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ABSTRACT

The mygalomorph spider genera of the world are placed in 15 families based upon a cladistic analysis. The Cyrtaucheniidae (including the Amblyocareneae, Aporoptycheae, *Kiama,* and the North American "ctenizids," save *Ummidia* and *Hebestatis*) and the Idiopidae (including the Idiopeae, Genyseae, some Nemesieae, and all Australian ctenizids, save *Conothele*) are removed from the Ctenizidae. Many genera previously included in the Ctenizidae and Dipluridae, and all genera included in the synonymized Pycnothelidae are transferred to the newly constituted Nemesiidae. Several genera are transferred between the Theraphosidae and Barychelidae. All families are diagnosed, described, and keyed. All valid genera (238) are keyed; 138 generic names are newly placed in synonymy (including the mesothelid genus *Ryuthela*); the names of six genera are considered *nomina dubia*; three new generic names are proposed to replace their junior homonyms. Four new subfamily names—Ixamatinae in the Nemesiidae, Trichopelmatinae in the Barychelidae, Glabropelmatinae in the Paratropididae, and Euctenizinae in the Cyrtaucheniidae—and several new higher group names are proposed. All nemesiid and most cyrtaucheniid genera are diagnosed.

Cladograms of all subfamily groups and of nemesiid, diplurid, idiopid, and cyrtaucheniid genera are proposed. The Mygalomorphae are considered a monophyletic group sharing the complete absence of anterior median spinnerets or their homolog, the reduction or absence of anterior lateral spinnerets, the presence of sternal sigilla (paralleled in *Ectatostica,* according to Gertsch, 1958), the embolus plesiomorphically fused to the tegulum, and the presence of a subsegmentation of the basal segment of the posterior lateral spinnerets. The Fornicephalae—spiders that share the presence of an arched caput, legs I and II more slender than III and IV, spines on legs III and IV confined to the upper surfaces, and the leg tarsi of females stout—includes the Ctenizidae, Actinopodidae, Migidae, Idiopidae, Cyrtaucheniidae, and the Atypoidina. The Atypoidina (the Atypidae plus Antrodiaetidae) share the presence of pseudosegmented leg tarsi in males, tarsal trichobothria greatly reduced in number or absent, and the presence of a unique form of the palpal conductor.

The Domiothelina—which have the apical segment of the posterior lateral spinnerets domed, reduced dentition of the paired claws, and teeth on both margins of the cheliceral furrow—include the Ctenizidae, Migidae, Idiopidae, and Actinopodidae, that with their sister group, the Cyrtaucheniidae, constitute the Rastelloidina.

The Rastelloidina share the plesiomorphic presence of a strongly procurved fovea, a well-developed rastellum, and several parallelisms shared with the Orthopalpae and Quadrithelina.

The Ctenizoidina include the Migoidea (Migidae plus Actinopodidae), characterized by a wide eye group, and their sister group, the Ctenizidae. The synapomorphy for those last three families is the presence of strong spines laterally on the tibiae, metatarsi, and tarsi of the first and second legs.

The sister group of the Fornicephalae, the Tuberculotae, includes the Mecicobothriidae plus Microstigmatidae as the sister group of the Orthopalpae, including all remaining families. The synapomorphies for the Tuberculotae are the sloping thoracic region of the cephalothorax, the presence of a maxillary serrula, and the presence of a distinct eye tubercle. The Microstigmatidae may be neotenic in some characters (the round booklung apertures, the presence of the anterior lateral spinnerets and serrula) and share with the Mecicobothriidae only the absence of tarsal spines, a short wide labium, and the presence of a palpal conductor—all paralleled in other Tuberculotae or the Atypoidina. Thus, although the Microstigmatidae and Mecicobothriidae are grouped as the Mecicobothrioidina, they may not be monophyletic.

The Orthopalpae—including the Hexathelidae plus the Quadrithelina—share the presence of an orthogonally inserted palpal bulb and of maxillary cuspules, both being paralleled in the Rastelloidina.

The Quadrithelina (the Dipluridae plus Crassitarsae) share the presence of corrugiform trichobothrial bases and the loss of anterior lateral spinnerets (also paralleled in the Rastelloidina).

The Crassitarsae and the Rastelloidina share two parallelisms—the loss of teeth on the unpaired claw and the presence of some scopulae on the tarsi, but the Crassitarsae usually have the third claw reduced in size. The Crassitarsae include the Nemesiidae plus the Theraphosoidina—the Theraphosidae plus Paratropididae as the sister group of the Barychelidae.

The Theraphosoidina are characterized by the similar conformation of the tibial mating spur of males, and share with the Domiothelina (save two parallelisms in the Nemesiidae and one reversal in the Paratropididae) reduced dentition of the paired claws and the presence of claw tufts and numerous labial cuspules. The Theraphosoidea—the Theraphosidae plus Paratropididae (including *Glabropelma,* new name, as a new subfamily)—share the presence of a distinct maxillary lobe, and increased density (over the plesiomorphic barychelid condition) of labial and maxillary cuspules.

The synapomorphies of the families are as follows (with the number of valid genera given in parentheses; homoplasies in other families are indicated by an asterisk): Actinopodidae (2), subquadrate maxillae and elongate labium; Antrodiaetidae (3), the loss of a rastellum* and the reduced or longitudinal fovea*; Atypidae (3), the truncate tips of the posterior median spinnerets and the elongate, curved maxillary lobe; Barychelidae (29), the very short posterior lateral spinnerets*, biserially dentate paired claws in males, and the loss of the third claw*; Ctenizidae (10), possibly the single tooth on the paired claw, otherwise the group lacks a synapomorphy; Cyrtaucheniidae (13), multilocular spermathecae, and tarsi I and II scopulate*; Dipluridae (17), widely spaced spinnerets, posterior lateral spinnerets very long, thorax as high as caput; Hexathelidae (10), densely grouped labial cuspules*; Idiopidae (17), males with thorn spines on palpal tibia, distal sclerite of palp open with an extensive haematodocha; Mecicobothriidae (4), apical segment of posterior lateral spinnerets with two or more "segments," fovea longitudinal*; Microstigmatidae (4), booklung apertures small and rounded, thorax as high as caput; Migidae (8), loss of rastellum*, two longitudinal keels along outer surface of fang; Nemesiidae (31), paired claws with two rows of teeth, palpal claw of female with teeth on the claw promargin; Paratropididae (4), tarsal scopulae reduced*, claw tufts reduced, unpaired claw absent*, leg cuticle scaly*; Theraphosidae (83), strongly developed leg scopulae*.

INTRODUCTION

At the outset of this study, the Australian Diplurinae seemed to be a morphologically homogeneous group that lacked any synapomorphy; their relationships with other taxa were unclear. The object then was to establish monophyletic groups that included those genera. Before long, it became evident that groups within which relatives of the Diplurinae might be sought belonged to several different families. Inevitably, the quest for monophyly led to an ever-broadening search for sister groups (Gaffney, 1979). What began as a relatively small problem generated a spectrum of related questions eventually requiring examination of all mygalomorph groups. At that point, resolution of the problem required the formulation of a hypothesis of relationships for all mygalomorph genera; from that classifications can be constructed.

Essentially, classification schemes have formed through four types of hypotheses. First was the comprehensive and nonregional type of Simon (1892a, 1903a), who used genera as the lowest named taxonomic category (in some cases he used species groups). In the second type, authors assumed the monophyly of at least subfamilies and many dealt only with the taxa of a zoogeographic or political region. A third type is that based upon a particular organ system, e.g., cardiac ostia (Petrunkevitch, 1933), the genitalia (Gertsch, 1949; Kraus, 1978; Forster, 1980), the eyes (Homann, 1950), the spinnerets (Petrunkevitch, 1942), the serrula (Platnick, 1977), and the tarsal organ (Forster, 1980). Such hypotheses are based upon a limited number of taxa (often used because of their availability) but nevertheless usually have widespread implications. The fourth type of hypothesis is that implicit in dichotomous keys.

Simon (1889d) provided the first classification including a sufficient number of mygalomorph taxa to warrant attention. Prior to that time, studies that proposed family groups were few, the groups large, and the subgroups were even fewer. After Simon's comprehensive (1892a) review, many new taxa were described and groups recognized. Simon's (1892a, 1903a) classifications differed from those of most of his contemporaries in that he recognized only two families within the Mygalomorphae. Most subsequent authors (except Bristowe, 1938) elevated all of Simon's tribes to subfamilies (many are now considered families) and his subfamilies to families. I follow that principle and use the family names of Brignoli (1983) throughout this historical summary.

Simon's (1892a) classification was unique in several other important respects. First, through the examination of material (although often not the types) of many genera, he was able to add new information to the original descriptions. Second, he established many new groups of genera. Third, as the first definitive and comprehensive study of spider genera, his work was highly innovative; however, any errors originating through his understanding of taxa tended to be perpetuated without question. In the years before his revised statement (Simon, 1903a) and subsequently, many new genera were described seemingly because they did not "fit" his keys. However, Simon's work shared a weakness of many taxonomic reviews of that period, namely an inattention to the examination of types. Usually, only the specimens in the author's own collections were studied, and genera were assumed to be adequately described in the literature. Misconceptions entering the literature at that early stage often persisted. Nevertheless, the confusion caused by those oversights was generally localized and cannot diminish the importance of the classificatory foundations that Simon laid.

Simon (1892a, 1903a) recognized only two mygalomorph families, the Atypidae and the Aviculariidae. Simon's Aviculariidae included the mygalomorphs placed in 12 families recognized below. The Atypidae included only the contemporary Mecicobothriidae, Antrodiaetidae, and Atypidae. Pocock (1897b, 1903c) followed Simon (1892a), but added one new family, Halonoproctidae (for *Cyclocosmia*), elevated the Cyrtaucheniinae to family status, and like F. O. P.-Cambridge (1896) elevated all subfamilies to families. Simon (1903a) increased the number of genus groups and transferred the current Mecicobothriidae and Antrodiaetidae from his Atypidae to the Aviculariidae, but did not revise his classification of families. Smith (1908) was similarly impressed by the distinctiveness of the Atypidae (*sensu* Simon, 1892a) and maintained, as did Chamberlin and Ivie (1945), that mecicobothriid-diplurid and antrodiaetid-ctenizid similarities were convergent.

Savory (1926), making brief generalized statements concerning the significance of either the hunting or burrow-digging habits of Mygalomorphae, recognized two superfamilies. Savory's Ctenizoidea included the Ctenizidae, Atypidae, Migidae, and Paratropididae; and his Theraphosoidea, the Theraphosidae, Barychelidae, Dipluridae, and Pycnothelidae. How the families of Savory (1926) were constituted is unclear but at least he recognized the need for "natural" subgroups. Subsequently, Savory (1934) postulated that the "archearaneid" had eight eyes grouped on a low, "segmented" head, four booklungs, paraxial fangs, and three bare claws.

Petrunkevitch based his first classification (1928) on external anatomy; although it was similar to that of Simon (1892a) it included several significant innovations. The Atypidae excluded the Mecicobothriidae and Antrodiaetidae and were the sister group only of the Migidae and Paratropididae. The current Antrodiaetidae were the sister group of the Ctenizidae, and as in Simon (1903a), the Mecicobothriidae were included in the Dipluridae as the sister group of the Hexathelinae. Petrunkevitch (1928) also retained the Pycnothelinae (Chamberlin, 1917), elevating them to family level; he did not recognize the parity of Simon's Masterieae with other diplurid subfamilies although he raised the Dolichosterneae (based upon an artifact of preservation; see Raven and Platnick, 1978) to a diplurid subfamily.

Petrunkevitch's second classification (1933) was based upon internal anatomy but, as with the first, his knowledge of the characters of each family was founded on a very small number of genera. In one group were the Paratropididae and their sister group, the Theraphosidae, that together were the sister group of the Ctenizidae plus Dipluridae. In a second group, the Pycnothelidae plus Barychelidae were the sister group of the Atypidae plus Migidae. Nevertheless, the constitution of those families remained unchanged.

Only four other authors attempted a classification of all mygalomorph families. Mello-Leitão (1923) divided the Brazilian mygalomorphs into those with "fused" and "free" labia, thus making the Actinopodidae plus Paratropididae the sister group of the Ctenizidae-Dipluridae and the Theraphosidae-Barychelidae.

Giltay (1926), intent upon the tarsal scopulae, the reduced third claw, and the reducing trends in spinneret numbers, considered that the mygalomorphs fell into two main groups. In one group were the Barychelidae and Theraphosidae as the sister group of the Pycnothelidae. In the second group, the Migidae were considered the sister group of the Paratropididae; the successive sister groups were then the Dipluridae, Ctenizidae, and Atypidae. Giltay gave no characters to support his classification.

Kishida (1930) also produced a classification which, judging by Bristowe's (1938) summary, was fascinating in its novelty but completely unsupported. Kishida recognized three superfamilies. His Ctenizoidea included the current Antrodiaetidae, Ctenizidae, and Actinopodidae; the Dipluroidea comprised the Dipluridae, Atypidae, Migidae, and Pycnothelidae; and the Avicularoidea consisted of the Barychelidae, Sasonidae (previously and still considered barychelids by all other authors), Aviculariidae, and Hexuridae (Mecicobothriidae). Thus, Kishida recognized four extra families, but like that of Bristowe (1938), his classification was replete with multiple branching.

Caporiacco (1938) retained groupings similar to those of Petrunkevitch (1933) but grouped the claw-tufted families, Theraphosidae and Barychelidae, as the sister group of all other mygalomorphs. The Paratropididae and their sister group, the Pycnothelidae, were then the sister group of the Atypidae plus Migidae and the Dipluridae plus Ctenizidae.

The classifications of only two other authors are of interest, although neither included all mygalomorph families but considered only the North American taxa. Comstock (1913) grouped the Antrodiaetidae and Ctenizidae as the sister group of the Atypidae and Dipluridae. Together those families were the sister group of the Theraphosidae. Gertsch (1949) followed Simon (1892a) and Chamberlin and Ivie (1945) and united the Atypidae, Antrodiaetidae, and Mecicobothriidae together as the Atypoidea, the sister group of all other mygalomorphs. Coyle (1971, 1974) agreed. However, Platnick and Gertsch (1976) began disrupting the hypothesis of atypoid monophyly. Platnick (1977) completed that process by showing that all characters previously used to delimit the Atypoidea were plesiomorphic, and aligned the Mecicobothriidae with the Dipluridae rather than Atypidae or Antrodiaetidae.

In recent years concepts of phylogeny in mygalomorphs and other spiders have changed radically. Those changes were introduced through analyses of particular organ systems. Homann (1950) focused on the structure of the tapetum in spider eyes. Using that character, which apparently is uninformative in mygalomorphs, Levi (1982) attempted to classify all spiders. Lehtinen (1967, 1980) suggested some value in hair and trichobothrial structure in classification, but his generalized and often incorrect remarks included few specific or justified hypotheses and are therefore largely uninformative. Kraus (1978) imparted a radical new perspective on the complex male palp of the Mesothelae. Previously regarded as a derived structure, the liphistiid palp shows a number of structures homologous with those in many araneomorphs (Kraus, 1978). Similarly, the comparatively simple mygalomorph palpal bulb was no longer seen as the most plesiomorphic form but as a result of the fusion of sclerites found in the Mesothelae and most araneomorphs. Forster (1980) indicated homologies in the tarsal organ, and Gertsch and Platnick (1979), using Forster's extensive survey of spider tarsal organs, founded the hypothesis that the presence of concentric ridges and encapsulate receptors on the tarsal organ of some mygalomorphs are derived conditions.

Thus, a number of different classification schemes have emerged. In the beginning, groups were frequently defined by the lack of structures in the sister group (in a key couplet). Subsequent authors failed to challenge the constitution of those families. The final result has been the ineffectiveness of many family groups. This study represents the first approach to a critical examination of mygalomorph phylogeny through the proposal of informative, falsifiable hypotheses of monophyly. It is also the first generic review of the Mygalomorphae since 1903, and (unlike all preceding studies) is based upon a firsthand knowledge of genera for which types are available.

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MATERIALS AND METHODS

Wherever possible, type material of type species has been examined and, where necessary, figured. To save space I have used several simple abbreviations as follows: AME, anterior median eyes; ALS, anterior lateral spinnerets; ITC, inferior, unpaired, or third tarsal claw; MOQ, median ocular quadrangle; PMS, posterior median spinnerets; PLS, posterior lateral spinnerets; STC, superior or paired tarsal claws. Institutional acronyms are in Acknowledgments. Synonymies not explained in the Systematics section are detailed alphabetically in New Generic Synonymies; a list of misplaced species follows that.

TERMINOLOGY

A number of terms require minor clarification.

INTERCHELICERAL TUMESCENCE (figs. 124, 129): A pallid and soft area at the lower basal interface of the chelicerae near the tip of the closed fang of some male mygalomorphs. The structure may be small and indistinct, or large and reaching to half the height of the chelicera; it is presumably glandular. Hirst (1908) noted it in the type of *Metriopelma* [=*Pycnothele*] *auronitens* (Keyserling) and presumed that it was stridulatory in function. Only in the Pycnothelinae, *Cyclocosmia,* and *Cataxia* does it bear unusually thick setae. In structure and occurrence it differs from the cheliceral gland found in araneomorphs (see Forster and Platnick, 1984).

AUSTRALOTHELINE CRESCENT: The structure is found only in *Masteria* and in certain Euagrinae (but not *Euagrus*). It is a crescent of hirsute cuticle immediately anterior to the bases of the posterior median spinnerets (Raven, 1984b, figs. 108–112, 115). It is separated from the surrounding hirsute cuticle of the abdomen by pallid elastic tissue similar to that surrounding the spinneret bases, and was earlier called the "evagrine" crescent (Raven, 1983a) on the assumption that *Allothele* was synonymous with *Euagrus.*

HAEMATODOCHAE: Plesiomorphically three haematodochae are present on the male palp of spiders. The first haematodocha joins the bulb to the cymbium. The second lies between the basal sclerite (subtegulum) and the main or distal sclerite (tegulum). The third, known in mygalomorphs only in the Atypidae, Antrodiaetidae, some Mecicobothriidae, and *Neocteniza,* may or may not separate the embolus (and conductor, if present) from the distal sclerite.

CONDUCTOR: A structure is only considered such if it can physically act to support the embolus. All conductors are not considered homologous.

BISERIALLY DENTATE CLAWS: Paired claws in which at least one tooth appears on each lateral face of the claws. Generally, the opposed condition is teeth set on a medial keel.

MYGALOMORPH MONOPHYLY

Mygalomorphs have traditionally been seen as that gray area between the Liphistiidae and the hypochiloid spiders, and little attention has been paid to their monophyly (see Platnick and Gertsch, 1976). Like the Mesothelae, the mygalomorphs have retained four booklungs and longitudinal (paraxial) fang action. Also, they have retained a number of other plesiomorphic characters. Therefore, before proposing a hypothesis of mygalomorph relationships, a falsifiable hypothesis of their monophyly and that of the suborder Opisthothelae is needed.

SUBORDER OPISTHOTHELAE

Platnick and Gertsch (1976) proposed six characters in support of the monophyly of the Opisthothelae (Mygalomorphae plus Araneomorphae). I suggest a further character. In the Mesothelae, the sternum is narrow and appears as a plateau with steep edges (fig. 10). It is so narrow that the labium, at its widest, is at least as wide as the sternum. In most other arachnids, including the Amblypygi which are the sister group of the Araneae (Platnick, 1977), the sternum is either absent or very reduced. In the Opisthothelae, the sternum is wider than the labium and, in profile, is quite low to domed—never is it so elevated and narrow as in the Mesothelae. The most parsimonious hypothesis explaining the different sternum types in spiders is that the presence of a sternum is another autapomorphy for the Araneae, the elevated sternum is an autapomorphy of the Mesothelae, and that the wide, low sternum of the Opisthothelae is their autapomorphy.

INFRAORDER MYGALOMORPHAE

In all mygalomorphs, the anterior median spinnerets or their homologs (the cribellum and colulus) are absent. The most plesiomorphic number of spinnerets, six, includes only the posterior laterals, posterior medians, and anterior laterals (Marples, 1967). In all Mesothelae (fig. 12), the anterior median pair is present; the posterior medians are small and often nonfunctional in both *Liphistius* and *Heptathela* (Platnick and Sedgwick, 1984). Similarly, plesiomorphic araneomorphs have retained homologs of the anterior median spinnerets as well as the two posterior pairs and the anterior lateral spinnerets. Therefore, the first mygalomorph synapomorphy is the loss of the anterior median spinnerets (character 1, table 1, fig. 1, p. 24; Platnick and Gertsch, 1976).

A second character with a similar distribution is the reduced anterior lateral spinnerets. In the Mesothelae and in the plesiomorphic hypochiloid families, the anterior lateral pair is much larger than the posterior medians and similar in size to the posterior laterals (fig. 12). Within the mygalomorphs, the most plesiomorphic and largest state of the anterior lateral spinnerets is in the hexathelid *Plesiothele* (fig. 14; Raven, 1980b) but even there they are much smaller than the posterior laterals. Therefore, the reduction of the anterior lateral spinnerets is a second synapomorphy of the mygalomorphs (character 2, table 1, fig. 1).

Mygalomorphs have a unique combination of characters: labial and maxillary cuspules; a reduced number of palpal sclerites in the male bulb; a subsegmentation of the basal segment of the posterior lateral spinnerets; and sternal sigilla. These characters require individual discussion.

1. Cuspules—modified stout blunt setae found on the labium, maxillae, and sometimes on the inner edges of leg coxae—are found in genera of every mygalomorph family, save the Mecicobothriidae and Antrodiaetidae, but do not occur in the Mesothelae or Araneomorphae. They occur in all genera with six spinnerets except the mecicobothriids, antrodiaetids, *Mediothele* (Hexathelidae), and *Calommata* (Atypidae). Of mygalomorph taxa without the anterior lateral spinnerets, cuspules are also absent in the Euagrinae and Masteriinae (Dipluridae), some *Idiommata* (Barychelidae), some nemesiids (*Diplothelopsis,* some *Mygaloides*), and some cyrtaucheniid genera (*Kiama,* some species of *Ancylotrypa*). Contrary to Purcell (1902), cuspules are present in *Lepthercus* but, as in many male mygalomorphs, they are reduced to fine points.

The origin of cuspules in the Microstigmatidae is unclear. Of the four genera, cuspules are absent in the plesiomorphic genus *Micromygale* (Platnick and Forster, 1982), in some *Microstigmata,* and in one of the two *Pseudonemesia* species (Raven and Platnick, 1981). Thus, whether the cuspules are assumed to have been plesiomorphically present or absent in the microstigmatids, the number of steps is the same. Three losses are required assuming an original presence, and three gains if original absence is assumed. I opt to minimize reversals and prefer the hypothesis that from original absence, the microstigmatids acquired cuspules three times. All mecicobothriids and antrodiaetids lack cuspules and therefore cuspules were absent in their respective ancestors.

As I show below (Diplurid Intrarelationships), it is unparsimonious to isolate *Mediothele* from the Hexathelidae and/or Dipluridae simply because it lacks cuspules. Thus, cuspules were plesiomorphically present in the sister group of *Mediothele.* Similarly, outgroup comparison with the Diplurinae plus Ischnothelinae (fig. 6) and the Hexathelidae (fig. 1) suggests that the loss of cuspules is a synapomorphy for the acuspulate diplurids, and also that cuspules were plesiomorphically present in the Dipluridae.

