, Tierreich *69:* 213, fig. 229.
1950 *R. kartabo* CHAMBERLIN, Zoologica, New York *35:* 143. (4)

Previous records: British Guiana (2): Demerara (1); Demerara: Labba Creek Sand Hills; cacao plantation; Demerara River (3); Kartabo (4).

BRITISH GUIANA: Georgetown (Coll. J. J. QUELCH, Mus. London), 1 ♀; Demerara: Vrijheidslust (W. H. TURNER, London), 1 ♀; Potaro Road at 82 miles, Mazaruni (Dr. G. S. CARTER, London), 2 ♀♀; Konawaruk, from beneath bark of decaying tree, 28 Dec. (G. E. BODKIN, London), 2 ♀♀; Ituri Savannah, May 1919 (Cattle Trail Survey, A. A. ABRAHAM, London), 2 ♂♂, 2 ♀♀; Essequibo River, Moraballi Creek, at base of Mora bukir tree, 15 Sep. 1929 (Oxford Univ. Exped., O. W. RICHARDS, London), 1 ♀; Essequibo

River, Monkey Jump, in a dark forest, 11 Oct. 1929 (Oxford Univ. Exped., O. W. RICHARDS, London), 1 ♂; Essequibo River, Moraballi Creek, 7 ft. up a Mora bukir tree, 21 Oct. 1929 (Oxford Univ. Exped., O. W. RICHARDS, London), 1 ♀.

When in London, I compared the material enumerated above with the type specimen of GRAY. The following description has been made from a ♂ and a ♀ specimen from Ituri Savannah, which were kindly presented to me by Mr. E. BROWNING of the British Museum.

Colour. – Dull grey-brown. The lateral keels and the tail more yellowish brown. Ventral side of the segments, the sternites and the legs pale brownish.

Width. – ♂♂: 11.3–11.5 mm (in the order of the above enumeration: 11.5, 11.5 and 11.3 mm). ♀♀: 12.0–14.3 mm (in the order of the above enumeration: 12.6; 12.8; 12.9, 12.9; 12.4, 13.6; 12.3, 12.8; 12.0 and 14.3 mm).

Head and antennae. – Labrum scarcely emarginate, tridentate. Clypeus rather weakly convex, moderately impressed towards the labrum. Lateral sides widely convex. Headplate rather densely granulate all over, tegument shiny, but between the granules generally dulled by adhering earth particles. Clypeus with a transverse row of about 10 tufts of setae above the labrum and a similar row of 4 tufts a little higher up. Rest of headplate hairless. Antennal sockets separated by a little less than the diameter of one socket, or by about the length of the 2nd antennal joint. Postantennal groove and the wall in front moderately developed. Vertex moderately convex, not demarcated from the frontal region. Sulcus rather weakly impressed in the upper part, rather strongly impressed in the lower part, running downward to between the antennal sockets. Antennae short and thick. The 2nd joint a little longer than the others, which are of subequal length. The 6th joint about three quarters of the length of the 2nd. Width of the 2nd to 4th joints subequal, the 5th and 6th joints each a little narrower than the preceding joint. All joints densely set with very short setae and some longer ones, which become more numerous in the distal joints.

Collum. – Subtrapezoidal in dorsal outline, with the greatest width before the middle. Anterior border medially straight or very weakly convex, becoming a little more strongly rounded towards the lateral sides. Posterior border almost forming one continuous circular line between the lateral edges, but medially a little less rounded. Lateral edge of collum about rectangular and rather narrowly rounded. Surface shiny, although generally dulled between the dense granulations by adhering earth. Surface rather convex, especially laterally. Granules of variable size; those along the posterior border and those just behind the anterior border usually belong to the larger-sized ones and form an inconspicuous row. There is, however, no sharp distinction between larger and smaller granules. Collum without marginal rim, a little wider than the head.

Body segments. – Rather weakly constricted by a narrow, shiny waist, which may be distinctly longitudinally ribbed in some segments, or a little irregularly uneven, or smooth. Waist anteriorly well marked off from the dull, densely minutely granulate prosomite. Metatergites with sculpture similar to that of collum. In most segments there are no distinct transverse rows of larger granules. Only in a few posterior segments is a sharper distinction possible between larger and smaller granules, with the larger granules distinctly arranged in three transverse rows: one

behind the waist, one in the middle, and one along the posterior margin. Tergites without transverse furrow or depression. Sides more finely granulate. Pleural keels in the 3rd segment represented by a row of rather small tubercules; from the 4th segment onwards by a single, larger, conical tubercule above the posterior legs of each segment, which grows smaller in subsequent segments, and disappears in about the 15th segment.

Lateral keels. – 2nd segment much wider than the collum. The 3rd somewhat wider than the 2nd and a little narrower than the 4th. 5th segment of about the same width as the 4th. Keels of all segments on a rather high level, sloping strongly in lateral direction in the 2nd segment, gradually less in the subsequent segments, but not attaining the horizontal level in any. Keels of the 2nd segment a little thrust forward, with the anterior border shouldered at the base but otherwise straight, finely and weakly scalloped to subserrulate. Lateral margin without edges, evenly rounded, with about six scallops. Posterior border straight; like the anterior margin, weakly serrulate. Only the anterior border with a very indistinct marginal rim. Keels of the 3rd segment subsimilar to those of the 2nd segment, but a little less thrust forward, and with a rather widely rounded acute anterior edge and a more narrowly rounded obtuse posterior edge. The lateral margin widely rounded. Keels of the 4th segment similar to those of the 3rd, but scarcely thrust forward, the anterior edge almost rectangular, rounded, and the posterior edge a little less obtuse than in the 3rd segment. Keels from the 5th segment onwards directed laterad or gradually more caudad. The anterior margins very weakly rounded, shouldered at the base, finely serrulate, with a scarcely defined rim. Latero-anterior edges obtuse, gradually more so in the posterior segments. Lateral margins widely rounded, almost straight, or even a little emarginate, generally with 5 to 6 scallops, sometimes with up to 9 scallops. Posterior edges generally bent a little inward, obtuse, generally finely pointed, produced a little behind the margin of the segments in the second half of the body, but distinctly so only in the 17th, 18th and 19th segments. Posterior margins straight or very weakly emarginate, finely serrulate. Poriferous segments with the peritremes rather small, situated one and a half to two and a half times the diameter from the lateral margin.

Sternites and legs. – Sternites of middle segments about as long as wide. Cross impressions consisting of a distinct transverse furrow and a wide longitudinal excavation. Sternite of 4th segment with a narrow longitudinal incision. Sternite of 5th segment with a deep cross impression and well-developed cones at the base of the legs. Sternite of 6th segment deeply and widely longitudinally incised, the cones present only at the base of the anterior legs. Sternite of the 7th segment with cones at the base of the posterior legs. Sternite of the 8th segment also with well-developed cones at the base of the legs. In the 9th and 10th segments these cones become smaller, and from the 11th segment onwards they are almost obsolete. Sternites weakly granulose, hairless except in the pregonopodial segments. Legs of moderate length, thick, rather densely pubescent, especially in the distal joints. In particular the dorsal side of the tibiae and tarsi is very densely setiferous. The hairs short, except in the pregonopodial segments. Length of the joints: $3 > 6 > 5 > 2 = 1 > 4$. The 6th joint two thirds the length of the 3rd, the 5th two thirds the length of the 6th.

Anal segment. – Tegument subrugulose. Tail of moderate length, about twice as broad as long, distinctly constricted at the base. The sides widely rounded, the

latero-posterior edge somewhat more narrowly rounded. Posterior border widely rounded, a little irregular. Ventral side of tail concave, shiny. Scale subgranulose, trapezoidal. The sides very weakly concave, the posterior border straight. Setiferous tubercules almost obsolete. Anterior side of scale thick, medially slightly produced cephalad in front of the posterior border of the anal ring. Valves weakly granulose, subrugulose. Rim rather narrow, moderately high. Setiferous tubercules rather weakly developed.

Gonopods. – These have been clearly illustrated by ATTEMS (1899, 1938) and CHAMBERLIN (1923).

Female. – More robust than the ♂♂. Otherwise differing from the ♂♂, apart from the usual sexual characters, in having the 5th body segment slightly wider than the 4th. Lateral keels comparatively less developed than in the ♂♂. Sternites of the 5th to 10th segments with cones at the base of the legs, which become almost obsolete in the second half of the body. Tail broader, about two and a half times as broad as long. The latero-posterior edges more widely rounded.

Location of type material. — British Museum (Natural History), London (*P. drurii* Gray); Zoologisches Museum, Berlin (*R. terminalis* Cook); Museum of Comparative Zoölogy, Cambridge (*R. amphelictus* Chamb.); American Museum of Natural History, New York (*R. kartabo* Chamb.).

Up till now, all workers have credited NEWPORT with the authorship of this species. The name *drurii*, however, was introduced in literature by GRAY twelve years before the appearance of NEWPORT's paper, in connection with two small but fairly adequate gonopod drawings. Although NEWPORT was the first to give a verbal description of *drurii*, without doubt based upon the same material from which GRAY made his drawings, there seems to be no reason for not following his precedent in attributing the species to GRAY.

NEWPORT's brief diagnosis did not allow of a decision regarding the correctness or otherwise of the reference to *drurii* of the material described by ATTEMS under that name – material possibly derived from the SCHOMBURGK collection. Actual study of the type specimen of *drurii*, a well-preserved male in the dry collection of the British Museum, and of the additional material mentioned above, has convinced me of the correctness of this reference. Moreover, the study of this material has revealed that *R. terminalis* Cook, *R. amphelictus* Chamb. and *R. kartabo* Chamb. all belong to the same species. The discrepancies in the descriptions of these species mainly concern the sculpture of the collum and the metatergites. As regards

*terminalis*, COOK has stated that three rows of larger tubercles are present on the metatergites, and a similar statement has been made by CHAMBERLIN in respect of his *amphelictus*. In ATTEMS' description of *drurii*, and that by CHAMBERLIN of *kartabo*, the granulation of the tergites is said to be uniform. This difference is obviously due to the variation of the sculpture occurring in this species as well as to the personal interpretations of the describers. A sharp distinction between larger and smaller granules, however, is possible only in a few posterior segments; in the other segments the distinction between two sizes of granules is merely a matter of personal opinion. In some specimens the transverse rows of granules may be a little more distinct than in the others, but that condition falls within the range of variation of the species. For this reason, the alleged presence of larger granules along the anterior and posterior margins of the collum of *R. amphelictus*, and the absence of such granules in *R. terminalis*, also lose their value as taxonomic characters.

According to CHAMBERLIN, *R. kartabo*, based on a female specimen, might also be distinguished from *amphelictus* by its more convex dorsum and the location of the pores at a somewhat greater distance from the margins of the keels. The first character is a usual feature of the female specimens in *drurii*, the latter falls within the range of variability of that species.

# 4. THE FAMILY CHELODESMIDAE

## (POLYDESMIDA)

### **Chelodesmidae** Cook

1895 Chelodesmidae & Xystodesmidae COOK, in: COOK & COLLINS, Ann. New York Acad. Sci. *9:* 4, 5.
1898 Polydesmidae, subfam. Leptodesminae ATTEMS, Denkschr. Ak. Wien *67:* 369.
1909 Chelodesmidae subfam. Chelodesminae & Xystodesminae POCOCK, Biol. Centr.-Amer., Diplop., p. 160, 186.
1914 Xystodesmidae & Leptodesmidae ATTEMS, Arch. Naturg. *80A* (4): 241, 280.
1916 Leptodesmidae, subfam. Leptodesminae, trib. Leptodesmini, Rhysodesmini & Melaphini, & subfam. Devilleinae, trib. Devilleini BROLEMANN, Ann. Soc. Ent. France *84:* 550, 551, 553, 554, 555.
1938 Leptodesmidae ATTEMS, Tierreich *69:* 1.
1950 Eurydesmidae CHAMBERLIN, Zoologica, New York *35:* 142.

After the re-examination by HOFFMAN (1950, Proc. Biol. Soc. Washington *63*: 185) of *Chelodesmus marxi* Cook, there seems to be no reason at all for not accepting the family name based on this species, even though the name *Chelodesmus* Cook has proved to be a subjective synonym of *Eurydesmus* Sauss.

Recently, however, SCHUBART (1956, Rev. Brasil. Biol. *16*: 453) has strongly opposed the use of the name Chelodesmidae. In his opinion (1) *Chelodesmus marxi* Cook is a nomen nudum, and accordingly has no status, and (2) the name Leptodesmidae has been generally accepted for over fifty years and is older than the name Chelodesmidae.

However, the statement that *Chelodesmus* is a nomen nudum is incorrect, since the proposal of the name was accompanied by a description, short and inadequate though it may be. Obviously the genus was monobasic, and the type species was mentioned by name, although no separate description was given. The short description of *Chelodesmus* must therefore be regarded as a combined generic-specific diagnosis.

In itself, the way in which COOK introduced *Chelodesmus* and the family Chelodesmidae into literature must be strongly deprecated. But, on the other hand, since there is no generally accepted rule against this kind of "taxonomic" work, any personal attitude to it

on grounds not in accordance with the international rules of nomenclature must inevitably lead to complete nomenclatorial chaos.

SCHUBART's second argument, relating to use of the name Chelodesmidae, brings up again the old feud among taxonomists regarding priority versus continuity.

In my opinion the principle of continuity should be followed only in those cases were the scientific names concerned have long been used in non-taxonomic literature. In all other circumstances the law of priority must prevail, since it affords us the only possibility of arriving at an objective solution, and facilitates a quick stabilization and unification of nomenclature.

As regards the present case, since nearly all literature on tropical millipeds is either taxonomic or faunistic, I cannot see any reason for not following the law of priority. Moreover, the name Chelodesmidae has been used by POCOCK and most of the American authors for a long time.

I may add here that it becomes more and more evident that European authors of the previous generation either sadly neglected the nomenclatorial part of their work or adhered to some quite unreasonable principles regarding nomenclature.[1]) These conditions have resulted in quite a number of errors, the correction of which naturally involves some more or less important changes. The sooner these errors are located and disposed of, the better it will be for the future taxonomy of the group.

The Chelodesmidae constitute the dominant family of the Polydesmida in South America, although their range also includes Central and North America and the eastern and western parts of the Palearctic regions. The whole group is in need of a thorough revision since it seems to contain heterogeneous elements. Moreover, in particular, its delimitation from the African Oxydesmidae does not seem satisfactory yet.

[1]) It may be of some interest to students of Diplopoda not familiar with Chilopod literature that ATTEMS' principle of discarding any scientific name attached to an insufficiently described species was criticized as far back as 1903 by such an authority as KRAEPELIN in his "Revision der Scolopendriden" (Mitt. Naturhist. Mus. Hamburg *20*: 7).

In Guiana the family is now represented by five genera, a number which will doubtless be enlarged considerably by future exploration.

KEY TO THE GENERA OF THE FAMILY CHELODESMIDAE

which are known to occur in Guiana.

1. Lateral keels of the body segments with two deep emarginations each, so that in the poriferous keels the pore calluses are situated at the end of a stalklike process. Width of males: 3.0 to 5.1 mm. . . . . *Priodesmus* Cook
   Lateral margin of the lateral keels entire or with some notches 2

2. Large species: width of males 7.8 to 10.9 mm. Prefemoral process of gonopods extremely large, ear-shaped, forming a protective shield at the lateral side of the acropodite . . . . . *Leptherpum* Att.
   Smaller species: width of males less than 6.0 mm. Prefemoral process smaller, more slender, not forming a shield at the lateral side of the acropodite . . . . . 3

3. Metatergites granulate, with two or three transverse rows of larger tubercules, and with a distinct transverse depression. Lateral margins of the lateral keels from the 5th segment onwards with three notches . . *Brasiloschubartia* nov. gen.
   Metatergites smooth and without a transverse impression. Lateral margins of the keels entire or weakly incised in front of the pore calluses . . . . . 4

4. Lateral keels on a comparatively low level; their lateral margins incised in front of the pore calluses . . . . . *Zigwadesmus* Chamb.
   Lateral keels on a rather high level; their lateral margins entire . . . . . *Iphyria* Chamb.

## Priodesmus Cook

1895 *Priodesmus* Cook, Proc. U.S. Nat. Mus. *18:* 53.
1938 *P.*, Attems, Tierreich *69:* 62.

Type species. – *P. acus* Cook, by subsequent designation: Brolemann, 1916 (Ann. Soc. Ent. France *84:* 552).

Surinam, French Guiana, Brazil (Amapá, Pará).

Number of species: six, plus one variety.

According to our present knowledge this genus is focussed in the geographical area under report, and so far only two species have been described from elsewhere. These two are *P. parae* Cook 1895 from Pará and *P. aurae* Schub. 1947 (Bol. Mus. Nac. Rio de Janeiro (n.s.) *82*: 45, fig. 44–45) from Aurá (near Belém), Pará. Some doubt must be raised as to the validity of *P. aurae*. Unfortunately, Cook's species was based on a female specimen, and the type locality seems somewhat uncertain since we do not know whether Cook meant the state or the city of Pará. In any case, the description of *parae* closely agrees with the one Schubart gave of his *aurae*. But, as is usual in such cases, the eventual identity of the two can only be ascertained by actual comparison of the type material.

In the present paper two new species are added to *Priodesmus*. A quite unexpected addition to the genus is the long-enigmatic *Polydesmus elegans* Gray, which actual examination showed to be based on a female specimen of a *Priodesmus* species.

The species added here, *P. haematopterus* and *P. coralloides*, are taxonomically rather disjunct from the species hitherto known, and widen our concept of the genus considerably. They resemble the other species of the genus in their general aspect, determined largely by the deep emarginations of the lateral keels which divide these keels into three subequal prongs. In many characters, too numerous to list here but easily found in the diagnosis of *haematopterus*, they deviate strongly from the more typical members of the genus. The gonopods, for instance, show much more similarity to the general type encountered in the Chelodesmidae, and femoral modifications of the males occur in the 2nd, 3rd and 4th pairs of legs

instead of in the 4th, 5th, 6th and 7th. Apart from the gonopods, in other characters as well, the two new species show a less pronounced differentiation than do *P. acus, papillosus* and *aurae.*

Within the group of the latter three species, *P. aurae* is apparently somewhat disjunct from the others, although the principal differential characters are found in the gonopods.

*Priodesmus elegans* (Gray) is a species most closely related to *P. haematopterus* nov. spec.; its status will be discussed in connection with the description of that species.

The intra-generic relationship of the species may be expressed as follows:

1. a. *P. acus* Cook, *P. acus* var. *rutilipes* Jeek., *P. papillosus* Att.
   b. *P. aurae* Schub.; *P. parae* Cook?

2. *P. coralloides* nov. spec., *P. elegans* (Gray), *P. haematopterus* nov. spec.

The relationship of the genus *Priodesmus* is still a matter of speculation. When describing the genus, COOK suggested a relationship to *Rhachidomorpha nodosa* (Pet. 1864), a species referred to *Alocodesmus* by ATTEMS in 1938. In the gonopods of this Colombian species, however, scarcely anything can be found in support of this view.

