Rowland, J. M., and J. A. L. Cooke. 1973. Systematics of the arachnid order Uropygida (=Thelyphonida). J. Arachnol. 1:55-71.

SYSTEMATICS OF THE ARACHNID ORDER UROPYGIDA (=THELYPHONIDA)[1]

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ABSTRACT

This paper presents a review of the genera of extant whipscorpions (Arachnida: Uropygida, or Thelyphonida), and of the characters used in their systematics. Family group and generic taxa are keyed and diagnosed, and a synoptic list of the species and their distribution is given. The family Mastigoproctidae is relegated to synonymy, the subfamily Hypoctoninae is elevated to family status, and the subfamilies Uroproctinae and Typopeltinae are created.

INTRODUCTION

The whipscorpions, although conspicuous and sometimes locally abundant, have attracted little attention from systematists and remain a poorly known order. The principal monographs of the group (Pocock, 1894; Kraepelin, 1897, 1899; Mello-Leitao, 1931; Werner, 1935) are now considerably out of date, particularly since additional genera and species have been described.

The main purpose of this paper is to provide a readily available way of identifying the family group and generic taxa of Uropygida by means of a key and diagnoses. The diagnoses are brief, but bring together for the first time all those characters thought useful in recognizing the various taxa. In most cases we have treated each of at least five characters, but some genera are based on a single specimen, thus making mention of certain sexual characters impossible. Also provided is a badly needed synopsis of the species, and their general distribution. In addition to general revisionary works, references are given to some important papers which have escaped attention until now.

This paper forms the first stage in a thorough revision of the whipscorpions of the world, and summarizes the present state of our knowledge.

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SYSTEMATICS

In older works the whipscorpions and schizomids were usually considered as the suborders Holopeltidia and Schizopeltidia, respectively, within the order Uropygida. This system is followed by those authors (Millot, 1949; Kaestner, 1968) who wish to emphasize their numerous morphological similarities. There is, however, a growing tendency to treat these groups as separate orders (Petrunkevitch, 1945a, 1945b, 1955; Savory 1964; Levi and Levi, 1968), but a discussion of the merits of these higher classifications is beyond the scope of this paper.

A cursory examination suggests that the obvious external characters traditionally used to distinguish uropygid genera are both sound and clear-cut. It has become apparent, however, that the existing classification is inadequate, especially in one assemblage of genera. Some of the characters at present used to distinguish these genera are of doubtful phylogenetic significance, show considerable variation, and may even intergrade. Nevertheless, we feel that the classification presented here is sufficiently sound to provide a workable basis for further studies.

At the present time the 85 known species of whipscorpions are divided among 16 genera, and up until now were usually all placed in the single family Thelyphonidae. Speijer (1933) erected the family Mastigoproctidae for the New World genus *Mastigoproctus*, but has not been followed in this by other workers. The four genera added by Speijer (1933, 1936) have gone virtually unnoticed, which is fortunate, for his inadequate understanding of the Uropygida adds only confusion to an already questionable classification.

The following will clarify some of the terms used herein, and will serve to emphasize a few of the deficiences of the existing classification.

In earlier systematic literature (Pocock, 1894, 1900; Kraepelin, 1897, 1899; Gravely, 1916; Mello-Leitao, 1931; Werner, 1935) confusion existed over the correct terminology for the parts of the pedipalp, and this has been perpetuated by Millot (1949) in his authoritative account of uropygid morphology. Snodgrass (1948) demonstrated that the moveable finger of the pedipalp is a fusion of both basitarsus and tarsus, and that the fixed finger arises as an apophysis of the tibia rather than of the basitarsus. Thus, what hitherto has been regarded as the tibia is in reality the patella. Arising from the patella is a large apophysis (Figs. 14-17) that opposes the inner surface of the tibia and in effect forms a second pincer. The patellar apophysis has thus previously been called the tibial apophysis. In several genera the patellar apophysis is basically similar in both sexes, although the male's is frequently longer and more slender (Figs. 16, 17). In *Hypoctonus*, *Labochirus*, and *Typopeltis* the patellar apophysis of the male is much enlarged and elaborated (Figs. 14, 15), providing valuable characters for distinguishing species. In *Uroproctus* the male's apophysis has a very slight anterior elaboration of spines. This could be the first step toward the condition occurring the the previous three genera. Whether or not the modification of the apophysis has arisen independently in any of these genera, which otherwise represent three very distinct groups, is a matter of considerable interest. Further study toward elucidation of this problem will require, however, examination of far more material than is presently available to us.

Females of the genera *Tetrabalius*, *Thelyphonus*, *Abaliella*, *Typopeltis*, and *Ginosigma* have one or more of the distal tarsal segments of the first leg distinctively modified (Fig. 13). This condition can range from a few minor incrassations on the pentultimate segment, to deep sculpturing and production of long apophyses on the four or five most distal segments. In the above genera, frequently most or all of the female's tarsal segments are more nearly moniliform than in the male's. Females of *Abaliella rohdei* from New