Kiama and the Aporoptychinae (Cyrtaucheniidae) share biserially dentate paired claws and chelicerae in which a rastellum is reduced. Thus, it is unparsimonious to propose that because *Kiama* alone of the Rastelloidina lacks cuspules it is either the sister group of the Ctenizidae or Cyrtaucheniidae. Hence, the absence of cuspules in *Kiama* is considered one of its autapomorphies.

In the Atypoidina, *Calommata* (Atypidae) and the Antrodiaetidae (the sister group of the Atypidae) lack cuspules. Hence, the only parsimonious conclusion is that within the Antrodiaetidae plus Atypidae, cuspules were originally absent and acquired once in *Atypus* plus *Sphodros.*

Therefore, at the family level, cuspules are plesiomorphically present in all but the microstigmatids, mecicobothriids, atypids, and antrodiaetids, and although they are unique to the Mygalomorphae, their presence in two atypid genera, three microstigmatids, the Rastelloidina, and the Orthopalpae must be considered parallelisms (character 12; table 1, fig. 1).

2. The palpal bulb of mygalomorphs generally is a simple distal cone joined by a haematodocha to a proximal sclerite (subtegulum) and thence by another haematodocha to the cymbium. In the Atypidae and Antrodiaetidae, the palp has an additional sclerite often named the conductor but identified by Kraus (1978) simply as KI. It appears that because the conductors of mesothelids, atypids, and araneomorphs are analogs in a similar position they have been considered homologs. However, the mesothelid and atypid conductors are not homologs, as I will later show in my discussion of the different palpal bulbs.

First, Platnick and Sedgwick's (1984) illustrations show that in only one *Liphistius* species, *L. desultor* Schiödte (=*L. batuensis* Abraham in Kraus, 1978), does such a supporting configuration occur, and the plesiomorphic state of the bulb sclerites in the Mesothelae has not been identified. Similarly, no care has been taken to determine the most plesiomorphic state within the atypoids. Generally, only *Atypus* has been used (e.g., Haupt, 1983, 1984) and that genus has several autapomorphies, of which the modifications of the bulb may be one. The character is discussed further below. Suffice it to observe here that the plesiomorphic mygalomorphs have fewer palpal sclerites than either the Mesothelae or hypochiloids. Hence, the reduction of the number of sclerites in the male palp is a third mygalomorph synapomorphy (character 5; table 1, fig. 1; with parallelisms in some araneomorphs).

3. In all mygalomorphs, the basal segment of the posterior lateral spinnerets bears an incomplete diagonal subsegmentation (character 3; table 1, fig. 1) that is most easily seen from above or on the anterior faces of the spinnerets; it was first observed by Bertkau (1880, fig. 5a) in *Diplura.* That subsegmentation may represent the vestige of an additional segment. No ontogenetic evidence supports the possibility of a divided basal segment although a transverse division does occur in the ontogeny of some *Atypus* (Yoshikura, 1958). No similar subsegmentation occurs in the Mesothelae or in the plesiomorphic hypochiloids but the basal three segments of the anterior and posterior lateral spinnerets of the Mesothelae have a complete dorsal longitudinal division. That could represent the precursor of the mygalomorph condition if four or more of the most basal segments of the posterior lateral spinnerets in the Mesothelae fused. In that case, the mygalomorph condition is presumably an autapomorphy; and it is equally so, even if the mesothelid condition is not the precursor.

4. A fourth but possibly more tenuous mygalomorph autapomorphy is the presence of sternal sigilla and associated musculature (character 4; fig. 1). The sigilla are the depressions formed by the attachment of paired ventral muscles arising on the endosternite (Millot, 1949). As far as I am aware, those muscles reach the sternum only in the mygalomorphs, filistatids (M. R. Gray, personal commun.), and perhaps *Ectatostica* (Hypochilidae; see Gertsch, 1958); thus they are presumed apomorphic in all three. Platnick (*in litt.*) has observed that if true sigilla occur in *Ectatostica* and filistatids, they may be a synapomorphy for the Opisthothelae but that would require many losses in the four remaining hypochiloid genera if not also in some araneomorph groups.

The only actions contradicting the monophyly of the Mygalomorphae are that of Kaestner (1968, p. 184) who grouped the Gradungulidae with the Mygalomorphae and also that of Lehtinen (1975, p. 2) who stated that the "ultrastructure of the hairs and skin clearly support . . . the relationship of Atypidae and Anthrodiaetidae [*sic*] with Liphistiidae." No evidence was given to support that claim, and from my own extensive studies in association with those of Platnick, I find that no such support exists from characters that can be considered apomorphic.

CHARACTER ANALYSIS

The cladograms used in this study are formed by progressively adding on sister groups—the taxa that share more apomorphic characters than any other taxon does with any of those in the sister group. Within a monophyletic group, it is necessary to identify the most plesiomorphic state of any character. That character state partially diagnoses the group's hypothetical ancestor. Hence, the ancestors of each taxonomic group that share a character parsimoniously determined to be apomorphic are sister groups. Thus, that an autapomorphic character is present in an unmodified form in all the taxa of a monophyletic group is not necessary; taxa that are polythetic, i.e., lack a single common (unmodified) character, are frequently so formed and their diagnoses are problematical.

In the following discussion the Mesothelae are included to assist the determination of character polarity and perspective. Wherever possible or necessary, I will propose the apomorphic character state; however, the support for synapomorphy will usually be available only with the analysis of the respective cladogram.

SEXUAL DIMORPHISM

Mygalomorph spiders, like araneomorphs, are sexually dimorphic. However, in mygalomorphs that creates problems in the identification of conspecifics or congeners, and also in some cases the synapomorphies used to unite family groups are limited to either males or females. Apart from obvious differences in genitalia and those structures modified in males for mating (chelicerae and legs I and II), dimorphism affects numerous characters. In some ctenizoid genera (e.g., in *Cteniza*), the spination of the distal segments of legs I and II of females (fig. 255), a characteristic of the Ctenizidae, Migidae, and Actinopodidae, is reduced or absent in males. In such cases, tarsi I–IV, ascopulate in females, may be distinctly scopulate in males.

In some males, the claws may have several teeth in an S-shaped row (e.g., *Scalidognathus*: Idiopidae), whereas females may have few teeth (e.g., many Idiopidae) or two full rows (Bemmerinae: Nemesiidae). In contrast, in most barychelid genera the paired claws of males bear two rows of teeth, whereas those of females have a few small or no teeth.

Some leg structures are better developed in females. For example, metatarsal preening combs, when present, are well developed and clearly paired in females, whereas they may be weak to absent in males. On the other hand, male Nemesiidae show greater development of scopulae, both in hair density and number of scopulate tarsi.

In a number of groups (Ischnothelinae, Diplurinae, Atypidae, Antrodiaetidae, some Pycnothelinae, and some Theraphosidae and Barychelidae), male tarsi have either a ventral transverse suture ("cracked"), or the cuticle of the lower surface is pallid and has a shattered appearance like drying mud ("pseudosegmented"). Pseudosegmented tarsi appear either bent or curved (fig. 21). In those taxa, females show less development of those characters than males, or the tarsi appear normal (integral). In males of some nemesiid genera (e.g., *Teyl, Xamiatus*), the tarsi are quite long and ventrally pallid but lack any weak zones. Pseudosegmented tarsi also occur in females of Diplurinae, and some *Stanwellia* and *Acanthogonatus,* as well as in a number of other nemesiid genera.

Sexual dimorphisms also account for the lower caput of many male mygalomorphs (but generally not in ctenizoids). However, the eye tubercle of male cyrtaucheniids is often noticeably more elevated than in females. In some genera (e.g., *Kiama, Bolostromoides*; figs. 219, 221), all eyes are sessile in females, whereas in males (at least in *Kiama*), the anterior median pair is raised on a low common tubercle. Also, labial and maxillary cuspules are sometimes present in males but absent in females (e.g., *Scalidognathus*; figs. 249, 252). In general, males have relatively smaller maxillae than females. Also, in the males of some genera (e.g., *Calommata, Missulena*), the ventral surface of the maxilla is rotated forward and almost faces anteriorly, making the plesiomorphically retrolateral (vertical) surface almost ventral and horizontal. In contrast, maxillary modifications of the posterior corner (heel, e.g., Anamini) are less pronounced in males than in females. Sexual dimorphisms are not known to account for marked differences in the serrula, rastellum, cheliceral tooth rows, number of claws, or claw tufts.

ANTERIOR–POSTERIOR GRADATIONS

Several structures on legs warrant mention for the differences each exhibits on the first through the fourth legs. In general, the first two leg pairs show the greatest modification. In some cases, the distinction is readily explicable in functional terms. For example, burrow and door construction and possibly prey capture (as suggested by Coyle, *in litt.*) are facilitated by the greater development of lateral spines on the tibiae, metatarsi, and tarsi of legs I and II of Ctenizidae (fig. 255), Migidae, Actinopodidae, and some Idiopidae. In those taxa, the corresponding segments on legs III and IV have fewer spines that are more disordered or are dorsal rather than ventral and lateral (fig. 256). However, other characters require more sophisticated functional explanations presumably, in some cases, involving the greater sensory role of the first two pairs of legs. That may explain the dual tarsal organ on legs I and II of *Cethegus daemeli* Raven (see Raven, 1984b, fig. 23), the fused organs on leg III, and the single organ on leg IV. However, that would not account for the tarsal organ in *Ixamatus fischeri* Raven that is more steeply inclined and longer on leg IV than on leg I (see Raven, 1982a, figs. 9, 10).

In *Ixamatus* and *Kiama,* the paired claws of the anterior tarsi are biserially dentate, whereas on the fourth leg they are uniserially dentate or entirely bare (Raven, 1982a; Main and Mascord, 1971). In *Aname,* some species of *Phlogiellus,* and a number of pycnotheline genera, the third claw may be absent or very reduced on legs I and II, but is progressively or abruptly larger on legs III and/or IV.

Similarly, development of the tarsal scopulae also shows a progressive reduction from the first to the fourth legs. In the nemesiid subfamilies Pycnothelinae and Anaminae, the scopulae may be entire on tarsi I and II, thin or divided on tarsi III, and thin but more widely divided or even absent on tarsi III and IV. With the exception of male ctenizoids, male atypoids, and some *Atrax* species, if scopulae are present on any tarsus, the tarsi anterior to that one (save if it is the first) are also scopulate, and often more densely so.

A reverse trend is evident in the leg spination, preening combs, and tarsal weakenings of males and females. The posterior legs show the greatest "development." Two notable exceptions to the otherwise universal trends in the third claw and tarsal weakenings are known. First, in *Paratropis* and *Anisaspoides,* a distinct, curved third claw is present on legs I, and I and II, respectively. Second, in *Pycnothele perdita* Chamberlin, the male shows some indication of pseudosegmentation on tarsi I and II but none is evident on tarsi III and IV. Both exceptions are most likely autapomorphic.

SPINNERETS

Plesiomorphically, the Mesothelae have eight spinnerets (fig. 12). The median pairs are much smaller than the laterals and are one-segmented. The laterals consist of a large basal segment and a number of sclerotized annuli that are unbroken. The diameter of the anterior laterals is about twice the diameter of the basal segment of the posterior laterals.

In all mygalomorphs, the anterior medians are lost and the largest remaining pair is the posterior laterals (Marples, 1967). The anterior laterals are either one- or two-segmented (Atypidae, Antrodiaetidae, Hexathelidae, Mecicobothriidae, Microstigmatidae) or absent (most families). They are always much smaller than the posterior laterals and usually are also smaller than the posterior medians. As in the Mesothelae, the posterior medians are one-segmented. The posterior laterals of mygalomorphs are plesiomorphically three-segmented. The basal segment of mygalomorphs, however, bears an incomplete diagonal junction most evident on the internal face of the segment but usually also visible from above and below (fig. 140). Although the junction divides the base of the basal segment it stops well short of the distal edge. I have already (in Mygalomorph Monophyly) concluded that the subsegmentation is a mygalomorph autapomorphy. Spigots are usually present on all segments of the posterior laterals, the posterior medians, and apically, if at all, on the anterior laterals.

The terminal segment of the posterior laterals exhibits a number of conditions. In most ctenizoids, some nemesiids, some barychelids, some pycnothelinids, and the microstigmatids, the apical segment is short and domed (e.g., figs. 259, 90, 111). In the cyrtaucheniids, some paratropidids, some barychelids, some pycnothelinids, and in the first postembryonic stage of some mygalomorphs (Yoshikura, 1958), the apical segment is distinctly ovoid, triangular, or longer (e.g., figs. 140, 204). In atypids, antrodiaetids, hexathelids, diplurids, some nemesiids, most anaminids, some theraphosids, and some paratropidids, the apical segment is digitiform or much longer than wide (e.g., figs. 182, 14, 22, 35, 177). Finally, in mecicobothriids, and the diplurids *Phyxioschema,* Ischnothelinae, and one undescribed species of *Linothele,* the apical segment is very attenuated and bears numerous incomplete sclerotized annulations giving a pseudosegmented appearance (Gertsch and Platnick, 1979, fig. 51; Raven, 1981a, fig. 4). The most widespread and also the most parsimoniously plesiomorphic state is that found in the postembryonic larvae (e.g., Yoshikura, 1958, fig. 11): the nominally digitiform state, from which both the domed ctenizoid segment was presumably condensed and the elongate diplurid segment developed. However, unequivocal synapomorphies of the palpal bulb of male pycnothelinids indicate that either a domed tip re-elongated or an elongate tip was reduced to a dome. From the distributions of associated characters, I find that the most parsimonious conclusion is that the domed segments of microstigmatids, nemesiids, and the ctenizoids arose independently.

SERRULA

The significance of the serrula in araneomorph spiders was first recognized by Marples (1968). Platnick (1977) later considered it a synapomorphy for the Mecicobothriidae plus Dipluridae (*sensu lato*). In mygalomorphs, the serrula occurs on the anterior face of the maxillae near or on the maxillary lobe and generally consists of an area of short cuticular thorns inclined at an acute angle to their originating surface. Two notable exceptions occur on that theme. In Masteriinae, the teeth of the serrula form a line of elongate thorns set orthogonally to the surface (Platnick, 1977, fig. 25); and in *Micromygale,* the teeth are broad and multipectinate (Platnick and Forster, 1982, fig. 3). In both cases, the orthogonal and multipectinate types are most parsimoniously autapomorphic.

Because the serrula teeth of mesothelids are less erect, in a different position (more dorsally; Platnick, 1977, figs. 26, 27) on the anterior maxillae than in mygalomorphs, and hardly differentiated from other cuticular scales, Platnick (1977) concluded that the structures are not homologous. Such a serrulate structure was again reported by Platnick and Sedgwick (1984) in other species of *Liphistius* and I have observed similar structures in *Heptathela kimurai* Kishida. The extent of the structure in the Mesothelae at least partially coincides with the serrulate area in some mygalomorphs. A number of further observations since Platnick (1977) have increased our knowledge of the serrulate mygalomorph genera, and they are summarized below.

The serrula is present in Mecicobothriidae, Hexathelidae, Masteriinae, Ischnothelinae, and Dipluridae (*sensu stricto*) (Platnick, 1977); in the Microstigmatidae, save *Ministigmata,* and the nemesiids *Pycnothele, Diplothelopsis,* and *Ixamatus* (Raven and Platnick, 1981; Platnick and Forster, 1982); and also in some *Stanwellia* [=*Aparua*] and *Acanthogonatus* [=*Tryssothele*] (Raven, 1981c); in the nemesiids *Entypesa* and some species of *Aname,* and in the theraphosid *Heterothele* (Raven, 1983b). In the course of this study, a serrula has been observed in the theraphosids *Ischnocolus, Cyriocosmus, Stromatopelma* [=*Scodra*], *Pterinochilus, Harpactira,* and *Brachionopus*; in the cyrtaucheniids *Fufius, Bolostromus,* and *Bolostromoides*; and in the nemesiids *Mygaloides* [=*Lycinus*], *Hermacha, Rachias, Androthelopsis* [=*Pycnothelopsis*], and *Stenoterommata.* Platnick (1977) also reported that a number of genera were aserrulate. As well as those, the absence of a serrula has been newly confirmed by SEM observations of *Kiama* (Raven, 1981c), *Acontius* [=*Aporoptychus*] (Raven, 1983b), *Atrax adelaidensis* Gray, *A. eyrei* Gray, and *A. flindersi* Gray (Gray, 1984), *Teyl, Xamiatus,* many species of the *Aname pallida* group, juvenile paratropidines, one *Calisoga* species, and some *Ixamatus.*

At present, the most parsimonious hypothesis is that the serrula was independently acquired in the Mesothelae, Araneomorphae, and some Mygalomorphae, despite its disparate occurrence. Furthermore, at present it is more parsimonious to consider the presence of a serrula in the theraphosids as seven parallelisms rather than to propose innumerable losses from an original presence. One of two alternatives may explain the above distributions of the serrula within the Theraphosidae. First, as indicated by the appearance of a serrula-like structure in postembryonic stages of *Grammostola, Acanthoscurria,* and *Avicularia* (Galiano, 1969, 1973a, 1973b), the serrula may have been present in a higher group including the theraphosids, then lost in all theraphosids, and regained in seven. That uses eight steps. Equally, the larval structure may not be a serrula homolog, as is suggested by the fact that during the ontogeny of those theraphosids the entire cuticle is covered with similar thorns (Galiano, 1973a, and personal SEM observ.). In that case, the development of the serrula is the same.

Second, the serrula may have been plesiomorphically present in the Theraphosidae and lost in numerous lineages with the exception of seven genera. Although the first explanation is unlikely it does explain all of the data. The second saves only one step and is parsimonious only if all of the serrulate theraphosid genera are monophyletic; otherwise the number of losses becomes inordinately high. The first alternative, however, requires eight or nine steps—one gain (that may be a synapomorphy for the dipluroids plus Theraphosidae and therefore would not be an added step), one familial loss, and seven independent acquisitions. Obviously, as the maxillae of more theraphosid genera are examined for a serrula, that hypothesis may have to be revised.

A cladogram of plesiomorphic species of *Aname* (Raven, 1984d) indicates that the serrula is plesiomorphically present both in the *Aname maculata* group and in the Anamini. Because a serrula is present also in most pycnothelinid genera, the most parsimonious conclusion is that it is plesiomorphically present in all nemesiids, despite its apparent absence in *Nemesia, Brachythele,* and some Bemmerinae. In this study, only the presence of a serrula was confirmable because most specimens examined were types and could not be scanned; the serrula was assumed absent if it was not readily evident after careful observation under light microscopy. The maxillae of many species need to be examined with a scanning electron microscope before plesiomorphic absence at the genus level can be assumed.

In the absence of further falsifying evidence, I have assumed that a serrula was plesiomorphically present in the Mecicobothriidae, Hexathelidae, Dipluridae, Nemesiidae, Microstigmatidae, and Theraphosidae. It remains more parsimonious to assume that the serrula was independently acquired in the Neotropical Aporoptychinae.

MALE PALPAL BULB

Considerable attention has been given recently to the sclerites of the palpal bulb of male spiders. In the three traditional suborders—Mesothelae, Mygalomorphae, and Opisthothelae—the bulb is respectively complex, simple with some complex exceptions, and both simple and complex. The term simple was initially considered synonymous with primitive or little evolved. The major problem with that notion was that "primitive" segmented spiders had a complex bulb.

Gertsch (in Platnick and Gertsch, 1976) and later Kraus (1978) proposed an alternative hypothesis of greater merit and explanatory power. The mesothelid bulb consists of three sclerites (Kraus, 1978). The mygalomorph bulb and, presumably, "simple" araneomorph bulbs were in fact more derived conditions (Gertsch, in Platnick and Gertsch, 1976) resulting from the fusion of the distal two of the three sclerites. The conductor and embolus of the "atypoid" families (Atypidae, Antrodiaetidae, Mecicobothriidae) were considered the vestiges of the third sclerite. Thus, all other mygalomorphs share a synapomorphy—distal sclerites of the bulb completely fused. However, Kraus (1978) based his hypothesis on one *Liphistius* species and one *Atypus* species. Neither of those species was claimed to have the most plesiomorphic palp for each group but were assumed to be representative of each. In this study, I have examined male palps of all genera of the Mesothelae (except *Ryuthela*), the Atypidae (except *Calommata*), the Antrodiaetidae, and the Mecicobothriidae, and as many described species of each as possible. I present the following revised findings.

MESOTHELAE: The material of the recent revision of *Liphistius* by Platnick and Sedgwick (1984) has been used in the following observations. The mesothelid palp may include two or three sclerites. Because the basal sclerite (SI of Kraus, 1978) is present in all the Mesothelae and mygalomorphs, it is not further considered. The distal two sclerites (SII and SIII of Kraus, 1978) are clearly separated by a haematodocha in *L. desultor* Schiödte (fig. 11) and *Heptathela kimurai* Kishida. In *Liphistius murphyorum* Platnick and Sedgwick, *L. sumatranus* Thorell, and *L. birmanicus* Thorell, the distal sclerite is hardly separated from SII and the full expansion of the palp would be needed to determine the extent of continuous sclerotization. In *L. malayanus* Abraham and *L. tioman* Platnick and Sedgwick, the distal sclerite is fused at least to the point of being an almost inflexible hinge and no conductor is present. In *L. langkawi* Platnick and Sedgwick, there are no such hinged points. In *L. murphyorum, L. sumatranus,* and *L. langkawi,* the embolus is closely adpressed and basally fused to a hyaloid lamella—presumably a conductor.

Clearly, there is no simple answer to the question of whether the distal sclerite is fused to SII. I suggest that even by expanding the bulb and observing the fusion point with an SEM the question could not be answered: intermediate states of sclerotization will ensure that. Thus, Haupt's (1983, 1984) conclusions, based partially upon the separation of the sclerites, are invalid. According to Haupt (1983), the entire or broken ring of the second sclerite is phylogenetically important.

After my examinations of *Liphistius* species I found that no definitive statements about the phylogenetic significance of that character are possible. In *L. murphyorum, L. birmanicus, L. malayanus,* and *L. tioman* the second sclerite is a complete ring of chitin that narrows in parts but is always evident. Only in *L. sumatranus, L. langkawi, L. desultor,* and *Heptathela kimurai* is the ring broken. Thus, the character shows no correlation with the degree to which the distal and second sclerites approximate or fuse.

THE "HEPTATHELID" GENUS *RYUTHELA*: Haupt (1983, 1984) has proposed a third mesothelid genus *Ryuthela* as the sister group of *Heptathela,* together forming the Heptathelidae. Although Haupt (1983) gives two, one, and three characters in support of the Heptathelidae, *Heptathela,* and *Ryuthela,* respectively, he gives no reason for presuming that the characters used are apomorphic. The monophyly of *Heptathela* plus *Ryuthela* is in little doubt. However, of the two characters used to support the group, one (palp with conductor) is found also in *Liphistius murphyorum, L. sumatranus,* and *L. langkawi,* and thus could only be a parallelism in the "heptathelids" or plesiomorphic for the Mesothelae. The other heptathelid character, the paired receptacula, is later found to be parsimoniously a synapomorphy for *Heptathela* (including *Ryuthela*). Of the remaining four characters, the first—the triangular tegulum—putatively the autapomorphy of *Heptathela,* is probably on autapomorphy only of *H. kimurai* Kishida. But on similar grounds *Liphistius* could be divided into as many genera as it has species. The second character—the complete sclerotization of the embolus—is totally insubstantial, especially given that the embolus was presumed to have been derived from the totally sclerotized tarsal claw. Moreover, as with other of Haupt's generalizations, it appears to be based upon a very restricted survey. The third character—the combined conductor and contrategulum—is again insubstantial. In the first instance, no characters were given by which the two structures could be distinguished. Second, when only one is present in the liphistiids and atypids, Haupt stated without reason that it is the contrategulum; the conductor is absent. In contrast, the two structures are said to be combined in *Ryuthela.* The fourth character—the single pair of anteromedian spermathecal receptacula—must be considered plesiomorphic in relation to the receptacula of *Liphistius* (median unpaired; see Platnick and Sedgwick, 1984), and *Heptathela* (anteriorly paired). Certainly, the simplest form evident in mygalomorphs is one broad pouch, but in most mygalomorphs a pair of receptacula are present. I regard the condition in *Ryuthela* as a precursor to that in *Heptathela* and *Liphistius.* Haupt's hypothesis requires three steps—first a median receptacula in *Liphistius,* second a quadrilobulate heptathelid condition, and third a bilocular reduction in *Ryuthela* (but possibly with an additional step to the plesiomorphic mesothelid condition). A more parsimonious alternative is that the median (unsclerotized) multilocular receptacula is the plesiomorphic mesothelid condition. From that, the ventral plate became more sclerotized in *Liphistius,* and the median group divided in the "Heptathelidae" and again in *Heptathela.* That also requires three steps but the plesiomorphic mesothelid condition is included. Thus, Haupt's concept of the genus *Ryuthela* is not only insubstantial but also invalid, and accordingly I here place the name in the synonymy of *Heptathela,* and return the Heptathelidae to the synonymy of the Liphistiidae.