Striking similarity is observed in the structure of the lateral keels of *Priodesmus* and of the genera *Beatadesmus* Loom. 1934 and *Quisquicia* Loom. 1936 from Hispaniola. It is, however, difficult to say whether this indicates a close relationship or is the result of an evolutionary convergence. The fact that in some species of *Quisquicia* the lateral keels lack the deep emarginations points to the latter possibility.

Among the Chelodesmid genera occurring in Guiana, *Priodesmus* is perhaps most closely related to *Brasiloschubartia* nov. gen. This is shown by the sculpture of the metatergites and by the outline of the lateral keels, in which the notches in front of and behind the pore calluses in *Brasiloschubartia* seem to represent the wide lateral emarginations in *Priodesmus.*

The definitive status of *Stenonia* Gray, a genus at present still

dubious, may be of importance to the fate of the name *Priodesmus*. This point will be discussed under the remarks on that genus.

## KEY TO THE SPECIES OF *Priodesmus*,

based primarily on characters of the males.

*P. parae* Cook, and *P. elegans* (Gray), based on female specimens, cannot be separated properly from the other species of their groups.

1. Antennae distad of the 5th joint yellowish to orange-red, the proximal joints more or less dark-brownish. Lateral keels dark brown, with only the tips of the lobes paler or whitish. (Antennae of moderate length, distinctly clavate, the first joint subglobose.) [1]) Middle lobe of the lateral keels of the non-poriferous segments distinctly bidentate, sometimes tridentate. Posterior lobe of the lateral keels with three to five teeth. (Pleural keels in most of the segments represented by a conical process above each leg, the posterior process of each segment projecting well behind the posterior margin. Legs of ♂ rather long, the femora in the 4th, 5th, 6th and 7th pairs ventrally inflated.) [1]) . . . . . 2 [2])

   Antennae of more or less dark brown colour, the distal joints not contrastingly coloured. Lateral keels orange to blood-red. Antennae long, scarcely clavate, the first joint distinctly elongate. Middle lobe of the lateral keels of the non-poriferous segments entire, or with one or two very weak notches. Posterior lobe of the lateral keels unidentate. Pleural keels in middle segments represented only by swellings above each leg, bearing some conical granules. Legs of ♂ long, the femora of the legs of the 2nd, 3rd and 4th pairs with a ventral tubercule . . . . . 5 [3])

[1]) The characters between parentheses are not known for *aurae*.
[2]) *P. parae* Cook also belongs here.
[3]) *P. elegans* (Gray) also belongs here.

2. Gonopod coxa setiferous. Prefemoral process well developed, a little shorter than the acropodite, serrulate. Acropodite not marked off from the prefemur, split into two branches almost to the base . . . . . *P. aurae* Schub.
Gonopod coxa hairless. Prefemoral process either almost obsolete or well developed as a slender styliform process of about the same length as the acropodite. Acropodite distinctly demarcated from the prefemur, the distal end divided into a short solenomerite and a lamelliform, notched tibiotarsus . . . . . 3

3. Prefemoral process almost completely reduced, shorter than the coxa . . . . . *P. papillosus* Att.
Prefemoral process well developed, of about the same length as the acropodite . . . . . 4

4. Colour of the distal joints of the antennae and of the legs yellowish. Width of ♂♂: 3.0–3.8 mm. . . . . *P. acus* Cook
Colour of the distal joints of the antennae and of the legs bright orange-red. Width of ♂♂: 4.3–5.1 mm. . . . . *P. acus* var. *rutilipes* Jeek.

5. Lateral margin of collum with two weak, similar notches, the latero-posterior edge entire. Middle prong of the lateral keels of the poreless segments entire or very slightly bifid. The emarginations separating the three prongs of the lateral keels moderately wide and deep. Tibiotarsus of gonopods scarcely projecting distad of the prefemoral process, with a triangular lobe . . . . . *P. haematopterus* nov. spec.
Lateral margin of collum with the second notch deepest, the latero-posterior edge bifid. Middle prong of the lateral keels of the poreless segments distinctly bidentate or tridentate. The emarginations separating the three prongs of the lateral keels wider and deeper. Tibiotarsus of gonopods projecting distinctly distad of the prefemoral process, without a triangular lobe . . . . . *P. coralloides* nov. spec.

## Priodesmus acus Cook

1895 *Priodesmus acus* Cook, Proc. U.S. Nat. Mus. *18:* 55, pl. 1 fig. 1–19. (1)
1934 *P. a.*, Loomis, Smiths. Misc. Coll. *89* (14): 33, pl. 2 fig. 3. (2)
1938 *P. a.*, Attems, Tierreich *69:* 62, fig. 68–69.
1950 *P. a.*, Jeekel, Ent. Ber. *13:* 70. (3)

Previous records: Surinam (1): 70 km from Paramaribo, along railway to Kabelstation (2); Wilhelmina mountains, near the Lucie Rivier (3).

Surinam: Wilhelmina mountains, near the Lucie Rivier (Exped. Stahel 1926, Coll. Dr. D. S. Fernandes, Mus. Amsterdam), 2 ♂♂ re-examined; without locality (Saramacca Exped. 1902–1903, Dr. P. J. de Kock, Mus. Leiden), 3 ♂♂.

Colour. – Dark reddish-brown, the teguments of the head and the metasomites often covered by earth particles. Labral and lower portion of the clypeal region of the head, the antennae distad of about the middle of the 5th joint, the venter and the legs: pale reddish-brown to brownish or reddish yellow. Larger granules of the collum and the metatergites, and the teeth and lobes of the lateral keels: dirty-whitish.

Width. – Lucie Rivier: 3.6 mm, 3.8 mm; without locality: 3.5 mm, 3.6 mm and 3.6 mm.

Head and antennae. – Labrum very weakly emarginate, tridentate. Clypeus moderately convex, rather weakly impressed towards the labrum. Lateral sides straight or very weakly convex. Surface of headplate shiny, smooth in the clypeal part, rugulose and dispersedly granulose in the frontal part, rather densely granulose in the vertex. Pubescence moderately dense in the clypeal part, sparse in the frontal region; the vertex with a transverse row of four setae. Antennal sockets separated by about one and a quarter times the diameter of one socket or by about two thirds the length of the 2nd antennal joint. Postantennal groove moderately developed, the wall in front rather prominent. Vertex moderately convex, not or weakly demarcated from the frontal region. Sulcus well impressed, running downward to just between the antennal sockets. Antennae of moderate length, rather thick. Joints two to six gradually decreasing in length, the 6th about two thirds the length of the 2nd. Width of the 3rd and 4th joints very slightly less than that of the 2nd and 5th. The 6th joint distinctly wider than the others. Pubescence moderate, distally rather dense.

Collum. – A little wider than the head, subtrapezoidal in dorsal outline. Anterior margin widely rounded, abruptly more convex towards the lateral sides. Posterior margin scarcely emarginate in the middle, a little convex laterally; the posterior border of the keels widely emarginate, finely and rather weakly serrulate. Lateral border very weakly convex, with two or three weak teeth, without marginal rim. Latero-posterior edge acute, sharply pointed. Surface of collum granulate, shiny, transversely and longitudinally weakly convex, a little flattened or even weakly longitudinally impressed in the middle. Granules of unequal size: the larger granules are dispersed on the surface, four of them are closely arranged in a row along the middle of the posterior border.

Body segments. – Moderately constricted by a rather broad waist, which is smooth and shiny, posteriorly passes gradually over into the metasomite, but anteriorly is sharply marked off from the dull, minutely punctulate prosomite. Metatergites shiny, with a dense granulation; the granules of unequal size. Larger granules arranged in a generally regular row of six to eight along the posterior margin; before this row, a similar but more irregular row of three to five granules; a few dispersed granules on the anterior portion of the metatergites. From the 3rd to the 18th segment, a transverse depression is present, situated just behind the middle of the metatergites, rather broad, well impressed, smooth and shiny. Sides of metasomites granular like the dorsum, but without larger granules, with a transverse depression in the middle. Pleural keels up to the 4th segment represented by a coarsely tuberculate ridge. From the 5th segment onwards these ridges are interrupted in the middle, anteriorly and posteriorly they are produced in a conical process, the posterior of which projects behind the margin of the metasomites up to about the 17th segment. In the posterior segments the anterior cone becomes a little less strongly developed, but both cones remain visible up to the 18th segment.

Lateral keels. – 2nd segment distinctly wider than the collum, somewhat narrower than the 3rd segment. 4th segment of width subequal to the 3rd, a little narrower than the 5th. Keels of all segments on a high level, about horizontal or, in posterior segments, raised a little above the horizontal level, and in the 18th segment projecting a little above the middorsal surface of the metasomite. Keels of the 2nd to the 4th segment with the anterior margins widely convex, finely rimmed and a little shouldered at the bases. The lateral sides rather weakly convex, generally with three teeth. Posterior edges rather sharply pointed, acute. Posterior borders widely emarginate, irregularly denticulate, in the 4th segment with a large triangular tooth. From the 5th segment onwards the keels are trilobate. Anterior margins straight or very weakly convex, with a fine marginal rim as in the preceding segments. The anterior margins of the lateral keels up to the 5th segment are directed a little cephalad; in the 6th segment they are transverse on the longitudinal axis, to become directed a little caudad in the subsequent segments. The end of the anterior lobe bi or tridentate, the posterior tooth the largest. Middle lobe extending a little more laterad than the anterior; in poreless segments generally ending in two, sometimes in three teeth. In poriferous keels the middle lobe bears the sharply marked-off pore callus. The pores are situated latero-dorsally in about the centre of the pore callus, in a weak excavation. Posterior lobe of keels directed laterad and a little caudad, extending less laterad than the anterior or middle lobes, ending in three to five teeth. Posterior margin of keels emarginate, irregularly denticulate. In the 19th segment the anterior lobe of the keels is missing.

Sternites and legs. – Sternites of middle segments about one and a third times as broad as long, rather densely set with minute setiferous tubercules. Sternite of 4th segment with a pair of elongate cones. Sternites of 5th and 6th segments with deep cross impressions and with well-developed, blunt cones at the base of each leg. 7th segment also with distinct cones at the base of the posterior legs. Sternites of the 8th and subsequent segments without cross impressions, transversely widely and weakly concave; transverse furrow rather weak, often interrupted in the middle. Sternal cones in these segments either vestigial (in the material from the Lucie Rivier) or small but distinct and finely pointed, present up to the last sternite (material without locality). Legs rather long and not particularly slender. Pubescence

moderate, a little more dense in the distal joints and in the anterior legs. Length of joints: 3 > 6 > 5 > 2 > 4 > 1. The 6th joint about three quarters the length of the 3rd, the 5th joint about half the length of the 6th. Legs of the 5th and 6th segments with a well-developed ventral inflation a little proximad of the middle of the femur.

Anal segment. – Finely rugulose-granulose. Tail short and broad. The setiferous tubercules very strongly developed. Sides of tail a little concave, rather strongly convergent. Dorsal side of tail convex, at the base a strongly developed transverse depression. End of tail broadly truncate, directed a little downward. Valves rugulose, the margins smooth, rather narrow and rather strongly raised; the setiferous tubercules weakly developed. Scale with minute scattered granules; the setiferous tubercules rather small, scarcely projecting. Scale rather broadly triangular, the sides widely convex.

Gonopods. – The gonopods of *P. acus* are identical with those of *P. acus* var. *rutilipes* which were illustrated in 1950.

Female. – Unknown. See, however, the remarks made under *P. papillosus*.

Location of type material. – U.S. National Museum, Washington.

The only apparent difference between the present material and the description by COOK is that the type specimen must be considerably smaller: width 3.0 mm. In this respect *P. acus* shows a quite extraordinary intraspecific variability, considering the width of the specimens studied here: 3.5–3.8 mm, and that of the variety *rutilipes*: 4.3–5.1 mm. Unfortunately, in the absence of sufficient geographical data it is impossible to determine the nature and taxonomic importance of this variability.

*P. acus* cannot be distinguished from *P. papillosus* by non-gonopod characters. The reference to *acus* by LOOMIS, 1934, concerning a female and an immature male specimen, may therefore be erroneous.

## **Priodesmus acus** Cook var. **rutilipes** Jeekel

1950 *Priodesmus acus* var. *rutilipes* JEEKEL, Ent. Ber. *13:* 70, fig. 1–3.

Previous record: Surinam, Saramacca Rivier.

SURINAM: Saramacca Rivier, 1932 (Coll. VAN DER SLEEN, Mus. Amsterdam), 1 ♂; Surinam, without further indications (Mus. Amsterdam), 4 ♂♂. – The type material re-examined.

Differs from the type form of *P. acus* in the following characters:

Colour. – As in *acus*, but the 6th, 7th and 8th joints of the antennae and the legs are bright reddish orange.

Width. – 4.3–5.1 mm.

Body segments. – Dorsad of the posterior cones of the pleural keels of the 18th or the 17th and 18th segments, a few smaller, posteriorly projecting cones may be present.

Sternites and legs. – Small but distinct sternal cones are present in all specimens.

Location of type material. – Zoölogisch Museum, Amsterdam.

The taxonomic status of this variety remains uncertain, since the material of *P. acus* available is too scanty to allow determination of the constancy of the characters given above.

The differences in colour between *acus* and *rutilipes* are likely to be due to the somewhat better state of preservation of the material of the latter; fresh material of the typical form of *acus* might show a coloration similar to that of *rutilipes*. The systematic value to be attributed to the larger size of the var. *rutilipes* becomes a little dubious after consideration of the wide, though somewhat less significant, variation in dimensions found in *P. papillosus*. Regarding the presence of the small cones along the posterior margins of the sides of the posterior segments, attention should be drawn to the fact that *P. papillosus* shows a great variability in this respect too.

## **Priodesmus papillosus** Att.

1931 *Priodesmus papillosus* ATTEMS, Zoologica, Stuttg. *30* (3/4): 41, fig. 60–63. (1)
1938 *P. p.*, ATTEMS, Tierreich *69:* 63, fig. 70–72.

Previous record: Surinam (1).

SURINAM: Paramaribo, 1911 (Coll. Jhr. W. C. VAN HEURN, Mus. Leiden), 1 fragm. of ♂, 1 fragm. of ♀; Nassau Mts., big falls in Bleeders Kreek, 7 km line, 7 Mar. 1949 (Sci. Exp., Dr. D. C. GEIJSKES, Leiden), 1 ♂; Nassau Mts., 7.4 km line, 11 Mar. 1949 (Sci. Exp. Geijskes, Leiden), 1 ♂; Nassau Mts., 8.6 km line, 11 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♂, 1 ♀; Nassau Mts., base camp, 15 Feb. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♂; 'steenbedrijf', 121 km S of Paramaribo along railway, 21 Apr. 1949 (GEIJSKES, Leiden), 1 ♀; Republiek, in tree stump, May 1957 (GEIJSKES, Mus. Amsterdam), 5 ♂♂; Sabanpasi, savanna forest, 3 Aug. 1957 (GEIJSKES, Amsterdam), 1 ♀.

Differs from *P. acus* in the following characters:

Colour. – Similar to that of *acus*, but the 6th, 7th and 8th joints of the antennae and the legs are bright reddish orange (freshly preserved material) or pale reddish to brownish-yellow (older material).

Width. – ♂♂: 3.5–4.1 mm (in the order of the above enumeration: 3.6 mm; 3.5 mm; 4.1 mm; 4.1 mm; 4.0 mm; 3.5, 3.6, 3.7, 3.8, 3.8 mm). ♀♀: 4.7–5.6 mm (in the order of the above enumeration: 4.7 mm; 4.9 mm; 5.1 mm; 5.6 mm).

Head and antennae. – Labral emargination very weak to rather weak.

Collum. – Anterior margin sometimes a little emarginate just mesad of the lateral rounding; the surface a little impressed there. Granulation sometimes a little coarser.

Body segments. – Granulation sometimes a little coarser. Posterior conical process of the pleural keels generally present up to the 18th segment. Above these conical processes, generally in the 17th and 18th segments, sometimes also in the 16th, the granules of the sides along the posterior margins are developed as a series of small spines, a condition suggesting that met with in species of the African Oxydesmid genus *Scolopopleura* Att. In the majority of the specimens studied the number of these spines is small. In one specimen (Nassau Mts., 7.4 km line, 11 Mar. 1949) there is a series of spines up to the level of the lateral keels in the 18th segment.

Lateral keels. – The anterior margin may sometimes be directed a little more caudad. The latero-posterior edges may be somewhat more acute; the denticulation of the posterior margin of the keels may be stronger, the teeth then being elongate triangular.

Sternites and legs. – Sternites from the 8th segment onwards with small but distinct, finely-pointed cones near the bases of the legs in all specimens.

Gonopods. – (Fig. 18) Almost entirely similar to those of *acus* but differing in the almost vestigial prefemoral process, which is shorter than the prefemur. Acropodite a little straighter than in *acus*.

Female. – Apart from the usual secondary sexual characters, the ♀♀ differ from the ♂♂ in being more robust. The lateral keels are situated a little lower on the sides, are horizontal, and extend a little less laterad. The surface of the metatergites is consequently a little more convex. The sternites are one and a half to one and three quarter times as broad as long. The sternites of the 4th, 5th and 6th segments lack the larger cones. All sternites from the 5th segment onwards have small sternal cones near the bases of the legs similar to those of the ♂♂. Legs a little more slender than in the ♂♂, those of the 5th and 6th segments without femoral inflation. Coxae of the 2nd pair of legs each have a small medio-terminal cone; behind the coxae a widely rounded transverse crest.

Location of type material. – Zoologisches Museum, Hamburg.

With the exception of the gonopods this species appears to be morphologically identical with *acus*, a remark applying also to the incrassate femora of the legs of the 5th and 6th segments, of which no mention was made by ATTEMS. The differences in the external morphology mentioned above are therefore to be seen as an extension

of the description of *acus* as regards variability, since the material of *papillosus* is considerably more abundant than that of *acus*.