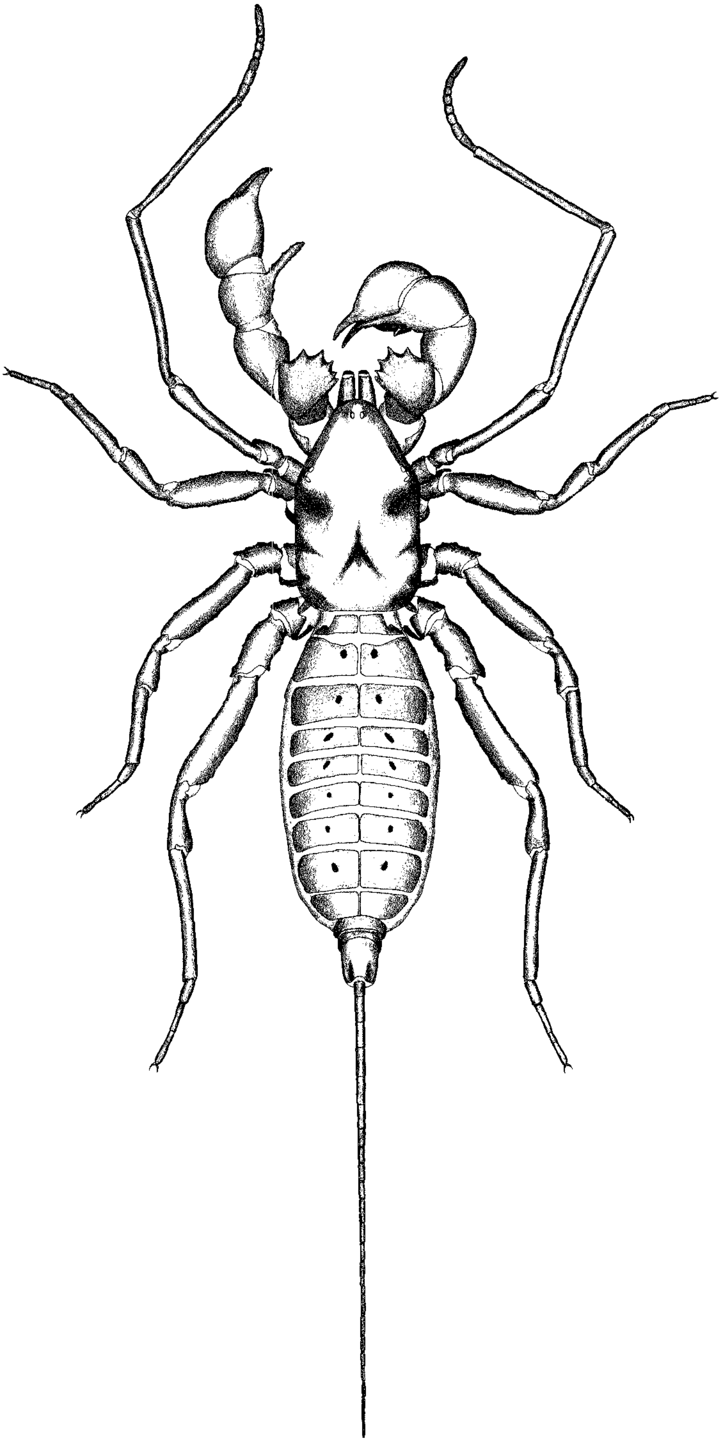


Fig. 1.–Dorsal view of *Glyptogluteus augustus*.

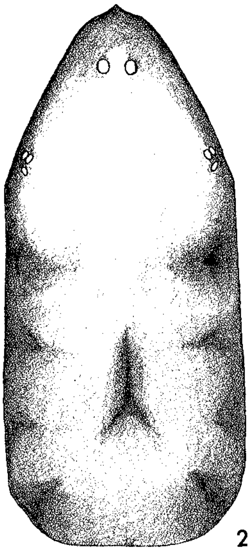
Guinea, however, differ from other members of the genus in having all the tarsal segments of the first leg uniformly similar. This problematic species, the type of *Abaliella*, may necessitate a redefinition of the genus and the consequent reassignment of the remaining species.

The anal segment is the last true body segment, and with the two preceding segments forms the pygidium from which the flagellum arises. On the dorsolateral surface of the anal segment of most genera are paired, pale patches of undetermined function, known as ommatidia or ommatoids. Since they are not proven to be light sensitive, though Laurie (1894) showed them to have a thin, specialized cuticle, the more noncommital term ommatoids is to be preferred. The work of Patten (1917) would indicate that these structures are not at all light sensitive. Considerable variation exists in the size and shape of the ommatoids and in some species they are extremely reduced (Figs. 4-7). The orifices of the anal glands, the structure and defensive function of which were well described by Eisner, et al. (1961), lie in the arthrodial membrane on either side of the anus, ventrolateral of the insertion of the flagellum. These orifices should not be confused with the ommatoids.

Tetrabalius, *Abaliella*, and *Chajnus* apparently differ significantly from *Thelyphonus* only in the number or configuration of the ommatoids. The size of the ommatoids in species of the latter genus varies from those that are easily visible with the unaided eye, to those which are scarcely distinguishable from large setal pits from which the setae are missing. Two large ommatoids are present on each side of the anal segment in *Tetrabalius*, the lower pair being somewhat smaller than the upper pair. *Chajnus* has a sclerotized inclusion in each ommatoid. The margin of the ommatoids can be circular, or can be very irregular, as in the African species of *Hypoctonus*. Having examined specimens of several diverse species, we are of the opinion that the presence, absence, or slight modification of the ommatoids is generally of questionable value in the separation of genera. Rowland (1973a) found a great similarity among several species from New Guinea and the Solomon Islands which, by definition, belong to different genera. The species were considered to be poorly separated into two genera solely on the basis of presence or absence of ommatoids.

The modification of abdominal sternites II (genital sternite) and III indicated for various genera is manifested in several forms. Modification in the males is usually in the form of a median, longitudinal furrow, or sulcus, on sternite II, and a posteromedian projection on sternite III (Fig. 8). The genital sternite in *Mimoscorpius pugnator* was reported to be uniquely modified (Pocock, 1894). It is in actuality, elaborated medially and its posterior border is mesally convex which closely approaches the condition found in males of *Uroproctus* and *Mastigoproctus*. Modifications in female uropygids take on a variety of forms. The posterior margin of this segment can be gently rounded, or can be acutely produced. Several further specializations may also occur in the structure of the surface of sternite II. Modification of sternite III in the females consists of a pronounced anterior emargination, usually accommodating the modified posterior margin of sternite II.