ATYPIDAE: Similarly, I find Haupt's (1983) observations concerning *Atypus* at variance with mine. In atypids, the term conductor has generally been applied to the structure supporting the embolus. Kraus (1978) considered the atypid and mesothelid conductors homologous. However, the configuration of the atypid bulb is variable and three conditions are evident. The conductor of *Atypus* species may be completely surrounded by a haematodocha, or partially or completely fused to the terminal sclerite (see Kraus and Baur, 1974, fig. 33). The embolus may also be fused to that same sclerite or free. In most species of *Sphodros* (e.g., *S. coylei*; Gertsch and Platnick, 1980, fig. 59), both the embolus and conductor are fused to the terminal sclerite that is a complete ring.

MECICOBOTHRIIDAE: In *Mecicobothrium thorelli* Holmberg, the embolus and conductor are so closely intertwined that the haematodocha is either very small or absent (see Gertsch and Platnick, 1979, figs. 45, 48, 49). However, the two elements are fused to a common base. In *Hexurella,* although the embolus and conductor are distally separate they are fused to a common sclerite and no haematodocha is evident (Gertsch and Platnick, 1979, figs. 77, 84, 87, 90). Once again, the haematodocha may be vestigial. In *Megahexura* and *Hexura,* the distal haematodocha is evident but so also is the fusion of the embolus and conductor to the common distal sclerite (Gertsch and Platnick, 1979, figs. 54, 61, 64).

ANTRODIAETIDAE: In *Atypoides* and *Antrodiaetus,* the embolus is enclosed in a complex conformation of the conductor (Coyle, 1968, figs. 53–60; Coyle, 1971, figs. 188–233). However, both elements are basally fused as in the Mecicobothriidae. In *Aliatypus,* the distal separation of embolus and conductor is more evident and the two elements are basally fused (Coyle, 1974, figs. 96–120).

The most widespread and most plesiomorphic condition of these three families is that a distinct distal haematodocha is present and the embolus and conductor are distally separated but basally fused to a common element—the distal sclerite. Only two distal structures in the "atypoid" palp can be homologized with their counterpart in the Mesothelae—the embolus and distal haematodocha. The mesothelid conductor is a thin hyaloid lamella basally fused and closely juxtaposed to the embolus (Kraus, 1978, fig. 2), whereas the "atypoid conductor" is a fully sclerotized process basally fused to SII but diametrically opposite the embolus. A probable homolog of the "atypoid conductor" in the Mesothelae is instead a sclerotized process arising from SII (e.g., *L. bristowei* and *L. murphyorum*; Platnick and Sedgwick, 1984, figs. 28, 21). That is the only structure occurring in a similar position and which by increased development could perform the role of an embolic support.

Two conclusions are possible at this point. First, *Liphistius* is a paraphyletic assemblage in which only those species with three palpal sclerites are monophyletic; or second, the three sclerite condition is plesiomorphic. Platnick and Sedgwick (1984) gave three independent characters (clavate trichobothria, retrolateral tibial apophysis on the male palp, and a poreplate in the female genitalia) to support the monophyly of *Liphistius* and thereby eliminated the first alternative. Thus, it is more parsimonious to accept the three sclerite condition of the Mesothelae as plesiomorphic than to reject the monophyly of *Liphistius.* In that case, all mygalomorphs share the apomorphic condition of embolus and SII fused.

Thus, although the homologs of the mygalomorph conductor and embolus are present in the mesothelids, only the embolus homolog has previously been identified. The conductor of mesothelids has no counterpart in mygalomorphs because it is not sclerotized and is very closely fused to the embolus; the mygalomorph conductor is a sclerotized process arising opposite the embolus, separated from it by an extensive haematodocha, and with the embolus is basally fused to the tegulum. The probable homolog of the mygalomorph conductor in the Mesothelae is a tegular process. It has developed more in the atypids, antrodiaetids, and mecicobothriids but has been reduced in other families. Whether that increased development of the "atypoid" conductor is their autapomorphy can only be assessed through the consideration of other character distributions on the cladogram.

In a number of other mygalomorph genera—*Paraembolides* and *Scotinoecus* (Hexathelidae; Raven, 1980b, fig. 2), *Masteria* (Dipluridae; Raven, 1979, fig. 25), *Micromygale* (Microstigmatidae; Platnick and Forster, 1982, fig. 13), *Cyriocosmus* (Theraphosidae; Schiapelli and Gerschman, 1973a, figs. 1, 2, 9–11), *Actinopus* (Actinopodidae; Mello-Leitão, 1941a, fig. 1), and *Neocteniza* (Idiopidae; Platnick and Shadab, 1976, figs. 21–23)—a fully sclerotized process (previously called a paraembolic apophysis; Raven, 1978) is fused to the base of the embolus. At best, the paraembolic apophysis could be homologous with the mesothelid conductor or any other sclerotized process adjacent to the embolus, but that would not be parsimonious in the mygalomorph genera noted. In general, the paraembolic apophysis is more parsimoniously considered apomorphic than as a plesiomorphic retention.

Also in *Neocteniza,* an extensive distal haematodocha is present and separated from the median haematodocha. From examinations of the palpal bulbs of *Neocteniza fantastica* Platnick and Shadab, and a new species of *Neocteniza* (being described by Pablo Goloboff, MACN), it is evident that, apomorphically, the haematodocha is an isolated area of the extensive medial haematodocha in the Idiopidae, in which it is the family autapomorphy. In the Idiopidae, the second (medial) haematodocha extends distally almost to the embolus tip; thus, the tegulum (SII) is not shaped like a complete cone (as in most mygalomorphs) but like a scoop (fig. 244). The idiopid haematodocha can be homologous with the distal haematodocha of the Mesothelae only at the expense of more homoplasies than can parsimoniously be accepted. Because of that and the congruence of other characters of the Idiopidae (see Intrafamilial Relationships) with the extensive haematodocha, I reject the hypothesis that it is a plesiomorphic retention.

CYMBIUM

The conformation and spination of the cymbium (palpal tarsus) of mygalomorphs occur in a number of combinations but forms found only in monophyletic groups are of particular interest. Two such conditions are the position along the cymbium that the bulb attaches to and the shape of the cymbium. Obviously, the two are correlated: when the cymbium is very short and wide, the attachment point will be close to the base.

INSERTION OF BULB ON CYMBIUM: In the Mesothelae, the cymbium has a proximal process (paracymbium; Platnick and Sedgwick, 1984, fig. 65) and the bulb is inserted terminally on the cymbium (Kraus, 1978, fig. 2; Platnick and Sedgwick, 1984, fig. 7). In mygalomorphs, two primary configurations are known. First, in the Mecicobothriidae, the bulb insertion undergoes a further modification from the mesothelid state: the embolus points distally and lies longitudinally in a plane parallel to the cymbium, much as in many araneomorphs (Gertsch and Platnick, 1979, figs. 45, 54, 61, 78). In the plesiomorphic microstigmatid genus *Micromygale,* the bulb insertion is terminal and the long axis of the bulb is almost continuous with that of the cymbium (Platnick and Forster, 1982, fig. 12). In *Aliatypus,* the most plesiomorphic antrodiaetid, and the atypids, the bulb insertion is presumed again to be terminal but the cymbium is so short as to be totally occupied by the bulb insertion (Coyle, 1971, fig. 324; Gertsch and Platnick, 1980, fig. 25). Second, in most taxa, the long axis of the bulb is orthogonally directed (with respect to the long axis of the cymbium) and inserted subterminally or more basally (e.g., *Pseudonemesia kochalkai* Raven and Platnick; Raven and Platnick, 1981, figs. 47, 48); distal of the bulb, the cymbium divides into two lobes (fig. 106). Parsimoniously, the terminal insertion of the Mesothelae is a plesiomorphic retention in the Atypidae, Mecicobothriidae, Antrodiaetidae, *Micromygale,* and also in a number of haplogyne araneomorphs. Thus, of the various conditions of the palp plus cymbium conformation, the orthogonal orientation and subterminal insertion found in all mygalomorphs, save the Atypidae, Antrodiaetidae, Mecicobothriidae, and some Microstigmatidae, are apomorphic.

SHAPE OF CYMBIUM: In plesiomorphic mygalomorphs, the cymbium is found in essentially two states. In the Hexathelidae, the tarsus is short and consists of two similar rounded lobes (Raven, 1978, fig. 52). In the Atypidae and Mecicobothriidae, the cymbium is usually spoon-shaped, acuminate and encloses the bulb (Gertsch and Platnick, 1979, 1980); those are presumed apomorphic modifications of the simple plesiomorphic shape. In the Antrodiaetidae, the tarsus is very short and hardly divided into terminal lobes. In most mygalomorphs, as in the Hexathelidae, each lobe is short and of similar shape to the other. In the Ischnothelinae and also in most Barychelidae, one lobe is greatly elongated and the other is greatly reduced and indistinct (Raven, 1983a, fig. 7; Benoit, 1966, fig. 24); however, unlike the otherwise similar mesothelid condition, the bulb is orthogonally aligned with respect to the cymbium. Similar indistinctly divided lobes is the condition most parsimoniously presumed plesiomorphic for most mygalomorphs and the dimorphic modifications are considered independent apomorphies in the Ischnothelinae and Barychelidae.

MAXILLAE

As in the Mesothelae, the palpal coxae or maxillae of mygalomorphs resemble leg coxae (fig. 10); in contrast, the maxillae of araneomorphs are strongly modified. The maxillae of most mygalomorphs are rectanguloid and the ventral surface is horizontal or slopes strongly downward (viewed from below) so that the anterior corner is lowest (e.g., fig. 34); the distal ectal corner, on which surface a serrula is sometimes found, is generally demarcated by a ventral ridge making an acute angle with the distal face of the maxillae (fig. 16). The distinctiveness of that ridge and the degree to which the anterior corner is extended define the "anterior lobe." That lobe is weakly defined in most mygalomorphs including the Rastelloidina (save for *Stasimopus, Aepycephalus,* and *Cteniza*), the Antrodiaetidae, Microstigmatidae, Hexathelidae, Dipluridae, Nemesiidae, and Barychelidae. In theraphosids, the lobe is a distinct conical process (see F. O. P.-Cambridge, 1896, fig. 10); in paratropidines, it is even longer (figs. 170, 178). In mecicobothriids, actinopodids, and aporoptychines the ventral surface of the maxilla is subquadrate and the anterior lobe, although broadly rounded, is quite distinct. Finally, in atypids, the maxillae are the most highly modified of any mygalomorphs. The ventral surface has rotated forward and is now the front face; that is indicated by the setation and presence of cuspules on that face and by the reduced setation of the new ventral surface (see Gertsch and Platnick, 1980, fig. 49). Also, the anterior lobe of the maxillae is greatly elongated, slender, and curves upward along the outer cheliceral face (Simon, 1892a, fig. 139). No such elongated condition occurs in any other mygalomorph group. However, a similar but less rotated condition does occur in a number of rastelloids. In some cases, that condition is simply an artifact of preservation; its natural occurrence, however, is indicated by the absence of a distinct posterior ventral edge on the maxillae—instead the edge is uniformly rounded, e.g., *Scalidognathus* (Idiopidae) and *Missulena* (Actinopodidae).

By outgroup comparison with the Mesothelae and by ontogeny (Yoshikura, 1958), I consider that the undeveloped lobe is plesiomorphic. The development of the lobes and the rotations are thereby apomorphic but the consideration of other characters allows the unequivocal rejection of the hypothesis that the various conditions form a transformation series, with the exception of the lobes in theraphosids and paratropidids.

THIRD CLAW

The absence of a third claw in mygalomorphs has long been considered sufficient evidence for the elevation of a family, e.g., the Pycnothelidae and Paratropididae. That is based upon the valid assumption, supported by ontogeny (Galiano, 1973a) and outgroup comparison with the Mesothelae, that a third claw is plesiomorphically present in spiders, and that its loss is apomorphic. A number of mygalomorph genera (*Aname, Hermacha, Stanwellia, Mygaloides, Pselligmus, Acanthogonatus, Rachias, Phlogiellus,* and *Heterothele*) include species in which a third claw is absent from one or more tarsi but is retained on at least one leg. In those cases where a third claw is present in the unequivocal sister group, the only parsimonious conclusion is that the third claw was lost independently within each genus. In the Paratropidinae, a third claw may be present or absent on all but the first (*Paratropis*) and second (*Anisaspoides*) tarsi but is always absent from the third and fourth. Therefore, in itself the absence of a third claw is no indication of relationship but only of relative apomorphy.

CLAW TUFTS

Claw tufts are here regarded as dense groups of hair arising from discrete pads between the outer faces of the claws and the cuticle of the lateral tarsus, to which the pads may be fused (see Raven, 1985, fig. 2a). In mygalomorphs, claw tufts occur in the Theraphosidae, Barychelidae, *Glabropelma,* new genus (Paratropididae), *Neodiplothele* (Nemesiidae) and "*Brachythele*" *incursa* Chamberlin (Cyrtaucheniidae). In the Paratropidinae, the cuticle adjacent to the claws often bears a line of four to six strong setae; those may represent the vestiges or precursor of scopulae or claw tufts in *Glabropelma.* However, they are generally absent in juveniles and are thus presumably a secondary development rather than a reduction. In several nemesiid genera (*Aname, Acanthogonatus,* and most Pycnothelinae), the tarsal scopulae are so distally extensive that the paired claws may be partially concealed. Presumably, such a condition influenced early authors to conclude that claw tufts were present and thus many genera were placed either in the Barychelidae (e.g., *Acanthogonatus, Androthelopsis, Diplothelopsis, Agersborgia* [=*Pycnothele*], *Chaco, Neostothis, Psalistopoides* [=*Pselligmus*]) or Theraphosidae (*Metriopelma auronitens* Keyserling [=*Pycnothele*]). However dense those extensions of the scopulae may be, they do not arise from the same surface as claw tufts and are considered to have originated independently. Claw tufts are later shown to be a synapomorphy for the Barychelidae and Theraphosidae plus Paratropididae with parallelisms in the Nemesiidae and Cyrtaucheniidae.

FOVEA

The fovea represents the attachment point of two groups of muscles—medially the fovea is the dorsal attachment point of the muscles of the sucking stomach; the lateral arms of the fovea and carapace anterior to it are joined by muscles to the lower angles of each chelicera. In the Mesothelae, the fovea is plesiomorphically an open, direction-free depression (some direction is evident in fig. 9). In some *Calommata* (Atypidae), the fovea is open but the anterior face is ventral, thereby imparting a transverse appearance (as is typical of the family). In the Antrodiaetidae, the fovea is pitlike to longitudinal; however, the pit is very small and steep-sided and in some species of *Aliatypus,* the pit is presumably completely closed and no fovea is evident (Coyle, 1971). The mecicobothriid fovea is also longitudinal although somewhat more closed than in the Antrodiaetidae and in *Microhexura* (Gertsch and Platnick, 1979). Similarly, the afoveolate condition characteristic of *Carrai* (Dipluridae) presumably arose independently through the closure of the pit. One other remarkable variation in the structure of the fovea appears in the theraphosid genera *Ceratogyrus* and *Sphaerobothria.* In those genera, the fovea is a raised mound or horn. However, in juvenile *Ceratogyrus,* the mound is much lower and almost flat. Griswold (*in litt.*) has associated that low mound in juvenile *Ceratogyrus* with the strongly procurved fovea of *Coelogenium*; the latter appears to be a precursor of the horn.

LABIOSTERNAL JUNCTION

A number of authors have awarded considerable phylogenetic importance to the nature of the labiosternal junction of mygalomorphs. Neither Ausserer (1871, 1875) nor Thorell (1869) used the character in their keys and Simon (1892a, p. 67) appears to have first introduced the character: "La pièce labiale est tantôt libre et mobile, tantôt immobile et intimement soudée au sternum, dont elle n'est distincte que par une striae suturale ou une légère dépression." Simon then used the state of the labiosternal junction to separate his Diplurinae ("*libera*") from his Miginae and Paratropidinae ("*immobilis*"). According to Simon (1892a), his Ctenizinae and Atypidae (the Mecicobothriidae and Antrodiaetidae as well as the Atypidae *sensu stricto*); and the Actinopodinae have only the immobile state. Because Simon (1903a) did not revise his key to families it is uncertain whether he continued to maintain faith in the value of the labiosternal junction. Subsequent authors (Comstock, 1913; Mello-Leitão, 1923; Petrunkevitch, 1923, 1928, 1933; Gertsch, 1949, 1979; Forster and Wilton, 1968; Levi, 1982) used it although Pocock (1897b, 1903c) notably did not.

What, then, is this character, and is it so consistent within monophyletic groups as to be informative? First, to correct any misconceptions that may have arisen, the labium is never "free" of the sternum. The two conditions—mobile and immobile—are based upon assumptions about the nature of the labiosternal junction. When there is a distinct groove it is generally termed mobile; immobile connotes the absence of the groove. However, the groove is always present in some form although its depth, width, and the degree to which sigilla are included may vary.

The groove arises through the attachment of a pair of muscles—the anterior pair of *suspensor centralis*—that are the anterior ventral extensions of the endosternite (Millot, 1949). In the Mesothelae, the labiosternal junction is obscured medially where the elevation of the sternum projects forward over a deep groove (fig. 10). In most mygalomorphs, the junction includes a distinct glabrous area. In some diplurid, theraphosid, nemesiid (fig. 94), and hexathelid genera, two separate oval areas with fine pitting similar to that of sigilla are evident within the groove. Often, however, those sigilloid areas are medially joined. Only in a few genera (e.g., actinopodids, *Neocteniza*, and some atypids and theraphosids) is the labiosternal junction indistinct or noticeably different from a simple transverse groove.

In the idiopids *Scalidognathus* (fig. 249) and *Neocteniza* (Platnick and Shadab, 1976, fig. 7), and some migids (*Migas, Heteromigas*) the anterior medial sternum bears a posteriorly directed V-shaped depression continuous with the labiosternal suture. In some theraphosids, the groove includes a pair of often rugose, keeled mounds. In other groups (e.g., Paratropidinae, figs. 175, 178), the sternum is much higher medially than laterally (but not so much as in the Mesothelae); the ridge so produced may continue onto the labiosternal suture, which is then transformed (medially at least) into a ridge. However, the condition is not comparable to that found in the Migidae although Simon (1892a) implied otherwise by naming both as immobile.

Contrary to many authors, the condition in most migids and all paratropidids (e.g., figs. 170, 178) is typical of that of many mygalomorphs—one or two sigilloid marks occupy the labiosternal suture. In some atypids (e.g., Gertsch and Platnick, 1980, figs. 33, 39) the attachment points of the most anterior suspensors are located on the sternum posterior to the groove or actually degenerate entirely (*loc. cit.*, fig. 43).

Similar conformations also occur in genera in which the sternal sigilla are large and medially confluent so that they form a medial depression almost or completely continuous with the labiosternal suture (e.g., *Atmetochilus*, Nemesiidae; fig. 59). In contrast, the anterior and medial sigilla of migids and the idiopid *Scalidognathus* (fig. 249) are small and marginal. Thus, two similar but not homologous conditions are recognizable. The groove may extend posteriorly or the anterior and medial sigilla may form a depression confluent anteriorly with the labiosternal suture. However, these conditions (although useful in identifying genera) are by no means of familial significance. Neither of the sister genera of *Atmetochilus* (*Damarchus*) or *Scalidognathus* (*Genysa*) have those degenerate or extensive conditions. Similarly, not all species of *Sphodros* have the posterior occurrence of the anterior labiosternal suture (see Gertsch and Platnick, 1980, figs. 22, 28).

Thus, a number of similar forms of labiosternal suture occur in the mygalomorphs. However, because those forms occur in distantly related taxa and frequently not in the sister groups of those taxa they cannot be assigned any wide phylogenetic significance. Therefore, the distinction between free and fused labia is very diffuse and inconsistent at most higher taxonomic levels; the terms are misleading and inaccurate.

BOTHRIAL STRUCTURE

Bothria (the collars around the trichobothria) show a number of basic types that are sufficiently consistent in taxa to be useful in estimating group relationships. The Mesothelae have two short crescentic opposed plates (Platnick and Gertsch, 1976, figs. 9, 11). The antrodiaetids, atypids, hexathelids, and mecicobothriids—all plesiomorphic groups—have a collarlike bothria that may have concentric ridges (Platnick and Gertsch, 1976, figs. 13–15, and new observ.). That condition is also found in the diplurid *Microhexura* (new observ.), Ischnothelinae (Raven, 1983b, pl. II, fig. 2), and *Microstigmata* and *Ministigmata* (Raven and Platnick, 1981, figs. 37, 38), whereas the other two microstigmatids, *Pseudonemesia* and *Micromygale,* have longitudinal ridges that resemble corrugations and are very deep in *Micromygale* (Raven and Platnick, 1981, figs. 39, 40; Platnick and Forster, 1982, fig. 9). That corrugiform condition is also found in the nemesiids (Raven, 1981c, figs. 59–64), some theraphosids, aporoptychine cyrtaucheniids (Raven, 1983b, pl. II, figs. 1–4), all diplurids, save *Microhexura* and the Ischnothelinae (Raven, 1983a, pl. I, fig. 1; Raven, 1983b, pl. II, figs. 1–4), and barychelids; Paratropidinae and some theraphosids have smooth collared, raised bothria (new observ.). Outgroup comparison with all plesiomorphic mygalomorph families indicates that the corrugiform bothria are synapomorphic for the Quadrithelina with reversals in some theraphosids, paratropidines, Ischnothelinae, and *Microhexura,* and with some parallelisms in the Migidae.

TRICHOBOTHRIAL PATTERNS

The distributions of trichobothria of all genera considered have been recorded for this study. Despite remarks by Lehtinen (1979, 1980), the contributions of those patterns to discerning the relationships of mygalomorphs is very small and generally confined to lower ranks. The plesiomorphic condition and that found in the Mesothelae and most mygalomorphs is not that indicated by Lehtinen (1980): a single subdistal trichobothrium on the metatarsi, two parallel rows on the tibiae, none on the tarsi or femora. Instead, on the tibiae, as shown by many authors (most recently by Emerit, Bonaric, and Raúl Gonzales Calderón, 1984), the trichobothria form two rows that each extend from the lateral face of the proximal tibia where the trichobothria are very small, closely set, and form an entally curving line that rises onto the dorsal face, thus closely approaching the other row. The entire length of both rows may be confined to the proximal one-third of the tibia or extend up to the full length of it. In the latter case, the distinction between the two rows distally is sometimes vague, and the rows may be considered to have merged. On the metatarsi, the trichobothria extend for the length of the segment in a line that may be slightly disordered. That line may be confined to the dorsal surface. However, in many groups it curves proximally onto the retrolateral surface. The distribution of trichobothria on the tarsi varies from being in a straight line to forming a broad disordered band that can appear to consist of five curving rows that diverge distally. Contrary to Lehtinen (1980), no femoral trichobothria occur in any known liphistiid or mygalomorph.