A possible difference in the vulvae of *acus* and *papillosus* could not be ascertained in the absence of female specimens referable with certainty to the former species. The present reference of female specimens to *papillosus* is more or less arbitrary and has been based on the geographical data: according to our present knowledge, *papillosus* occurs in the north-eastern part of Surinam, whereas *acus* has been recorded with certainty only from the central part of that country. In view of these data it is clear that the record of *acus* 70 km south of Paramaribo by Loomis, 1934, not based on male

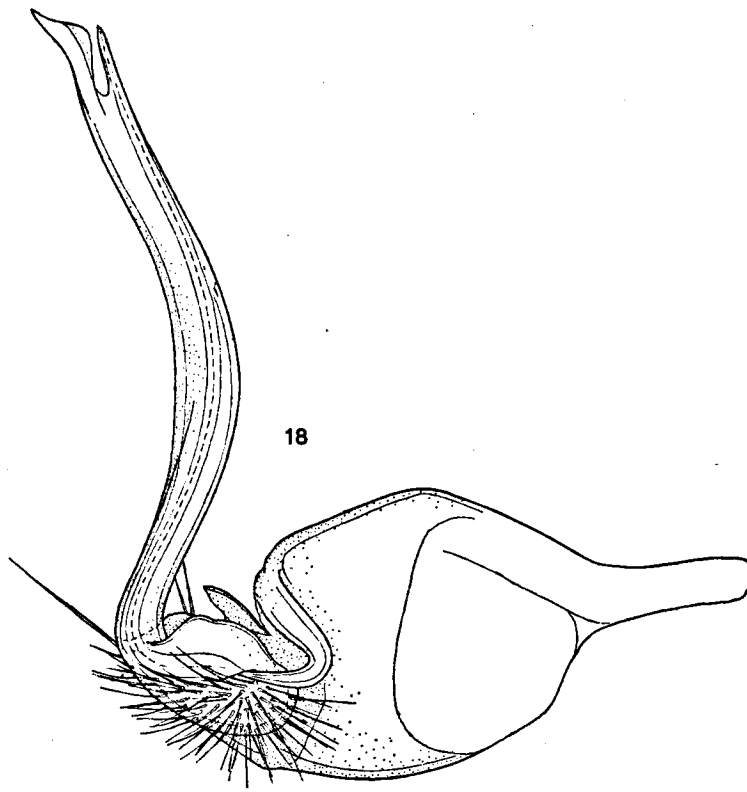



Fig. 18. *Priodesmus papillosus* Att., ♂. — Right gonopod, medial view.

specimens, may be incorrect – an assumption rendered much more feasable by the fact that *papillosus* males have been collected near Republiek, which is most probably the locality from which LOOMIS got his material.

## **Priodesmus haematopterus** nov. spec.

SURINAM: Nassau Mts., tree stump, 6 km line, 3 Mar. 1949 (Sci. Exp., Coll. Dr. D. C. GEIJSKES, Mus. Leiden), 1 ♀; Nassau Mts., 6 km line, Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♀; Nassau Mts., 6.8 km line, forest ground and decaying wood, Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♂, 1 juv. ♀; Nassau Mts., 7.4 km line, 4 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♀; Nassau Mts., 6 km line, forest ground and tree stump, 7 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♂, 1 ♀; Nassau Mts., mountain slope, 3.6 km line, 8 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♂ (holotype), 1 ♀; Nassau Mts., forest near Bleeders Kreek, south 7 km line, 14 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♀; Nassau Mts., 11.2 km line, 15–24 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 2 ♂♂; Nassau Mts., near creek, 14.5 km line, 16 Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♀; Nassau Mts., base camp (?), Feb.–Mar. 1949 (Sci. Exp., GEIJSKES, Leiden), 1 ♀.

Differs from *P. acus* in the following characters:

Colour. – Head brown, turning pale yellowish-brown below the antennae. Antennae dark brown, the proximal joints with a slight reddish tinge. Collum and subsequent body segments dark brown to almost black, the ventral portion pale brownish. Lateral keels of collum and body segments and the tail, orange red to blood red. Sternites brownish red to orange red. Legs orange red to blood red, the tibiae and especially the tarsi a little darker: reddish brown.

Width. – ♂♂: 3.6–4.2 mm (holotype: 4.2 mm; other ♂♂ in the order of the above enumeration: 3.8 mm, 3.9 mm, 3.6 and 4.0 mm). ♀♀: 4.8–5.2 mm (in the order of the above enumeration: 5.2 mm, 5.0 mm, 4.8 mm, 4.9 mm, 4.9 mm, 4.9 mm, 4.9 mm, 5.2 mm, 5.0 mm). Juv. ♀ with 19 segments: 3.5 mm.

Head and antennae. – Vertex more finely granulose than in *acus*. Antennal sockets separated by about one and a quarter times the diameter of one socket or by about half the length of the 2nd antennal joint. Vertigial sulcus running downward to well between the antennal sockets. Antennae long, rather slender. Width of antennal joints decreasing very slightly from the 2nd to the 4th joint. The 5th joint about as wide as the 2nd; the 6th a little wider than the 2nd.

Collum. – (Fig. 19) A little narrower than the head. Lateral border straight or even a little concave, with two notches. Latero-anterior margin weakly rimmed. Granulation of collum finer than in *acus*, but the larger granules not smaller.

Body segments. – A little more strongly constricted in the waist area than in *acus;* the waist smooth and shiny. Granulation of metatergites finer than in *acus*, the larger granules as in *acus* but the lateral ones, in particular, a little more prominent. Transverse depression of metatergites present from the 2nd to the 19th segment. Transverse depression of the sides very strongly impressed. Pleural keels up to the

4th segment represented by a row of small pointed cones. From the 5th segment onwards the pleural keels are reduced to a swelling above each leg, bearing some small pointed cones; the cones above the anterior legs disappear before the middle of the body, and those above the posterior legs disappear in the middle part of the body, except one single cone which remains visible up to about the 16th segment. In none of the segments do the pleural keels project behind the posterior margin.

Lateral keels. – (Fig. 20) 4th segment a little wider than the 3rd. Keels from about the 5th segment onwards raised above the horizontal level and in a number of posterior segments projecting distinctly above the middle surface of the metatergites. Keels of the 2nd and 3rd segments distinctly thrust forward. Lateral margins of the keels of the 2nd to the 4th segment with two teeth more strongly developed than in *acus*. The incision behind the second tooth gradually grows deeper from the 2nd to the 4th segment. Anterior margin of the lateral keels from the 5th segment onwards usually directed a little cephalad, generally more strongly convex than in *acus*. The end of the anterior lobe of the keels from the 5th segment onwards bidentate. The middle lobe in poreless segments unidentate or with a very weak notch. Posterior lobe unidentate, directed more caudad than in *acus*. Posterior margin of keels almost straight, finely granulate at the base. Anterior lobe of the keels of the 19th segment weakly developed but present.

Sternites and legs. – Sternites of middle segments about as long as broad. Sternite of 4th segment with a deep median incision, but with rather weakly developed, blunt cones. Sternites of the 5th and 6th segments as in *acus*, but the cones between the posterior legs of the 6th segment vestigial. Cones at the base of the legs of the 7th segment weakly developed. Sternites of postgonopodial segments with well impressed, complete transverse furrows but without longitudinal impression; sternal cones absent. Legs long and slender. Length of joints: $3 = 6 > 5 > 2 > 4 > 1$. The 6th joint about twice as long as the 5th. Anterior legs a little incrassate; those of the 2nd, 3rd and 4th pairs with a ventral tubercule just distad of the middle of the femur.

Anal segment. – Finely granulate. Tail rather long, much longer than in *acus*, and more of the usual Chelodesmid type. The sides moderately strongly converging, straight. The dorsal side a little convex, with a deep basal transverse depression, as in *acus*. The end of the tail curving a little ventrad, narrowly truncate. Setiferous tubercules well developed, but more elongate and less thick at their base than in *acus*. Valves rugulose and somewhat granulose. Posterior edge of anal scale about rectangular.

Gonopods. – (Fig. 21) Coxa rather large, with a latero-distal, setiferous, and finely roughened swelling. Prefemur also rather large, embracing about two fifths of the entire length of the telopodite. Prefemoral process well developed, about as long as the acropodite. The distal end abruptly bent in a latero-posterior direction and finely acuminate. Demarcation between prefemur and acropodite quite distinct. The acropodite terminally divided into an anterior solenomerite and a posterior tibiotarsus, which consists of a triangular latero-distal lobe and a posterior blade curving medially at first and then cephalad.

Female. – Rather conspicuously larger than the ♂♂. The antennal sockets separated by about three fifths of the length of the 2nd antennal joint. Antennae comparatively a little shorter than in the ♂♂, the 6th joint about as long as the 5th. Body segments comparatively less constricted than in the ♂♂, the dorsum of the metasomites a little more convex, and the lateral keels distinctly less developed.

Sternites of the middle segments about one and a quarter times as broad as long. That of the 4th segment rather deeply medially incised; the other sternites without cones. Behind the coxae of the 2nd pair of legs a low transverse ridge directed a little caudad. 6th joint of the legs about four fifths the length of the 3rd. The coxae of the 2nd pair of legs without cone; the legs of the 2nd, 3rd and 4th pairs without modifications.

Juvenile. – Considerably smaller than the adult female, but otherwise similar, except that the transverse ridge behind the coxae of the 2nd pair of legs is absent.

## **Priodesmus elegans** (Gray)

1832 *Polydesmus elegans* GRAY, in: GRIFFITH, Animal Kingdom, Insecta, Vol. *1*, pl. 135 fig. 6–6b; Vol. *2*, p. 792.

1847 *P. e.*, GERVAIS, in: WALCKENAER & GERVAIS, Hist. nat. Ins. Aptères *4*: 114.

Distribution unknown.

Location of type material. — British Museum (Natural History), London.

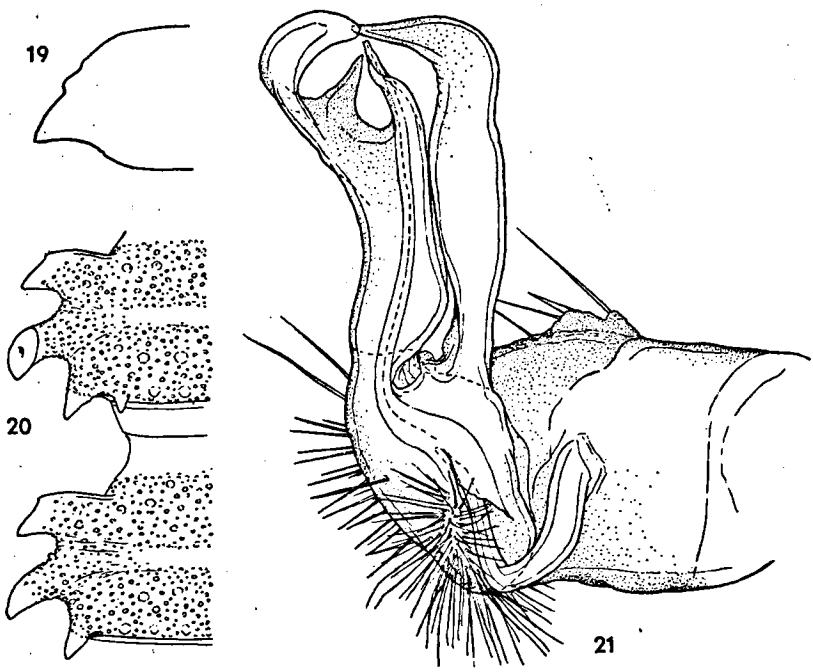



Fig. 19–21. *Priodesmus haematopterus* nov. spec., holotype ♂. — 19: outline of collum, left side. — 20: dorsal view of the 10th and 11th segments, left side. — 21: right gonopod, medial view.

During my stay at the British Museum I noticed that the type specimen of this species, a female in the dry collection, looked extremely similar to *Priodesmus haematopterus*. Unfortunately, I had no opportunity to study the specimen in detail, but recently R. L. HOFFMAN kindly provided me with some sketches of the collum, the tenth body segment and the caudal end of the body, which are reproduced here (Fig. 22–24).

According to these drawings, differential characters of *elegans* and *haematopterus* female specimens are to be found in the outline of the collum and of the lateral keels. In the collum the lateral margin has only one notch and the latero-posterior edge is wider than in *haematopterus*. In the lateral keels of the body segments, the three lobes are separated by much weaker emarginations; the lobes themselves are less developed than in *haematopterus*, the posterior triangular lobe in particular is less pointed. In conformity with this, the width of the specimen is also somewhat less than in *haematopterus:* 4.5 mm as against 4.8 to 5.2 mm.

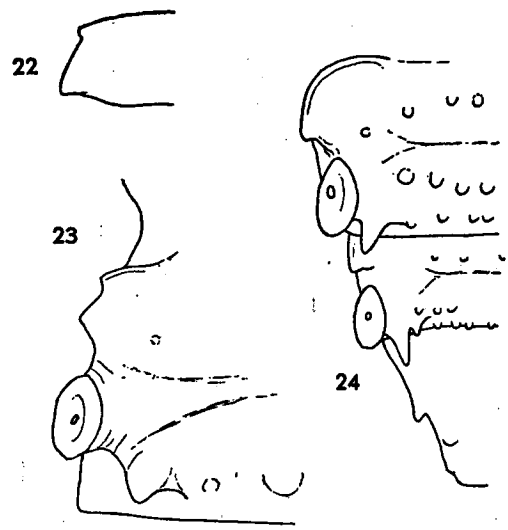



Fig. 22–24. *Priodesmus elegans* (Gray), holotype ♀. — 22: outline of collum, left side. — 23: dorsal view of the 10th segment, left side. — 24: dorsal view of the 18th, 19th and 20th segments, left side.

In spite of our ignorance of the provenance of *P. elegans*, I have included this species in the present study, since it seems likely, in view of the similarity between *elegans* and *haematopterus*, that it also came from Guiana. It was probably collected in British Guiana, whence GRAY's *Polydesmus drurii* was also described.

## **Priodesmus coralloides** nov. spec.

FRENCH GUIANA: Oyapock, Camopi, 1900 (Coll. F. GEAY, Mus. Paris), 2 ♂♂.
BRAZIL: Amapá: "Placers de Carsevène, 1897" (GEAY, Paris), 1 ♂ (holotype), 3 ♂♂; "Haut Carsevène, 1897" (GEAY, Paris), 1 ♂.

Differs from *P. acus* in the following characters:

Colour. – Head and antennae brown, the labral area somewhat paler. Collum and body segments dark brown, the ventral part paler brownish. Lateral keels orange, more deeply so towards the tips of the lobes. Sternites pale brownish. Legs yellowish brown to pale orange.

Width. – 3.3–3.9 mm (holotype: 3.6 mm; other specimens in the order of the above enumeration: 3.3 and 3.4 mm; 3.8, 3.9 and 3.9 mm; 3.6 mm).

Head and antennae. – Vertex and vertigial sulcus as in *haematopterus*. Antennal sockets separated by scarcely more than the diameter of one socket or by slightly less than half the length of the 2nd antennal joint. Width of antennal joints decreasing very slightly from the 2nd to the 5th; the 6th joint about as thick as the 2nd.

Collum. – (Fig. 30) A little broader than the head. Lateral margin as in *haematopterus*, but the incision behind the 2nd tooth much deeper. The latero-posterior edge longer than in *haematopterus*, raised a little above the horizontal level, and bifid. Latero-anterior margin and granulation of collum as in *haematopterus;* the granulation may be even finer than in that species.

Body segments. – As in *haematopterus;* the granulation of the metatergites is generally finer and a little more dispersed than in that species.

Lateral keels. – (Fig. 31) In general similar to those of *haematopterus*. Raised above the horizontal level in all segments. The teeth of the lateral margins of the 2nd to the 4th segment much more strongly developed than in *haematopterus*, and the incision behind the 2nd tooth deeper. A third tooth may be present, but weakly developed. The three lobes of the lateral keels from the 5th segment onwards distinctly more slender than in *haematopterus*, the emarginations separating the lobes wider and deeper than in that species. Anterior lobe bi or tridentate. Middle lobe in poreless segments bi or tridentate. Posterior lobe unidentate as in *haematopterus*, but directed almost straight caudad.

Sternites and legs. – Sternites of middle segments about as long as wide. Sternite of the 4th segment with a pair of well-developed cones, which distally are rendered bifid by a slight transverse incision. Sternite of the 5th segment and that of the 6th segment between the anterior legs with strongly developed cones, which are usually slightly transversely incised distally. Sternite of the 6th segment

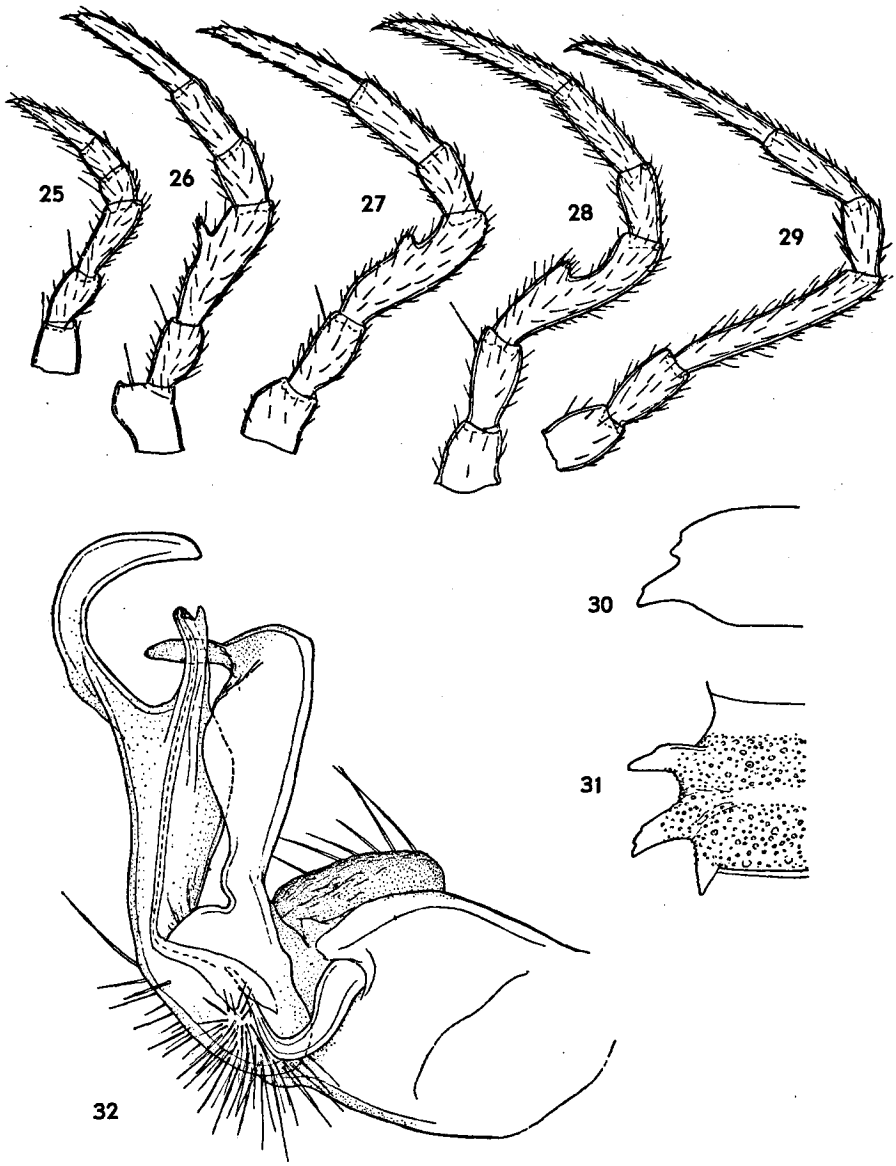



Fig. 25–32. *Priodesmus coralloides* nov. spec., holotype ♂. — 25: first leg. — 26: second leg. — 27: third leg. — 28: fourth leg. — 29: leg of 7th segment. — 30: outline of collum, left side. — 31: dorsal view of the 11th segment, left side. — 32: right gonopod, medial view.

between the posterior legs widely concave, without cones. Sternal cones of the 7th segment rather weakly developed. Sternites of the postgonopodial segments with a well-impressed, complete transverse furrow; the longitudinal impression very weak; sternal cones absent. Legs as in *haematopterus* (Fig. 25–29).