The division of abdominal tergites by a median suture was mentioned by Pocock (1894) and Kraepelin (1897). This character has not until now been used to distinguish supraspecific taxa. The variation in this character runs from no division in any tergite, to a wide division in all non-pygidial tergites (Fig. 1). In some the division occurs only in tergite I, II, or III, while in others it occurs in all non-pygidial tergites other than IV, V, or VI. The latter condition occurs in species which are otherwise considered to be closest related to those with all non-pygidial tergites divided.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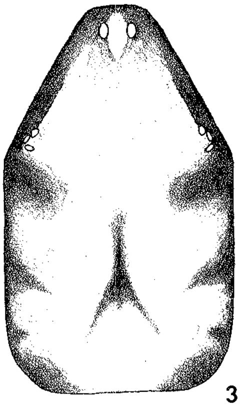
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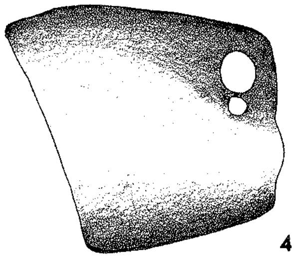
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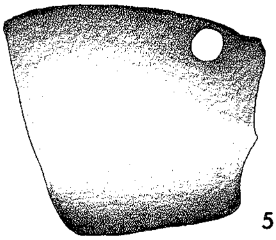
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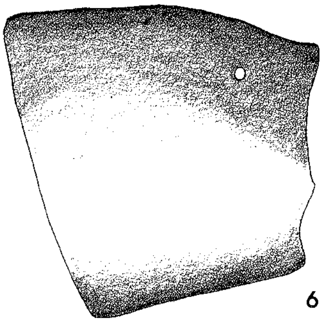
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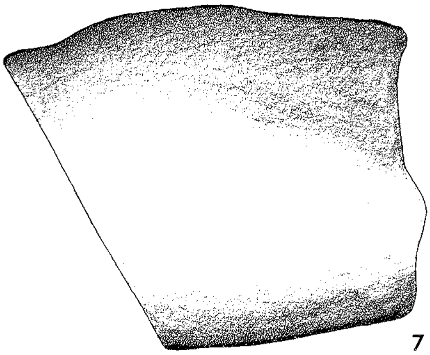
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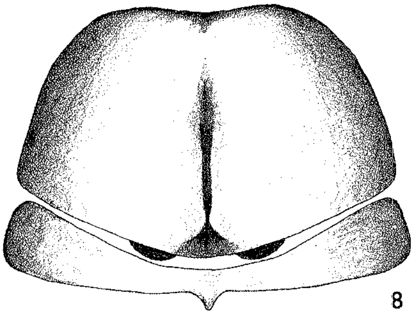
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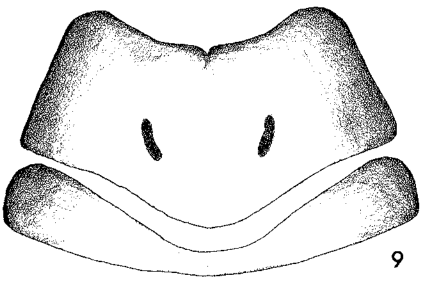
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Figs. 2-3.–Dorsal view of prosoma: 2, *Hypoctonus* sp., typical for hypoctonid genera; 3, *Thelyphonus* sp., typical for thelyphonid genera.

Figs. 4-7.–Lateral view of anal segment: 4, *Tetrabalius* sp., typical for genus; 5, *Thelyphonus* sp., typical also for *Mastigoproctus*, *Uroproctus*, *Typopeltis*, *Labochirus* and *Hypoctonus*; 6, *Thelyphonus lawrencei*; 7, *Abaliella* sp., typical also for *Glyptogluteus*, *Amauromastigon* and *Thelyphonellus*.

Figs. 8-9.–Ventral view of sternites II and III: 8, male *Thelyphonus* sp., typical for most Thelyphoninae males; 9, female *Thelyphonus* sp., typical for most Thelyphoninae females.

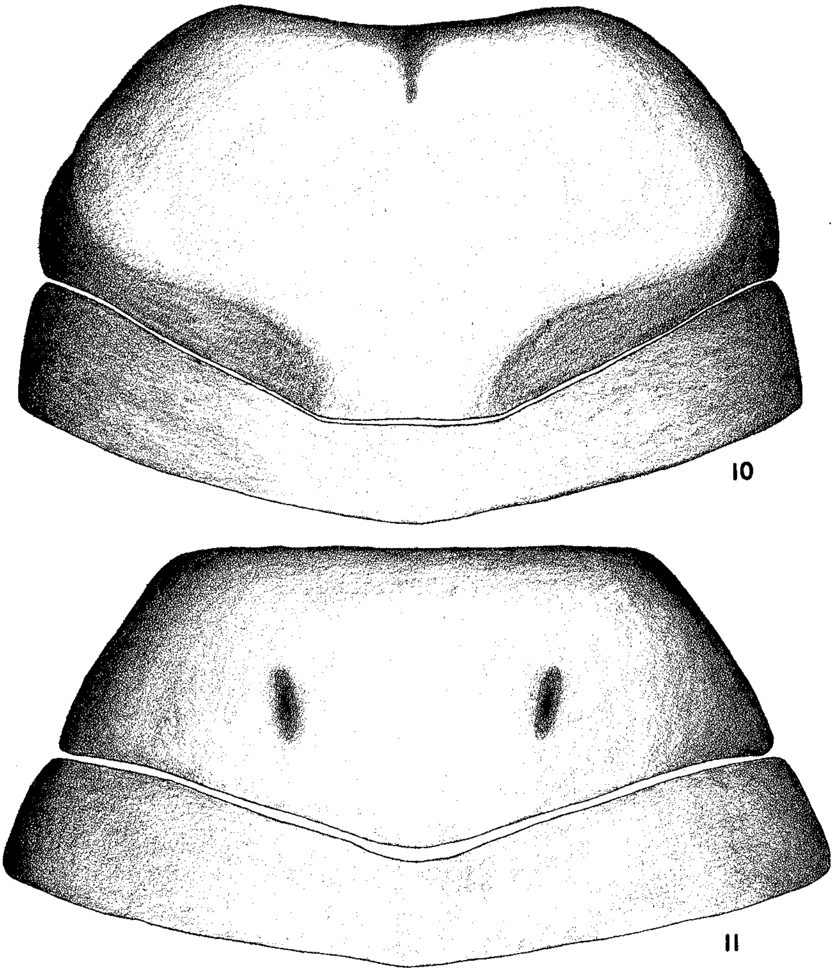
Speijer (1933), in ignorance of generic relationships within the order, erected the family Mastigoproctidae. The two genera placed in this family are supposed to possess one less tarsal segment on the first leg than other whipscorpions. We have not seen specimens of *Teltus vanoorti*, but no species of *Mastigoproctus* known to us show any reduction in the number of tarsal segments. Mastigoproctidae must, therefore, be relegated to synonymy under Thelyphonidae.