The preceding description is the generalized condition in mygalomorphs; only three variations on that theme are known. First, the antrodiaetids lack any trichobothria on the tarsi—a condition that Lehtinen (1980) extends to the atypids. However, Gertsch and Platnick (1980) mention a single row on the tarsi and although I have not seen a row, I have seen tarsal trichobothria in *Sphodros.* The atypid condition is one of very significant reduction and is considered the second exception. The third case is that of the Paratropidinae in which the tibial trichobothria form a small group located proximally, often in a saddle-like depression, and in *Anisaspis* are "protected" by a pair of spines (fig. 166). Similarly, the metatarsal and tarsal trichobothria are "protected" by a distally directed spine in *Anisaspis.* Apart from those exceptions, the distribution patterns of trichobothria in mygalomorphs are too homogeneous or incongruent with other characters to have special phylogenetic significance.

The overall form of the trichobothria varies from slender filiform to clavate. The fine structure of each of those types is quite variable (see Platnick and Gertsch, 1976, figs. 14, 16, 18; Murphy and Platnick, 1981, fig. 6; Raven, 1983b, pl. II, fig. 3). Murphy and Platnick (1981) pointed out that the clavate trichobothria of ctenizids do not resemble those of liphistiids; the same is also true of the clavate trichobothria of theraphosids and liphistiids. Moreover, clavate trichobothria are present on the tarsi of the paratropidid *Glabropelma,* some nemesiids, and most theraphosids and barychelids but are not present in any of the plesiomorphic mygalomorph families. Thus, they may be a further synapomorphy of the Theraphosoidina with some parallelisms in other families and reversal within the group. A comprehensive survey is needed before a hypothesis of the synapomorphy of such a character can be supported. At this point, only the clavate form of the trichobothria shows sufficient congruence with other characters to warrant further study.

TARSAL ORGAN

In the Mesothelae and mygalomorphs, tarsal organs occur in a number of conditions that have been extensively reviewed by Gertsch and Platnick (1979, 1980) and Forster (1980). In the Mesothelae, the tarsal organ is a raised, smooth dome (Gertsch and Platnick, 1979, figs. 11–14; Forster, 1980, fig. 1). In antrodiaetids, the organ is low, domed, and smooth (Gertsch and Platnick, 1979, figs. 5–10), and similarly in atypids, it is a "protruding lobe without series of concentric ridges occupying the entire surface, sometimes with small ridges encircling receptor area only" (Gertsch and Platnick, 1980, p. 9, figs. 7–12). In the dipluroid families, Gertsch and Platnick (1979), Forster (1980) and Raven (1981c) found that the plesiomorphic condition was that in the diplurid Masteriinae in which the receptors are exposed and, as in the mecicobothriids, nemesiids, and other diplurids, the central receptor area is surrounded by a series of concentric ridges (Gertsch and Platnick, 1979, figs. 17–32; Forster, 1980, fig. 4). However, the types of tarsal organ found in microstigmatids are variable. In the plesiomorphic genus *Micromygale,* the tarsal organ has deep concentric ridges (Platnick and Forster, 1982, fig. 7); in *Microstigmata* and *Ministigmata,* the organ is a raised shaft (Raven and Platnick, 1981, figs. 29, 30, 33, 34), much as in the Mesothelae but narrower, whereas in *Pseudonemesia,* "only the central (receptor) area of the organ protrudes high above the cuticle, and is surrounded by concentric ridges" (Raven and Platnick, 1981, p. 13, figs. 31, 32, 35, 36). The nemesiid *Ixamatus* and its sister genus *Xamiatus* have tarsal organs elevated even higher than the Mesothelae, but the correlation of that with other characters considered apomorphic indicates that the condition is an apomorphic reversal.

From preliminary surveys of other families, I can add the following. The idiopid *Hermeas* (=*Cantuaria*) has a slightly pitted low dome without concentric ridges (Forster, 1980, fig. 3); the theraphosid *Heterothele* and the cyrtaucheniid *Acontius* (=*Aporoptychus*) have a low dome with shallow concentric ridges (Raven, 1983b, pl. II, figs. 5, 6); the cyrtaucheniid *Kiama* has a broad, smooth, and slightly raised dome, and most of the nemesiid Anamini have a low dome with concentric ridges (Raven, 1981c, figs. 58–61); paratropidids have a smooth raised mound with no concentric ridges; the barychelid *Sason* and the migid *Migas* have a low centrally excavated mound with shallow concentric ridges.

There is no doubt that the protruding lobe lacking concentric ridges is correctly considered plesiomorphic by Gertsch and Platnick

(1979) and Forster (1980). However, the question of whether all similar apomorphic conditions are homologous cannot be so readily answered. Clearly, the conflicting distributions of a number of other characters eliminate the homology of the conditions in the Tuberculotae and Aporoptychini. Before the significance of the apomorphic state in the Tuberculotae can be fully assessed considerably more study of the tarsal organs of ctenizoid families is required.

INTERFAMILIAL RELATIONSHIPS

TUBERCULOTAE

I propose to discuss the synapomorphies at each point in the family cladogram (fig. 1, table 1) beginning at the terminal clades—the Theraphosoidea and the Migoidea—and progressing downward with the union of the sister groups to the successive clades. Unless otherwise indicated character numbers in the discussion of interfamilial relationships refer to table 1.

THERAPHOSOIDINA

Within the mygalomorphs, the Theraphosidae, *Glabropelma* (Paratropididae), the Barychelidae, one nemesiid, and one cyrtaucheniid genus share the presence of true claw tufts (character 19). Apart from the nemesiid and cyrtaucheniid, the presence of claw tufts is correlated with a number of characters. First, females of all theraphosids and barychelids have few or no teeth on the paired claws (character 21), the third claw is bare and reduced if not absent (characters 15, 16), the tarsal and metatarsal scopulae are well developed (character 17), the carapace is low and hirsute, and the eye tubercle is elevated (character 7). I recognize claw tufts as one synapomorphy (with parallelisms in the nemesiid and cyrtaucheniid) for the Theraphosidae, *Glabropelma,* and Barychelidae, constituting part of what hereafter shall be named the Theraphosoidina.

Second, males of many theraphosid and barychelid genera have a similar spur distally on tibia I (character 18). The spur is composed of two parts: the upper, lateral half is usually a short digitiform cuticular projection with a short modified spine below it; the lower and ventral half is a broad upcurved apophysis, usually with a modified spine dorsal to the spur (Gerschman and Schiapelli, 1973a, figs. 19, 25, 33, 42, 48, 60, 87; Schiapelli and Gerschman, 1979, figs. 4, 10, 19, 27, 34, 45). That basic spur type or a derivative of it occurs in every theraphosid and barychelid subfamily (Benoit, 1966, figs. 22, 26), and also in *Glabropelma* (fig. 17). The most parsimonious conclusion is that it was present in the group ancestor and has undergone varying modifications or losses in all groups. The alternative hypothesis, numerous acquisitions of a more or less identical and complex structure, is untenable. Other than the Theraphosoidina, only two other groups share comparable characters. The idiopid Arbanitinae have a similar spur (see Main, 1957, fig. 7) but their closer relationship to the Idiopidae is unequivocally supported by the homologous palpal bulb and a number of other characters (see discussion of intrafamilial relationships of idiopids), and *Spiroctenus* (Nemesiidae; fig. 161) has a similar spur shown below to be an autapomorphy for the genus.

Another character common in the Theraphosoidina is the densely clustered cuspules on the labium (character 23) which are present in the barychelid subfamily Trichopelmatinae, new subfamily and almost universally present in the Theraphosidae. Apart from those Theraphosoidina, the character is the autapomorphy of the Hexathelidae (Raven, 1980b), and is present in the Paratropididae and some species of the nemesiid *Spiroctenus.* To propose that the dense cuspules are the synapomorphy of the Theraphosidae plus either the Hexathelidae or *Spiroctenus* is not parsimonious; numerous homoplasies of other characters would be needed in the Barychelidae, Nemesiidae, and Hexathelidae. The relationships of the Paratropididae will be discussed more fully below. Suffice it to say here that they are almost as parsimoniously accommodated in the Ctenizoidina as they are as the sister group of the

TABLE 1

Mygalomorph Family Synapomorphies for Cladogram in Figure 1[a]

1. Anterior median spinnerets absent [present].
2. Anterior lateral spinnerets much smaller than posterior laterals [as large].
3. Basal segment of posterior laterals subsegmented [not or a collar].
4. Sternal sigilla present [absent].
5. Embolus fused to tegulum [free].
6. Thorax slopes [flat].
7. Eyes on a common tubercle [all eyes sessile on carapace].
8. Maxillary serrula present [absent].
9. Tarsal spines absent [present].
10. Labium short and wide [subquadrate].
11. Axis of palpal bulb orthogonal to axis of cymbium [axes parallel].
12. Cuspules present [absent].
13. Anterior lateral spinnerets absent [present].
14. Fovea transverse [pitlike].
15. Unpaired claw edentate [toothed].
16. Unpaired claw short, small [well developed, long].
17. Scopula present on tarsus I [absent].
18. Unique conformation of male tibial spur.
19. True claw tufts present [absent].
20. Maxillary serrula absent [present].
21. Teeth on paired claws of female few [numerous].
22. Anterior maxillary lobe produced [not produced].
23. Labial cuspules dense and numerous [few or absent].
24. Caput elevated [low].
25. Rastellum present [absent].
26. Legs I and II shorter and more slender than legs III and IV [all legs similar].
27. Spines confined to upper surfaces of legs III and IV [spines also ventrally].
28. Leg tarsi of females stout [slender].
29. Third haematodocha absent [present].
30. Dorsal abdominal tergite absent [present].
31. Fovea broad, procurved [pitlike].
32. Apical segment of posterior lateral spinnerets domed [digitiform].
33. Cheliceral furrow with teeth on both margins [only on promargin].
34. Tibiae, metatarsi, and tarsi I and II with numerous short, strong lateral spines [spines weak, few, or absent].
35. Eye group occupies about half of head width [one-third].
36. Palpal conductor present [absent].
37. Tarsal trichobothria few or absent [numerous].
38. Male leg tarsi pseudosegmented [integral].
39. Bothria corrugiform [collariform or platelike].

[a] Family autapomorphies given only on family cladograms. Plesiomorphic state in brackets.

Theraphosidae. Therefore, the form of the tibial spur and dense clustering of the labial cuspules are most likely apomorphic in the Theraphosoidina. Whether or not they are synapomorphic is discussed below.

CONTRAINDICATIONS: The very short spinnerets of most, and the rastellum of some, Barychelidae may seem to contraindicate the close relationship of that family with the Theraphosidae. However, in the Barychelidae, *Ammonius* has posterior lateral spinnerets (PLS) with a short digitiform apical segment, and *Thalerommata* and the Trichopelmatinae have a triangular state intermediate between that of the long digitiform theraphosid and the domed barycheline condition. Thus, the retention of the plesiomorphic tuberculote condition of the PLS in theraphosids and some barychelids prevents a falsification of their close relationship on that ground. Considered along with the hypothesis that a labium with densely clustered cuspules is apomorphic for the Theraphosoidina, the intermediate triangular state of the PLS can parsimoniously be seen as a modification of the theraphosid condition.

Several barychelid genera (e.g., *Barychelus, Idiophthalma,* some *Trittame*) have a rastellum but no other characters indicate that they form a monophyletic group. Moreover, only *Barychelus* has a well developed rastellum like that of the Rastelloidina. Also, a rastellum is present in the theraphosids *Euphrictus* (=*Zophopelma*; Benoit, 1965c). Parsimony indicates that a rastellum was acquired in several different groups; its distribution cannot contribute to a discussion of the relationships of the Barychelidae with other families because it is not plesiomorphic for the family.

Theraphosoid monophyly is challenged by a third character. In theraphosids, *Glabropelma* (fig. 16), *Stasimopus* (Ctenizidae), and especially in paratropidids (figs. 170, 178), the anterior lobe of each maxilla is produced into a distinct cone. Mecicobothriids also show some lobe enlargement (see Gertsch and Platnick, 1979, figs. 39, 52, 71) but the greatest development is in the atypids. A number of other characters allow the rejection of any hypothesis closely relating mecicobothriids or most other families with the atypids on the basis of a transformation series of the

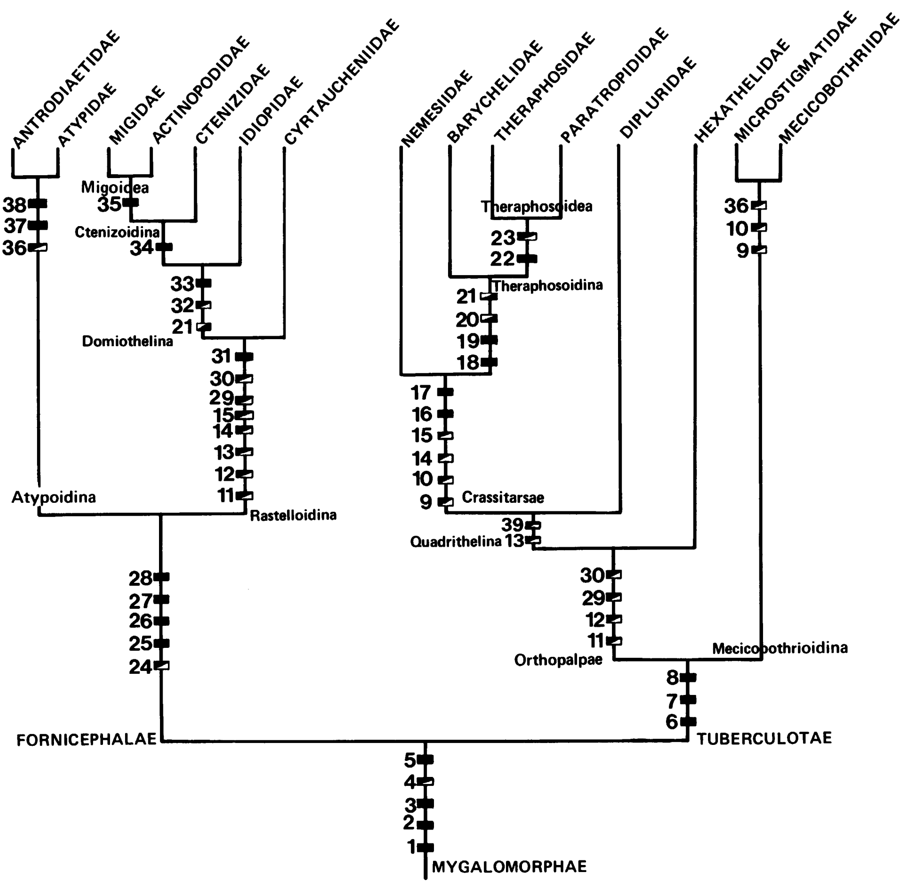


FIG. 1. Cladogram of mygalomorph family relationships. Numbers refer to characters in table 1 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies at the family level; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

maxillary lobe. Equally, the enlargement of the lobes cannot be used to support a monophyletic group apart from the theraphosids plus paratropidids (character 22). Notably, however, the lobes of the other theraphosoids (Barychelidae) are not conical and are hardly distinct. At this point, I must expand the discussion to clarify the relationships of the Paratropididae and *Glabropelma* because the analysis becomes more complex.

RELATIONSHIPS OF THE PARATROPIDIDAE

Table 2

The paratropidids are a small (three genera plus *Glabropelma,* transferred here) but very distinctive family that have been generally considered related to the Pycnothelidae because they lack a third claw or claw tufts. However paratropidid (*sensu stricto*) relationships are analyzed the family will always be characterized by a number of characters (table 2) that are apomorphic relative to their sister group but homoplasious in the total perspective. Some of those characters may indicate that paratropidids are closely related to one of at least two other groups—the Ctenizidae and the Theraphosoidina. By proposing short transformation series and reinterpreting apparently homologous states, I will minimize those apparent autapomorphies and any homoplasies, and maximize synapomorphies. At present, I lower the rank of the three paratropidid genera (*Paratropis, Anis-*

TABLE 2
Paratropidid Similarities, Most Plesiomorphic States for Group

	Nemesiidae	Barychelidae	Theraphosidae	*Glabropelma*	Paratropididae	Rastelloidina
1.	distinct	distinct	distinct	distinct	arched	absent*
2.	straight*	straight	straight	straight	procurved	procurved
3.	low*	low	low	low	low	arched
4.	bare	bare	bare	spinose	bare/spinose	spinose*
5.	present	absent	present	absent	pres./absent	present*
6.	weak	weak	distinct	distinct	conical	weak*
7.	few	many	many	many	many	few*
8.	many*	few	few	few	one	few
9.	absent	present	present	present	absent	absent*
10.	present	present	present	present	absent*	present
11.	smooth*	smooth	smooth	scaly	scaly	smooth
12.	absent*	weak	absent	absent	absent	present
13.	digitiform*	domed	digitiform	digitiform	digitiform	domed
14.	one*	one	one	one	two	two/one
15.	all*	all	all	all	all	upper

Characters: 1, eye tubercle; 2, fovea (straight denotes anything other than strongly procurved); 3, caput elevation; 4, anterior tarsi; 5, third claw on tarsi I and II; 6, anterior maxillary lobe; 7, labial cuspules; 8, dentition of paired claws of females; 9, true claw tufts; 10, scopulae on tarsi I and II of males; 11, leg cuticle; 12, rastellum; 13, apical segment of PLS; 14, number of cheliceral tooth rows; 15, occurrence of spines on third and fourth legs ("all" denotes that dorsal, lateral, and ventral surfaces are spinose; "upper" denotes that only the upper faces of the segments are spinose). Plesiomorphic states are indicated by an asterisk.

aspis, Anisaspoides) to a subfamily; I will show that their sister group is *Glabropelma.*

Seven paratropidine autapomorphies are recognized (table 2; including characters 1, 5, 6, 8, 11). The eye tubercle is uniquely very steep-sided compared with other mygalomorphs (fig. 169, table 2; character 1). The leg cuticle is very scaly and soil impregnated (table 2; character 11)—conditions approached only in *Glabropelma,* some microstigmatids, and to a lesser extent in *Ixamatus* (Raven and Platnick, 1981). The body and leg setation—large and isolated setae on raised mounds and with soil-encrusted tips—are also very unusual and found otherwise only in *Microstigmata* and *Glabropelma.* The tarsal organ is a smooth, raised dome. In most mygalomorphs, the tarsal organ is low with concentric ridges; however, in antrodiaetids and atypids, it is smooth and low (Gertsch and Platnick, 1979). In *Ixamatus,* and to a lesser extent in *Xamiatus,* the tarsal organ is a smooth and obliquely inclined rod (Raven, 1980a, figs. 11, 12; Raven, 1981c, fig. 62). In all paratropidines, a third claw is absent on tarsi III and IV, but may be present on tarsi I (*Paratropis*) and II (*Anisaspoides*), or absent on all legs (*Anisaspis*), as is also in *Glabropelma.* However, juveniles of all genera lack a third claw on all legs, thus indicating that the presence of a third claw is apomorphic in the paratropidines (i.e., a reversal). That condition—third claws absent on legs III and IV but present on I and/or II—is unique (character 5; see discussion above under Anterior–Posterior Gradations). The maxillary lobes that are noticeably elongate and conical in paratropidines (fig. 170, table 2; character 6) are less modified in the mecicobothriids, *Stasimopus* (Ctenizidae), *Glabropelma,* and the theraphosids, and to a far greater extent in atypids. Finally, the paired claws of males and females of paratropidines have a long single tooth (table 2; character 8). In theraphosids, barychelids, *Glabropelma,* and most ctenizids, the paired claws of females are either bare, have small serriform teeth, or have a number of irregularly shaped teeth, save the barychelids *Troglothele* and *Monodontium* that have biserially dentate paired claws.

Rastelloid affinities with paratropidines lie in three possible synapomorphies (table 2; characters 4, 13, 14)—the biserially dentate cheliceral teeth, the spinose tarsi, and the short PLS. And against those three characters are seven homoplasies (characters 1–3, 5–7, 12; table 2). However, careful examination of the dentition of paratropidine chelicerae indicates that, unlike the ctenizoid condition, in paratropidines the inner row of teeth is smaller than the outer; in some undescribed species the two rows converge and join, and the intermediate row of teeth is absent. Thus, the two rows are considered the result of the separation of the smaller teeth on the row with the larger teeth being retained on the outer margin. In contrast, ctenizoids have two rows of similarly large teeth plus a mesal row (lacking in paratropidines). Thus, although similar, the biserially dentate paratropidine chelicerae are not homologous with those in the Domiothelina. Juveniles of paratropidine species lack tarsal spines; thus, presumably that character too is not homologous with the spinose tarsi of Domiothelina. Finally, in most paratropidines the PLS are short; only in *Anisaspis* is the apical segment short and domed (fig. 168; as in the ctenizoids) rather than digitiform as in the Theraphosidae. Thus, the short spinnerets of the paratropidines and ctenizoids cannot be considered homologous.

On the other hand, closer affinities of the paratropidids with theraphosids is indicated by five synapomorphies (table 2; characters 1, 3, 5–7): a distinct eye tubercle (although not as high as in paratropidines); a low caput; the third claw reduced in size or absent; maxillary lobes distinctly conical (but not as much as in paratropidines); and dense maxillary and labial cuspules. A sister group relationship between theraphosids and paratropidines requires six homoplasies (table 2; characters 4, 5, 9, 10, 14 and one reversal in 5). A sister group relationship between paratropidines and *Glabropelma* converts one homoplasy (spinose tarsi) and a paratropidine autapomorphy (scaly cuticle) into two further synapomorphies.

Thus, the most parsimonious hypothesis is that *Glabropelma* is the sister group of the paratropidines; it is included here as a subfamily, and the Paratropididae are placed as the sister group of the Theraphosidae. Wherever Paratropidinae and Glabropelmatinae are placed, each group requires four steps for characters 4, 5, 11 (table 2) plus the reduction of tarsal scopulae. In this hypothesis, paratropidines must undergo three further changes: the loss of claw tufts and of scopulae and the reacquisition of a third claw on the anterior legs; and the Glabropelmatinae require the loss of the third claws also on legs I and II—a total of four steps. In contrast, the monophyly of paratropidines plus rastelloids requires minimally eight steps. If the Paratropidinae plus Glabropelmatinae are considered the sister group of the Barychelidae plus Theraphosidae then the gain of scopulae and claw tufts needs two steps (Glabropelmatinae and Barychelidae plus Theraphosidae; table 1; characters 17, 19) but in addition an extra step is needed for the maxillary lobe (character 22), absent in Barychelidae. Thus, the most parsimonious conclusion is that the paratropidids are the sister group of the Theraphosidae and the two families together are the sister group of the Barychelidae. Those three families are hereafter referred to as the Theraphosoidina, whereas the Theraphosidae plus Paratropididae constitute the Theraphosoidea.

SISTER GROUP OF THE THERAPHOSOIDINA

Of all the possible sister groups of the Theraphosoidina, two—the Nemesiidae or the Nemesiidae plus Dipluridae—are more parsimonious than any others.