Anal segment. – As in *haematopterus*, but the tail a little shorter.

Gonopods. – (Fig. 32) Strongly suggesting those of *haematopterus*, but the coxa with a much more strongly inflated latero-distal swelling. The telopodite differs from that of *haematopterus* not only in smaller details but also, and more particularly, in the more elongate tibiotarsus, which lacks the triangular latero-distal lobe.

Female. – Unknown.

## "Polydesmus" schomburgkii Erichs.

1848 *Polydesmus Schomburgkii* ERICHSON, in: SCHOMBURGK, Reisen in Britisch-Guiana, Vol. *3*, p. 552. (1)
1864 *P.* (*Rhacophorus*) *S.*, PETERS, Mon.ber. Ak. Berlin *1864:* 537. (1)
1938 *Rhacophorus s.*, ATTEMS, Tierreich *69:* 200.

British Guiana. (1)

Location of type material. – Zoologisches Museum, Berlin.

The original description of this species was apparently not known to ATTEMS, since reference is only made to PETERS in the "Tierreich". ERICHSON's description runs as follows:

"Der Rücken flach, die seitlichen Fortsätze mit dem Rücken fast in gleicher Ebene und flach, die meist am Rande stumpf, dreizähnig, indem die im Rande liegenden Poren als stumpfe Zähnchen vortreten. Der erste mit scharfzugespitzen Ecken, der letzte schmal zugespitzt. Die Oberseite äusserst fein gekörnt, die Farbe des Körpers bräunlich purpurroth, die ziemlich langen Beine dunkel, und die Fühler lebhaft gelb.

In Wäldern. *Schomb.*"

This may be a species of the genus *Priodesmus*, because the characters mentioned, in particular the situation of the pores, tally more closely with this genus than with those of any other Chelodesmid genus known to occur in British Guiana. The contrast in the coloration of the legs and the antennae is, however, not found in any of the known species of *Priodesmus*.

## Stenonia Gray

1843 *Stenonia* GRAY, in: TODD, Cyclop. of Anat. and Phys. *3:* 546.
1896 *S.*, COOK, Brandtia *12:* 51.
1956 *S.*, HOFFMAN, Proc. Biol. Soc. Washington *69:* 46.

Type species. – *Iulus dentatus* Olivier, by subsequent designation (Cook, 1896).

French Guiana.

Number of species: one.

For a discussion of the status of this genus and its type species I would refer to Hoffman's most readable account, cited above. Unlike Hoffman, however, I am inclined to think that *Stenonia dentata* falls within the current concept of the genus *Priodesmus* rather than belongs taxonomically in the neighbourhood of *Leptherpum zernyi* Att. – in particular because of what Olivier has said of the lateral keels of his species.

## Stenonia dentata (Oliv.)

1792 *Iulus dentatus* Olivier, Encycl. Méthod. Insect. *7:* 417. (1)
1847 *Polydesmus d.*, Gervais, in: Walckenaer & Gervais, Hist. Nat. Ins. Aptères *4:* 113.

French Guiana: Cayenne. (1).

Location of type material. – Unknown; material probably lost.

Unfortunately, the original description is the only evidence available regarding the possible identity of this species. It runs as follows:

"Iulus fusco-ferrugineus, segmentis utrinque inaequaliter dentatis.
Il est deux fois plus grand que le précédent (i.e. *Polydesmus complanatus* (L.), which is roughly 2 cm long and about 3.0 mm wide). Le corps est quelquefois grisâtre, et plus souvent d'un brun ferrugineux. Les anneaux ont de chaque côté plusieurs dentelures d'inégale grandeur, une ligne transversale au milieu de leur partie supérieure et une ou deux rangées de petits tubercules, vers le bord postérieur. Les pattes sont au nombre de trente et une paires."

It seems very likely that *S. dentata* is a species of *Priodesmus* of the group of *haematopterus*, in view of what the description says of the lateral keels, the transverse depression of the metatergites, and the granulation. Quite probably it will be possible to identify Olivier's species when the millipede fauna around Cayenne has been more thoroughly explored.

## Leptherpum Att.

1931 *Leptherpum* ATTEMS, Zoologica, Stuttg. *30* (3/4): 48.
1938 *L.*, ATTEMS, Tierreich *69:* 90.

Type species. – *Leptodesmus carinovatus* Att., by original designation.

Venezuela, British Guiana, Surinam, Brazil (Amazonas).

Number of species: five.

In his treatment of the Leptodesmidae in 1938, ATTEMS brought three species under the heading of this genus: *L. carinovatum* from Brazil, *L. huebneri* (Att.) from southern Venezuela, and *L. zernyi* Att. from Brazil. However, the reasons for the reference of the last-mentioned species to *Leptherpum* are not clear. It differs quite obviously from the other species in the structure of its gonopods and in the shape of the lateral keels, and should therefore be excluded from *Leptherpum*. Its generic position will be discussed in connection with the proposal of the new genus *Brasiloschubartia*.

After the disposal of *L. zernyi* the genus *Leptherpum* becomes an extremely homogeneous one. The close relationship between the species is shown particularly by the interspecific constancy of the gonopods, which, at least in the species studied, did not reveal any appreciable distinctive features. The alleged difference in length of the secondary branch of the prefemoral process, used for separating *carinovatum* from *huebneri* by ATTEMS in 1938, needs confirmation. Such statements are easily elicited by the different aspects these organs assume in slightly changed positions.

The homogeneity of *Leptherpum* is linked with a clearly isolated position of the genus in the family Chelodesmidae. Its relationship is still difficult to ascertain, but it seems to me that *Leptherpum* has some affinity to *Chondrodesmus* Silv., an opinion put forward previously by BROLEMANN in 1903 (Rev. Mus. Paulista *6*: 74) and POCOCK in 1909 (Biol. Centr.-Amer., Diplop., p. 165), and apparently shared by ATTEMS in 1938, to judge from the closely successive position given to both genera in the "Tierreich". *Chondrodesmus* ranges from Mexico to Ecuador and Venezuela, and has not been found as yet in the area under report.

Possibly also related to *Leptherpum* is the genus *Macrocoxodesmus* Schub. 1947 (Rev. Brasil. Biol. 7: 109), in which the gonopod coxa is produced distad of the prefemur in a similar way as in *Leptherpum*. In *Macrocoxodesmus*, however, the acropodite is split into a small solenomerite and a large lamellar tibiotarsus.

Among the Chelodesmid genera occurring in Guiana, *Leptherpum* is doubtless most closely related to *Iphyria*, a genus also related to *Chondrodesmus*. However, in *Iphyria* the gonopod acropodite has a tibiotarsus, and the prefemoral process is much smaller. In fact, the large, ear-shaped, prefemoral process in *Leptherpum* distinguishes this genus from all the other known Chelodesmidae.

## KEY TO THE SPECIES OF *Leptherpum*,

based exclusively on non-sexual characters.

1. Antennae and legs of same colour as the body, or only slightly paler. (Tegument of metatergites dull.) [1]) Pore calluses oval, situated on the dorsal side of the keels; the pores near the medial border of the calluses. (Marginal membrane of metasomites ventrally not fringed, but with raised hairlike processes.) [1]) . . . . . 2
   Antennae and legs pale yellow, contrasting with the reddish-brown ground colour of the body. Teguments of metatergites shiny. Pore calluses elongate elliptical, situated on the dorso-lateral side of the keels; the pores about in the middle of the calluses. Marginal membrane of metasomites ventrally fringed 3

2. Posterior edges of keels formed by the pore calluses in all poriferous segments. Prefemur of legs from the 8th pair onwards with a terminal knob, which becomes a spiniform process in the posterior legs . . . . . *L. huebneri* (Att.)
   Posterior edges of poriferous keels emarginate up to the 16th or 17th segment. Legs without prefemoral processes . . . . . *L. carinovatum* (Att.)

[1]) The characters between parentheses are not known for *huebneri*.

3. Posterior edges of poriferous keels emarginate up to the 15th segment. Posterior edges of poreless keels emarginate on segments 8, 11 and 14. Lateral keels yellowish . . . . . *L. geijskesi* n. sp.
   Posterior edges of poriferous keels emarginate up to at most the 10th segment. All poreless keels without emarginate posterior edges. Lateral keels of same colour as the remaining portion of the somites . . . . . 4

4. Posterior edges of poriferous keels emarginate up to the 10th segment . . . . . *L. staheli* Jeek.
   None of lateral keels with emarginate posterior edges . . . . . *L. loomisi* n. sp.

## **Leptherpum geijskesi** nov. spec.

SURINAM: Nassau Mts., 6.8 km line, soil of forest and in decaying wood, Mar. 1949 (Sci. Exp., Coll. Dr. D. C. GEIJSKES, Mus. Leiden), 1 ♂ (holotype).

Colour. – Deep reddish-brown, with a vinaceous tinge. Anterior part of the head somewhat paler. Lateral and latero-posterior margins of collum and keels, and the tail, pale yellowish. Legs and antennae pale yellow.

Width. – 3rd segment: 9.0 mm, middle segments: 8.3 mm, prosomites of middle segments: 5.2 mm.

Head and antennae. – Labrum widely and moderately deeply emarginate, tridentate. Clypeus weakly convex, moderately impressed towards the labrum, the lateral sides widely rounded. Surface of headplate smooth, somewhat rugulose in the clypeal part and behind the antennae, moderately densely setiferous up to the lower part of the vertex. Antennal sockets separated by one and a third of the diameter of one socket or by two thirds of the length of the 2nd antennal joint. Vertex moderately convex, sulcus well impressed in the lower part, more weakly impressed in the upper part, running downward to between the antennal sockets. Antennae of moderate length, the 3rd, 4th and 5th joints each somewhat shorter than the preceding one. 6th joint somewhat longer than the 5th and about as long as the 3rd. The 5th and 6th joints slightly thicker than the others. Terminal joints densely, proximal joints moderately setiferous.

Collum. – Considerably broader than the head. Anterior border weakly convex in the middle, very slightly emarginate behind the antennae, and laterally widely rounded. Latero-posterior edge about rectangular, very narrowly rounded. Posterior border distinctly emarginate in the middle, straighter towards the sides, and laterally weakly concave. Anterior border with a laterally well-developed marginal rim, growing very weak and narrow towards the middle of the anterior border. Surface of collum moderately transversely convex in the middle; the lateral sides

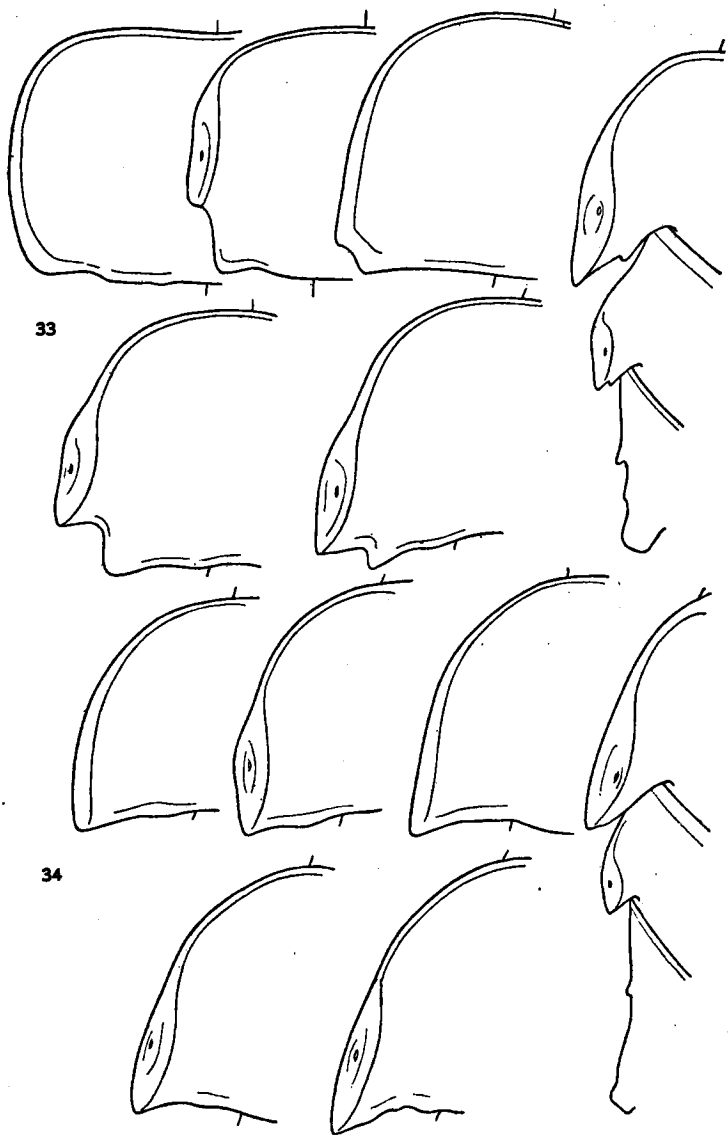



Fig. 33. *Leptherpum geijskesi* nov. spec., holotype ♂. — Lateral keels of the 6th, 7th, 11th, 13th, 16th, 18th and 19th segments, dorsal view.
Fig. 34. *Leptherpum loomisi* nov. spec., holotype ♂. — Lateral keels of the same segments.

directed a little ventrad, their surface flat. Surface of collum laterally rugulose-granulose, more leathery in the middle; a narrow zone along the posterior border smooth. Some dispersed small rounded spots are visible. Teguments shiny.

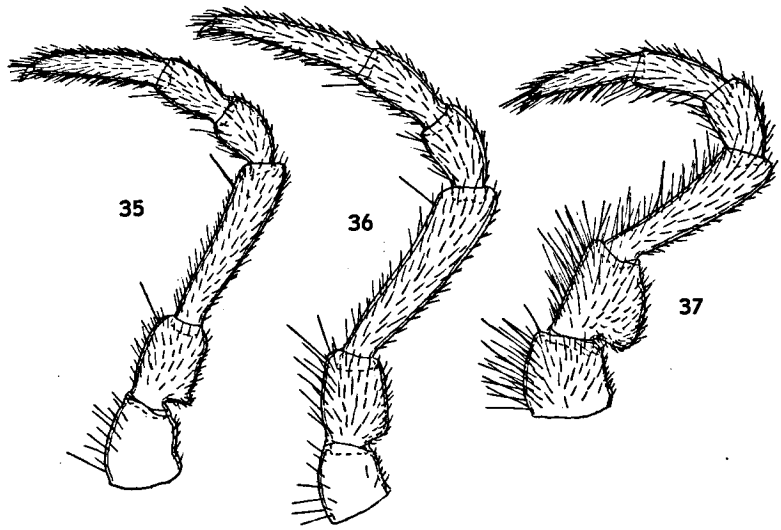
Body segments. – Moderately constricted by a rather broad waist, which gradually passes over into the metasomite but is sharply demarcated from the prosomite. The broader anterior part of the waist is weakly wrinkled, the posterior portion has, at least in the middle segments, a weak dorsal longitudinal striation. Prosomites very dull, minutely punctulate and with fine short longitudinal striae. Metasomites with shiny tegument and the same dorsal sculpture as the collum, though somewhat coarser, except in a few anterior segments: granulose in particular on the lateral keels, more granulose-rugulose towards the middle. From the 4th to the 17th segment a weak transverse depression. In front of this a single row, behind it two rows of small flattened granules, especially distinct on the lateral keels. Posterior margins of metatergites of the 2nd and 3rd segments medially emarginate, though less than in the collum and in the 3rd segment very weakly. Sides of metasomites granulate. Pleural keels up to the 4th segment represented by tuberculate ridges. From the 5th segment onwards, some tubercules only above the anterior and posterior legs. From the 7th segment onwards only a few granules on a swelling above the anterior legs of each segment. From the 17th segment onwards the swelling disappears. Marginal membrane simply irregularly fringed ventrally, as drawn for *staheli*.

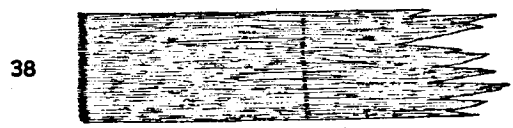
Lateral keels. – (Fig. 33) Strongly developed; on a high level. 2nd segment somewhat wider than the collum and somewhat narrower than the 3rd. 4th segment somewhat narrower than the 3rd and somewhat wider than the 5th. From the 5th to the 16th segment the width remains subequal. Keels of 2nd segment slope downward like those of the collum, following the arch of the dorsum. Anterior and latero-anterior border widely rounded, curving a little inward near the latero-posterior edge. Latero-posterior edge a little more than 90°. Posterior border widely and weakly emarginate. Marginal rim subsimilar to that of the collum. Keels of the 3rd segment similar to those of the 2nd but a little less sloping, and with the latero-anterior border somewhat more narrowly rounded. Keels of the 4th segment still a little less downward-sloping, largely similar to those of the 6th. Keels from the 5th segment onwards approximately horizontal and on a rather high level. All poreless keels from the 8th segment onwards with an emarginate posterior edge. All poriferous keels up to and including the 15th segment with the posterior edge emarginate, so that the pore calluses do not coincide with the posterior edges of the keels. This, however, is the case from the 16th segment onwards, the posterior margins of the keels here having a tooth which gradually becomes smaller in subsequent segments. All keels with a marginal rim which is narrow along the anterior border, gradually growing wider along the lateral border. Pore calluses long-elliptical, the pores latero-dorsal in a shallow excavation. Posterior border of keels with a generally smooth margin, but without premarginal furrow.

Sternites and legs. – Sternites of middle segments about one and a half times as broad as long, rather densely set with minute setiferous granules. Longitudinal impression absent, transverse depression interrupted in the middle of the sternites. At the bases of the posterior and anterior legs of each segment, respectively from the 13th and 15th segments onwards, a posteriorly directed, moderately developed cone. Legs (Fig. 35) of moderate length, moderately densely setiferous. Tarsal claw rather small. Length of joints: $3 > 6 > 5 = 2 > 4 = 1$; the 5th joint

about half the length of the 6th, the 6th joint about two thirds the length of the 3rd. The two basal joints of the legs somewhat incrassate. Prefemur of the legs from the 3rd pair onwards dorsally with a protuberance, well developed from the 4th pair onwards, weakly developed in the penultimate pair, and absent in the last pair.