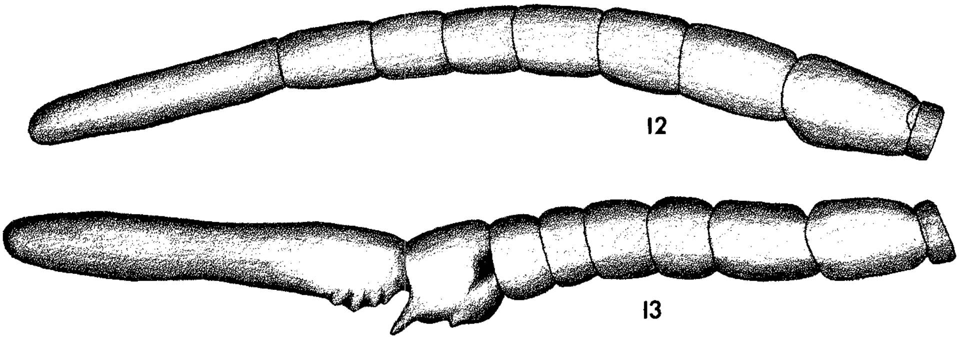
We concur, however, with Pocock (1899) who separated into subfamilies those genera possessing a ridge or keel running between the lateral and median eyes from those without this keel (Figs. 2, 3); the subfamilies Thelyphoninae and Hypoctoninae, respectively. From our knowledge of the groups, and in keeping with the systematics of other related orders, we find it necessary to elevate these subfamilies to family rank, and to further elaborate on the subordinate taxa within these groups. Within the Thelyphonidae (*sens. str.*) we erect herein the new subfamily Uroproctinae for *Uroproctus, Mastigoproctus, Amauromastigon*, *Mimoscorpius* and, tentatively, *Teltus*, and the new subfamily Typopeltinae for *Typopeltis*. This scheme much more adequately reflects the relationships of the genera.

The hypoctonid genera, besides lacking a keel, also lack any specialization of the tarsal segments of the first pair of legs. They appear to be closely related, although *Thelyphonellus* males do not display the elaboration of the patellar apophysis as found in the other two genera. There may be just cause to put *Thelyphonellus* in its own subfamily, separate from *Hypoctonus* and *Labochirus*. We feel, however at this point, that it would be unadvisable solely on the basis of the unmodified nature of the patellar apophysis in the males.

Gravely (1916) split the keeled genera (Thelyphonidae, *sens. str.*) into three groups. The first is characterized by a strongly modified patellar apophysis in the males (Fig. 14) and is represented by *Typopeltis*. The second group, characterized by a strongly modified hand and finger of the pedipalp, is represented by *Mimoscorpius*. In the third group, consisting of *Mastigoproctus*, *Uroproctus*, *Thelyphonus*, *Abaliella*, and *Tetrabalius*, both the hand and the patellar apophysis of the males are unmodified (Fig. 16). *Teltus*, *Chajnus*, *Minbosius*, *Ginosigma* and *Amauromastigon*, although poorly defined (Mello-Leitao, 1931; Speijer, 1933, 1936), and *Glyptogluteus* would have undoubtedly been considered as members of his latter group.

Gravely's third group contains a heterogenous assemblage of genera, and probably wrongfully divorces *Mimoscorpius. Mastigoproctus* and *Uroproctus* are apparently closer related to *Mimoscorpius* than to *Thelyphonus*, *Abaliella*, and *Tetrabalius*. A marked morphological dichotomy exists within the above group of genera. We see fit to place *Uroproctus*, *Mimoscorpius*, *Mastigoproctus*, *Amauromastigon* and *Teltus* into the new subfamily Uroproctinae, apart from the other genera, and likewise, Gravely's first group (*Typopeltis*) into the new subfamily Typopeltinae. The Uroproctinae display little (Figs. 10,11)or no modification of the genital sternite in either sex, and have at most only the anterior abdominal tergites divided by a median suture. The tarsal segments of the first leg in females, and the patellar apophysis of the pedipalp in males are never strongly modified. There exists in all species of Thelyphoninae a modification of the genital sternites and at least the anterior and posterior non-pygidial abdominal tergites are divided by a median suture (Fig. 1). Only in two species of the Thelyphoninae, *Minbosius manilanus* and *Abaliella rohdei*, are the tarsal segments of the female's first leg known to be unmodified, althouth this sex is unknown in *Chajnus* and *Glyptogluteus*.





Figs. 10-11.–Ventral view of sternites II and III: 10, male *Mastigoproctus* sp., typical also for *Amauromastigon*, *Uroproctus*, *Mimoscorpius* and hypoctonid males; 11, female *Mastigoproctus* sp., typical also for *Amauromastigon*, *Uroproctus* and hypoctonid females.

Figs. 12-13.–Mesal view of tarsus-basitarsus of first leg: 12, male *Thelyphonus* sp., typical for Thelyphoninae and Typopeltinae males, for both sexes of Uroproctinae and Hypoctoninae, and for *Minbosius* and *Abaliella rohdei* females; 13, female *Thelyphonus* sp., typical for most Thelyphoninae females and all Typopeltinae females.

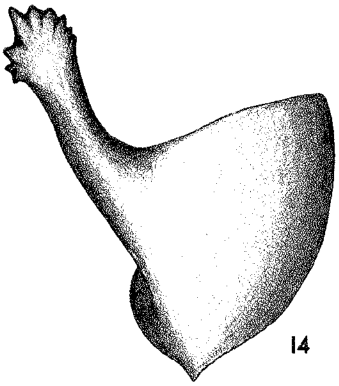
Typopeltis is represented by several widespread species, and appears to be the most specialized genus of the order, and is placed in its own new subfamily, Typopeltinae. It differs from the other thelyphonids most significantly in having the patellar apophysis of the male's pedipalp greatly modified (Fig. 14). Also considered to be of importance is the lack of a posterior projection on abdominal sternite III of males, the great modification of abdominal sternite II in females, which is strongly raised and unevenly produced distally, and the possession of entire, undivided, posterior non-pygidial abdominal tergites.