NEMESIIDAE: The Theraphosoidina share a number of characters with the Nemesiidae (table 2). In both groups, the carapace is low and hirsute; plesiomorphically, the PLS are short (compared with diplurids) with a digitiform apical segment; the legs lack tarsal spines; the eyes are raised on a tubercle (character 7); the anterior lateral spinnerets are absent (character 13); and the third claw is bare, if present (characters 15, 16). In addition, some scopuliform hairs are present on the legs in both groups (character 17). Of those characters, only the aspinose leg tarsi, the bare third claw, and the leg scopulae may be considered synapomorphic for the two groups. The short spinnerets and eye tubercle are present in the Hexathelidae; and the anterior lateral spinnerets are absent in all Dipluridae. Teeth on the third claw and tarsal spines are absent also in the Diplurinae; however, they are present in both outgroups of the Diplurinae, the Ischnothelinae and Euagrinae plus Masteriinae, and were therefore plesiomorphically present in the family.

Another possible synapomorphy for the Nemesiidae plus Theraphosoidina is the acquisition of two rows of teeth on the paired claws. That hypothesis requires that the claw dentition was reduced in the females of most Theraphosoidina, but was retained in females of the barychelids *Troglothele* and *Monodontium* in males of both groups, and subsequently reduced in almost all male theraphosids and all paratropidids. That reversal hypothesis minimally requires two steps (in addition to the first already counted in the Nemesiidae). The alternative hypothesis requires a single reduction of dentition in both males and females of the Theraphosoidina and at least two acquisitions of biserial claw dentition in each family. That hypothesis minimally requires three steps and is falsified if those theraphosid taxa in which the paired claws of males are biserially dentate are found to be monophyletic or diphyletic. Until the first hypothesis is falsified I accept the second hypothesis—that biserially dentate claws were acquired once in the Nemesiidae with parallelisms in male and some female barychelids and *Ischnocolus.*

NEMESIIDAE PLUS DIPLURIDAE: For this alternative to be accepted the Nemesiidae must share more characters with the Dipluridae (five) than the Theraphosoidina (four). At best, the Nemesiidae and Dipluridae share the presence of multidentate paired claws and a serrula. I earlier (Character Analysis, Serrula) judged the occurrence of a serrula in only seven (of 78) theraphosid genera—*Ischnocolus, Harpactira, Heterothele, Cyriocosmus, Stromatopelma, Pterinochilus,* and *Brachionopus*—to be most parsimoniously considered absent in the Theraphosoidina. However, both the multidentate claws and a serrula are present in the plesiomorphic outgroups—Hexathelidae, Microstigmatidae, and Mecicobothriidae. No other known characters are uniquely shared by the Nemesiidae and Dipluridae. Therefore, the Nemesiidae are considered the sister group of the Theraphosoidina and these groups together constitute the Crassitarsae and share aspinose, scopulate leg tarsi, and an edentate third claw (characters 15–17).

SISTER GROUP OF THE CRASSITARSAE

The Crassitarsae (Nemesiidae plus Theraphosoidina) share two apomorphic characters with the Dipluridae—the absence of the anterior lateral spinnerets (character 13) that outgroup comparison and ontogeny indicate are plesiomorphically present, and corrugiform bothria (character 39). Corrugiform bothria are also found in two microstigmatid genera (*Pseudonemesia, Micromygale*; Raven and Platnick, 1981), the cyrtaucheniid *Acontius* (Raven, 1983b), the idiopid *Hermeas,* and possibly other rastelloid genera. Until it is shown otherwise, I consider that enough evidence exists to propose that corrugiform bothria are autapomorphic for the Quadrithelina. The other characters are shared also with the Hexathelidae and are therefore plesiomorphic in the Crassitarsae. Thus, based upon the present character analysis, the Dipluridae are the sister group of the Crassitarsae and together those groups constitute the Quadrithelina.

SISTER GROUP OF THE QUADRITHELINA

The Hexathelidae and Quadrithelina share two characters (table 1, characters 11, 12) that are apomorphic relative to other Tuberculotae. The other characters of the Hexathelidae shared either with the Mecicobothriidae and/or Microstigmatidae are either plesiomorphic or are shared also with the Quadrithelina. Outgroup comparison with the Mecicobothriidae, Microstigmatidae, Atypoidina (Atypidae plus Antrodiaetidae), and Mesothelae indicates that the paraxial insertion of the palpal bulb on the cymbium (character 11) of those groups is plesiomorphic. Thus, the Hexathelidae are the sister group of the Quadrithelina.

One other character of uncertain polarity is of interest in discussing hexathelid relationships but is not used in the cladogram. In all or most species of the Hexathelinae, Mecicobothriidae, Microstigmatidae, Diplurinae, Ischnothelinae, and some Euagrinae, the eye group occupies up to two-thirds of the head width (e.g., see Raven, 1978; less in some species) but is only about twice as wide as long. In the Mesothelae, the eye group is compact and occupies about one-third of the head width, as is also the case in the Atypoidina and most Theraphosidina and Rastelloidina. Ontogenetic studies of *Atypus* (Yoshikura, 1958), *Ummidia* (Yoshikura, 1972), *Ischnothele* (Holm, 1954; Galiano, 1972), and the theraphosids (Galiano, 1969, 1973a, 1973b) indicate that the wide eye group is a plesiomorphic character (presumably retained in many araneomorphs). That hypothesis is not inconsistent with the proposed relationships of the Tuberculotae but introduces a further synapomorphy for the Crassitarsae—the eye group is reduced to one-third (or less in many theraphosids; allometric growth may partially account for much smaller values). However, initially the plesiomorphic nature of the wide eye group seems to falsify Platnick and Shadab's (1976) hypothesis concerning the apomorphy of that character in the Migoidea (Migidae plus Actinopodidae; character 35). Because the rejection of their hypothesis would introduce several parallelisms (see Migoidea), I propose an alternative explanation—that the eye group of the Migoidea was secondarily widened from the compact state found in most Rastelloidina. Thus, the smaller eye groups of some Tuberculotae are attributed to parallelisms.

SISTER GROUP OF THE MICROSTIGMATIDAE

The Microstigmatidae plesiomorphically have six spinnerets, one row of teeth on the paired claws, a serrula (character 7), and an elevated eye tubercle (character 8)—all characters shared with the Hexathelidae and Mecicobothriidae. The dorsal abdominal shield in the plesiomorphic genus *Micromygale* is smooth and oval (Platnick and Forster, 1982) but is questionably homologous with the dorsal sclerites in the Mecicobothriidae. Also, the "conductor" in *Micromygale* is fused, as in some Hexathelidae but is a probable homolog of the mecicobothriid conductor. In that case, the Microstigmatidae would share the apomorphic absence of the third palpal haematodocha (character 29) with the Orthopalpae—Hexathelidae, Dipluridae, Nemesiidae plus Theraphosoidina—which may be their sister group. However, that would require the change of two further characters, the loss of the tarsal spines (character 9) and the lowering of the caput (character 6), which need to be proposed also for the Mecicobothriidae. (Hexathelidae have spinose leg tarsi and a more elevated caput than either the Mecicobothriidae or Microstigmatidae.)

An alternative hypothesis is that the form of the booklung apertures and possibly other characters in the Microstigmatidae are neotenic. That is supported by similar conditions in very juvenile paratropidids and barychelids. However, at present, there is insufficient evidence to favor that hypothesis. Therefore, it is more parsimonious to regard the Microstigmatidae and Mecicobothriidae as sister groups (together forming the Mecicobothrioidina), and those three "characters"—the aspinose tarsi, the palpal "conductor," and low caput (characters 6, 9, 36)—as apomorphic. Thus, the loss of the third haematodocha (character 29) is presumed to be a parallelism in the Microstigmatidae and other Orthopalpae.

TUBERCULOTAE AND RASTELLOIDINA PLUS ATYPOIDINA

The Tuberculotae (Orthopalpae plus Mecicobothrioidina) share several characters not present in plesiomorphic rastelloids or atypoids. First, the eye tubercle is elevated in most Tuberculotae (character 7), and absent in the Antrodiaetidae, Atypidae, and many rastelloids. However, in some Atypidae the anterior median eyes are set on a triangular projection but that too is considered a derivation from the sessile eyes of the Antrodiaetidae (fig. 180). In Tuberculotae in which the eye tubercle is absent, it is always more parsimonious to regard the loss of the tubercle as apomorphic rather than to consider it plesiomorphically absent. Accepting the latter would require the transfer of those genera far from sister groups with which they share unequivocal synapomorphies. (Otherwise, eyeless troglobites would be the most plesiomorphic in their groups rather than apomorphic species within each genus.) Reduction or loss of the eye tubercle occurs in the diplurids *Masteria* and *Euagrus* (see Gertsch, 1982) and in the barychelids *Ammonius* (Benoit, 1965c, p. 75) and *Sason* (Simon, 1892a, p. 129). In the Rastelloidina—Cyrtaucheniidae, Idiopidae, Ctenizidae, Actinopodidae, and Migidae—the eye tubercle is low or absent in most Cyrtaucheniidae (e.g., fig. 194) with the exception of *Homostola* (fig. 186), and some *Ancylotrypa* and Euctenizinae, new subfamily; in the idiopids Genysinae (fig. 241), several Australian Arbanitinae, and the Idiopinae (in which the eyes are not on a common tubercle, as in the Barychelinae with three eye rows); and in the Migidae, Actinopodidae, and the Ctenizidae (fig. 258), except the Pachylomerinae, *Latouchia,* and *Cyclocosmia.* The presence of a tubercle in otherwise atuberculate groups is regarded as an autapomorphy. The raised tubercle and the compact structure of the eye group in the Mesothelae (fig. 9) are similar to those in the Masteriinae and to a lesser extent in the Paratropididae (fig. 169). The homoplasies required to maintain that the mesothelid conformation is plesiomorphic for mygalomorphs are innumerable and the absence of a tubercle in plesiomorphic araneomorphs increases the number. Therefore, the compact eye group on a tubercle is regarded as a further autapomorphy for the Mesothelae. The plesiomorphic condition in mygalomorphs (and araneomorphs) is considered to be the absence of a tubercle.

A second character supporting the separation of the Rastelloidina and Tuberculotae is the elevation of the caput (character 24). In Atypoidina (fig. 180) and, with few exceptions, the Rastelloidina (figs. 253, 258), the caput is considerably more arched and the thoracic region flat and not so sloping as in the Mecicobothriidae, Microstigmatidae, or other Tuberculotae. Two exceptions exist in the hexathelids *Plesiothele* (fig. 13) and *Atrax,* in which the caput is raised to a similar extent to that in rastelloids. As with cases of rastelloids with a low caput—the Miginae and some arbanitine idiopids—considerations of parsimony indicate that reversals have occurred. In such cases, it is initially unclear which of the two cases is apomorphic but other characters in both groups are congruent with each state.

In the Rastelloidina, the fovea is generally broad, deep, and procurved (character 31; figs. 206, 254), and in the Tuberculotae and its sister groups, the eyes are raised on a common tubercle (character 7). Both conditions are presumably apomorphic. The plesiomorphic condition of the caput is presumably that intermediate state of the Mesothelae in which the caput is advanced and raised, although not to the same degree as in the Atypoidina and Rastelloidina.

Other characters have distributions that are congruent with the hypotheses of the Atypoidina plus Rastelloidina and the Tuberculotae. The Atypoidina and Rastelloidina are generally burrowers and most have anterior legs that are shorter and more slender than the posterior pair (character 6), the distal segments of the anterior legs are spinose (characters 9, 34; figs. 184, 255), a strong rastellum is generally present (character 25; figs. 181, 257), the PLS are short and the apical segment is plesiomorphically triangular or domed (character 32; fig. 259); and in the Rastelloidina, the fovea is broad, deep, and strongly procurved (character 31), and the paired claws of females have a reduced number of teeth (character 21).

Plesiomorphically, the Tuberculotae have long legs, the anterior legs are the least spinose, a rastellum is absent (with few exceptions), the PLS are long with a digitiform apical segment, the fovea is small, closed, and shallow, and the paired claws of females bear many long teeth. The Mecicobothriidae and more apomorphic families are predominantly builders of webs rather than burrows.

The Mesothelae serve as a poor outgroup either because they have retained characters far more plesiomorphic than in either the Fornicephalae or Tuberculotae or their characters are highly autapomorphic. In some cases, the Mesothelae possess a combination of the characters typical of both the Fornicephalae and Tuberculotae. However, whichever alternative of the two contrasting character conditions in the Fornicephalae or Tuberculotae is regarded as plesiomorphic, the other will be apomorphic. Nevertheless, the polarity of each character condition favored here needs some justification.

The Mesothelae and most rastelloids have numerous strong lateral spines on the anterior tarsi (character 9). In many rastelloids, those spines are modified and resemble short, conical thorns (fig. 255; character 34). Presumably, the "ancestral spiders" burrowed to some extent and spinose legs would probably assist that if not also door construction, as found in *Ummidia* (Coyle, 1981a). Thus, the spinose front legs of plesiomorphic hexathelids, atypids, and rastelloids are probably plesiomorphic. Thus, I propose that those spines were modified in burrowers and lost in web builders. In the development of diplurids, leg spines attain any strength only in juveniles and, like the rastellum, appear late in the ontogeny of rastelloids (*Ummidia,* Yoshikura, 1972). Thus, the presence of strong leg spines and a rastellum in rastelloids is presumably apomorphic (characters 34, 25).

Of the various conditions of the apical segment of the PLS, the short and triangular-tipped condition found in some rastelloids and atypoids (fig. 182) was earlier shown by parsimony and ontogenetic evidence to be plesiomorphic. Thus, both the elongate and domed forms are apomorphic.

The fovea in Mesothelae is open and narrow but shows little or no direction (fig. 9). That pitlike state is probably the most plesiomorphic. A similar condition does occur in some *Calommata* (Atypidae) and to a lesser extent in *Aliatypus* (Antrodiaetidae) but not in the Araneomorphae. In the ontogeny of mygalomorphs, the depression that forms the fovea is not evident until quite late when it is simply shallow and open. The open pitlike fovea of some hexathelids and diplurids is most similar to that in the Mesothelae. Thus, the broad, procurved fovea of the rastelloids is apomorphic (character 25), as is also the longitudinal fovea of some atypoids, all mecicobothriids, and *Microhexura.*

Mesothelid paired claws have few short teeth (Platnick and Sedgwick, 1984). Ontogeny cannot assist the finer determination of the polarity of claw dentition because the familial condition is evident only after the appearance of bare claws. However, Galiano (1973b, table 2) lists three theraphosid genera that, by the third postembryonic stage, have paired claws with long teeth that are absent in the adults. A row of long teeth occurs on the paired claws of male and female atypoids, males of many rastelloids, and males of plesiomorphic web building families; I regard that condition as plesiomorphic. In females, those teeth are absent or reduced in number and size in many rastelloid genera but are present in most Tuberculotae (character 21).

FORNICEPHALAE

The Fornicephalae include the Rastelloidina and Atypoidina. As with the discussion of the Tuberculotae, I begin the discussion of this clade at the terminal rastelloid group—the Migidae plus Actinopodidae. Within the Rastelloidina, I recognize five families: as well as the Actinopodidae and Migidae, I have separated the Cyrtaucheniidae and Idiopidae from the Ctenizidae. In many respects, the relationships I have proposed for those groups are similar to those of Simon (1903a) but the constitution of each group has been greatly changed.

MIGOIDEA

At a time when no informative hypotheses existed for rastelloids or any mygalomorphs, Platnick and Shadab (1976) proposed that the Actinopodidae (including *Actinopus, Missulena,* and *Neocteniza*) were the sister group of the Migidae because only those two families had the eyes spread widely across the carapace (character 35). Since then, Pablo Goloboff, of the Museo Argentino de Ciencias Naturale, Buenos Aires, has collected males of more species of *Neocteniza* from Argentina that give a broader perspective to the genus and its characters. I agree that wide eyes are synapomorphic for the Actinopodidae plus Migidae, to which I hereafter refer as the Migoidea, but the affinities of the genus *Neocteniza* require further discussion.

Through the kindness of Mr. Goloboff, I have examined the male of another species (only one was previously known) and a manuscript describing males of several new species that he is describing. Platnick and Shadab (1976) used only the wide eye group and sternal sigilla to support the sister group relationship of *Neocteniza* and the Actinopodidae but they added that the apical comb of spines on patella III was characteristic of the Actinopodidae (but not used in their cladogram) and on those grounds excluded the ctenizid *Stasimopus.*

The migids, actinopodids (hereafter restricted to *Actinopus* and *Missulena*), and *Neocteniza* share a number of characters. The first character used to support the monophyly of the actinopodids plus migids was the wide eye group but it requires qualification. In the most apomorphic state in those two families, the eye group occupies almost three-quarters of the head width, forms a very short wide group, and the eyes are very small (e.g., *Missulena*). The most plesiomorphic state in migids is presumably that in *Migas secundus* Wilton (Forster and Wilton, 1968, fig. 264) and in *Neocteniza,* that in one of Goloboff's new specimens in which the group is as little as 0.35 of the head width. However, in some migids (e.g., *Heteromigas*), and *Actinopus, Missulena,* and some *Neocteniza,* the eye group is also several times wider than long compared with the usual twice wider (as in most mygalomorphs). Thus, the wide eye group consists of two apomorphic characters—the group occupies about half of the head width and the group is three times wider than long or at least wider than twice its length. However, the rastelloid genera *Stasimopus* (Platnick and Shadab, 1976; Ctenizidae) and *Eucyrtops* (Main, 1957; Idiopidae) have the eyes similarly spread across the head. Also, in some Hexathelidae, the eye group occupies about half of the head width (Raven, 1978) but homologizing those conditions with the actinopodid one would introduce excessive homoplasy, especially since the character is not associated with the relatively wider group.

What then of the two rastelloid genera with a wide eye group? Although some species of *Stasimopus* do have the eyes widely spread, that is not true of at least one, *S. oculatus* Pocock, in which the eyes are in a tight group. (The polyphyly of *Stasimopus* is rejected by the shared presence of the distinct maxillary lobe and the combination of a number of other characters found only in *Stasimopus.*) Because of that and the tightly grouped condition being found in almost all rastelloids, the wide eyes in some species of *Stasimopus* and in *Eucyrtops* are presumed autapomorphic. That is further supported in the Idiopidae in which the possible sister groups of *Eucyrtops* all have closely grouped eyes.

Thus, the synapomorphy of the Migidae plus the Actinopodidae is that the eyes are plesiomorphically widely spread across the head but are about twice as wide as long. I concluded earlier (Sister Group of the Quadrithelina) that the eye group of plesiomorphic Tuberculotae was originally wide. If that was assumed true for all migids plus actinopodids seven additional parallelisms—domed apical PLS, spinose legs, loss of anterior lateral spinnerets, biserially dentate chelicerae, reduction of claw dentition (characters 32–34, 21), and three modifications (characters 5, 11, 29) of the male palp—would be required because that would place the actinopodids and migids lower on the cladogram (fig. 1) than the Atypidae (unless further "parallelisms" were accepted).

Second, the excavated sigilla of actinopodids (as opposed to the platelike sigilla of migids) were considered apomorphic and on those grounds *Neocteniza* was retained in the Actinopodidae. However, both forms of sigilla occur in ctenizid, migid, and actinopodid genera and excavated sigilla are the most common form in most mygalomorph families. Very shallow or platelike sigilla are also found in the nemesiid *Atmetochilus* (fig. 59), the atypid *Sphodros* (Gertsch and Platnick, 1980), and some euctenizine cyrtaucheniids. However, the outgroups of each of those groups have excavated sigilla. Therefore, it is more parsimonious to assume that in mygalomorphs, sternal sigilla are plesiomorphically excavated (sigilla are absent in the Mesothelae; fig. 10) and that shallow sigilla are the precursor to the absence of either the posterior (*Idiops*) or anterior pair, as in several migids.

The spine comb on patella III is present in the actinopodids, the migids *Thyropoeus, Paramigas, Micromesomma,* and of course in *Neocteniza.* It does not occur in the ctenizids *Cteniza, Latouchia, Cyrtocarenum, Cyclocosmia,* or the Pachylomerinae, nor does it occur in any cyrtaucheniids diagnosed here; however, it is found in the idiopid Genysinae. Thus, the spine comb is presumably apomorphic for the Migoidea with one parallelism in the Genysinae.

One character—the labiosternal suture medially extends posteriorly—does seem apomorphic solely for the actinopodids plus *Neocteniza.* In *Missulena,* I assume that the groove has progressed further back and also, as in *Atypus* and *Sphodros,* a fourth pair of small distinct sigilla is evident in the groove. A similar but not so pronounced condition does appear in *Heteromigas* but is not known in any other migids. If that condition was plesiomorphically present in the Migidae, *Neocteniza,* and other actinopodids, several losses would be required to explain its widespread absence in the Migidae. Thus, that posterior extension of the suture is considered apomorphic for *Neocteniza,* and *Missulena* plus *Actinopus*; and *Neocteniza* shares two possible synapomorphies with the Actinopodidae.

Neocteniza also shares some apomorphic characters solely with the migids. First, the migids *Migas, Heteromigas, Thyropoeus,* and *Poecilomigas,* and *Neocteniza* have three longitudinal rows of setae anterior to the fovea. The character does not occur in the Actinopodidae or any other rastelloids, at least in a distribution that falsifies its apomorphy in this hypothesis.

Second, in some species of both groups the fovea is tripartite (the posterior margin of the fovea is divided by a short but distinct longitudinal groove), and third in all species, it is also broad and recurved. Among the mygalomorphs, that tripartite state is unique in the migids plus *Neocteniza.* It is present in all migid subfamilies and is parsimoniously another autapomorphy of the group. However, the significance of its presence in *Neocteniza* in ambiguous. The tripartite fovea is present in only a nominal form in some of Goloboff's species of *Neocteniza.* Therefore, it may be either plesiomorphically present in *Neocteniza* and thus a synapomorphy with the migids, or it may have been plesiomorphically absent in *Neocteniza* and thus could not bear upon its relationship with the migids.

However, the broadly recurved fovea also occurs in the idiopid Genysinae (figs. 240, 250), the cyrtaucheniid *Fufius* (fig. 225), and the Nemesiini (figs. 79, 85). The condition in *Neocteniza* and that in the nemesiids cannot be considered homologous without introducing numerous homoplasies. However, a closer relationship of *Neocteniza* with the Genysinae is possible and will be briefly elaborated here (with a full discussion to be given in the idiopid intrafamilial discussion).

Three apomorphic characters of *Neocteniza* suggest that the affinities of the genus are with ctenizids or close relatives. The first of those characters is the absence of leg scopulae in females (character 17). Leg scopulae are present in Cyrtaucheniidae, most Idiopidae, and most Crassitarsae. Because neither the Mesothelae nor the Atypidae plus Antrodiaetidae have leg scopulae in females, the presence of scopulae is presumed apomorphic. Thus, the loss of scopulae would need to be proposed to include, in the same group, spiders that are scopulate and those that are not. Because that is unparsimonious *Neocteniza* seems more parsimoniously excluded from the Idiopidae and Cyrtaucheniidae.

The second character is the reduced dentition of the paired claws of females (character 21). That character is very evident in the Ctenizidae, Actinopodidae, *Neocteniza,* and the Migidae, and its more plesiomorphic condition—multidentate claws—is evident in the idiopids, cyrtaucheniids, Atypoidina, and plesiomorphic Tuberculotae. Thus, the synapomorphic nature of that character also supports a sister group relationship of *Neocteniza* with one of the ctenizoid subgroups.