Anal segment. – Setiferous tubercules of tail well developed. End of tail



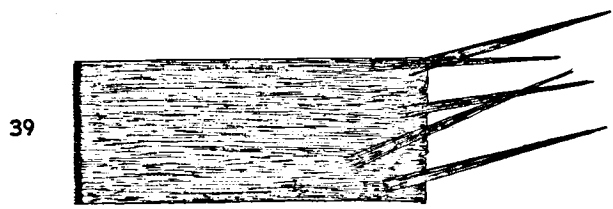




Fig. 35. *Leptherpum geijskesi* nov. spec., holotype ♂. — Fifth leg.
Fig. 36. *Leptherpum staheli* Jeek., holotype ♂. — The same.
Fig. 37. *Leptherpum loomisi* nov. spec., holotype ♂. — The same.
Fig. 38. *Leptherpum staheli* Jeek., holotype ♂. — Marginal membrane of the ventral side of one of the middle body segments.
Fig. 39. *Leptherpum carinovatum* (Att.), ♂. — The same.

narrow, parallel-sided, bluntly truncate. Valves rugose-granulose, marginal rims strongly raised but narrow. Scale triangular, posterior edge almost rectangular. Setiferous tubercules well developed, projecting slightly behind the margin.

Gonopods. – As in *L. staheli*.

Female. – Unknown.

This species is gratefully dedicated to Dr. D. C. GEIJSKES, who was responsible for collecting most of the Surinam millipedes treated in the present series of papers.

## Leptherpum staheli Jeekel

1950 *Leptherpum carinovatum* subsp. *staheli* JEEKEL, Ent. Ber. *13:* 71, fig. 4–5.

Previous record: Surinam: Wilhelmina Mts., near the Lucie Rivier.

SURINAM: Wilhelmina Mts., near the Lucie Rivier (Exped. Stahel 1926, Coll. Dr. D. S. FERNANDES, Mus. Amsterdam), 1♂ (holotype). – The holotype re-examined.

Differs from *L. geijskesi* in the following characters:

Colour. – Paler, although this may be due to the rather poor state of preservation. Lateral keels of the same colour as the rest of the somites.

Width. – 3rd segment: 9.8 mm, middle segments: 8.5 mm, prosomites of middle segments: 5.4 mm.

Head and antennae. – The distal parts of both antennae are missing in the type specimen, and therefore could not be compared.

Collum. – Latero-posterior edge somewhat less than 90°.

Body segments. – Larger granules present on the metatergites but distinct only on the dorsal surface of the keels. Marginal membrane of metasomites ventrally simply and somewhat irregularly fringed (Fig. 38).

Lateral keels. – Posterior edges of none of the poreless keels emarginate. In the poriferous keels the pore calluses do not coincide with the posterior edges up to the 10th segment. Latero-anterior borders of keels a little more widely rounded than in *geijskesi*.

Sternites and legs. – The cones at the bases of the legs are somewhat more strongly developed than in *geijskesi*, and are present from the 11th and 13th segments onwards, respectively. Prefemur of the legs (Fig. 36) somewhat incrassate, especially at the proximal end, but without a distinct protuberance. In the first two and last two pairs the prefemora are not incrassate. Legs of the first half of the body ventrally rather densely setiferous, the hairs rather long.

Anal segment. – Setiferous tubercules of tail not so strongly developed as in *geijskesi*, though more distinct than in *loomisi*. Tail shorter than in *geijskesi*, the sides a little convergent.

Gonopods. – Illustrated in connection with the original description.

Female. – Unknown.

Struck by the practically complete identity of the gonopods of this form with the drawings published by ATTEMS, I tended to regard *staheli* as a subspecies of *carinovatum*. Actual study of material pertaining to the latter species has shown conclusively that the two are specifically distinct.

In most of its characters, *L. staheli* appears to be intermediate between *L. geijskesi* and *L. loomisi*, and one may wonder whether these three species are not local forms of a single species. This seems, however, somewhat doubtful, considering in particular the fact that *staheli* and *loomisi* apparently came from almost the same region. Moreover, the comparatively small variation in *L. carinovatum* renders an extreme amount of geographical variation in a closely related species somewhat improbable. Future collections may throw more light on this interesting problem.

## **Leptherpum loomisi** nov. spec.

SURINAM: Wilhelmina Mts., line I, Aug.–Sep. 1943 (Coll. Dr. D. C. GEIJSKES, Mus. Leiden), 1 ♂ (holotype).

Differs from *L. geijskesi* in the following characters:

Colour. – Paler than in *geijskesi*, possibly owing to the longer time of preservation. Pale reddish-brown, the lateral keels having the same colour as the rest of the somites. Colour of legs and antennae as in *geijskesi*.

Width. – 3rd segment: 7.8 mm, middle segments: 7.1 mm, prosomites of middle segments: 5.2 mm.

Head and antennae. – Length of 6th antennal joint subequal to that of the 5th, about two thirds the length of the 2nd joint. Only the 6th joint somewhat thicker than the others.

Collum. – Anterior margin scarcely emarginate behind the antennae.

Body segments. – Larger granules of metatergites present, but indistinct. Pleural keels represented by a tuberculate ridge up to and including the 8th segment. From the 9th segment onwards some tubercules above the anterior and posterior legs of each segment. From the 12th segment onwards some tubercules only above the anterior legs, becoming vestigial from the 17th segment onwards.

Lateral keels. – (Fig. 34) None of the keels with emarginate posterior edges. In the poriferous keels the posterior edges are formed by the pore calluses. Latero-anterior margins of keels more widely rounded than in *geijskesi* or *staheli*.

Sternites and legs. – Sternal cones present from the 10th and 11th segments onwards, respectively, somewhat more strongly developed than in *geijskesi*. Legs (Fig. 37) from the 3rd pair onwards with strongly incrassate coxae and praefemora, excepting the last two pairs. The 2nd and 5th joints of the legs relatively

longer than in *geijskesi*. Ventral side of the proximal joints of the legs densely set with long hairs, especially in the anterior part of the body.

Anal segment. – Setiferous tubercules of the tail weakly developed. Tail somewhat shorter. The setiferous tubercules of the scale not projecting.

Gonopods. – As in *L. staheli*.

Female. – Unknown.

I take great pleasure in dedicating this species to H. F. LOOMIS, perhaps the only diplopodologist who has visited Surinam, in recognition of his fine work on West Indian millipedes.

## Leptherpum carinovatum (Att.)

1898 *Leptodesmus carinovatum* ATTEMS, Denkschr. Ak. Wien *67:* 376, pl. 6 fig. 127–129, pl. 7 fig. 154. (1)
1903 *Leptod. c.*, BROLEMANN, Rev. Mus. Paulista *6:* 74. (2)
1909 *Dirhabdophallus c.*, POCOCK, Biol. Centr.-Amer., Diplop., p. 165.
1931 *Leptherpum c.*, ATTEMS, Zoologica, Stuttg. *30* (79): 49, fig. 71.
1938 *Lepth. c.*, ATTEMS, Tierreich *69:* 91, fig. 104.

Previous records: Brazil: Amazonas: Manaos (1, 2). The record from Port Limon, Costa Rica, by ATTEMS in 1901 (Mitt. Naturh. Mus. Hamburg *18:* 85) is doubtless erroneous.

BRITISH GUIANA: Canister Falls, June 1920 (Cattle Trail Survey, Coll. A. A. ABRAHAM, Mus. London), 1 ♂; source of Kutari, June 1936 (C. A. HUDSON, London), 2 ♂♂.
SURINAM: top of Mt. Janbasigodo, 20 Dec. 1902 (Saramacca Exped. 1902–1903, Dr. P. J. DE KOCK, Mus. Leiden), 1 ♂; Tugumutu, 7–14 Feb. 1903 (Saramacca Exped. 1902–1903, DE KOCK, Leiden), 1 ♂, 1 ♀; Mapane, savanna forest, in a pit, 10 Dec. 1953 (Dr. D. C. GEIJSKES, Mus. Amsterdam), 5 ♂♂, 1 ♀.

Differs from *L. geijskesi* in the following characters:

Colour. – Dark to very dark reddish-brown; the ventral side, the antennae, and the legs of same colour or slightly paler.

Width. – 3rd segment, middle segments, and prosomites of middle segments respectively, in mm:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ♂♂ | Canister Falls | 10.4 | 9.6 | 5.8 | | | |
| | Kutari | 10.9 | 10.4 | 6.2 | 10.8 | 9.9 | 5.9 |
| | Janbasigodo | 12.4 | 11.8 | 6.7 | | | |
| | Tugumutu | 10.8 | 10.0 | 5.9 | | | |
| | Mapane | 10.0 | 9.8 | 5.8 | 9.9 | 9.5 | 5.5 |
| | — | 9.8 | 9.6 | 5.6 | 9.8 | 9.3 | 5.6 |
| | — | 9.5 | 8.9 | 5.5 | | | |
| ♀♀ | Tugumutu | 10.2 | 9.9 | 6.5 | | | |
| | Mapane | 9.5 | 9.3 | 6.0 | | | |

Head and antennae. – 6th antennal joint somewhat shorter than the 5th, about two thirds of the length of the 2nd. Only the 6th joint a little thicker than the others.

Collum. – Latero-posterior edge generally somewhat less than 90°. Surface finely but distinctly granular, laterally as well as in the middle. Some irregular rows of larger granules are visible.

Body segments. – Surface of metatergites granular as in the collum; the granules shiny, the tegument between them dull. Larger granules distinct. Pleural keels up to about the 9th segment represented by a series of cones on a ridge. In about the 10th segment some cones above the anterior and posterior legs only, which cones gradually disappear in subsequent segments, those above the posterior legs first. The swelling above the anterior legs disappears in the 17th segment. Marginal fringes of the ventral portion of the metasomites (Fig. 39) consisting of hairlike processes arising from the terminal end as well as from the external surface of the membrane.

Lateral keels. – (Fig. 40) In general outline strongly resembling those of *geijskesi*. Posterior edges of the poreless keels sometimes emarginate from the 4th segment onwards. However, the emarginations are generally less pronounced than in the illustration given, and may be more or less obsolete. Moreover, the character seems variable in a particular specimen, since in a single segment the emargination may be present on one side only. Poriferous keels with emarginate posterior edges up to about the 16th segment; from about the 17th segment onwards the porecalluses form the posterior edges of the keels. Pore calluses more oval than in the three preceding species, though generally somewhat more elongate than in the drawings given. They are situated here more on the dorsal side of the keels; the pores are located in a wide and shallow excavation near the medial border of the calluses. Marginal rims of the keels sometimes distinct only along the anterior border, and then laterally represented only by a narrow smooth zone. Pore calluses sometimes anteriorly separated from the marginal rim by a weak incision.

Sternites and legs. – Transverse impression of sternites generally complete, not medially interrupted, but shallow. Sternal cones present from about the 10th and 12th segments onwards respectively, strongly developed in the posterior sternites. Legs of the anterior part of the body rather densely set with long setae. Coxae and prefemora not particularly incrassate.

Anal segment. – Setiferous tubercules of tail rather strongly developed. Tail rather short, the sides slightly convergent. Scale with a posterior angle of somewhat more than 90°; the tubercules projecting slightly.

Gonopods. – As in *staheli*.

Female. – In size the ♀♀ do not differ much from the ♂♂; the lateral keels, however, are a little more weakly developed in relation to the size of the prosomites, which results in a slightly more robust habit. Sternites of middle segments about one and three quarters as broad as long. The transverse depression of the sternites is broadly interrupted in the middle. Legs more slender than in the ♂♂, rather densely setiferous, but the setae of the anterior legs much shorter.

Location of type material. – Zoologisches Museum, Hamburg.

No characters could be found which would justify a specific separation of this material from that from Manaos as described by

ATTEMS. The Guiana specimens appear to be larger than the Brazilian ones. ATTEMS gives 9.0 mm as greatest width and 5.0 mm for the width of the prosomites, whereas BROLEMANN had a specimen whose greatest width was 9.5 mm. The Brazilian material therefore appears to be of the same size as *L. geijskesi*. Since, however, the material studied shows considerable variation in size, this character is considered to be insufficient to justify subspecific distinction.

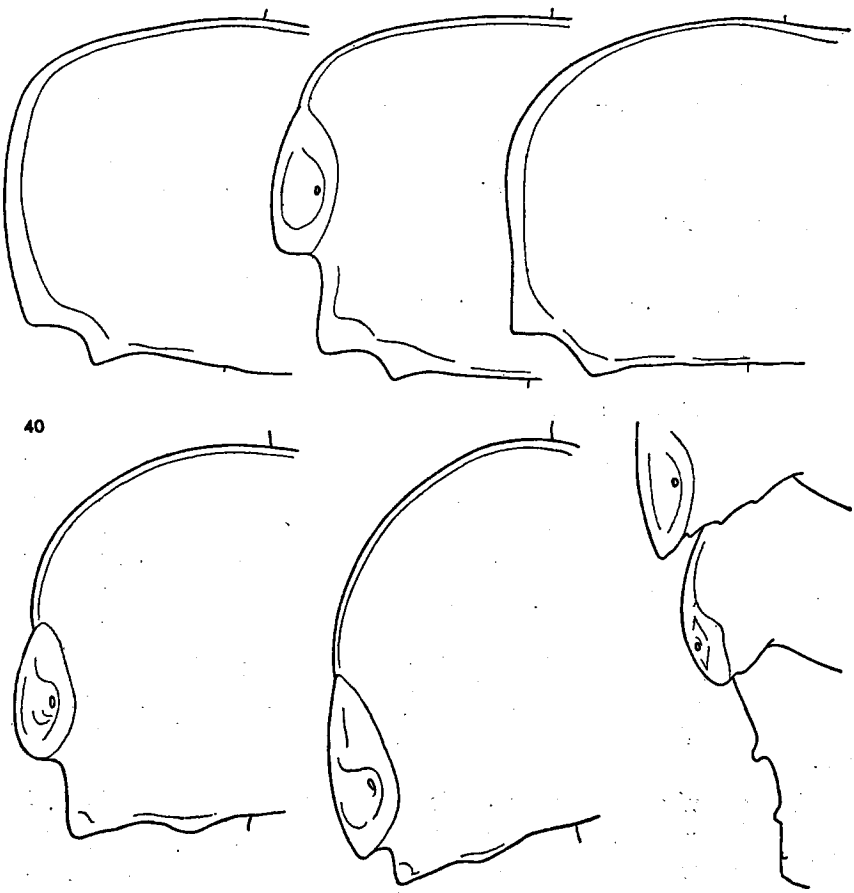



Fig. 40. *Leptherpum carinovatum* (Att.), ♂. — Lateral keels of the 6th, 7th, 11th, 13th, 16th, 18th and 19th segments, dorsal view.

## **Brasiloschubartia** nov. gen.

Rather small-sized Chelodesmidae with 20 body segments and a normal pore formula. – Body segments with a rather broad waist which is sharply demarcated from the protosomite. Metatergites granulate, with three transverse rows of larger granules, one in front of, the other two behind the transverse depression. – Lateral keels strongly developed, on a high level, mostly horizontal. The lateral margins with two or three notches. Pore calluses latero-dorsal, distinctly demarcated from the margin by an anterior and a posterior incision. – Gonopods with coxa of moderate size, without coxal rod, laterally largely concealing the prefemur. Prefemur comparatively rather large, about as long as the acropodite. Prefemoral process undivided. Acropodite without or with a small solenomerite.

Type species. — *Leptherpum zernyi* Att.

French Guiana, Brazil (Pará).

Number of species: two.

As HOFFMAN (1956, Proc. Biol. Soc. Washington *69*: 48) has already briefly pointed out, *Leptherpum zernyi* Att. 1931 (Zoologica, Stuttg. *30* (79): 49) is not congeneric with the type species of *Leptherpum*. Actual study of several species of *Leptherpum*, of *zernyi* and a new species related to the latter has shown that this opinion is quite correct. Apart from the differences in the gonopods, the structure of the lateral keels in *Leptherpum carinovatum* and *zernyi* is quite different, as will be instantly seen from a comparison of the drawings published in the present paper with those of ATTEMS for *zernyi*.

For *zernyi* and the new species *styliger* from French Guiana, I therefore propose the new genus *Brasiloschubartia*, named in honour of Dr. O. SCHUBART, Pirassununga, the most versatile authority on Diplopoda today, in special recognition of his fine work on Brazilian millipedes.

Among the genera known from Guiana, *Brasiloschubartia* seems to me to be related most closely to *Priodesmus*. The lateral keels, in particular of *B. styliger*, are basically similar to those of *Priodesmus*, although the deep incisions characteristic of *Priodesmus* are represented here only by rather weak notches. In many other characters, and in the total habit of the species too, there is much resemblance between *Priodesmus* and *Brasiloschubartia*. The two species of the new genus are probably also related to some species of the large genus *Leptodesmus*, but a revision of this heterogeneous group is needed before more can be said.

A remarkable similarity also exists between the structure of the lateral keels of *Brasiloschubartia*, in particular of *B. styliger* n. sp., and of *Cearodesmus gomesi* Schubart 1945 (Rev. Brasil. Biol. 5: 276) from Ceará, Brazil. *Cearodesmus*, however, totally lacks a prefemoral process of the gonopods.

## **Brasiloschubartia styliger** nov. spec.

FRENCH GUIANA: Ilet Père, 1902 (Coll. F. GEAY, Mus. Paris), 1 ♂ (holotype), 3 ♂♂, 3 ♀♀.

Colour. – Rather dark reddish-brown, the teguments of the head, collum and metatergites covered with earth particles. Ventral side of body segments, sternites and legs pale reddish-brown. Marginal teeth of the lateral keels very pale.

Width. – ♂♂: 3.1–3.3 mm (holotype: 3.1 mm; other ♂♂: 3.2, 3.2 and 3.3 mm). ♀♀: 3.8–3.9 mm (3.8, 3.8, and 3.9 mm).

Head and antennae. – Labrum weakly emarginate, tridentate. Clypeus moderately convex, rather strongly impressed towards the labrum. Lateral sides widely convex. Surface of headplate shiny, smooth to very weakly rugulose up to the middle of the vertex, posterior portion of vertex finely but densely granulose-rugulose. Pubescence moderately dense in the clypeal to sparse in the frontal region; vertex with a transverse row of four setae. Antennal sockets separated by a little more than one and a half times the diameter of one socket, or by about the length of the 2nd antennal joint. Postantennal groove moderately impressed, the wall in front rather prominent. Vertex moderately convex, not demarcated from the frontal region. Sulcus rather weakly impressed in the posterior part of the vertex, more deeply in the anterior part, running downward to well between the antennal sockets and dividing there into two branches each running towards a socket. Antennae of moderate length, moderately thick. The 2nd, 3rd and 6th joints of subequal length, the 4th and 5th slightly shorter. Joints of subequal width, the 6th rather distinctly thicker than the others. Pubescence moderate, rather dense distally.

Collum. – Distinctly wider than the head, semi-elliptical in dorsal outline.

Anterior margin very weakly rounded in the middle, more convex laterally, evenly passing into the lateral margin. Posterior margin very weakly emarginate in the middle, a little convex towards the lateral sides; the keels of the collum widely emarginate. Latero-posterior edges acutely angular, sharply pointed. Surface of collum rather weakly convex, granulose; along the anterior margin four to six larger granules, along the posterior margin about four, closely arranged, larger granules, and some of these granules dispersed on the surface. Along the latero-anterior margin a narrow smooth marginal rim, the premarginal furrow almost obsolete. Teguments shiny.