NOTES ON THE GENERA

Mastigoproctus shows little specialization and has been assumed by Gravely (1916) to be the most primitive genus. The characters most often used to separate species within the genus are color and the dorsal armature of the pedipalpal tronchanter. Both of these characters, unfortunately, vary geographically, and with age within a single species. Considerable study will be necessary in order to clarify the specific limits within the genus and to establish the relationships of the species. *Amauromastigon*, also from the New World, differs from *Mastigoproctus* apparently only in the absence of ommatoids, a characteristic of doubtful significance as already indicated. The other New World genus, *Thelyphonellus*, is represented by a single enigmatic species. It bears more resemblance to *Labochirus* and *Hypoctonus* than other genera in being keel-less, but unlike the latter two genera the patellar apophysis of the male's pedipalp is not modified. It is possible that *Thelyphonellus* may have been introduced from the Far East where the other hypoctonid genera occur, in the same way that species of *Hypoctonus* may have been introduced into West Africa (Cooke and Shadab, 1973).

Of the Old World genera, *Uroproctus* has been suggested by Gravely (1916) to be the most similar to *Mastigoproctus*, as is reflected in our classification. This monotypic genus appears to be the most primitive of the Old World genera, and may represent an ancient relict. We are not able to confirm the relationship of the other Old World uroproctine genus, *Teltus*, to *Mastigoproctus*, but Speijer (1936) united them as the only representatives of his family, Mastigoproctidae.

Labochirus and *Hypoctonus* have obvious mutual afffinities and represent the most advanced non-keeled genera. A dichotomy of opinion exists concerning the definition of these genera. Kraepelin (1897, 1899) and Pocock (1894, 1900) defined *Labochirus* as possessing a conspicuous accessory tooth on the inner margin of the anterior process (apophysis) of the pedipalpal coxa (Fig. 18), *Hypoctonus* being distinguished by the absence of such a tooth (Fig. 19). Gravely (1916) discounted this character and rearranged the species on the basis of whether or not the tibia of the third leg possesses an apical spine. Although Mello-Leitao (1931) follows Gravely's arrangement, Werner (1935) does not, and we, too, disagree with Gravely's classification and follow the earlier arrangement. Not only does this present a better zoogeographical picture, with *Hypoctonus* confined essentially to Burma and *Labochirus* to South India and Ceylon, but the accessory tooth on the coxal apophysis of the pedipalp appears to be a more dependable character than the tibial spines, which are known to vary. An African *Hypoctonus* specimen, for example, was found to possess this apical, tibial spine on one side only, while it was entirely absent in other specimens of the same species. Moreover, tibial spines are also present in several species of other genera.



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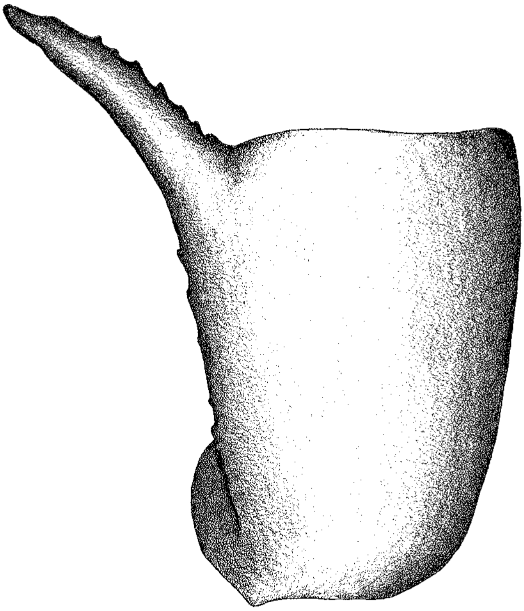

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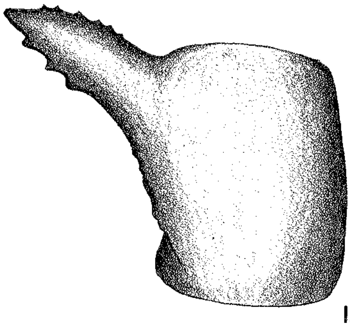

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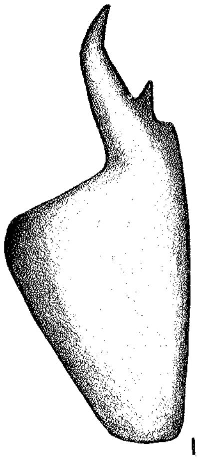

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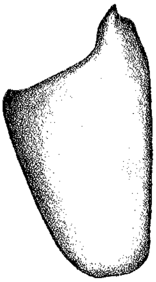

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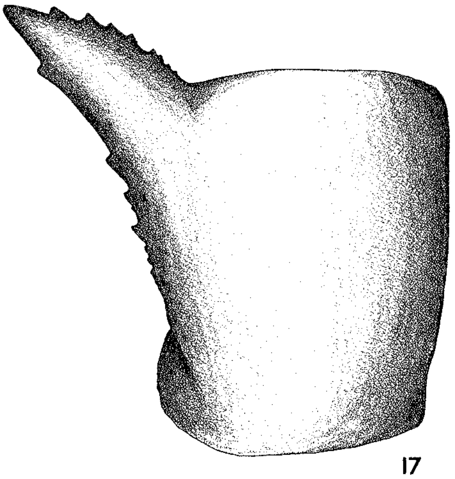

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Figs. 14-17.–Dorsal view of patella of right pedipalp: 14, male *Typopeltis* sp., typical also for *Hypoctonus* and *Labochirus* males; 15, female *Typopeltis* sp., typical for all uropygid females; 16, male *Mastigoproctus* sp., typical for all uropygid males other than *Typopeltis*, *Labochirus* and *Hypoctonus*; 17, female *Mastigoproctus* sp., typical for all uropygid females.

Figs. 18-19.–Ventral view of coxa of right pedipalp: 18, *Labochirus* sp., typical also for *Uroproctus*; 19, *Hypoctonus* sp., typical also for *Mastigoproctus*.

Thelyphonus is the most widespread and diversified genus. There is some doubt, however, that all the species attributed to it are discrete. Unfortunately, many of the names are based on missing or inadequate material. The close relationship between *Abaliella* and certain species of *Thelyphonus* was emphasized by Rowland (1973a). A significant dichotomy may indeed exist somewhere within the *Abaliella-Thelyphonus* complex, however, the only characteristic currently separating these genera is the lack of ommatoids in *Abaliella* (Fig. 7). *Tetrabalius* also conforms well with the latter group, differing only in the possession of two pairs of ommatoids (Fig. 4).