The third character is the two strongly toothed rows on the cheliceral furrow (character 33), a characteristic of the ctenizoid families Ctenizidae, Actinopodidae, and Migidae, but present to a lesser extent in the Idiopidae and two cyrtaucheniids (*Homostola* and some species of *Eucteniza*). In most idiopids, the second (outer) row of teeth is noticeably smaller than the inner row; the exceptions (e.g., *Cataxia*) are considered autapomorphic because both of their outgroups have the weaker condition. In *Neocteniza* species examined by Platnick and Shadab (1976), the teeth of the second row are as strong as in the ctenizoid families. However, in the one male of Goloboff's that I have examined, the outer row is weak, as in most idiopids. Thus, it is not clear whether the weak condition is an apomorphic reduction or the strong condition is an apomorphic increase; the character is equivocal.

Two other characters of the migids, actinopodids, and *Neocteniza* require some explanation. First, all migids lack a rastellum (cf. character 25), whereas *Neocteniza, Actinopus, Missulena,* and all ctenizids have a strong rastellum. Does this then indicate that the Migidae are the sister group of all rastellate rastelloids? Three characters—the tripartite and recurved states of the fovea, and the three prefoveal rows of setae—could support the monophyly of *Neocteniza* and the Migidae. A further two characters in females—the reduction of teeth on the paired claws, the strong lateral spines on the distal segments of the anterior legs (characters 21, 34)—support the monophyly of the group including *Neocteniza,* the Migidae, Actinopodidae, and Ctenizidae. Thus, rejecting those relationships solely for the rastellum is very unparsimonious. The Cyrtaucheniidae are not considered in that analysis because they plesiomorphically lack a second row of teeth on the cheliceral furrow but those homoplasies increase further if the Cyrtaucheniidae are part of the sister group of the Migidae. Therefore, it appears that the absence of a rastellum in the Migidae is the result of a secondary loss and is an additional autapomorphy for the family.

The second character is the form of the palp of *Neocteniza* which is very unusual in mygalomorphs other than Atypidae, Antrodiaetidae, and Mecicobothriidae. Initial difficulty in understanding the structure of the bulb of *Neocteniza* was encountered when only *N. fantastica* Platnick and Shadab was known. However, from figures and the examination of palps of some of Goloboff's species of *Neocteniza,* a better understanding has emerged and it now appears that some of the very unusual aspects of the bulb of *N. fantastica* are autapomorphies of the genus that have been further modified. (In most mygalomorph genera, with a few notable exceptions, the variation in the form of the male palpal bulb of any one genus is limited and the knowledge of the genus is not grossly altered when more species are found.) In *Neocteniza,* as in most mygalomorphs, only two sclerites are present (character 5), but possibly the most important aspect of the bulb is that a third haematodocha is present. The embolus, although not surrounded by a haematodocha as in some *Atypus* species, is not fused to the second sclerite but is hinged. As I have indicated above, a hypothesis of monophyly between *Neocteniza* and the Atypidae is highly unparsimonious. Thus, the presence of a third haematodocha in *Neocteniza* is most parsimoniously considered autapomorphic. Although no other mygalomorph group but the atypoids and plesiomorphic Tuberculotae have a third haematodocha, the condition is approached in the Idiopidae.

Two equally parsimonious alternatives exist for the sister group of *Neocteniza* but neither is preferable. Including *Neocteniza* in either the Migidae or as the sister group of *Actinopus* plus *Missulena* requires a considerable broadening of the concepts of those groups. In the case of the Migidae, the rastellum would be present or absent, and the fangs would be keeled or smooth. With the Actinopodidae, the fovea would be recurved or procurved, and the labium and maxillae would be respectively long and subquadrate or short and rectangular. Therefore, I will examine a third but possibly somewhat less parsimonious alternative.

A third alternative relationship of *Neocteniza* is with the Idiopidae and is indicated by the presence of a distal haematodocha and an incrassate palpal tibia with thorn setae. At what expense can *Neocteniza* be included in the Idiopidae? Three characters—the wide eyes, the spinose anterior tarsi, and the reduced dentition of the paired claws (characters 35, 34, 14)—indicate that *Neocteniza* belongs to either the Migidae or Actinopodidae. One of Goloboff's *Neocteniza* species (eye group = 0.4 of head width) does not have the very wide eyes of other species (0.6–0.7). If that wide condition is apomorphic and *Neocteniza* is included within migids or actinopodids then a reversal (extra step) is required. Alternatively, if it is plesiomorphic, then the compact eye group is apomorphic and is only a parallelism in the Migidae plus Actinopodidae. Both alternatives are equally parsimonious but because I have opted to minimize reversals, I prefer the latter hypothesis.

Apart from the three palpal characters just mentioned, *Neocteniza* has some other similarities with the Genysinae. In the Genysinae, the fovea is broad and recurved (fig. 240); and in *Idiops, Genysa,* and *Scalidognathus* the third patella has an apical comb of spines similar to that in *Neocteniza* (Platnick and Shadab, 1976, figs. 9, 11). In one of Goloboff's *Neocteniza* species, the third haematodocha is separated from the second by a slender sclerotized zone; that condition is here considered homologous with that in idiopids (with the qualification that the base of the tegulum has fused in *Neocteniza,* whereas it is separated in most idiopids), as are also the incrassate palpal tibia of males and associated thornlike spines. Thus, inasmuch as minimally four steps are added by removing *Neocteniza* from the Migoidea, five (three palpal characters, plus the recurved fovea and spine comb on patella III) are accounted for by its inclusion in the Idiopidae. Thus, rather than place *Neocteniza* as the sister group of the Migidae (based upon the recurved fovea, the prefoveal row of setae, and possibly also the tripartite fovea, and thus necessitating either the widening of the concept of a well-defined monophyletic group or the creation of a new family for *Neocteniza*) I select the slightly less parsimonious alternative of including it in the idiopid Genysinae.

SISTER GROUP OF THE MIGOIDEA

As I have already indicated, the most parsimonious sister group of the Migoidea—the Migidae plus Actinopodidae—is the Ctenizidae. Males and females of both groups share the presence of strong teeth on both edges of the cheliceral furrow, and females share the presence of strong spines laterally on the distal segments of the anterior legs and of only one or few teeth on the paired claw (characters 34, 21). Three other rastelloid taxa—the Idiopinae, *Neocteniza,* and *Cataxia* (all Idiopidae)—closely approach that combination. The Cyrtaucheniidae lack strong spines on the anterior legs and the row of teeth on the retrolateral margin of the cheliceral furrow. The presence of spines laterally on the anterior tarsi is later (Idiopid Monophyly) explained in two ways with equal parsimony. The spines may have been plesiomorphically present in the Idiopidae with secondary losses in the Genysinae and most Arbanitinae. Alternatively, they may have been plesiomorphically absent in the Idiopidae and their presence in the Idiopinae, *Neocteniza,* plus *Cataxia* may be independent apomorphies. Outgroup comparison and the congruence of other synapomorphies in both groups supports the former hypothesis. Thus, the Idiopidae and Ctenizidae share two possible synapomorphies: the reduction of teeth on the paired claws, and teeth on the retromargin of the cheliceral furrow (characters 21, 33). Parsimony indicates that the absence of a retrorow of teeth in some idiopids is a reversal. In comparison, the Migoidea share a third synapomorphy with the Ctenizidae—the strong lateral spines on the anterior legs (character 34). Therefore, the Ctenizidae are the sister group of the Migoidea and together constitute the Ctenizoidina.

SISTER GROUP OF THE CTENIZOIDINA

Similarly, the Idiopidae are the sister group of the Ctenizoidina, including the Ctenizidae, Actinopodidae, and Migidae, which together constitute the Domiothelina because they share the domed apical segment of the posterior lateral spinnerets, the first stage in the reduction of claw dentition, and the presence of an outer row of the teeth on the cheliceral margin. The plesiomorphic state of the apical segment of the posterior lateral spinnerets has already (in Character Analysis) been shown to be the digitiform state; thus the domed condition (character 32) is presumed apomorphic with parallelisms in microstigmatids and some cyrtaucheniids and Crassitarsae. The teeth on the paired claws of idiopids, although numerous (especially in males), show a differential reduction (character 21) of the proximal and distal teeth, a condition proceeding further in the Ctenizoidina. The idiopid condition is considered the first stage in a synapomorphic reduction with a parallelism in the Crassitarsae. Similarly, the outer row of teeth on the cheliceral furrow of idiopids, although often not as strong as in ctenizids, is at least differentiated and separated sufficiently to allow the recognition of a third (intermediate row). In most Idiopinae and some Arbanitinae, the transformation to the ctenizoid condition is complete. Thus, a second row of teeth (character 33) is apomorphically present also.

SISTER GROUP OF THE DOMIOTHELINA

Because no other group shares with those rastelloid families the elevated caput (character 24), a broad, deep, and procurved fovea (character 31), and a rastellum (character 25), the Cyrtaucheniidae are presumed the sister group of the Domiothelina. However, only two characters—the broad, deep, and procurved fovea and the presence of maxillary cuspules—are synapomorphic for the Cyrtaucheniidae plus Domiothelina. The fornicephaline fovea is either wider, more strongly procurved, or deeper than any in the Tuberculotae, save possibly in the bemmerine nemesiids (which would introduce several homoplasies and thus may be excluded from any further consideration). Hence, the possibility of a closer relationship of the Cyrtaucheniidae and Nemesiidae requires discussion.

A CLASSIFICATION OF THE MYGALOMORPHAE

- Microorder Tuberculotae, new
  - Gigapicoorder Mecicobothrioidina, new
    - Mecicobothriidae
    - Microstigmatidae
  - Gigapicoorder Orthopalpae, new
    - Megapicoorder Hexatheloidina, new
      - Hexathelidae
    - Megapicoorder Quadrithelina, new
      - Hyperpicoorder Dipluroida, new rank
        - Dipluridae
      - Hyperpicoorder Crassitarsae, new
        - Micropicoorder Nemesioida, new
          - Nemesiidae
        - Micropicoorder Theraphosoidina, new
          - Superfamily Theraphosoidea
            - Theraphosidae
            - Paratropididae
          - Superfamily Barycheloidea, new
            - Barychelidae
- Microorder Fornicephalae, new
  - Gigapicoorder Atypoidina, new rank
    - Atypidae
    - Antrodiaetidae
  - Gigapicoorder Rastelloidina, new
    - Megapicoorder Cyrtaucheniina, new
      - Cyrtaucheniidae
    - Megapicoorder Domiothelina, new
      - Hyperpicoorder Idiopina, new
        - Idiopidae
      - Hyperpicoorder Ctenizoidina, new rank
        - Superfamily Ctenizoidea
          - Ctenizidae
        - Superfamily Migoidea, new
          - Migidae
          - Actinopodidae

ALTERNATIVE SISTER GROUP OF THE CYRTAUCHENIIDAE: Many cyrtaucheniid genera share a number of characters with the Nemesiidae. All Cyrtaucheniidae except the Euctenizinae have broad, biserially dentate paired claws. The anterior tarsi of most Aporoptychinae are scopulate or lack spines; and three aporoptychine genera (*Bolostromoides, Bolostromus, Fufius*) are serrulate. At least two cyrtaucheniine genera (*Ancylotrypa, Homostola*) have the eyes on a tubercle. All of those characters are present in the Nemesiidae. However, the eye tubercle and serrula are plesiomorphically absent in the Cyrtaucheniidae. Similarly, it is less parsimonious to propose the plesiomorphic presence of biserially dentate claws in the Cyrtaucheniidae with a loss in the Euctenizinae, than to propose one acquisition in the Cyrtaucheniinae plus Aporoptychinae. Thus, possible synapomorphies of the Cyrtaucheniidae plus Nemesiidae are reduced to two, the anterior tarsi of females are aspinose and scopulate (characters 9, 17). However, the Cyrtaucheniidae share five less equivocal characters with the rastelloid families (characters 24–27, 31). Because the hypothesis of their possible monophyly with the Nemesiidae requires a reversal, the lowering of the eye tubercle, and a substantial increase in rastellum development (further reducing parsimony), it is rejected in favor of the monophyly of the Domiothelina. A further character, the maxillary cuspules (see Mygalomorph Monophyly), can be considered synapomorphic for the Domiothelina with a parallelism in the Orthopalpae. Equally, the loss of the anterior lateral spinnerets and abdominal tergites along with the orthogonal insertion of the palpal bulb are synapomorphies (characters 13, 30, 11) with parallelisms in the Tuberculotae. Corrugiform bothria (character 39)—synapomorphic for the Quadrithelina—are known only in *Acontius* (see Raven, 1984b) but the corrugations are far less extensive and are shallower than in the Quadrithelina and thus can hardly be considered homologous. The distribution of corrugiform bothria in the Fornicephalae remains to be determined; they are certainly absent in the Atypoidina.

As with that of Platnick (1977), this classification is only one of those possible and consistent with the cladogram (fig. 1) and no previous classification approaches it. The equivalent ranking of sister groups follows that implicit in Hennig's (1966) method of classification. Equally, although the classification itself can be ignored, the structure of the cladogram is very "sensitive" to changes at all ranks and only by interacting with all the hypotheses embodied in the cladogram can it be changed and maximum parsimony be maintained.

INTRAFAMILIAL RELATIONSHIPS

TUBERCULOTAE

THERAPHOSIDAE

Figure 2; table 3

THERAPHOSID MONOPHYLY: The well-developed claw tufts and leg scopulae, in combination, are considered the autapomorphies, in association with the distinct maxillary lobes (shared also with the Paratropididae). Apart from the Ischnocolinae, the Theraphosidae have well-developed scopulae on all tarsi (character 1). That character, plesiomorphically absent in the Theraphosoidina, is considered a synapomorphy for the theraphosids with a parallelism in the Barychelidae. Apart from that, no character unique to the Theraphosidae is known. However, most theraphosids have particularly reduced spination of legs III and IV, which in barychelids are as spinose as in nemesiids and diplurids. The character requires further investigation and definition before it can be asserted to be apomorphic.

THERAPHOSID INTRARELATIONSHIPS: Within the Theraphosidae, several well-defined groups are evident. All the Ornithoctoninae, Thrigmopoeinae, Selenocosmiinae, and Eumenophorinae have unique systems of stridulatory lyrae. In the first three subfamilies, the lyra lies between the maxillae and chelicerae (character 5); in the Ornithoctoninae and Thrigmopoeinae, the strikers are on the maxillae and the paddles on the posterior basal chelicerae (character 6; Pocock, 1895a, 1895b, 1900c); in the Selenocosmiinae, the strikers are on the chelicerae and clavate setae, pegs, or paddles are on the prolateral maxillae (Pocock, 1895b). Those ornithoctonine, thrigmopoeine, and selenocosmiine conditions were considered a single transformation series by Gravely (1915a). However, the two conditions were likely derived from a common ancestral condition that was not so modified as in each subfamily. In the Eumenophorinae, the lyrae are located between the coxae of the palp and leg I, and between the coxae of legs I and II (character 12); the retrodistal surface of the coxae of the palp and leg I bear a distinct vertical column of long strong setae oriented horizontally and pointed ectally; on the opposing (prolateral) faces of the coxae of the first and second legs are a number of small, and one or two large, paddle-shaped setae on the dorsal edge. Those modified setae are accompanied by dense scopulate pads both on the coxae and the trochanters.

All other groups are recognizable by their unique character combinations. The Harpactirinae have a wide clypeus and, like the Ornithoctoninae, have a distinct scopula on the outer chelicerae (character 8; Pocock, 1897b); the Theraphosinae have a modified palpal bulb bearing ridges or keels (character 15), and the basal sclerite extends down the bulb (character 15) to a greater extent than usual for theraphosids (see Schiapelli and Gerschman, 1979); the Aviculariinae have broader tarsi than metatarsi (character 17), their legs are generally aspinose, and males have a spinose mound between the lobes of the palpal tarsi (character 18). Because *Euphrictus, Annandaliella,* and *Selenogyrus* have clavate setae in the same position on the selenocosmiine *Coremiocnemis,* they may be considered to be plesiomorphic Selenocosmiinae that have not acquired the lyra. That would indicate also that they are presumably the sister group of the Selenocosmiinae and Thrigmopoeinae, plus Ornithoctoninae and

TABLE 3
Theraphosid Synapomorphies for Cladogram in Figure 2[a]

1. Leg scopulae present on legs I to IV [only on legs I and II].
2. Dense scopulae present on all tarsi [only on tarsi I–III].
3. Third claw absent [present].
4. Labiosternal suture with two distinct mounds [depressed groove].
5. Lyra present between maxillae and chelicerae [absent].
6. Strikers on maxillae [pegs on maxillae].
7. Unique conformation of maxillary strikers [disordered].
8. Scopula on outer chelicerae present [absent].
9. Basal outer chelicerae with large paddlelike setae [setae normal].
10. Maxillary pegs claviform [thornlike].
11. Palpal femur with retrolateral scopula [setation normal].
12. Lyra situated between coxae of palp and leg I, and/or of legs I and II [lyra absent].
13. Clypeus wide [absent].
14. Subtegulum large, extensive [small, normal].
15. Palpal bulb with keels or ridges [bulb smooth].
16. Retrolateral femur IV with scopula [setation like other femora].
17. Tarsi broader than metatarsi [equal or more slender].
18. Cymbial lobes separated by spinose mound [mound absent or aspinose].
19. Paired claws of males biserially dentate [bare].

[a] Plesiomorphic state in brackets.

that a further synapomorphy of the latter two subfamilies is the loss of those clavate setae. I have no further evidence by which to support or reject that hypothesis and tentatively include the three genera in the Selenocosmiinae. The remaining taxa, the "Ischnocolinae" including *Heterothele,* appear to lack a synapomorphy and probably form a paraphyletic assemblage that shares only weakly developed scopulae on the tarsi and the almost complete loss of a third claw, neither of which is justifiably apomorphic. (The ischnocolinid genus *Heterothele* has three claws on all legs and a serrula [Raven, 1983b].) Revisions of some ischnocoline genera are needed before they can be grouped into monophyletic units.

Relationships between most theraphosid subfamilies are readily recognizable by at least one unique character. The Thrigmopoeinae plus Ornithoctoninae, which share the presence of strikers on the maxillae (character 6), are the sister group of the Selenocosmiinae by virtue of the shared presence of the cheliceral-maxillary lyrae (character 5). The Eumenophorinae, *Heteroscodra, Stromatopelma,* and most genera of the Thrigmopoeinae, Ornithoctoninae, and Selenocosmiinae have a uniquely modified labiosternal junction: instead of being a shallow or hardly defined "groove," as in most mygalomorphs, the "groove" is inverted so that two distinct narrow mounds with several peaks or teeth are present (character 4). The mounds are best developed in *Haploclastus,* in which they are bicuspidate, but the mounds are not present in *Phlogiellus, Haploclastus, Lyrognathus,* or some *Selenocosmia* species. Nevertheless, I maintain that it is more parsimonious to consider the character plesiomorphically present in the Thrigmopoeinae, Ornithoctoninae, Selenocosmiinae, and Eumenophorinae plus *Stromatopelma* and *Heteroscodra,* with secondary losses in the above selenocosmiine genera. Because *Stromatopelma* and *Heteroscodra* lack both a lyra and eumenophorine paddles, I can leave them only in a trichotomy (fig. 2).

The sole apomorphic character in the remaining four groups, save for the "Ischnocolinae," is the absence of a third tarsal claw (character 3) and the presence of dense scopulae on all tarsi (character 2), rather than only on tarsi I–III. The third claw is presumed to have been plesiomorphically present in the Selenocosmiinae because it is present in *Phlogiellus* and *Selenocosmia.* However, no other apomorphic character is shared by the remaining Selenocosmiinae. If the third claw was present in the Theraphosidae, a hypothesis of its independent loss would minimally require six losses—one each in the Eumenophorinae, Thrigmopoeinae plus Ornithoctoninae, *Stromatopelma* plus *Heteroscodra,* and three times in the Selenocosmiinae.

PARATROPIDIDAE

PARATROPIDID MONOPHYLY: There are four paratropidid autapomorphies: the scaly cuticle, the claw tufts are thin and weak if pres-

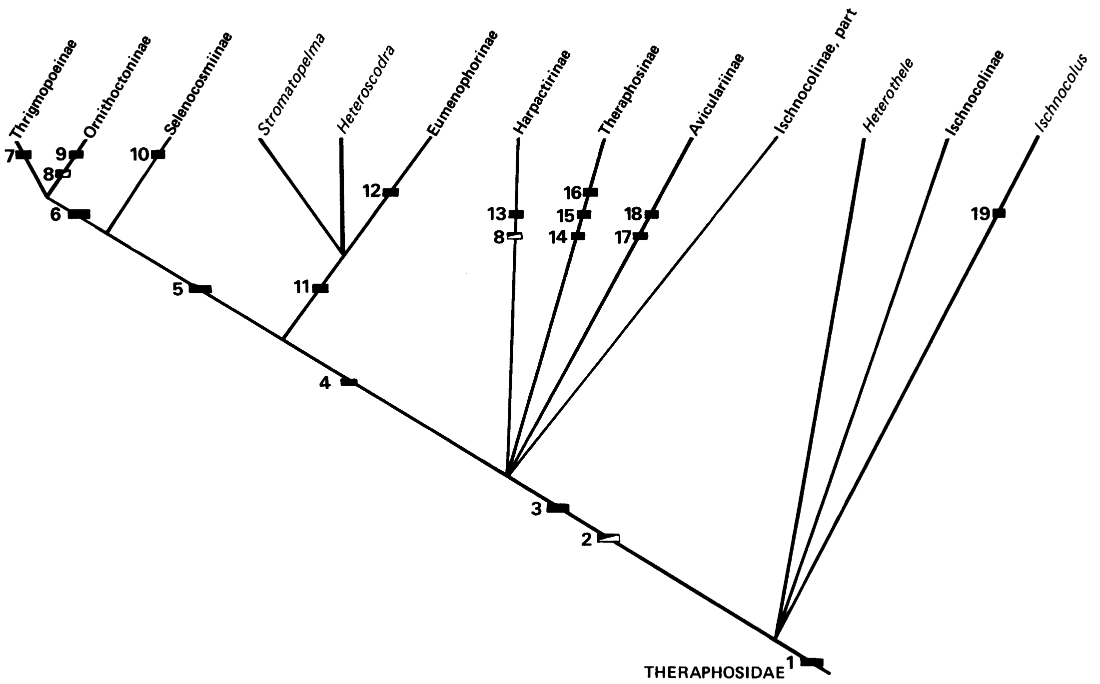


FIG. 2. Cladogram of theraphosid subfamilies. Numbers refer to characters in table 3 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

ent; the unpaired claw is plesiomorphically absent on legs III and IV; and the cuticle of the legs is clad only in strong setae and lacking fine hairs present in other Theraphosoidina. As I have shown earlier (Interfamilial Relationships), only the scaly cuticle is not found in other Theraphosoidina but is found in microstigmatids and ixamatine nemesiids. Claw tufts are well developed in other Theraphosoidina and presumed to have been reduced partially in *Glabropelma* and completely in the Paratropidinae; no other hypothesis is as parsimonious. Although paratropidids are considered to have lost the third claw on all four pairs of legs, its presence on legs I and/or II in *Paratropis* and *Anisaspoides* may appear to falsify that hypothesis. I have already shown (Character Analysis, Third Claw) those exceptions to be probable reversals.