Body segments. – Moderately constricted by a rather broad, shiny, but a little irregularly uneven, waist, which posteriorly passes over into the metasomite without a marking line, and anteriorly is sharply demarcated from the dull, minutely punctulate prosomite. Metatergites shiny, granulose, the granules of unequal size. Along the posterior border a row of six to ten larger granules; in front of this row a similar but more irregular row of four to eight larger granules; the anterior portion of the metatergites with some dispersed larger granules. Metatergites from about the 5th segment to about the 17th with a narrow, smooth or somewhat rugulose transverse depression, well impressed in the middle segments, situated just behind the middle of the metatergites. Sides of metasomites rather densely granular, without larger granules and without transverse depression. Pleural keels up to about the 5th segment represented by a tuberculate ridge. In subsequent segments they become reduced to swellings, one above each leg, bearing some larger granules. From about the 9th or 10th segment onwards there are only a few pointed granules above the posterior legs, disappearing gradually, and absent from about the 15th segment onwards. In none of the segments do the pleural keels project behind the margins of the segments.

Lateral keels. – (Fig. 41) 2nd segment distinctly wider than the collum, and about as wide as the 3rd. 4th segment a little narrower than the 3rd and about as wide as the 5th. Keels of all segments on a high level, about horizontal, except in the 2nd and 3rd segments where they slope downward a little, and in a few of the posterior segments where they are raised a little above the horizontal level but do not project above the middle of the tergites. Keels of the 2nd, 3rd and 4th segments with the anterior margin widely convex, finely rimmed, and distinctly shouldered at the base. Anterior margins of the 2nd and 3rd segments thrust forward a little. Latero-anterior margin in the 2nd to the 4th segment rather narrowly rounded; the lateral margins scarcely convex, anteriorly with a weak tooth. Posterior margins of the keels of the 2nd and 3rd segments emarginate, of the 4th segment almost straight. Latero-posterior edges acutely angular and pointed in the 2nd and 3rd segments, almost rectangular in the 4th. In the 4th segment the posterior margin of the keels has a triangular tooth just mesad of the latero-posterior edge. Keels from the 5th segment onwards with the anterior margins scarcely convex, finely rimmed and directed a little caudad. Lateral margin of keels weakly convex, with three notches, of which the caudal one is usually a little deeper than the others. The tooth in front of the deeper notch generally extends a little farther laterad than the latero-posterior edge; in poriferous keels it bears the pore callus, which is oval to elliptical. Marginal rim smooth, not sharply demarcated. Latero-posterior edge acutely angular and pointed in all segments. Posterior margin of keels weakly emarginate to almost straight, finely serrulate. Pores situated centrally in a slight excavation of the calluses. In the posterior segments the pore calluses become more elongate, and in

the 19th segment they extend caudad as far as the latero-posterior edges, so that the keels of this segment end caudally in two subequal teeth.

Sternites and legs. – Sternites of middle segments about twice as broad as long, rather densely set with minute setiferous tubercules. Sternites without longitudinal impression; the transverse furrow is broadly interrupted in the middle, and is present only between the coxae of the subsequent legs. Pregonopodial sternites without particular features, only the sternite of the 6th segment a little concave between the posterior legs. Legs (Fig. 42) of moderate length, moderately thick. Pubescence moderate, a little more dense on the tibiae and tarsi and on the anterior legs. From the 8th segment onwards the prefemora of the legs have a small ventro-terminal conical process that gradually grows out in subsequent legs to a long, slightly curved, spiniform process which, in the posterior legs, is about as long as a third to half the length of the prefemur proper. Moreover, from the 2nd pair onwards the prefemora have a slight dorsal protuberance near their base. These protuberances become weakly developed in the legs of the 17th segment, and are obsolete in those of the 18th segment. Length of joints: $3 > 6 > 5 = 2 > 4 > 1$. The 6th joint about two thirds the length of the 3rd. The 5th joint about two fifths the length of the 6th.

Anal segment. – More or less rugulose. Tail of moderate length and width; the sides a little concave, moderately convergent; dorsal side convex; the end directed a

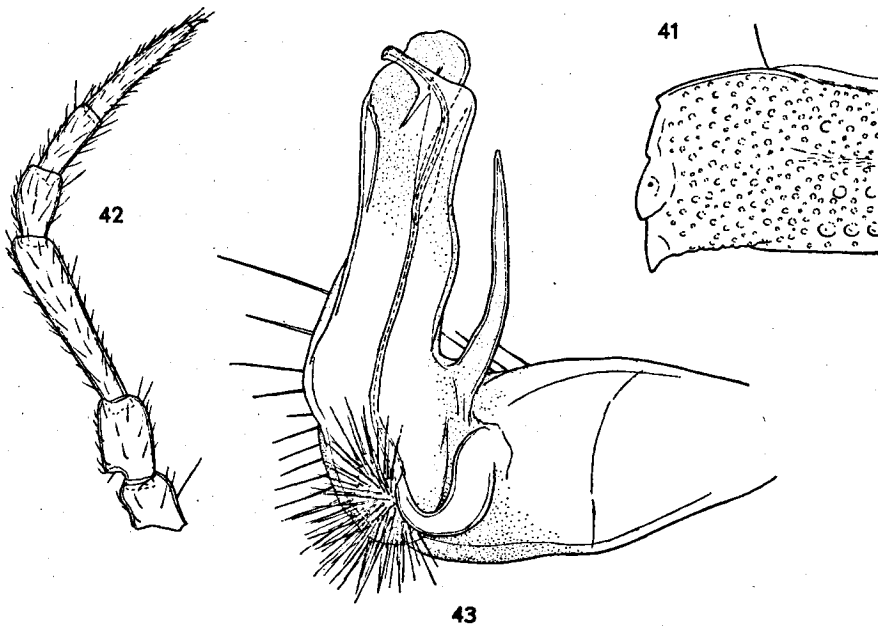



Fig. 41–43. *Brasiloschubartia styliger* nov. gen., nov. spec., holotype ♂. — 41: dorsal view of the 10th segment, left side. — 42: leg of 7th segment. — 43: right gonopod, medial view.

little downward, slender, truncate. Setiferous tubercules of tail well developed. Valves rugulose, the margins smooth, narrow, rather strongly raised; setiferous tubercules rather small. Scale smooth, rather broadly triangular, with convex sides and an acuminate end. Setiferous tubercles of scale moderately developed, projecting a little behind the margin but not equalling the end.

Gonopods. – (Fig. 43) Coxa of medium size, with a latero-distal setiferous area. Coxal hook somewhat inflated in its basal portion. Prefemur well developed, about half the length of the telopodite. Prefemoral process rather weakly developed, shorter than the acropodite, forming a slender, gradually tapering style. Acropodite rather complicated, basically composed of two lamellae, which are for the greater part connected with each other. The medio-anterior lamella, containing the spermal channel, ends in a short slender solenomerite. It is connected over almost its entire length with the latero-posterior lamella, which is slightly longer and which is rounded at the distal end. The spermal channel runs almost straight along the medial side of the acropodite.

Female. – Apart from the usual sexual characters the ♀♀ differ from the ♂♂ in being considerably more robust, although the lateral keels are somewhat less strongly developed. Antennal sockets separated by nearly twice the diameter of one socket, or the length of the second antennal joint. Collum only a little wider than the head. The anterior and lateral margins almost evenly rounded. 5th body segment a little wider than the 4th. The lateral keels of the posterior segments not raised. Sternites of middle segments nearly two and a half times as broad as long. Anterior sternites without particulars. Legs with the prefemoral modifications as in the ♂♂.

This species is easily distinguished from *B. zernyi* (Att.) by its smaller size: width 3.1 to 3.3 mm as against 4.5 mm. In *zernyi*, furthermore, the anterior edge of the lateral keels is evenly rounded, and the lateral margin has only two notches. *B. zernyi* has small sternal cones in the posterior half of the body, but lacks the prefemoral modifications of the legs. In the gonopods *zernyi* has a much larger prefemoral process, which is considerably longer than the acropodite. The acropodite apparently lacks a free solenomerite.

## **Zigwadesmus** Chamb.

1918 *Zigwadesmus* CHAMBERLIN, Bull. Mus. Comp. Zoöl. Cambridge *62:* 244.

Type species. – *Z. brunneus* Chamb., by original designation.

Trinidad, British Guiana, Surinam.

Number of species: three.

The species which have been described in this genus by CHAMBER-

LIN, *Zigwadesmus brunneus* Chamb. 1918 from Port of Spain, Trinidad, and *Z. guiananus* Chamb. and *Z. modestus* Chamb. from British Guiana, have all been based on female specimens. The taxonomic position of the genus within the family Chelodesmidae is therefore somewhat uncertain. When describing *Zigwadesmus* in 1918, CHAMBERLIN did not give his opinion as to the possible relationship, although later he mentioned the name *Zigwadesmus* in connection with the descriptions of his genera *Inconus* Chamb. 1941 from Peru and *Ankylophallus* Chamb. 1941 from Venezuela.

Amongst the other Chelodesmid genera occurring in Guiana, *Zigwadesmus* may come nearest to *Iphyria*, from which, however, it is readily distinguished by the entirely different shape and development of the lateral keels.

Of *Zigwadesmus* I have seen two specimens, both female, referable to *Z. guiananus*, as well as two females, each apparently representing an undescribed species, which were collected in Surinam. The latter two will be referred to below as *Zigwadesmus* spec. A and *Z.* spec. B, since the naming of such material is certainly not in the interest of future taxonomic work on the genus. The records of these two forms are, however, of interest since they extend the known range of the genus.

In itself, the fact that no males of *Zigwadesmus* have yet been found is also interesting. Future investigations will have to show whether the species of this genus reproduce parthenogenetically, or, which seems more probable to me, whether the females in the genus show a greater amount of activity, which may render them more conspicuous to the ordinary collector.

In general habit, the species of *Zigwadesmus* at first glance show a marked similarity to certain species of *Aphelidesmus*.

## KEY TO THE SPECIES OF *Zigwadesmus*,

based principally on colour characteristics.

**Our ignorance of the male characters in the genus renders distinction between the species extremely difficult.**

1. Dorsum with a serrate yellowish median band on dark ground

colour. Width: 5.2–5.6 mm. . . . . *Z. guiananus* Chamb.
Dorsum without a pale median band . . . . . 2

2. Dorsal portion of pro and metasomites equally dark in colour 3
Dorsal portion of pro and metasomites different in colour . . 4

3. Body segments brown, with the lateral keels and a spot on each side of the prosomites pale. Width: 4.5 mm. . . . . . . . . . . . . . . . . . . . . . . . *Z. brunneus* Chamb.
Prosomites without pale spots on the sides. Width of juvenile with 19 segments: 3.25 mm. . . . . *Z. modestus* Chamb.

4. Metatergites and the anterior portion of the prosomites yellowish, the posterior portion of the prosomites brown. Width: 6.0 mm. . . . . *Z.* spec. A
Metatergites brown, dorsal portion of the prosomites yellowish. Width: 4.6 mm. . . . . *Z.* spec. B

## **Zigwadesmus guiananus** Chamb.

1923 *Zigwadesmus guiananus* CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 73, pl. 27 fig. 189–193, pl. 28 fig. 195.

Previous record: British Guiana: Demerara, cacao plantation; forested sand hills.

BRITISH GUIANA: Potaro Road at 82 miles, Mazuruni (Coll. Dr. G. S. CARTER, Mus. London), 1 ♀; Canister Falls, June 1920 (Cattle Trail Survey, A. A. ABRAHAM, London), 1 ♀.

Colour. – Head rather dark reddish-brown, pale in the labral area. Antennae pale reddish-brown. Collum and subsequent segments dark reddish-brown. The lateral keels of the collum and a small spot in the middle of its posterior border yellowish. Subsequent segments with the lateral keels, and a portion of the metatergites above them of about the dorso-ventral width of the keels, yellowish. 2nd segment with a yellowish spot in the middle of the posterior margin. From the 3rd segment onwards a rather narrow, longitudinal, yellowish band, interrupted only in the anterior portion of the prosomites, in each segment widest just behind the waist. Ventral side of segments, sternites and legs pale reddish-brown to yellowish brown. Anal segment dark reddish-brown; a rather narrow longitudinal median band and the tail yellowish. Lateral side of valves also yellowish.

Width. – 5.5 and 5.6 mm.

Head and antennae. – Labrum moderately deeply and rather widely emargi-

nate, tridentate. Clypeus moderately convex, moderately impressed towards the labrum. Lateral sides straight or very slightly convex. Surface of headplate somewhat finely roughened (possibly by preservation); pubescence consisting of a transverse row of setae above the labrum and some sparse hairs in the clypeal and frontal regions. Antennal sockets separated by about one and a half times the diameter of a socket, or by about the length, or slightly more, of the 2nd antennal joint. Postantennal groove well developed, the wall in front rather prominent. Vertex rather convex, very weakly demarcated from the frontal area by a shallow impression. Sulcus moderately but regularly impressed, running downward to between the antennal sockets. Antennae of moderate length and width. Length of joints differing slightly, as follows: $2 > 3 > 4 = 5 < 6$. The 6th joint a little longer than the 2nd. 2nd, 3rd and 4th joints of subequal width, the 5th and the 6th each slightly thicker than the preceding joints. Pubescence of the 2nd joint moderate, the 3rd to the 6th joints rather densely to densely setiferous; the hairs mostly short.

Collum. – Distinctly broader than the head. Anterior border scarcely rounded, almost straight, even a little emarginate behind the post-antennal groove, and widely rounded near the lateral edge. Posterior margin distinctly emarginate in the middle, widely convex more laterally. The posterior margin of the keels of the collum straight or scarcely emarginate. Lateral edge acutely angular, very narrowly rounded. Surface of collum somewhat roughened, slightly rugulose (perhaps due to preservation), shiny. The surface rather convex transversely, especially more laterally. Marginal rim rather narrow along the latero-anterior border, almost obsolete towards the middle of the anterior border. Marginal rim along the posterior border of the lateral keels rather weakly developed, narrow.

Body segments. – Rather weakly constricted. The waist of moderate width, with fine and weak longitudinal striae. Prosomites sharply marked off from the waist, somewhat dulled by fine cellular structure, and with some very fine longitudinal wrinkles. Metatergites shiny, the surface somewhat roughened (possibly due to preservation), without transverse furrow or impression. Lateral sides very finely granular in a few anterior segments, smooth in the others. Pleural keels represented by a swelling, which is moderately developed in anterior segments but gradually diminishes in subsequent segments and is absent in the segments of the posterior half of the body. Ventrally and posteriorly, the swelling is demarcated by a weak furrow curving widely upward along the posterior margin of the sides.

Lateral keels. – Segments two to four each a little wider than the collum and the preceding segments respectively. The 5th segment a little narrower than the 4th. Keels on a rather low level: just above the middle of the segments. Those of the anterior segments directed rather strongly downwards, with the keels of the 2nd segment reaching a little more ventrad than the collum. Level of keels from the 6th segment onwards nearly horizontal. Keels of the 2nd to the 4th segments subsimilar. The anterior borders widely rounded, not shouldered at the base. Latero-anterior edges very obtuse, scarcely marked and rather widely rounded, with a distinct lateral tooth which becomes smaller in the 4th segment. Lateral borders very widely rounded, almost straight in the 4th segment. Posterior border scarcely emarginate in the 2nd segment, a little more so in the 3rd segment, and distinctly emarginate in the 4th. Latero-posterior edges approximately rectangular in the 2nd and 3rd segments, becoming a little acute in the 4th; the edges themselves very narrowly rounded. Marginal rims distinct though narrow along the anterior borders, gradually widening towards the latero-posterior edges. A fine marginal rim also present along

the posterior margins, but more distinct in the 3rd and 4th segments than in the 2nd. Keels from the 5th segment onwards rather weakly developed, not shouldered at the base, the latero-anterior margin very widely rounded or, in posterior segments, almost straight. Posterior borders narrowly emarginate. The latero-posterior edges acutely angular, very narrowly rounded or almost pointed, produced a little behind the posterior margins of the metasomites from the 5th to the 19th segment. Marginal rim of moderate width, widening a little towards the latero-posterior edge of the keels. The posterior margins of the keels also with a fine marginal rim. Poriferous keels with elongate oval pore calluses which form the latero-posterior edges of the keels and are sharply marked off anteriorly from the marginal rim by a deep furrow. Pores dorso-lateral in a slight excavation.

Sternites and legs. – Sternites of middle segments about one and a half times as broad as long, hairless, transversely weakly concave, and with the transverse furrow widely interrupted in the middle. Near the bases of the posterior legs of each segment a blunt, scarcely distinct cone. Legs of moderate length and not particularly slender, the prefemora in the anterior half of the body even somewhat incrassate. Length of joints: $3 > 6 > 2 > 4 = 5$. The 6th joint about three fifths the length of the 3rd, and about one and a half times the length of the 5th. Pubescence weakly developed, consisting of the usual single ventro-terminal hairs in the proximal joints. Only the tarsi and the distal portion of the tibiae moderately to rather weakly setiferous. In the anterior legs, the postfemora also setiferous.

Anal segment. – Tail of moderate length. The sides weakly concave, rather strongly convergent. The end curving a little ventrad, narrowly truncate and finely bifid. Setiferous tubercules weakly developed. Surface of anal segment a little roughened (preservation?). Valves very weakly rugulose, the marginal rims moderately high and of moderate width. Setiferous tubercules obsolete. Scale smooth, broadly triangular. The sides straight, the posterior edge slightly obtusely angular and very narrowly rounded. Setiferous tubercules rather weakly developed, projecting a little behind the margin, though not as for as the posterior edge.

Male. – Unknown.

Location of type material. – Museum of Comparative Zoölogy, Cambridge.

CHAMBERLIN's description of this species, as of the other species of the genus for that matter, is rather fragmentary, although accompanied by good drawings. The present description may therefore serve as a complementary one, since there can be hardly any doubt that the material studied belongs to *guiananus*. For illustrations I would refer to CHAMBERLIN's paper.

## Zigwadesmus modestus Chamb.

1923 *Zigwadesmus modestus* CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 74, pl. 27 fig. 194, pl. 28 fig. 196–199.

British Guiana: Demerara, forested sand hills.

Location of type material. – Museum of Comparative Zoölogy, Cambridge.

This species was based on a single juvenile female with 19 segments. Of course, there is scarcely any argument to be found in favour of naming such material, and future collections from the type locality will probably be necessary to throw some light on the identity and relationship of *Z. modestus*.

It seems to differ from *guiananus* mainly in characters of colour, especially in the absence of the middorsal pale stripe. The other features mentioned by CHAMBERLIN, such as the somewhat more reduced lateral keels, the shorter pore calluses and the shorter tail, lose much of their value if it is considered that the juvenile type specimen was compared with adult material of *guiananus*.