Mimoscorpius and *Glyptogluteus* are represented by two very singular species (Rowland, 1973b). These species, unlike any other whipscorpions, display remarkable, but dissimilar, modifications of the hand and finger of the pedipalps, and, in the latter genus, a unique configuration of abdominal sternites VIII and IX. Their relationships to other Thelyphonidae are obscure, however, due to the absence of females for study. *Mimoscorpius pugnator* is perhaps the most difficult to place of all the aberrant species. Pocock (1894) reported that while this species has a well developed keel, the median eyes are not separated by a median ridge. The ridge is apparently present in all other keeled genera. Further study of this species shows, however, that on the basis of the unmodified genital sternite and the entire posterior abdominal tergites, it fits well in the subfamily Uroproctinae. Gravely (1916) set *Mimoscorpius* in a group separate from the other keeled genera on the basis of its pedipalpal modification alone, but we cannot agree with this separation.

The genera created by Speijer (1933, 1936), *Teltus*, *Minbosius*, *Chajnus* and *Ginosigma*, are poorly diagnosed and must await further study to determine their exact placement. *Minbosius* and *Ginosigma* are separated from *Thelyphonus* on the basis of tarsal modifications of the female's first leg. They are apparently similar to *Thelyphonus* in all other features. *Minbosius* is distinguished by having no modification of the tarsus at all, which may be significant. *Ginosigma*, however, is based on a seemingly common modification of the ultimate segment, which is of doubtful generic importance.

The generic name *Abalius* Kraepelin (1897) was found to be a junior homonym and replaced by *Abaliella* Strand (1928). *Gipopeltis* was created by Speijer (1934) for *Typopeltis harmandi* Kraepelin (1901), but was later again synonymized by Speijer (1936) under *Typopeltis*.

Two of the genera created by Speijer, *Minbosius* and *Ginosigma*, were first mentioned as new taxa in 1933. Speijer failed, however, to mention any species in connection with either of these genera, although he purported to distinguish them from related groups. In 1936 he finally satisfied the conditions for availability by attributing the appropriate species to their respective genera. We have accordingly assigned the date of 1936 as the date at which time these generic names became available. The type species of *Minbosius* is established by monotypy, however the type species of *Ginosigma* must be arrived at by other criteria. We have decided that *G. schimkewitschi* (Tarnani, 1894) should become the type since it was the only described species capable of being attributed to *Ginosigma* when, in 1933, Speijer first proposed the genus. At the same time that *Ginosigma* became available Speijer also described *G. lombokensis*, the only other species attributed to the genus.

DIAGNOSES OF THE FAMILY GROUP AND GENERIC TAXA AND SYNOPSIS OF THE SPECIES OF UROPYGIDA

Family Hypoctonidae Pocock, 1899.
[*nom. transl.* Rowland and Cooke, herein (*ex* Hypoctonini Pocock, 1899)]

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male modified or unmodified; abdominal sternites II and III modified or unmodified; two or no ommatoids present; keel absent.

Genus *Hypoctonus* Thorell, 1889. (Type)

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male modified; abdominal sternites II and III modified or unmodified; two ommatoids present; keel absent.

1. *H. africanus* Hentschel, 1899. Africa.
2. *H. andersoni* (Oates), 1890. Burma.
3. *H. binghami* (Oates), 1890. Burma.
4. *H. birmanicus* Hirst, 1911. Burma.
5. *H. browni* Gravely, 1912. Burma.
6. *H. carmichaeli* Gravely, 1916. South China.
7. *H. clarki* Cooke and Shadab, 1973. Africa.
8. *H. dawnae* Gravely, 1912. Burma.
9. *H. ellisii* Gravely, 1912. Burma.
10. *H. formosus* (Butler), 1872. Burma. (Type)
11. *H. gastrostictus* Kraepelin, 1897. Borneo.
12. *H. granosus* Pocock, 1900. South China.
13. *H. kraepelini* Simon, 1901. Malaysia.
14. *H. oatesi* Pocock, 1900. Burma.
15. *H. rangunensis* (Oates), 1890. Burma.
16. *H. saxatilis* (Oates), 1890. Burma.
17. *H. silvaticus* (Oates), 1890. Burma.
18. *H. stoliczkae* Gravely, 1912. Burma.
19. *H. woodmasoni* (Oates), 1890. Burma.

Genus *Labochirus* Pocock, 1894.

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp or male modified; abdominal sternites II and III modified; two ommatoids present; keel absent; accessory tooth on inner margin or anterior process of pedipalpal coxae.

20. *L. cervinus* Pocock, 1900. India.
21. *L. proboscideus* (Butler), 1872. Ceylon. (Type)
22. *L. tauricornis* Pocock, 1900. India.

Genus *Thelyphonellus* Pocock, 1894.

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III unmodified; ommatoids absent; keel absent.

23. *T. amazonicus* (Butler), 1872. Guyana, Brasil. (Type)

Family Thelyphonidae Lucas, 1835.

Diagnosis—Tarsal segments of first leg of female modified or unmodified; patellar apophysis of pedipalp of male unmodified in all but *Typopeltis*; abdominal sternites II and III modified or unmodified; two, four or no ommatoids present; keel present.

Subfamily Thelyphoninae Lucas, 1835. (Type)

[*nom. correct.* Rowland and Cooke, herein (*pro* Thelyphonini Lucas, Pocock, 1899)]

Diagnosis—Tarsal segments of first leg of female modified in all but *Minbosius manilanus* and *Abaliella rohdei*; patellar apophysis of pedipalp of male unmodified, but in some species longer than in female; abdominal sternites II and III modified; two, four or no ommatoids present; keel present; posterior abdominal tergites divided.

Genus *Thelyphonus* Latreille, 1802. (Type)

Diagnosis—Tarsal segments of first leg of female modified; patellar apophysis of pedipalp of male unmodified, but in some species longer than in female; abdominal sternites II and III modified; two ommatoids present; keel present; posterior abdominal tergites divided.