PARATROPIDID INTRARELATIONSHIPS: Paratropidids form two well-defined groups. In the Paratropidinae, claw tufts are either absent or they have been reduced to a linear series of setae near the claws; the eye tubercle is elevated higher and more steeply than in any other mygalomorph group; the cheliceral furrow has two rows of teeth (that sometimes converge into one); the dentition of the paired claw is reduced to a moderately long single tooth in males and females; the anterior lobe of each maxilla is produced into an elongate cone; the sternum is short, wide, and almost round; the legs are entirely ascopulate; males of most species have no tibial spur; and the entire cuticle is soil-encrusted. In contrast, their sister group, the Glabropelmatinae, have weak but distinct claw tufts, thin scopulae on tarsi I and none elsewhere, and otherwise (apart from the scaly cuticle) have retained characters shared with the theraphosids. The reduced number of spinnerets in *Anisaspis* is also found in other paratropidines and does not, in itself, warrant generic status. However, the combination of the domed apical segment of the PLS of *Anisaspis* and the presence of a third claw in *Paratropis* and *Anisaspoides* indicates that *Anisaspis* is the sister group of other known Paratropidinae.

TABLE 4
Barychelid Synapomorphies for Cladogram in Figure 3[a]

1. Unpaired claw absent [present].
2. Paired claws of males biserially dentate [monoserially dentate or bare].
3. Labium much wider than long [subquadrate].
4. Labial cuspules few or absent [numerous].
5. Apical segment of posterior lateral spinnerets domed [digitiform].
6. All eyes save ALE moved back [eyes in one group].
7. Eye group longer than wide [subquadrate].
8. Eye group much wider than long [subquadrate].
9. Eye tubercle very low or absent [present].
10. Paired claws of male edentate [biserially dentate].
11. Clypeus present [clypeus absent].
12. Cuspules form a straight line on anterior edge of labium [cuspules disordered or absent].
13. Maxillary heel produced [rounded].

[a] Plesiomorphic state in brackets.

BARYCHELIDAE
Figure 3; table 4

BARYCHELID MONOPHYLY: Three characters—the absence of a third claw, biserially dentate paired claws in males, well-developed scopulae on tarsi I and II—support the monophyly of the Barychelidae. First, the third claw is absent in all genera (character 1). In contrast, in plesiomorphic Theraphosidae a third claw is present on the fourth and sometimes on more anterior legs. Also, because a third claw is present in the outgroups—the Nemesiidae and Dipluridae—its absence is presumed apomorphic. The number of theraphosid genera that have three claws (see Character Analysis, Third Claw) makes a hypothesis of original loss in the Theraphosoidina less parsimonious than independent losses (parallelisms) in the Barychelidae and Paratropididae.

The second barychelid autapomorphy, the biserially dentate paired claws of males (character 2), occurs in all genera of the Barychelinae and Trichopelmatinae but not in the Sasoninae. Female barychelids, save *Troglothele* and *Monodontium* which have biserially dentate paired claws, either lack teeth on the paired tarsal claws or have one row on the medial keel or a lateral face of the claw. In contrast, in only the theraphosid *Ischnocolus* does the condition (biserial claw dentition in males and few or no teeth on claws of females) occur outside the Barychelidae. The hypothesis that the biserial dentition of the claws is independently acquired in most barycheline genera is falsified by the autapomorphies of each of those genera in which some species lack teeth on the claws; such a hypothesis would require the separation of otherwise closely related species. Thus, the biserial dentition of the paired claws of male barychelids is considered an autapomorphy of the barychelids, with one parallelism in the theraphosid *Ischnocolus*. At present, the similar condition in females of *Monodontium* and *Troglothele* can only be considered their autapomorphies.

A possible third autapomorphy (not used in the cladogram of the barychelids) is the well-developed tarsal scopulae. All barychelids have scopulae on the tarsi and metatarsi I and II; in contrast, all save the plesiomorphic theraphosids ("Ischnocolinae") have well-developed scopulae on those legs. The "Ischnocolinae" are traditionally characterized by the presence of a band of setae dividing the scopulae on the tarsi of the anterior legs, but the scopulae are also very thin to absent on the third and fourth tarsi. That condition is even more evident in the serrulate theraphosid *Heterothele* (see Raven, 1983b). In the Paratropididae, the legs of Paratropidinae are entirely ascopulate, whereas those of their sister group *Glabropelma* have a very weak or thin scopulae on tarsi I and it is even thinner on tarsi II (tarsi III and IV are entirely ascopulate).

Two alternative hypotheses can explain such a distribution. First, the Theraphosoidina could have acquired well-developed scopulae on legs I and II that became reduced partially in *Glabropelma* and some theraphosids, and totally in the Paratropidinae. That hypothesis would require only the minimum of five steps if all of the weakly scopulate theraphosids were found to be a monophyletic group for which the reduction of scopulae was found to be synapomorphic.

The second alternative is that the plesiomorphic state of the scopulae in Theraphosoidina is similar to that in the plesiomorphic Nemesiidae or *Glabropelma*—weak scopulae on tarsi and metatarsi I and II. From that condition, the well-developed scopulae of the

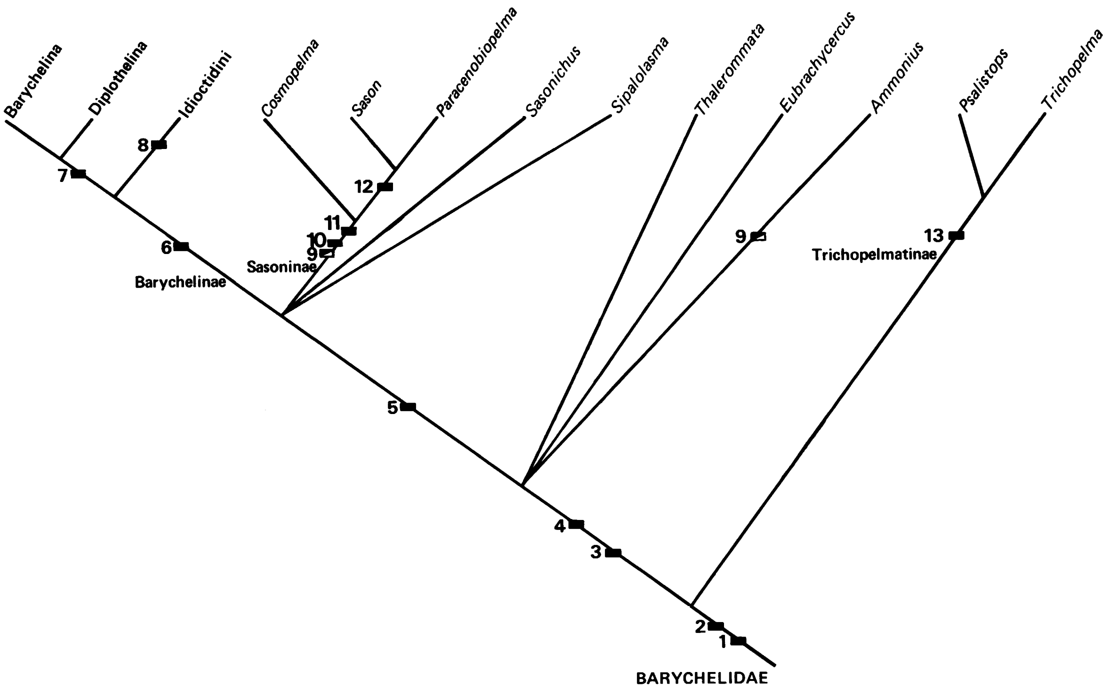


FIG. 3. Cladogram of barychelid relationships. Numbers refer to characters in table 4 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

barychelids and most theraphosids would need to be considered parallelisms. The second alternative requires only four steps (one gain of weak scopulae in the Crassitarsae, followed by two parallelisms of thick scopulae and one reduction in the Paratropidinae), and reduces the number of reversals and, as seen above (Theraphosid Intrarelationships), gains support from other character distributions. Therefore, the second alternative is accepted and the greater development of scopulae on the anterior legs is considered another barychelid autapomorphy, albeit a parallelism.

BARYCHELID INTRARELATIONSHIPS: The determination of which groups are monophyletic within the Barychelidae raises a number of problems in the interpretation of the polarity of the clypeus. A distinct clypeus (character 11)—a space between the front eye row and the carapace margin—is present in *Paracenobiopelma* and *Cosmopelma.* Those two genera form part of the Sasoninae (*Sason* being the rest). However, the long eye group of the Barychelinae could be interpreted as including an incipient clypeus (character 6); but that is not how I regard it. Outgroup comparison with the Theraphosidae, Paratropididae, Nemesiidae, and Dipluridae, and the ontogeny of barychelids supports the hypothesis that a clypeus is plesiomorphically absent in the Barychelidae. Thus, at most the differentiation of a clypeus need only be proposed twice—once in *Cosmopelma* and once in *Paracenobiopelma,* by the backward movement of all eyes, save the anterior laterals. Alternatively, one gain (Sasoninae) and one reversal (*Sason*) need be proposed.

The second apomorphic character shared by higher groups of the Barychelidae is the domed apical segment of the posterior lateral spinnerets (character 5). The ontogeny of mygalomorphs and outgroup comparison indicate that the plesiomorphic condition of the apical segment is short and digitiform to trianguloid. Within the barychelids, that condition is found in *Eubrachycercus, Ammonius, Thalerommata, Trichopelma,* and *Psalistops.* Thus, the presence of a domed apical segment to the posterior lateral spinnerets is considered the synapomorphy of the Barychelinae and Sasoninae, plus *Sasonichus* and *Sipalolasma*.

Third, the plesiomorphic condition of the labium and maxillae in the Theraphosoidina has been shown to be numerous or densely clustered cuspules on the labium and is found in the Paratropididae and almost all genera of the Theraphosidae. That condition is also found in the barychelid subfamily Trichopelmatinae (*Trichopelma* plus *Psalistops*) and is therefore presumed the plesiomorphic condition in barychelids. The Barychelinae, *Sasonichus, Sipalolasma, Eubrachycercus,* and *Thalerommata* all have few cuspules on the maxillae, and fewer on the labium (character 4), if any. The linear series of cuspules on the labium (character 12) of the Sasoninae is considered the group autapomorphy, with one reversal in *Cosmopelma.* Thus, the reduced number of labial cuspules is apomorphic. Correlated with that in the same groups is the short labium (character 3) that contrasts with the long or subquadrate labium found in the outgroups Nemesiidae, Theraphosidae, Paratropididae, Dipluridae, and Hexathelidae and hence presumed plesiomorphic.

MONOPHYLY OF BARYCHELID SUBFAMILIES: The Barychelinae (including the subtribe Diplothelina and Idioctidini, new tribe) share the separated eye group with the anterior lateral eyes set forward on the clypeal margin and the remainder set back (character 6). That condition occurs otherwise only in the idiopid groups Idiopinae and Aganippini (Arbanitinae); a sister group relationship between those groups and the Barychelinae is readily rejected by numerous synapomorphies between each of their respective sister groups. Thus, the separated eye group of Barychelinae is its autapomorphy.

The Diplothelina (*Diplothele, Tigidia, Synothele*) share the loss of the posterior median spinnerets (with several parallelisms within some Barychelina, e.g., *Trittame, Idiommata, Encyocrypta*) together with the very reduced size of the paired claws on the anterior legs as compared to those on the fourth legs. In most barychelids (and theraphosids), the paired claws are evident as their most hooked portion extends above the claw tufts; in contrast, in the Diplothelina (and on the palpal tarsi of females of many theraphosids and barychelids), the paired claws of the first leg are deep within the claw tufts. The claw tufts on the first and fourth legs of all Theraphosoidina are of similar size. Hence, as verified by a direct comparison of the first and fourth pair of claws of diplothelines, it is the claws that are smaller, rather than the claw tufts. Thus, the comparatively reduced size of the paired claws of the first and second legs is the autapomorphy of the Diplothelina. The recognition of a subfamily for the Diplothelina, solely because they lack the posterior median spinnerets, is not warranted, as implied by the actions of Simon (1892a) and later authors who unwittingly included in *Pisenor,* a genus long characterized by having four spinnerets, the type species that lacked the posterior median pair.

The autapomorphy of the Idioctidini (*Idioctis* plus *Idiophthalma*) is the broadly trapezoidal shape of the eye group (character 8) that contrasts with the longer eye group (character 7) of the tribe Barychelini. Both conditions are considered apomorphic, having been derived from an intermediate condition (character 6) similar to that in *Sason.* The barycheline condition arose by the group becoming longer, whereas the idioctidine group became wider.

The Sasoninae (*Sason, Paracenobiopelma, Cosmopelma*) share the loss or reduction of an eye tubercle and of teeth on the paired claws of males (characters 9, 10). An eye tubercle is plesiomorphically present in the Tuberculotae, Theraphosoidina, and therefore also in the Barychelidae; thus its reduction or absence in the Sasoninae is presumed apomorphic. Biserially dentate paired claws are present in males of most Barychelinae and the Trichopelmatinae; thus, the absence or reduction of teeth on the paired claws of sasonine males is considered apomorphic.

Another possible sasonine autapomorphy is the linear arrangement of cuspules anteriorly on the labium (character 12). The condition is not found in any other mygalomorph genera, save *Sason* and *Paracenobiopelma.* The condition could be considered homologous with that found in most Paratropididae and many Theraphosidae were it not for the much increased homoplasy that would be required.

In the other sasonine, *Cosmopelma,* cuspules are absent on the labium but do occur on both the maxillae and coxae I. Thus, in the Sasoninae, the linear cuspules on the labium would appear to have been acquired only once. However, *Paracenobiopelma* and *Cosmopelma* both share the presence of a clypeus. *Sason,* on the other hand, has no clypeus unless its eye group, which is longer than the plesiomorphic condition (twice as long as wide), is an incipient clypeus. If that were so then two steps would need be invoked within the Sasoninae: one gain of a clypeus in the group ancestor (retained in *Paracenobiopelma* and *Cosmopelma*), and one forward movement of the anterior lateral eyes to the clypeal margin in *Sason.* (In the Barychelinae, only the posterior movement of all eyes, save the anterior laterals, need be proposed to explain the same arrangement.) The alternative in the Sasoninae is that the clypeus differentiated once in *Paracenobiopelma* plus *Cosmopelma,* and the eye group moved back in *Sason.* Both hypotheses require two steps but the first is congruent with the linear cuspules on the labium, and hence is more parsimonious. Thus, a further autapomorphy of the Sasoninae is the differentiation of a clypeus (character 11). The linear cuspules are a synapomorphy of *Paracenobiopelma* plus *Sason.*

In the Trichopelmatinae (*Trichopelma* plus *Psalistops*), the form of the maxillae is very unusual: the posterior ental corner is produced back into a broad almost two-cornered heel (character 13), similar to that in the nemesiid genus *Aname* (see Raven, 1981c). Because the condition does not occur in any other Theraphosoidina it is considered the group autapomorphy.

LEPTOPELMATINAE: Before beginning any discussion of the other "barychelid" subfamily, the status of *Leptopelma* requires some clarification. In his original description of *Leptopelma transalpina* Ausserer (the type species of *Leptopelma*), Ausserer (1871, p. 183) states: "Die Augen klein, ganz am Vorderrande des Kopfbruststückes auf einem kaum angedeuteten Augenhügel stehend. [The eyes small, located entirely at the anterior margin of the cephalothoracic section of the barely discernible eye ridge.]" Thus, a clypeus is absent in *Leptopelma.* However, Simon (1892a, 1903a) characterized the genus and subfamily by the presence of a clypeus; and all subsequent authors have followed him. The type specimen (belonging to NHMV) has not been released by Brignoli, thus I am unable to confirm Ausserer's statement and place the genus further. Nevertheless, assuming no error on Ausserer's part, the genus is probably better placed in the Theraphosidae (where I here transfer it to the synonymy of *Ischnocolus*). If its maxillary lobes are distinct, as indicated by Benoit (1964a), then its closer affinities with theraphosids will be confirmed. Thus, the name Leptopelmatinae is incorrectly associated with the Barychelidae.

Nevertheless, the affinities of genera placed in the Leptopelmatinae require discussion. Benoit (1964a) indicated that the presence of a maxillary lobe and a wide clypeus in his Leptopelmatine was an indication of the monophyly of that group of barychelids. Further, Benoit (1965e) distinguished *Eubrachycercus, Leptopelma, Ammonius, Brachionopus, Harpactirella* (part) and *Cyclopelma* (here placed in the synonymy of *Sipalolasma*) from *Zophopelma* (=*Euphrictus*) by the shorter apical segment of the posterior lateral spinnerets. However, with the exception of *Brachionopus* and *Harpactirella* (here transferred to the Theraphosidae), a distinct maxillary lobe is absent in all genera of the Barychelidae (as here defined). His statement regarding the spinnerets is correct. However, from my examination of the type species of most of those genera, the apical segment of the posterior lateral spinnerets is always longer than wide (digitiform) but the overall length of the spinnerets is quite variable. Thus, Benoit's (1965e) character—the overall length of the spinnerets—is too imprecise and variable to support the monophyly of any group. For that and reasons discussed in the intrafamilial relationships of the Theraphosoidina, Benoit's groups are abandoned.

NEMESIIDAE

Figure 4; table 5

NEMESIID MONOPHYLY: Three congruent characters support the monophyly of the Nemesiidae. The females, and plesiomorphically the males, have biserially dentate paired claws (character 2), the paired claws are broad

TABLE 5
Nemesiid Synapomorphies for Cladogram in Figure 4[a]

1. Paired claws broad [narrow].
2. Paired claws biserially dentate [monoserially dentate].
3. Palpal claw of females with teeth only on promargin [medially on claw].
4. Rastellum present and on low mound [both absent].
5. Apical segment of posterior lateral spinnerets domed [digitiform].
6. Male palpal bulb with several low parallel ridges [smooth].
7. Serrula on edge and posterior surface of maxilla lobe [on anterior surface of lobe].
8. Rastellum absent [present].
9. Intercheliceral tumescence distinct, soft, and pallid [faint, if evident].
10. Embolus with distal lateral flanges [cylindrical in section].
11. Ridges on bulb form raised keels [see 6].
12. Apical segment of posterior lateral spinnerets elongated [domed].
13. Tarsi III entirely scopulate [not or thinly so].
14. Clypeus wide [absent].
15. Unpaired claws entirely absent [present].
16. Intercheliceral tumescence covered with enlarged setae [setae normal].
17. Keels on bulb form wide vanes [see 11].
18. Caput short, broad, and elevated [narrow, long, and low].
19. Cymbium with modified blunt-tipped setae [setae normal].
20. Sternum wide [narrowly cordate].
21. Serrula reduced or absent [present].
22. Posterior sternal sigilla long and nonmarginal [small and marginal].
23. Paired claws of males with one S-shaped row of teeth [two rows of teeth].
24. Fovea short and U-shaped [more or less straight].
25. Intercheliceral tumescence present but faint [absent].
26. Embolus tip broad [tapering].
27. Metatarsal preening combs present [absent].
28. Third claw short [long].
29. Leg tarsi of males pseudosegmented [integral].
30. Embolus short and acuminate [elongate, broad].
31. Tarsal organ elevated into a rod [low and domed].
32. Unique conformation of tibial spur.
33. Fovea broad and recurved [short and straight].
34. Unique conformation of tibial spur.
35. Maxillary cuspules extend back onto produced heel [cuspules confined to anterior inner corner of subrectangular maxillae].

[a] Plesiomorphic state in brackets.

(character 1), and the palpal claw has teeth set on the promargin (character 3). Outgroup comparison and ontogeny amply indicate that the plesiomorphic conditions are one row of teeth (usually in an S-shaped line) on a medial keel on the narrow paired claws and teeth set medially also on the palpal claw. However, because every barychelid subfamily, save the Sasoninae, and at least the theraphosid *Ischnocolus* have males that also have biserially dentate paired claws, at least one of those characters may have to be construed as a partial (only in males) parallelism. A third possible nemesiid autapomorphy is the presence of tarsal scopulae—absent or reduced in the Paratropididae. However, it is more parsimonious to consider that scopulae were acquired once (in a nominal state) in the Crassitarsae and lost once in the Paratropidinae, than to propose four separate gains in each of the Nemesiidae, Barychelidae, *Glabropelma,* and Theraphosidae. Of course, the degree of development is presumed to have increased twofold in the Barychelidae and Theraphosidae.

Union of the Pycnothelidae and Nemesiidae: This is based upon the shared presence of a number of characters that previous authors appear to have considered insignificant. First, as in the Anaminae, the paired claws of both the Pycnothelidae (as previously defined by Schiapelli and Gerschman, 1967) and Nemesiinae (as here defined) are biserially dentate, the tarsi are scopulate, the palpal claw has teeth only on the promargin, and the third claw is edentate. Like the Anaminae, the apical segment of the PLS of the Nemesiinae and Pycnothelidae (save *Calisoga, Pselligmus,* and *Hermachura*) is domed or triangular. The inner cheliceral faces of *Nemesia,* Pycnothelinae (figs. 124, 129), and some Anaminae have a slight to definite softening of the cuticle which may be covered with enlarged setae. That softening, the intercheliceral tumescence, is considered the precursor of the more extensive and setose state in *Pycnothele* (see discussion of the nemesiid relationships below). Finally, the most conclusive indication of a relationship between *Nemesia* and the Pycnothelidae is the presence on the palpal bulb of several ridges (figs. 83, 154) that are considered the pre-

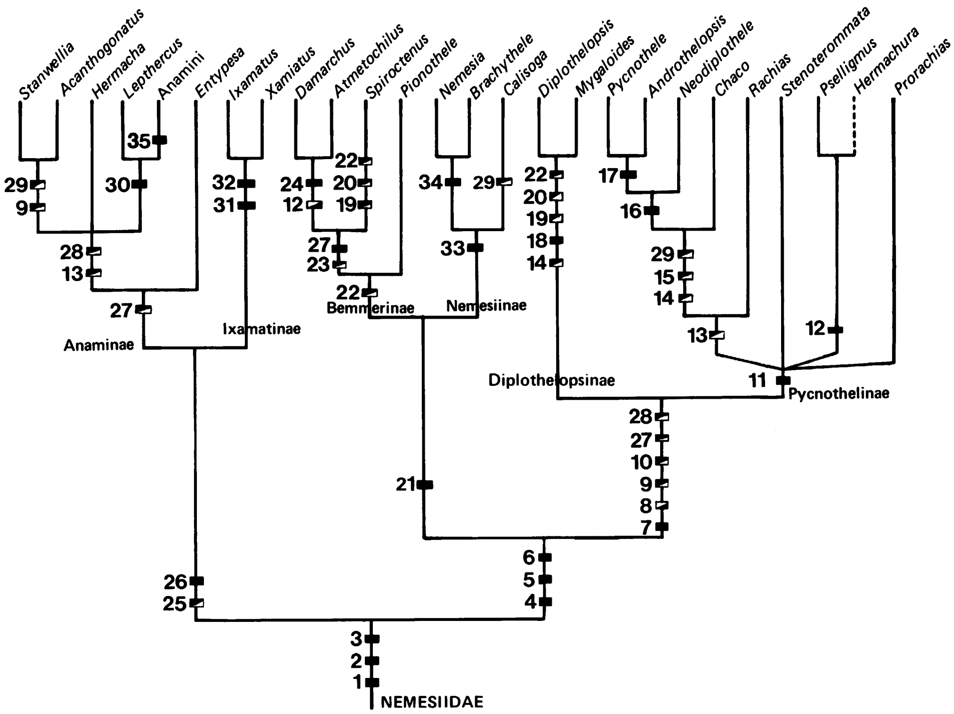


FIG. 4. Cladogram of nemesiid genera. Numbers refer to characters in table 5 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

cursor of the very elevated keels of *Pycnothele* (fig. 107).