## Zigwadesmus spec. A

SURINAM: Wilhelmina Mts., near the Lucie Rivier, 1926 (Exped. G. Stahel, Coll. Dr. D. S. FERNANDES, Mus. Amsterdam), 1 ♀.

In general morphology closely resembles *Z. guiananus*, but a little larger (width: 6.0 mm) and the lateral keels from the 5th segment onwards are more weakly developed. The lateral sides of the metasomites are also finely granulose in the 5th and subsequent segments. No indications of sternal cones. In colour this species differs from *guiananus*, particularly in the absence of the middorsal band. Collum with a faintly demarcated and weakly contrasting trapezoid pale spot in the middle, and pale lateral keels; the rest pale reddish-brown. In the subsequent body segments the metasomites and the anterior portion of the prosomites is pale brownish-yellow. The posterior portion of the prosomites darker, reddish brown. Marginal rims of the lateral keels and the pore calluses also a little darker than the remainder of the metasomites. On the prosomites a pale middorsal band is extremely weakly indicated.

## Zigwadesmus spec. B

SURINAM: Litanie, 2 Nov. 1903 (Gonini Exped., Coll. G. VERSTEEG, Mus. Leiden), 1 ♀.

Distinctly smaller than *guiananus* and the preceding species (width: 4.6 mm). The lateral keels more weakly developed than in spec. A, their posterior edges scarcely produced behind the margins of the segments. Tergites very finely roughened, the sides smooth except in a few anterior segments, where they are finely granular. Pleural swellings obsolete. Sternal cones absent. In colour this species differs in that the prosomites from the 5th segment onwards are yellowish. The metatergites are dark brown, the keels and the lateral sides yellowish. Collum with the lateral keels and a faintly demarcated spot at the middle of the posterior border yellowish, the remaining part brown. In the 2nd to the 4th segments the prosomites are yellowish only in the middorsal portion.

## Iphyria Chamb.

1941 *Iphyria* CHAMBERLIN, Bull. Amer. Mus. Nat. Hist. *78:* 500.
1954 *I.*, HOFFMAN, Proc. Ent. Soc. Washington *56:* 219.

Type species. – *I. claralata* Chamb., by original designation.

Peru, British Guiana.

Number of species: two.

Up to now *Iphyria* has been a monotypic genus, and, if it had not not been for the re-examination of the type species by HOFFMAN, would still have been a doubtful genus too. HOFFMAN, however, has given a good drawing of the gonopod of the type species and pointed out that the genus, although closely related to *Chondrodesmus* Silv., is fully justified.

The species classified here under *Iphyria, I. macconnelli* (Poc.), is disjunct from the type species in many important points which will be mentioned below. However, *macconnelli* is undoubtedly more closely related to *Iphyria claralata* than to any other Chelodesmid, and it seems best not to create another rather meaningless monotypic genus in the Chelodesmidae.

Possibly belonging to the same generic category is "*Leptodesmus*" *kalobatus* Brol. 1919 from Ecuador. In this species the gonopod coxa

is remarkably similar to that of the type found in *Iphyria*, *Chondrodesmus*, etc.; the telopodite seems more complicated, though basically similar to that of the species of *Iphyria*.

## Iphyria macconnelli (Poc.)

1900 *Odontopeltis Macconnelli* POCOCK, Trans. Linn. Soc. London (2) *8:* 64, fig. 1. (1)
1938 *Leptodesmus* (*Pseudoleptodesmus?*) *m.*, ATTEMS, Tierreich *69:* 44.

Previous record: British Guiana: summit of Mt. Roraima. (1)

BRITISH GUIANA: Summit of Mt. Roraima. 8600 ft. (Mus. London), 1 ♂ and 1 ♀ cotype.

Colour. – In the specimens studied the colour was as described by POCOCK: "black or very dark blackish brown, with the external half of the keels bright or dull red or yellowish brown, and, at least on the anterior terga, a median transverse yellowish or red patch along the posterior border; caudal process not pale; antennae blackish; legs blackish brown or deep reddish brown, ...". The sternites, however, are not brownish yellow, but dark brown.

Width. – ♂: 5.5 mm; ♀: 6.5 mm.

Head and antennae. – Labrum narrowly but rather deeply emarginate, tridentate. Clypeus rather weakly convex, moderately impressed towards the labrum. Lateral sides very weakly convex. Surface of headplate shiny, smooth or very weakly irregularly rugulose. Pubescence very sparse in the clypeal region, rest of headplate hairless. Antennal sockets separated by about one and a half times the diameter of one socket or by about four fifths of the length of the 2nd antennal joint. Postantennal groove moderately developed, the wall in front moderately prominent. Vertex moderately convex, not demarcated from the frontal area. Sulcus rather deeply impressed, especially anteriorly, and running downward to between the antennal sockets. Antennae rather long and slender. Length of joints: $2 > 3 = 4 > 5 = 6$, the 6th joint about three quarters of the length of the 2nd. Joints of subequal width, with the 6th a little wider than the others. Pubescence rather dense in the 2nd joint to dense in the 3rd to the last joints.

Collum. – Distinctly wider than the head. Anterior border very widely rounded in the middle, straight behind the antennal sockets, and widely rounded laterally. Posterior border scarcely emarginate in the middle, more laterally widely rounded, and laterally very widely emarginate. Latero-posterior edge a little acute, very narrowly rounded. Surface of collum rather convex in the middle, surface of the lateral keels of the collum flatter, sloping. Integument shiny, very weakly irregularly wrinkled. Along the anterior border a very fine marginal rim, becoming more distinct and broader towards the latero-posterior edge. Posterior borders of the keels also with a narrow but distinct rim.

Body segments. – Moderately constricted by a broad, shiny waist which posteriorly passes over into the metatergite without a marking line, but anteriorly is sharply demarcated from the somewhat dulled prosomite. Metatergites shiny,

weakly irregularly rugulose, and often marked by a network of very weak meandering sulci. Three transverse rows of small, low tubercules are visible only in a few posterior segments. In the other segments only a few of these tubercules are visible on the dorsal surface of the lateral keels. All tergites without transverse furrow or depression. Sides a little irregularly rugulose, and somewhat finely granulose in a few anterior segments. Pleural keels weakly developed: in the anterior segments represented by a low swelling and a furrow curving widely upwards along the posterior margin; both disappear in about the middle of the body.

Lateral keels. – (Fig. 44) 2nd segment a little wider than the collum and about as wide as the 3rd. 4th segment a little wider than the 3rd and a little narrower than the 5th. Keels of the 2nd segment sloping like those of the collum, those of the 3rd and 4th segments somewhat less, and from the 5th segment the keels are horizontal and on a rather high level. Anterior border of the keels of the 2nd to the 4th segments shouldered at the base and widely convex, directed a little caudad. Latero-anterior edge obtusely angular in the 2nd segment, becoming more widely rounded in the 3rd and 4th, marked by the presence of a distinct sharp tooth, which is lacking in the 5th and subsequent segments. Lateral border of the keels of the 2nd to 4th segments widely rounded; the posterior borders straight, in the 2nd and 3rd segment directed a little caudad, in the 4th and subsequent segments almost transverse. Latero-posterior edges rectangular or a little obtuse, rather narrowly rounded up to the 4th segment. A distinct marginal rim is present along the anterior, lateral and posterior borders, narrow along the anterior and posterior borders, broader along the lateral border. From the 5th segment onwards the lateral keels have a triangular outline, with the latero-anterior border very widely rounded, or almost straight, and scarcely or not shouldered at the base. The posterior border straight and transverse up to about the 15th segment; in the posterior segments directed more and more caudad. Latero-posterior edge about rectangular, narrowly rounded, becoming more and more acutely angular in the 17th, 18th and 19th segments and projecting distinctly behind the posterior border of the segments there. Pore calluses elongate oval, their surface dorso-lateral, the pores situated in a small excavation. Margins of keels rather narrowly rimmed, the rims growing a little wider near the latero-posterior edges.

Sternites and legs. – Sternites of middle segments about one and a half times as broad as long, moderately densely set with rather long hairs, the pubescence becoming sparse to obsolete in the sternites of the posterior segments. Sternites transversely very widely concave, the transverse furrow more or less interrupted in the middle. Sternites of anterior segments without particulars; no sternal cones. Legs (Fig. 45) rather long and slender. Pubescence moderate, a little more dense in the tibiae and tarsi and in the anterior legs. All legs without modifications. Length of joints: $3 > 6 > 2 = 4 = 5 > 1$. The 6th joint about five sixths as long as 3rd; the 5th joint about half as long as the 6th.

Anal segment. – Weakly rugulose. Tail of moderate length and width; the sides widely concave from a dorsal view, moderately convergent. Dorsal side straight, the end straightly truncate. Setiferous tubercules weakly developed. Valves rugulose, the margins smooth, rather strongly raised; the setiferous tubercules weakly developed. Scale almost smooth, triangular, with the sides straight and the posterior edge rectangular and pointed. The setiferous tubercules almost obsolete.

Gonopods. – (Fig. 46) Coxa large in comparison with the telopodite, cylindrical, hairless, laterally obliquely truncate, antero-laterally produced in a triangular

process and with an anterior coxal rod. Tracheal stalk of moderate length. Prefemur very strongly developed, rather densely hairy, especially on the lateral side. Prefemoral process rather long and slender, distally curving laterad and caudad, the end acuminate. Acropodite laterally very sharply demarcated from the prefemur, a little broader than the prefemoral process, the end split into a rather short acuminate solenomerite and a laminate, about equally long, tibiotarsus.

Female. – Apart from the usual sexual characters the female does not differ conspicuously from the male. As usual, the lateral keels are a little less prominent. Sternites about one and two thirds times as broad as long. The prefemora of the legs a little thinner than in the males.

Location of type material. – British Museum (Natural History), London.

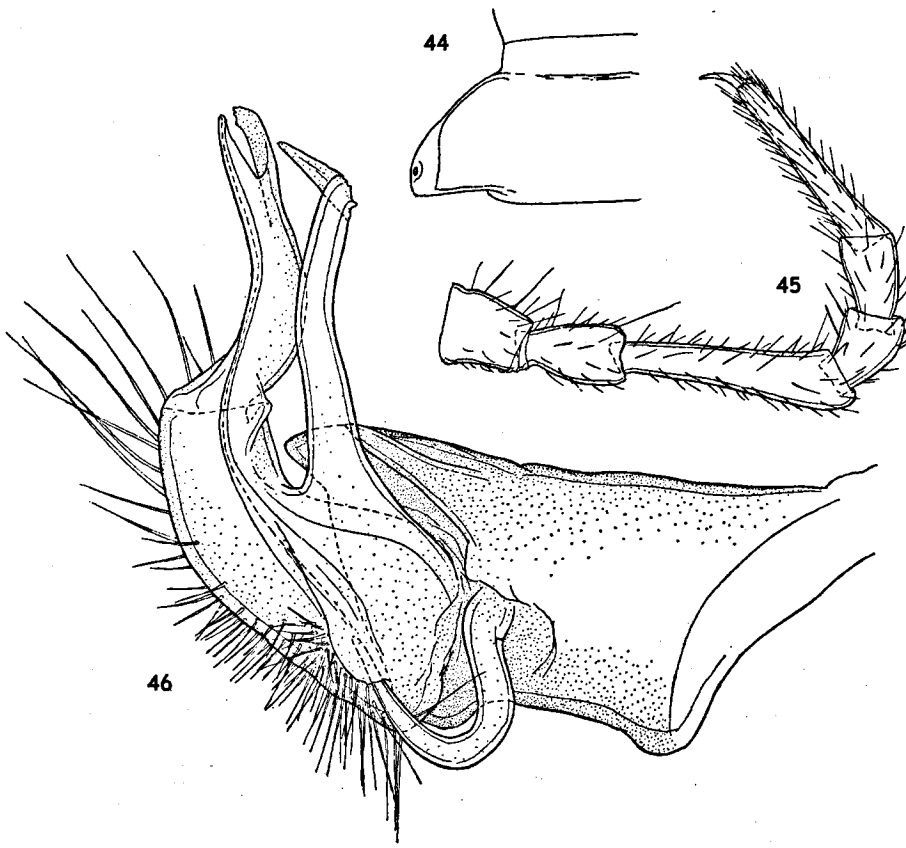



Fig. 44–46. *Iphyria macconnelli* (Poc.), cotype ♂. — 44: dorsal view of 10th segment, left side. — 45: leg of 7th segment. — 46: right gonopod, medial view.

Judging from the general structure of the gonopods and the relative proportions of their parts this species must be related to *claralata*. There are, however, many characters in which the two species differ. In the gonopods of *claralata* the coxa is produced distad of the prefemur, more or less as in *Leptherpum*. Moreover, a coxal rod appears to be absent. In *claralata* the prefemoral process is more lamellate and more strongly developed than in *macconnelli*, and the tibiotarsus appears to be smaller in relation to the solenomerite. There are also important differences in the other characters. The lateral keels in *claralata* have a widely rounded antero-lateral margin instead of an almost straight one. In *I. claralata* the prefemora of the legs are provided with a ventro-terminal spinelike process. In colour this species differs in having the antennae, lateral keels and legs yellow.

Although the differences between *macconnelli* and *claralata* are quite important, and may even ultimately prove to have partly a generic value, it seems best for the time being not to create a new genus, particularly because of the widely disjunct range of the species. There can be hardly any doubt that more species belonging to this group remain to be discovered in the intermediate area – species which may form transitions between the rather disjunct forms known at present.

## 5. THE GENERA TYPHLONANNOLENE CHAMB., HYPOCAMBALA SILV. AND TRACHYJULUS PET. (CAMBALIDA)

In Guiana the order Cambalida is represented by four genera, viz. *Pseudonannolene* Silv., *Typhlonannolene* Chamb., *Hypocambala* Silv. and *Trachyjulus* Pet. Each of the two last-named is represented by a single species imported from elsewhere. They do not belong to the autochthonous American fauna. Nevertheless, I have taken the opportunity of discussing their synonymy and taxonomy here in order to define the status and nomenclature of the two species involved.

The other two genera, *Pseudonannolene* and *Typhlonannolene*, are truly Neotropical, the first being dominant in Guiana. I hope to deal with this large genus and to discuss the taxonomy of the American Cambalida in a subsequent paper.

## **Typhlonannolene** Chamb.

1923 *Typhlonannolene* CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 19.

Type species. – *T. adaptus* Chamb., by original designation.

British Guiana.

Number of species: one.

According to the diagnosis, this genus differs from *Epinannolene* Brol. only in the absence of eyes. In itself this character, not correlated with others, scarcely has generic value, and since KRAUS in 1955 described the equally blind *Epinannolene flagellosa* Kraus from Peru, related to *E. alticola* (Silv.) which has eyes, *Typhlonannolene* becomes virtually a synonym of *Epinannolene*. *T. adaptus*, however, is known only in the female sex, and hence that it seems better to await the discovery of the male before a decision is taken regarding the status of the genus.

### **Typhlonannolene adaptus** Chamb.

1923 *Typhlonannolene adaptus* CHAMBERLIN, Occ. Papers Mus. Zool. Michigan *133:* 19, pl. 11 fig. 71–73.

British Guiana: Demerara: Second Mourie, forested sand hills, Labba Creek sand hills, sand hill forest.

Location of type material. – Museum of Comparative Zoölogy, Cambridge.

## **Hypocambala** Silv.

1897 *Hypocambala* SILVESTRI, Abh. Mus. Dresden *6* (9): 11.
1900 *Agastrophus* ATTEMS, Zool. Jahrb. Syst. *13:* 151.

1922 *Trichonannolene* CHAMBERLIN, Ent. News *33:* 85.
1935 *H.*, SILVESTRI, Bull. Bern. Bishop Mus. *142:* 8.
1938 *Ilyspasticus* ATTEMS, Mem. Mus. Paris (n.s.) *6:* 276.
1948 *H.*, LOOMIS & HOFFMAN, Proc. Biol. Soc. Washington *61:* 51.

Type species. – *H. helleri* Silv., by monotypy. (Type species of *Agastrophus: A. anguinus* Att., by monotypy; of *Trichonannolene: T. guiananus* Chamb., by original designation; of *Ilyspasticus: I. gracilis* Att., by monotypy).

Ethiopian region: Comore Is., Seychelles, Mauritius. Oriental region: Indo-China. Australian region: Celebes, Ceram, Aru Is., New Guinea, New Britain, Samoa, New Caledonia, Loyalty Is., Marquesas Is. Neotropical region: British Guiana.

Number of species: ten.

The identity of the genus *Agastrophus* with *Hypocambala*, and of *Trichonannolene* with *Hypocambala*, were demonstrated by SILVESTRI in 1935 and by LOOMIS and HOFFMAN in 1948, respectively. The synonymy of *Ilyspasticus* with *Hypocambala* becomes evident after comparison of the description and drawings of its type species with those of the other species of *Hypocambala*, in particular of *H. dahli* (Att.). The only character by which *Ilyspasticus* can be separated from *Hypocambala* is by the presence of pores in the 5th segment in the first genus, a feature, however, which is now more generally recognized as being of minor importance and certainly not sufficient for maintaining a generic separation. It was apparently purely on account of the presence of pores in the 5th segment that ATTEMS, when describing *Ilyspasticus*, compared this genus with *Epinannolene* Brol. It is quite astonishing that the resemblance between *I. gracilis* and the species of his own genus *Agastrophus* did not occur to him.

At present the genus *Hypocambala* embraces the following species:

| | |
|---|---|
| *H. anguina* (Attems 1900) | Seychelles, Samoa (an apparently different species has been recorded from the Marquesas Is. by SILVESTRI under this name) |
| *H. caledonica* (Carl 1926) | New Caledonia |
| *H. cinctella* (Carl 1926) | Loyalty Is. |
| *H. cornuta* (Verhoeff 1939) | Mauritius |
| *H. crinita* (Attems 1917) | New Guinea |
| *H. dahli* (Attems 1914) | New Britain |
| *H. gracilis* (Attems 1938) | Indo-China |

| | |
|---|---|
| *H. helleri* Silvestri 1897 | see p. 150 |
| *H. orientalis* (Carl 1912) | Celebes, Ceram |
| *H. voeltzkowi* (Attems 1910) | Comore Is. |

The genus possibly also includes *"Iulomorpha" exocoeti* (Pocock 1888), from Christmas Island, the male characters of which remain to be investigated.

A genus of importance to the status of *Hypocambala* is *Trichocambala* Silvestri 1895, which is based on *T. elongata* Silv. 1895 from Sumatra and is known only in the female sex. The character used by SILVESTRI for distinguishing *Hypocambala* from *Trichocambala* was the absence of eyes in the latter genus. This character, however, has lost its value since VERHOEFF described the blind *H. cornuta*. Nevertheless the identity of *Trichocambala* with *Hypocambala* may still seem somewhat doubtful, in particular because *T. elongata* is larger in size than any of the known species of *Hypocambala*. The dimensions make it more likely that the only other species assigned to *Trichocambala*, *T. sollasii* Pocock 1898 from the Ellice Is., should really be assigned to *Hypocambala*.

As yet, the only record of *Hypocambala* from the Western Hemisphere is that of *H. helleri*, referred to below.