24. *T. anthracinus* Pocock, 1894. Borneo.
25. *T. asperatus* Thorell, 1888. Java; Ambon.
26. *T. billitonensis* Speijer, 1931. Belitung.
27. *T. borneensis* Kraepelin, 1897. Borneo.
28. *T. burchardi* Kraepelin, 1912. Sumatra.
29. *T. caudatus* (Linne), 1758. Java. (Type)
30. *T. celebensis* Kraepelin, 1897. Celebes.
31. *T. doriae* Thorell, 1888. Borneo; Belitung; Singapore.
32. *T. grandis* Speijer, 1931. Borneo.
33. *T. hanseni* Kraepelin, 1897. Philippines.
34. *T. insulanus* Keyserling, 1884. New Hebrides.
35. *T. kinabaluensis* Speijer, 1933. Malaysia.
36. *T. klugi* Kraepelin, 1897. Sumatra; Celebes.
37. *T. lawrencei* Rowland, 1973. Solomon Islands.
38. *T. leucurus* Pocock, 1898. Solomon Islands.
39. *T. linganus* Koch, 1843. Lingga; Sumatra.
40. *T. pococki* Tarnani, 1901. Celebes.
41. *T. schnehageni* Kraepelin, 1897. Burma.
42. *T. semperi* Kraepelin, 1897. Philippines.
43. *T. sepiaris* Butler, 1873. Ceylon, India.
44. *T. sumatranus* Kraepelin, 1897. Sumatra.
45. *T. sucki* Kraepelin, 1897. Borneo.
46. *T. vanoorti* Speijer, 1936. Philippines.
47. *T. wayi* Pocock, 1900. Thailand.

Genus *Abaliella* Strand, 1928.

Diagnosis—Tarsal segments of first leg of female modified, except in *A. rohdei*; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III modified; ommatoids absent; keel present; posterior abdominal tergites divided.

48. *A. dicranotarsalis* Rowland, 1973. New Guinea.
49. *A. gertschi* Rowland, 1973. New Guinea.

50. *A. manilana* (Kraepelin), 1901. Philippines.
51. *A. rohdei* (Kraepelin), 1897. New Guinea. (Type)
52. *A. samoana* (Kraepelin), 1879. Samoa.
53. *A. willeyi* (Pocock), 1898. New Britain.

Genus *Tetrabalius* Thorell, 1889.

Diagnosis–Tarsal segments of first leg of female modified; patellar apophysis or pedipalp of male unmodified, similar to female; abdominal sternites II and III modified; four ommatoids present; keel present; posterior abdominal tergites divided.

54. *T. nasutus* Thorell, 1889. Borneo.
55. *T. seticauda* (Doleschall), 1857. Moluccas. (Type)

Genus *Minbosius* Speijer, 1936.

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III modified; two ommatoids present; keel present; posterior abdominal tergites divided.

56. *M. manilanus* (Koch), 1843. Philippines; Moluccas; New Guinea. (Type)

Genus *Ginosigma* Speijer, 1936.

Diagnosis–Tarsal segments of first leg of female modified, bayonet shaped; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III modified; two ommatoids present; keel present.

57. *G. lombokensis* Speijer, 1936. Sunda Islands.
58. *G. schimkewitschi* (Tarnani), 1894. Thailand. (Type)

Genus *Chajnus* Speijer, 1936.

Diagnosis–Tarsal segments of first leg of female unknown; patellar apophysis of pedipalp of male unknown; abdominal sternites II and III modified; two ommatoids present, with sclerotized inclusion; keel present.

59. *C. renschi* Speijer, 1936. Sunda Islands. (Type)

Genus *Glyptogluteus* Rowland, 1973.

Diagnosis–Tarsal segments of first leg of female unknown; patellar apophysis of pedipalp of male unmodified, hand orbital and stout, fixed and movable fingers short and stout; abdominal sternites II, III, VIII, and IX modified in male; ommatoids absent; keel present; posterior abdominal tergites divided.

60. *G. augustus* Rowland, 1973. Philippines. (Type)

Subfamily **Uroproctinae** Rowland and Cooke, NEW SUBFAMILY

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male unmodified, slightly longer than in female, or very slightly elaborated anteriorly; abdominal sternites II and III unmodified; two or no ommatoids present; keel present; posterior abdominal tergites undivided.

Genus *Uroproctus* Pocock, 1894. (Type)

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male slightly elaborated anteriorly; abdominal sternites II and III unmodified; two ommatoids present; keel present; posterior abdominal tergites undivided.

61. *U. assamensis* (Stoliczka), 1869. Assam. (Type)

Genus *Mimoscorpius* Pocock, 1894.

Diagnosis–Tarsal segments of first leg of female unknown; patellar apophysis of pedipalp unmodified, presumably similar to female; abdominal sternites II and III unmodified; two ommatoids present; keel present; pedipalpal hand in male extremely flat, twice as wide as femur; posterior abdominal tergites undivided.

62. *M. pugnator* (Butler), 1872. Philippines. (Type)

Genus *Amauromastigon* Mello-Leitao, 1931.

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III unmodified; ommatodis absent; keel present; posterior abdominal tergites undivided.

63. *A. annectens* (Werner), 1916. Brasil. (Type)

Genus *Teltus* Speijer, 1936.

Diagnosis–Tarsal segments of first leg of female unknown; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III unmodified; ommatoids absent; keel present; posterior abdominal tergites undivided.

64. *T. vanoorti* Speijer, 1936. Hainan. (Type)

Genus *Mastigoproctus* Pocock, 1894.

Diagnosis–Tarsal segments of first leg of female unmodified, similar to male; patellar apophysis of pedipalp of male unmodified, similar to female; abdominal sternites II and III unmodified; two ommatoids present; keel present; posterior abdominal tergites undivided.

65. *M. baracoensis* Franganillo, 1931. Cuba.
66. *M. brasilianus* (Koch), 1843. Brasil.
67. *M. butleri* Pocock, 1894. Brasil.
68. *M. colombianus* Mello-Leitao, 1940. Colombia.
69. *M. formidabilis* Hirst, 1912. Venezuela.
70. *M. giganteus* (Lucas), 1835. North America. (Type)
71. *M. liochirus* Pocock, 1902. Mexico; Guatemala.
72. *M. maximus* (Tarnani), 1889. Brasil.
73. *M. minensis* Mello-Leitao, 1931. Brasil.
74. *M. perditus* Mello-Leitao, 1931. Brasil.
75. *M. proscorpio* (Latreille), 1806. Antilles.
76. *M. tantalus* Roewer, 1954. El Salvador.