The genus *Hypocambala* forms a really coherent group, and distinction between the species is not always easy. The differences in the gonopods of *H. caledonica*, *H. crinita*, *H. dahli*, *H. gracilis* and *H. orientalis* are quite unimportant, and without the evidence of other characters one would tend to unite these five species.

In this light, the great geographical range of the genus becomes quite remarkable. Some of the species have doubtless attained a wide distribution by human agency; this seems to be the case with *H. anguina* and *H. helleri*. But the occurrence of closely related though distinct species in widely separated areas suggests an ecological adaptation within this genus which facilitated the crossing of formidable sea barriers by physical agencies.

## KEY TO THE SPECIES OF *Hypocambala*,

### based primarily on male characters.

In 1929, ATTEMS (Ins. of Samoa *8:* 33) gave a key to the species of *Agastrophus*, which, however, did not include the two species described by CARL in 1926. The

more recent addition of *A. cornutus*, *H. helleri* and *I. gracilis* to the same generic category made it all the more necessary to prepare the following new key.

1. Mentum of gnathochilarium with a subsemicircular impression. Coxite of the first pair of legs without a pair of processes; the basal joints of the telopodites medially contiguous. Telopodite of the anterior gonopods completely coalesced with the coxite . . . . . *H. voeltzkowi* (Att.)
   Mentum of gnathochilarium without an impression. Coxite of the first pair of legs with a pair of curved processes separating the first joints of the telopodites. Telopodite of the anterior gonopods articulating with the coxite . . . . . 2

2. Median process of the anterior gonopods reduced, not projecting distad of the telopodite, ending in a small uncate process curving mesad. Metasomites with two transverse rows of short hairs . . . . . *H. anguina* (Att.)
   Median process of the anterior gonopods well developed, projecting well distad of the telopodite . . . . . 3

3. Metasomites rather densely setiferous . . . . . 4
   Metasomites at most with three transverse rows of short hairs 7

4. Telopodite of the legs of the first pair consisting of four joints. Number of ocelli about 22. Dorsum yellowish brown, the sides black . . . . . *H. crinita* (Att.)
   Telopodite of the legs of the first pair consisting of five joints, the pretarsus excluded . . . . . 5

5. Median process of the anterior gonopods uncate: the end abruptly and strongly curved mesad. Eyes composed of up to 11 ocelli. Colour yellowish brown to pale reddish . . . . . *H. helleri* Silv.
   Median process not uncate, the end straight or curved a little laterad . . . . . 6

6. Median process of the anterior gonopods longer than broad.

Colour of body segments yellowish brown. Eyes consisting of about 14 ocelli . . . . . *H. orientalis* (Carl)
Median process of the anterior gonopods not longer than it is broad at the base. Body segments yellow, with a dark spot in front of the pores from the 5th segment onwards; the dorsal side of the prosomites with a dark transverse band . . . . . *H. cinctella* (Carl)

7. Eyes absent. Metasomites hairless . . *H. cornuta* (Verh.)
Eyes present (not definitely known for *gracilis*). Metasomites with at least one transverse row of hairs . . . . . 8

8. Median process of anterior gonopods curved slightly but distinctly sigmoidally. Metasomites with two or three transverse rows of hairs . . . . . *H. caledonica* (Carl)
Median process of anterior gonopods not curved sigmoidally, straight . . . . . 9

9. Pores beginning on the 5th segment. Metasomites with one transverse row of hairs . . . . . *H. gracilis* (Att.)
Pores beginning on the 6th segment. Metasomites with two transverse rows of hairs . . . . . *H. dahli* (Att.)

## **Hypocambala helleri** Silv.

1897 *Hypocambala helleri* SILVESTRI, Abh. Mus. Dresden *6* (9): 11, pl. 2 fig. 59–62. (1)
1922 *Trichonannolene guiananus* CHAMBERLIN, Ent. News *33:* 85, fig. (2)
1935 *H. h.*, SILVESTRI, Bull. Bern. Bishop Museum *142:* 8, fig. 2.
1948 *H. h.*, LOOMIS & HOFFMAN, Proc. Biol. Soc. Washington *61:* 51.

Australian region: Celebes (1); Aru Is. (1). Neotropical region: Philadelphia (U.S.A.), in soil around a potted palm from Georgetown, British Guiana (2).

Location of type material. – Zoologisches Museum, Dresden (*H. helleri* Silv.); Museum of Comparative Zoölogy, Cambridge (*T. guiananus* Chamb.).

After comparison of the description and drawing of *Trichonannolene guiananus* with those given by SILVESTRI there can be scarcely any doubt about the identity of *guiananus* with *helleri*.

Among the species of *Hypocambala*, *H. helleri* appears to be well characterized by the conformation of the anterior gonopods. It may come closest to *H. anguina* on the evidence of the uncate end of the medial process of the anterior gonopods, but it is easily distinguished from that species by the characters given in the key.

## Trachyjulus Pet.

1864 *Trachyjulus* PETERS, Mon.ber. Ak. Wiss. Berlin *1864:* 547.
1895 *Cambalopsis* POCOCK, Ann. Mag. Nat. Hist. (6) *15:* 363.
1923 *T.*, SILVESTRI, Rec. Indian Mus. *25:* 181.
1936 *Paratrachiulus* VERHOEFF, Zool. Anz. *113:* 51.
1941 *C.* & *T.*, CARL, Zool. Anz. *133:* 286, 287.
1950 *Phanolene* CHAMBERLIN, Zoologica, New York *35:* 136.

Type species. – *T. ceylanicus* Pet., by monotypy. (Type species of *Cambalopsis: Cambala calva* Poc., by original designation; of *Paratrachiulus: Trachyjulus mimus* Silv., by monotypy; of *Phanolene: P. sima* Chamb., by original designation).

Oriental region: India, Ceylon, Burma, Indo-China, Malaya, Sumatra, Java; one species erratically distributed in the Australian and Neotropical regions.

Number of species: twenty-two.

The taxonomic status of *Trachyjulus*, and of *Cambalopsis* for that matter, is still somewhat unsatisfactory, since the sexual characters of the type species of both genera are unknown. Admittedly, CARL in 1911 (Rev. Suisse Zool. *19*: 397, fig. 1–2) published some drawings of the gonopods of *T. ceylanicus*; but his material was derived from the HUMBERT collection and can be regarded neither as typical nor as topotypical. Nevertheless, judging from the evidence given by the external morphology, it seems most likely that the material identified as *ceylanicus* by HUMBERT and CARL at least belonged to the same generic category as the type material of *ceylanicus* Peters.

In 1895, POCOCK distinguished the genus *Cambalopsis* from *Trachyjulus* by the middorsal interruption of the series of longitudinal carinae along the posterior border of the collum. No reference was made, however, to sexual characters. The subsequent extension of the generic diagnosis in this respect was not based on the type species but on other species which, on account of morphological

agreement with POCOCK's diagnosis, were classified under *Cambalopsis* by ATTEMS and CARL.

In 1923 SILVESTRI showed that species exist which, as regards the sculpture of the collum, are intermediate between *Trachyjulus* and *Cambalopsis*, and the latter genus was therefore brought into the synonymy of *Trachyjulus*.

ATTEMS in 1930 (Arch. Hydrobiol. Suppl. *8*: 167), although sharing SILVESTRI's views with respect to the systematic value of the development of crests on the collum, kept the two genera separate on the grounds that the anterior gonopods in *Trachyjulus* lack a telopodite, in contradistinction to *Cambalopsis*. The same opinion was held by CARL in 1941.

However, it seems to me that the alleged absence of a telopodite in the anterior gonopods of *Trachyjulus* is fictitious. In the first place, all the published drawings of the anterior gonopods of the species of the genus, namely those published by CARL in 1911 (*T. ceylanicus*, *T. humberti*) and those given by the same author in 1941 (Rev. Suisse Zool. *48*: 642) for *T. willeyi*, are extremely schematic. In fact, they give little more than a simple outline.

On comparing CARL's drawings with those given by SILVESTRI in 1923 for *T. minor*, we find the outlines to be almost completely identical. However, SILVESTRI in his drawing clearly indicates the presence of a telopodite which is closely applied to the lateral process of the coxite over its entire length. It can easily be understood that without careful examination such a condition is likely to cause an erroneous interpretation of the structure concerned.

Remarkably enough, strong evidence in favour of the presence of a telopodite in *T. ceylanicus* is to be found in CARL's own drawing. In this he has indicated the course of a bundle of muscles in the gonopod coxa which corresponds exactly with a similar bundle drawn for *T. minor* by SILVESTRI and which must undoubtedly be regarded as the muscle moving the telopodite. The existence of such a muscle in *ceylanicus* without an articulating telopodite being present seems highly improbable!

That *T. minor*, *T. ceylanicus*, *T. humberti* and *T. willeyi* are indeed closely related species is shown by the basically similar posterior gonopods, and also by the almost identical structure of the first pair of legs of the males.

In view of all this evidence, it seems best to follow SILVESTRI in regarding *Trachyjulus* and *Cambalopsis* as synonymous.

CHAMBERLIN was obviously unaware of the Oriental origin of the species he described as *Phanolene sima*, for his gonopod drawings immediately show the identity of his material with *Trachyjulus nordquisti* (Att.), which had been recorded from the Western Hemisphere for the first time by SCHUBART a few years before.

The lack of any necessity for the creation of *Paratrachiulus* Verh. was shown by CARL as early as 1941.

The genus *Trachyjulus* now consists of the following species:

| | |
|---|---|
| *T. annectens* Silvestri 1923 | India |
| *T. butteli* (Carl 1922) | Sumatra |
| *T. calvus* (Pocock 1893) | Burma, Sumatra |
| *T. cavernicola* (Pocock 1894) | Sumatra |
| *T. ceylanicus* Peters 1864 | Ceylon |
| *T. costatus* (Verhoeff 1936) | Ceylon |
| *T. dentatus* (Pocock 1894) | Java |
| *T. fissispinus* (Attems 1930) | Sumatra |
| *T. heteropus* Silvestri 1923 | Malaya |
| *T. humberti* Carl 1911 | Ceylon |
| *T. mimus* Silvestri 1924 | India |
| *T. minor* (Silvestri 1923) | Ceylon |
| *T. modestior* Silvestri 1923 | India |
| *T. modiglianii* (Silvestri 1895) | Sumatra |
| *T. nordquisti* (Attems 1909) | see p. 157. |
| *T. pauper* Silvestri 1923 | India |
| *T. proximatus* Silvestri 1923 | India |
| *T. rivicola* (Attems 1930) | Sumatra |
| *T. simulans* (Carl 1941) | India |
| *T. singularis* (Attems 1938) | Indo-China |
| *T. tjampeanus* (Attems 1903) | Java |
| *T. willeyi* (Carl 1941) | India |

In respect of a number of these species the characters of the male are unknown, either because they have been based on female specimens (*T. costatus*, *T. modestior* and *T. pauper*) or because the sexual characters have not been described (*T. calvus*, *T. cavernicola*, *T. dentatus* and *T. modiglianii*). The latter category also includes *T. ceylanicus*, since we do not know whether the material described by CARL is conspecific with PETERS' types. However, the reference of these species to *Trachyjulus* seems fully justified on account of the external morphology.

*T. costatus* and *T. minor* have been described as a variety and as a subspecies of *T. ceylanicus*, respectively, and *T. willeyi* as a subspecies of *T. humberti*. However, the characters of these forms justify specific treatment. Moreover, it seems better in general not to speculate on the interrelationship of forms each of which has so far been reported from only one single locality.

In 1941 CARL referred to *Cambalopsis* the Indo-Chinese species described by ATTEMS under the name of *Glyphiulus mediator* Att. 1938. This species does not belong to the genus *Trachyjulus*, from which it differs in having more than one series of ocelli on each side, complete carinae on the collum, three joints to the legs of the first pair of the male, etc.

## KEY TO THE SPECIES OF *Trachyjulus*,

based mainly on the structure of the anterior gonopods and of the first pair of legs of the males.

The species of *Trachyjulus* are well characterized, in particular, by the differences in the posterior gonopods of the males. These differences, however, although easily seen on comparison of the pertinent drawings, are extremely difficult to describe. The external morphology and colour seem to be very monotonous, and have, moreover, generally been somewhat neglected. Consequently, species based on female specimens or of which the male characters have been insufficiently described could not be included in the following key.

1. Telopodites of the first pair of legs of the male long and slender, about four times as long as broad. The lateral sides of the coxae strongly protruding ventrad. Collum without carinae, with about three furrows on each side . . . . . 2
   Telopodites of the first pair of legs of the male about as long as or slightly longer than broad. Lateral sides of the coxae without strongly protruding processes; a triangular production, not longer than broad at the base, may be present 3

2. Dorsum without a dark median stripe. The lateral processes of the coxae of the first pair of legs projecting as far ventrad as the median process. Collum conspicuously

inflated, the segments immediately behind it strongly narrowed . . . . . *T. mimus* Silv.
Dorsum with a narrow blackish median stripe. The lateral processes of the coxae of the first pair of legs not projecting as far as the median process. Collum not conspicuously inflated . . . . . *T. proximatus* Silv.

3. Median process(es) of the coxae of the first pair of legs of the males about twice as long as the telopodites, and projecting well distad of these . . . . . 4
Median process(es) of the coxae of the first pair of legs of the males of about the length of the telopodites, projecting little or not at all distad of the telopodites . . . . . 5

4. Collum laterally with about five carinae on each side, the middle smooth. Telopodites of the first pair of legs of the males distally rounded . . . . . *T. annectens* Silv.
Collum with, in all, thirteen carinae laterally and medially along the posterior border. Telopodites of the first pair of legs of the males distally truncate . *T. simulans* (Carl)

5. Anterior gonopods with a single club-shaped and elongate median coxal process, and a long, slender and somewhat sigmoidally curved telopodite. The telopodite projecting distinctly distad of the coxal process . *T. singularis* (Att.)
Anterior gonopods with a medial and a lateral coxal process. The telopodite more or less closely applied to the lateral process . . . . . 6

6. Anterior gonopods with a broad, distally broadly truncate and somewhat anvil-shaped medial process. The lateral process shorter than it is broad at the base. Both processes somewhat diverging. Dorsum with a pale median band . . . . . *T. butteli* (Carl)
Anterior gonopods suboval or piriform in outline, the processes of the coxa converging distally. The median process

triangular or rodlike. The lateral process usually longer than it is broad at the base . . . . . 7

7. Collum with a series of longitudinal carinae along the whole of the posterior border. Telopodites of the first pair of legs of the males with numerous setae . . . . . 8
Collum with at most a few furrows on the lateral sides, the rest of the surface smooth, without carinae. Telopodites of the first pair of legs of the males with a few (less than ten) setae each . . . . . 11

8. Transverse constriction of the metasomites very distinct; the carinae consequently deeply incised halfway, with the anterior and posterior parts shorter than high, triangular. Posterior gonopods distally acutely angular, very narrowly rounded. Telopodite of the first pair of legs of the males setiferous only in the distal half . . . *T. ceylanicus* Pet.
Transverse constriction of the metasomites weaker, the parts of the carinae not higher than long . . . . . 9

9. The entire telopodite of the first pair of legs of the males setiferous. Posterior gonopods distally broadly truncate . . . . . *T. willeyi* (Carl)
Telopodite of the first pair of legs of the males setiferous only in the distal half . . . . . 10

10. Posterior gonopods distally broadly truncate . . . . . . . . . . . . . . . . . . . . . . *T. humberti* (Carl)
Posterior gonopods distally triangular, rounded . . . . . . . . . . . . . . . . . . . . . . *T. minor* Silv.

11. Lateral coxal process of the anterior gonopods slender, about seven or eight times as long as broad. The telopodite widening somewhat at the distal end, densely covered with setae, not conspicuously longer than the coxal processes . . . . . *T. nordquisti* (Att.)

Lateral coxal process of the anterior gonopods broader, at most four times as long as broad. Telopodite generally not widening distad, and more dispersedly setiferous, sometimes conspicuously projecting distad of the coxal processes . . . . . 12

12. Telopodite of the anterior gonopods curving abruptly mesad near the end, projecting distinctly distad of the coxal processes . . . . . *T. rivicola* (Att.)
Telopodite of the anterior gonopods straight or very weakly curved . . . . . 13

13. Telopodite of the anterior gonopods projecting strongly distad of the coxal processes. Dorsum with a yellowish median band . . . . . *T. fissispinus* (Att.)
Telopodite of the anterior gonopods not or scarcely projecting distad of the coxal processes . . . . . 14

14. Lateral coxal process of the anterior gonopods shorter than the medial process . . . . . *T. tjampeanus* (Att.)
Lateral coxal process of the anterior gonopods as long as or a little longer than the medial process. *T. heteropus* Silv.

## **Trachyjulus nordquisti** (Att.)

1909 *Cambalopsis Nordquisti* ATTEMS, Ark. Zool. *5* (3): 71, fig. xxv, pl. 2 fig. 28–32. (1)
1912 *C. n.*, CARL, Rev. Suisse Zool. *20:* 158, pl. 5 fig. 19–21. (2)
1914 *C. N.*, ATTEMS, Arch. Naturg. *80A* (4): 295. (3)
1923 *Trachyjulus n.*, SILVESTRI, Rec. Indian Mus. *25:* 188.
1927 *C. n.*, ATTEMS, Zool. Meded. Leiden *10:* 62. (4)
1946 *C. n.*, SCHUBART, Rev. Bras. Biol. *6:* 396, fig. 1–7. (5)
1950 *Phanolene sima* CHAMBERLIN, Zoologica, New York *35:* 136, fig. 1–2. (6)

Oriental region: Malayan Peninsula (1). Australian region: Celebes (2), Amboina (4), New Britain (3). Neotropical region: Brazil: Distr. Federal (5). British Guiana: Kartabo (6).

Location of type material. – Naturhistoriska Riksmuseum, Stockholm (*C. nordquisti* Att.); American Museum of Natural History, New York (*P. sima* Chamb.).

On comparison of the description and drawings of CHAMBERLIN for his *P. sima* with those of ATTEMS, CARL and SCHUBART for *C. nordquisti* it becomes evident that *sima* must be a synonym of *nordquisti*. Nevertheless, some questionable points remain in CHAMBERLIN's description.

His drawing of the anterior gonopods is a little schematic and not entirely in accordance with reality. However, it shows enough of the characteristic features of *nordquisti* to guarantee the correctness of the synonymy. The drawing of the posterior gonopod is undoubtedly erroneous. The gonopod as shown lacks the slender process projecting distad which is typical of *nordquisti*, but has a similar process at the base of the gonopod. This condition can be explained by assuming that the process had been broken off and displaced in the preparation of CHAMBERLIN's specimen.

Further discrepancies in CHAMBERLIN's description are the statements that the first pair of legs of the male is not modified, and that the pores are present from the 4th segment onwards. The single-jointed first pair of legs was obviously overlooked, while the presence of pores in the 4th segment is too improbable for the statement to be anything other than a misprint.