Subfamily **Typopeltinae** Rowland and Cooke, NEW SUBFAMILY

Diagnosis–Tarsal segments of first leg of female modified; patellar apophysis of pedipalp of male modified; abdominal sternites II and III modified; two ommatoids present; keel present; posterior abdominal tergites undivided.

Genus *Typopeltis* Pocock, 1894. (Type)

Diagnosis–Tarsal segments of first leg of female modified; patellar apophysis of pedipalp of male modified; abdominal sternites II and III modified; two ommatoids present; keel present; posterior abdominal tergites undivided.

77. *T. amurensis* (Tarnani), 1889. China.
78. *T. cantonensis* Speijer, 1936. China.

79. *T. crucifer* Pocock, 1900. Thailand. (Type)
80. *T. dalyi* Pocock, 1900. Thailand.
81. *T. harmandi* Kraepelin, 1901. South Vietnam.
82. *T. kamahouii* Tarnani, 1900. Siberia.
83. *T. niger* (Tarnani), 1894. China.
84. *T. stimpsoni* (Wood), 1862. China; Japan.
85. *T. tarnanii* Pocock, 1902. Thailand.

KEY TO THE FAMILIES, SUBFAMILIES, AND GENERA OF UROPYGIDA

1a. Distinct keel or ridge present between median and lateral eyes (Fig. 3); elevated ridge usually present between median eyes .... **Thelyphonidae** 2

1b. Keel between median and lateral eyes absent, or very indistinct (Fig. 2); elevated ridge never present between median eyes ...... **Hypoctonidae** 14

2a(1a). Genital sternite unmodified, or at most with vague lateral swelling in males (Figs. 10, 11); tarsal segments of female's first leg unmodified (Fig. 12); posterior abdominal tergites without median suture .... **Uroproctinae** NEW SUBFAMILY 3

2b. Genital sternite modified, usually with a median furrow in males (Fig. 8) and deep lateral pits or median elaboration in females (Fig. 9); tarsal segments of female first leg modified (Fig. 13), except in *Minbosius manilanus* and *Abaliella rohdei*; posterior abdominal tergites usually with median suture (Fig. 1).. 7

3a(2a). Coxa of pedipalp with a conspicuous accessory tooth on inner margin of apophysis (Fig. 18). .... ***Uroproctus***

3b. Coxa of pedipalp without an accessory tooth on inner margin of apophysis (Fig. 19). 4

4a(3b). Anal segment with two ommatoids (Figs. 5, 6). 5

4b. Anal segment without ommatoids (Fig. 7) .... ***Amauromastigon***

5a(4a). Patellar apophysis of male pedipalp with front edge truncate ...... ***Teltus***

5b. Patellar apophysis of male pedipalp with front edge not truncate (Fig. 16)...6

6a(5b). Pedipalpal hand of male extremely elongate and flat .... ***Mimoscorpius***

6b. Pedipalpal hand of male not elongate or flat .... ***Mastigoproctus***

7a(2b). Patellar apophysis of male pedipalp enlarged and elaborated (Fig. 14); abdominal sternite III of male without median projection; abdominal sternite II of female greatly modified, median portion elaborated, raised, and unevenly produced distally; posterior abdominal tergites entire .... **Typopeltinae**, NEW SUBFAMILY; ***Typopeltis***

7b. Patellar apophysis of male pedipalp not enlarged or elaborated (Fig. 16), although it may be somewhat longer and more slender than in the female (Fig. 17); abdominal sternite III of male usually with a median projection (Fig. 8); abdominal sternites of female not modified as above, usually with a pair of lateral depressions, and produced distally, sternite III anteriorly emarginate (Fig. 9); posterior abdominal tergites with a median suture (Fig. 1) .... ***Thelyphoninae*** 8

8a(7b). Anal segment with two or four ommatoids (Fig. 4-6). 9
8b. Anal segment without ommatoids (Fig. 7). 13

9a(8a). Anal segment with two ommatoids (Figs. 5, 6). 10
9b. Anal segment with four ommatoids (Fig. 4) . . . . ***Tetrabalius***

10a(9a). Tarsal segments of female first leg modified (Fig. 13). 11
10b. Tarsal segments of female first leg unmodified, similar to male's (Fig. 12). . . . . ***Minbosius***

11a(10a). Terminal tarsal segment of female first leg bayonet shaped . . . . . ***Ginosigma***
11b. Terminal tarsal segment of female first leg not bayonet shaped. 12

12a(11b). Ommatoids with a dark, sclerotized spot near center . . . . ***Chajnus***
12b. Ommatoids without a dark, sclerotized spot near center . . . . .***Thelyphonus***

13a(8b). Abdominal sternites VIII and IX of male intricately modified . ***Glyptogluteus***
13b. Abdominal sternites VIII and IX of male not modified, similar to VI and VII. . . . . ***Abaliella***

14a(1b). Anal segment with two ommatoids (Fig. 5, 6); patellar apophysis of male pedipalp enlarged and elaborated (Fig. 15). 15
14b. Anal segment without ommatoids (Fig. 7); patellar apophysis of male pedipalp not enlarged or elaborated (Fig. 16) . . . . ***Thelyphonellus***

15a(14a). Coxa of pedipalp with an accessory tooth on inner margin of apophysis (Fig. 18). . . . . ***Labochirus***
15b. Coxa of pedipalp without an accessory tooth on inner margin of apophysis (Fig. 19) . . . . ***Hypoctonus***

ACKNOWLEDGMENTS

We wish to thank Professor, Dr. L. Vlijm of the Biologisch Laboratorium, Der Vrije Universiteit, Amsterdam, and Professor, Dr. R. G. Collmer of the Department of English, Texas Tech University, Lubbock, for translating Speijer's 1933 paper from the Dutch. Thanks are also due the authorities at the British Museum (Natural History) for the loan of material, and to the Institute for Museum Research, Texas Tech University, Lubbock, for continued support to the senior author.

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