What then are the characters that have previously been considered evidence of relationships other than those proposed here? The classifications of only two authors—Simon and Mello-Leitão—are sufficiently comprehensive for the two groups to warrant discussion. Of the Pycnothelinae, Simon (1892a, 1903a) did not know *Pycnothele* but did have a male and female of the related genus *Rachias,* a male of *Chaco* (as *Hermacha leporina* Simon), and a female of *Pselligmus.* Simon (1892a) originally placed *Pselligmus* and *Stenoterommata* in the Cyrtauchenieae and *Rachias* in the Nemesieae; those two groups were distinguished by the procurved fovea of the former and the straighter or recurved fovea of the latter. (No further resolution of relationships need be discussed because Simon, having not seen *Stenoterommata,* misunderstood the genus; species placed by Simon in *Stenoterommata* are here transferred to *Acanthogonatus.*) However, a procurved fovea is a synapomorphy for the Rastelloidina (and therefore plesiomorphic when present in rastelloids) and is not so wide, deep, or procurved in *Pselligmus* (fig. 142); the "alternative" nemesiid state (e.g., in *Rachias,* fig. 132)—any other shape—is not a character. Thus, neither of Simon's groups was based upon a synapomorphy.

Later, Simon (1903a) placed *Pselligmus* ("de classification incertaine," p. 895) in the Bemmereae, *Stenoterommata* in the Amblyocareneae, and retained *Rachias* in the Nemesieae. The Bemmereae and Aporoptycheae putatively shared a number of characters—glabrous carapace, procurved fovea, rectangular eye group, small and submarginal posterior sternal sigilla, metatarsi I and II longer than tarsi, and legs that were not or lightly scopulate or spinose—but the Bemmereae had much shorter PLS. Simon retained *Stenoterommata* in the Amblyocareneae where it, with *Damarchodes* (=*Hermacha,* Anaminae), was wrongly identified as having monoserially instead of biserially dentate paired claws.

Thus, Simon's groups of mygalomorph genera were based either upon plesiomorphic characters or the absence of apomorphic ones, and hence are immediately questionable. However, insofar as *Rachias* and the Nemesieae were included within the same group, the classification of those taxa presented here does not differ strongly from that of Simon (1903a).

The second author, Mello-Leitão (1923), followed Simon (1903a) and made groups based upon symplesiomorphies. His Pselligmeae and the Amblyocareneae were grouped together because they had small sternal sigilla whereas the Cyrtauchenieae had large sternal sigilla, and differed by the more slender apical segment of the PLS in the latter. First, small sternal sigilla are the plesiomorphic condition in the Tuberculotae, and thus are presumed apomorphic in the Fornicephalae. Thus, his Pselligmeae lacked any apomorphic character. Similarly, the small sigilla of the Amblyocareneae are not consistent and are found in my analysis of cyrtaucheniid intrarelationships to be simply autapomorphies of species. Finally, the Brazilian genera—*Pselligmus* and *Stenoterommata*—he placed in each group are here considered sister groups.

NEMESIID INTRARELATIONSHIPS: Formulating a parsimonious cladogram of the family Nemesiidae presents two problems. First, in any cladogram of this group, a large number of homoplasies will be present; second, only type specimens were available and thus SEM studies were generally not possible. Also, in some cases, the condition of types was too poor to confidently establish the nature of even macroscopic characters such as tarsal scopulae, the position of the sternal sigilla, or the presence of an intercheliceral tumescence or serrula. In general, if a serrula was not discernible after careful examination of the maxilla with a light microscope at 90 magnifications, it was declared not evident and presumed to be very small or absent.

Homoplasies dominate a cladogram of nemesiid relationships because characters show little congruence. However, six genus groups are readily recognizable based upon unique characters. I will discuss the relationships that provide little conflict, establish a ground plan for the cladogram, and then introduce genera whose relationships are more problematical.

First, the Bemmerinae include *Spiroctenus* (the senior synonym of *Bemmeris*), *Damarchus,* and *Atmetochilus,* and share the presence of a single angular S-shaped row of teeth on the paired tarsal claws of males (character 23), whereas females have biserially dentate paired claws, as is typical of and plesiomorphic in the family. As far as I know, in all other mygalomorphs, if the females have biserially dentate paired claws, males have the same condition. In males of many barychelid genera, the paired claws are biserially dentate, but in females they have either a row of teeth on only one margin or they lack teeth entirely. Therefore, the bemmerine and barychelid conditions are not homologous, although each is unique and considered apomorphic; one is a hypothesis of gain in males, the other of a loss in females.

Why is the condition in the Bemmerinae not plesiomorphic for the Nemesiidae? There are two indications to the contrary. First, in the Diplurinae and all other groups that have biserially dentate paired claws in females, the dentitions of the paired claws of males and females are similar, but plesiomorphically the teeth on the palpal claw are located medially, as in the Hexathelidae, Mecicobothriidae, and other Dipluridae. In apomorphic Diplurinae, the Bemmerinae, and all other Nemesiidae, the tooth row on the palpal claw of females is located in the apomorphic position—on the promargin of the claw. Todd (1945) was in error in stating that females of *Aparua* have a biserially dentate palpal claw (Forster, *in litt.*). Second, juveniles of *Hermachastes* (=*Spiroctenus*) have biserially dentate paired claws (Purcell, 1902), thus confirming by ontogeny that the plesiomorphic condition in the Bemmerinae is biserially dentate paired claws in both males and females, and that the male condition is a group autapomorphy. The hypothesis that biserially dentate paired claws in male barychelids is apomorphic does not contradict the apomorphy of monoserially dentate claws in the Bemmerinae—each is apomorphic.

Within the Bemmerinae, *Atmetochilus* and *Damarchus* share three characters: the fovea is short and U-shaped (character 24), the apical segments of the PLS are elongated (character 12), and the posterior sternal sigilla are large and subcentral (character 22; figs. 56–59, 50–53). Those conditions are unique within the Nemesiinae and are thus considered synapomorphic. The foveal shape may seem similar to that in the Rastelloidina; however, in the Bemmerinae it is much shorter and shallower. Also, the overwhelming number of homoplasies that would be needed to consider the rastelloid and bemmerine conditions homologous allows the dismissal of that hypothesis. *Pionothele* is included in this group on tenuous grounds that the sternum and sigilla (fig. 74) are similar to those in *Spiroctenus* (fig. 71); the apparently bleached condition of the holotype of the type species of *Pionothele* prevents more discussion.

The second group is the tribe Nemesiini, including *Nemesia* and *Brachythele,* that share two synapomorphies—the broad and recurved fovea and the conformation of the spur on tibia I of males (characters 32, 33; figs. 79, 84, 85, 91). A similarly shaped but much wider fovea does occur in *Scalidognathus* (figs. 240, 250) and other Genysinae; however, the monophyly of that group is supported by the conformation of the bulb and tibia of the palp, and of the tibial spur in males (see Idiopid Monophyly). No other nemesiid genus has a similar fovea, so I conclude that the condition is apomorphic. A similar spur type occurs in *Damarchus* (in BMNH), *Atmetochilus* (in BMNH), some Anamini (Raven, 1984a, figs. 65–71), and *Calisoga* (Chamberlin, 1937, fig. 5). However, the spur of the Nemesiini is sufficiently homogeneous and distinct from other types to regard it as a group autapomorphy. The relationships of *Calisoga* and significance of its spur will be discussed below.

The third group is the Diplothelopsinae, including only *Mygaloides* and *Diplothelopsis,* that share a short raised caput (character 18; fig. 95), a broad sternum (character 20; fig. 94) that is anteriorly rebordered in males (fig. 97), and the presence of modified thick setae on the male palpal tarsi (character 19; fig. 100; see Schiapelli and Gerschman, 1967). No other nemesiids share the first two characters but possibly homologous modified setae occur in males of *Spiroctenus* (fig. 64) and may indicate a closer relationship. However, in the Bemmerinae and Diplothelopsinae, two separate acquisitions of the modified setae are more parsimonious than one gain and minimally two losses—once in *Atmetochilus* plus *Damarchus* and once in *Pionothele.* Therefore, ample evidence exists that the Diplothelopsinae are monophyletic.

The fourth group is the Pycnothelinae including *Pycnothele, Chaco, Androthelopsis, Rachias, Stenoterommata, Pselligmus, Neodiplothele,* and tentatively (until males are known) *Prorachias* and *Hermachura.* Males of all those genera share two characters. The upper side (that usually nearest to the tibia) of the palpal bulb bears a series of longitudinally oriented chitinous parallel ridges (character 11) in *Chaco* (fig. 131), *Pselligmus* (fig. 153), and *Stenoterommata* (Holmberg, 1881). In *Rachias* (fig. 134), *Androthelopsis* (fig. 115), and *Pycnothele,* those ridges are soft and elevated to form curved vanes of tissue (character 17) that are most developed and membranous in *Pycnothele* (fig. 109). Similar distinct ridges (character 6) occur also in *Nemesia* (fig. 83), to a lesser extent in some species of *Spiroctenus,* in *Mygaloides* (where they are less numerous), and in at least one species of *Atmetochilus* (in BMNH) in which they are diagonal.

The second character is the presence of an intercheliceral tumescence covered with thick modified setae (character 16). A similar but asetose tumescence (character 9) occurs in the Diplothelopsinae, *Acanthogonatus, Neodiplothele,* and *Stanwellia*; the same area is pallid and may be soft in *Teyl, Hermacha, Entypesa,* and in some species of *Nemesia, Ixamatus,* and *Namea.* Other than the Nemesiidae, the intercheliceral tumescence is known only in *Cataxia* (Idiopidae), *Cyclocosmia* (Ctenizidae), *Heterothele* (Theraphosidae), *Trittame* (Barychelidae), and *Australothele* (Dipluridae). Thus, I consider the distinctly elevated ridges on the palp of the Pycnothelinae synapomorphic; less developed homologs are present in related groups. The intercheliceral tumescence is considered apomorphic in the Diplothelopsinae plus Pycnothelinae, and the setose condition apomorphic for the Pycnothelinae.

Within the Pycnothelinae, *Chaco, Pycnothele, Androthelopsis,* and *Neodiplothele* share the wide clypeus (character 14; otherwise undifferentiated in nemesiids, save the Diplothelopsinae), the complete absence of a third claw (character 15), and the pseudosegmentation of the tarsi of males (character 29). *Pycnothele* and *Androthelopsis* share the very elevated vanes on the bulb (character 17), and those share with *Neodiplothele* the presence of distinctly enlarged setae on the intercheliceral tumescence. Those genera and *Rachias* share the presence of dense scopulae on tarsi III; and all have distinct keels on the bulb that are more elevated than those in *Nemesia* (fig. 83). *Hermachura* and some *Pselligmus* share the re-elongation of the apical segment of the PLS (character 12), but as with *Prorachias,* in the absence of males no more than a multiple furcation of those genera in the cladogram is possible.

The fifth group is the Ixamatinae, new subfamily, including *Ixamatus* and *Xamiatus,* which uniquely share an elevated, rodlike tarsal organ (character 31) and pustulose cuticle (see Raven, 1981c, figs. 62, 63). Similarly elevated tarsal organs are known only in the Mesothelae (Gertsch and Platnick, 1979, figs. 11–14), the Microstigmatidae (Raven and Platnick, 1981, figs. 29, 30), and *Kiama* (Raven, 1981c, fig. 61). The distribution of the character allows the rejection of the hypothesis that it is a plesiomorphic retention in those groups; thus, in all groups it is considered apomorphic. That is further supported in the Ixamatinae by the congruence of the raised tarsal organ with the pustulose cuticle, a combination found otherwise only in the microstigmatids.

The Diplothelopsinae plus Pycnothelinae share the unique character that in most genera the serrula lies mostly behind the anterior lobe of the maxillae with some teeth on the anterior edge (character 7) and also the loss of a rastellum (character 8); outgroup comparison with the Nemesiinae plus Bemmerinae indicates that it is plesiomorphically present. A second group is the Nemesiinae plus Bemmerinae in which a further proposed synapomorphy is the apparent loss of the serrula (character 21). At this point, one large group including the Bemmerinae, Nemesiinae, and Diplothelopsinae plus Pycnothelinae is evident. The synapomorphies for that group are hypothesized to be the presence of rastellum (absent in Anaminae and diplurids), the reduced apical segment of the PLS and the low ridges or keels on the male palpal bulb (characters 4–6).

The taxa remaining to be discussed in the Nemesiidae include the Australian group Anamini, plus *Entypesa, Stanwellia, Acanthogonatus, Hermacha,* and *Calisoga. Stanwellia* and *Acanthogonatus* share the pseudosegmented tarsi in males and a well-developed intercheliceral tumescence (characters 29, 9); males of *Calisoga* lack the latter. In each of the above taxa, except *Calisoga,* the distal embolus is broad and thin in at least one, but usually more, species of each genus or genus group.

The Anamini—whose synapomorphies are the very produced maxillary heel (i.e., extending posteriorly over the labium; see Raven, 1981c, figs. 13–16; character 35) and the extension of cuspules back from the inner corner—include only *Aname, Teyl, Kwonkan, Merridinia,* and *Namea.* The plesiomorphic condition is that the maxillae are rectanguloid and the cuspules are confined to the inner corner. In the Anamini, the embolus appears to be least modified in *Aname trevallynia* (Hickman) (fig. 40; see Raven, 1984d), in which it is acuminate and undifferentiated from the bulb (character 30). A similar bulb occurs in *Lepthercus* (fig. 49). I regard the condition in *A. trevallynia* as one modification of the broad embolus tip in *Entypesa* (fig. 41; see Benoit, 1965b), *Stanwellia* (fig. 43; Main, 1972; Forster and Wilton, 1968), and *Xamiatus ilara* Raven (Raven, 1982b, fig. 8). Thus, the broad embolus (character 26) is the proposed synapomorphy for the Anaminae (all of the above genera, save *Calisoga*). That hypothesis can be tested only when a cladogram for each genus or genus group of the Anaminae can be proposed. However, it is tenuous even though it is congruent with the apomorphy of the similarly extensive tarsal scopulae on the third and fourth legs (character 13) of all genera save *Teyl* (in which the absence of tarsal scopulae in females is considered its autapomorphy and a reversal), *Ixamatus, Xamiatus,* and *Entypesa.*

ANAMINI

Figure 5; table 6

The Anamini include those taxa (above) in which the cuspules extend back onto the maxillary heel (character 35). That character is unique in the Tuberculotae and is remotely approached only in the idiopid *Hermeas*. The proposition that it is not an anamine autapomorphy is therefore untenable. Those genera also share other apomorphic characters. Most lack a maxillary serrula that, by outgroup comparison with *Ixamatus* (see Raven, 1982a), the Dipluridae, and Hexathelidae, is plesiomorphically present in the Nemesiidae. The *Aname pallida* group and the three Western Australian genera, *Teyl, Kwonkan,* and *Merridinia,* have elongate nonmarginal sigilla (see Raven, 1981c; Main, 1975, 1983a). All anamine genera, save *Kwonkan* and plesiomorphic species of *Aname,* have an elongate cymbium. Outgroup comparison indicates that the nemesiid cymbium is plesiomorphically short; the only other nemesiid with such a cymbium is one undescribed species of *Entypesa.* Similarly, males of *Aname, Kwonkan,* and some species of *Namea* have a spur on a raised apophysis on tibia I. Finally, all species of the Anamini, save some of the *Aname maculata* group (Raven, 1984d), have an elongate tapering embolus. I have proposed above that the plesiomorphic nemesiid embolus is broad and flanged.

Of those characters, the reflexed embolic origin and the elongate cymbium of *Namea* (save for reversals to the straight embolic origin in *N. dahmsi* Raven and *N. callemonda* Raven) and *Teyl* are congruent. Equally, the tibial spur and elongate sigilla of the *A. pallida* group and *Kwonkan* are congruent. However, apart from those cases, the degree of congruence is limited. The elongate cymbium of *Merridinia* and *Teyl* is congruent with the elongate sigilla but the shapes of the embolic origins are not. Equally, the tibial spur appears in association with an elongate cymbium in *A. maculata* (Hogg), and some other species of the group, but not in *A. trevallynia.*

In *Namea,* the embolic origin may be reflexed or straight, and in the *A. maculata* group, the serrula may be present or absent. Thus, if the relexed origin is considered apomorphic, reversals must be proposed in the two exceptions in *Namea*; the same will be true whichever polarity is used. Because the reflexed origin is unique to *Namea* and *Teyl* in the Anaminae, I consider it apomorphic. Equally, because a serrula is plesiomorphically present in the Anaminae, its absence is presumed apomorphic.

From the above character distributions, the most parsimonious cladogram (by two steps) is that *Teyl* and *Namea* are sister groups sharing the reflexed origin of the embolus (step one), and they share with *Merridinia* the elongate cymbium and loss of tibial spur (steps two and three). The sister group of *Teyl-Namea-Merridinia* is *Kwonkan* plus the *Aname pallida* group, which all share the apomorphic absence of a serrula, the elongate tapering embolus, and the elongate posterior sternal sigilla (with a reversal in *Namea*; steps four through seven). *Kwonkan* plus the *Aname pallida* group share the presence of a proximoventral process on the first metatarsus of males; in the *A. maculata* group, the metatarsus is only slightly modified, if at all. The *Aname maculata* group in which the elongate cymbium of some is presumed a parallelism, plus *A. trevallynia,* and all other Anamini share the form of the tibial spur (steps eight and nine) which thus becomes the second autapomorphy of the Anamini and is secondarily lost in *Teyl-Namea-Merridinia*. Clearly, separating *Namea* from *Teyl* and *Merridinia* may save the reversal of the elongate sternal sigilla but only at the cost of three extra steps; thus, the most parsimonious alternative needs 11 steps.

Because the *Aname maculata* group, *A. trevallynia,* and all other Anamini form a trichotomy, and too little is known of species of the *A. maculata* group other than those revised by Raven (1984d), I refrain from restoring *Chenistonia* or making other new names. A second problem is that although *Kwonkan* is a well-defined group in which the spinose tarsi are its autapomorphy, the *Aname pallida* group is left without an apomorphic character; thus, the two may require re-amalgamation. The incrassate form of the first metatarsi of males of both groups is presumed their synapomorphy.

The sister group of *Calisoga* remains a problem. In the presence of scopulae on tarsi IV (character 13), the pseudosegmented tarsi in males (character 29), and the digitiform PLS, *Calisoga* is similar to *Acanthogonatus* but differs in the absence of both an intercheliceral tumescence and serrula (SEM confirmed). As mentioned earlier, *Calisoga* and

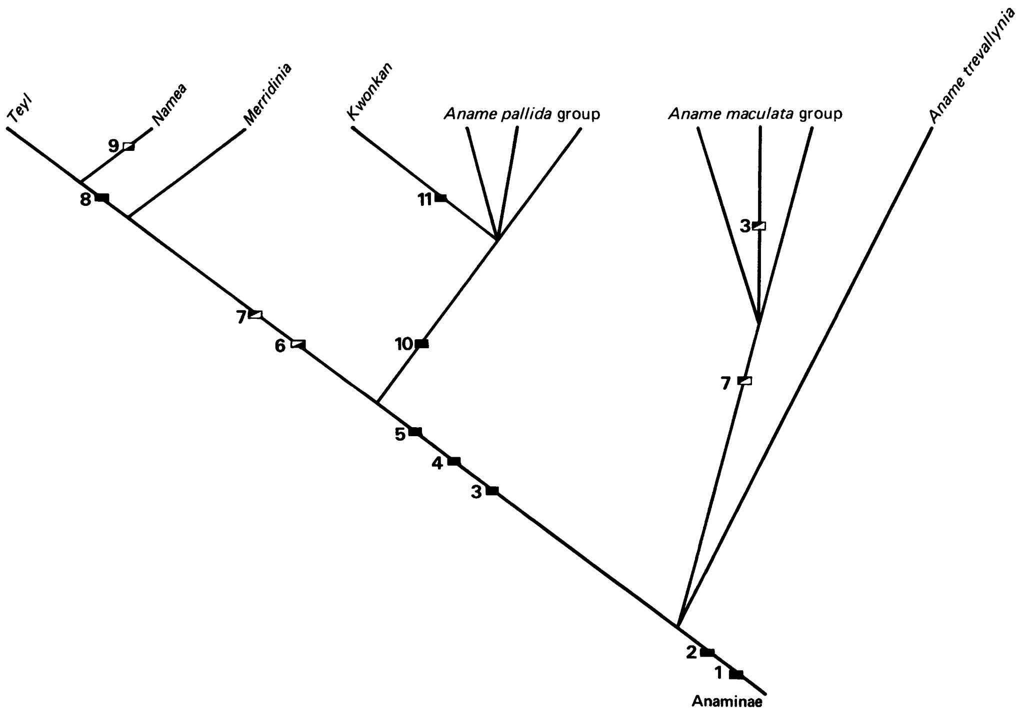


FIG. 5. Cladogram of genera of the Anamini. Numbers refer to characters in table 6 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies at the tribal level; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

Brachythele plus *Nemesia* share the presence of a distal spur and megaspine on tibia I of males (Chamberlin, 1937, fig. 5). Those spurs are sufficiently similar to one another and distinct from any others in the Nemesiidae to regard them as synapomorphic. The PLS in *Calisoga* are thus regarded as having re-elongated and, as in *Brachythele,* the ridges on the embolus are lost.

TABLE 6

Synapomorphies for Cladogram of Anamini in Figure 5[a]

1. Maxillary cuspules extend back onto produced heel [cuspules confined to anterior inner corner of subrectangular maxillae].
2. Unique conformation of tibial spur.
3. Maxillary serrula absent [present].
4. Embolus elongate [short].
5. Posterior sternal sigilla elongate [short].
6. Tibial spur absent [present].
7. Cymbium elongate [short].
8. Embolic origin reflexed [straight].
9. Posterior sternal sigilla short [elongate].
10. Metatarsi I of males noticeably incrassate [not or weakly so].
11. Leg tarsi spinose [aspinose].

[a] Plesiomorphic state in brackets.

DIPLURIDAE

Figure 6; table 7

DIPLURID MONOPHYLY: Three characters indicate that the diplurids are monophyletic. First, the posterior lateral spinnerets are very elongate (character 2) but with a secondary reduction (reversal) in *Microhexura* and possibly also the Masteriinae. Similarly long spinnerets are present otherwise only in the hexathelids *Macrothele* and *Porrhothele* (Raven, 1980b), the Mecicobothriidae (Gertsch and Platnick, 1979), and the theraphosid *Heterothele* (Raven, 1983b). However, mecicobothriids owe their long spinnerets to a differential prolongation of the apical segment which may be up to four times longer than the basal segment (Gertsch and Platnick, 1979). In diplurids, hexathelids, nemesiids, and theraphosids the three segments of the PLS are similar in length (see figs. 22, 28, 51). The PLS of diplurids are long because all three, rather than only the apical segment as in the mecicobothriids, segments are elongate. Therefore, the diplurid condition is considered apomorphic, and the mecicobothriid condition, although superficially similar, is not considered homologous.

The widely separated posterior median spinnerets of diplurids—up to several times their basal diameter—is possibly associated with their long PLS. In *Heterothele,* the hexathelids, nemesiids, and some mecicobothriids the posterior median spinnerets are separated only by about one of their diameters. Thus, the wide separation of the posterior median spinnerets is considered a diplurid autapomorphy.

The third autapomorphy of the diplurids is presumed to be the lowered caput plus elevated thoracic region (character 1): the two conditions are logically linked. In hexathelids (Raven, 1976, fig. 2b) and mecicobothriids (Gertsch and Platnick, 1979, fig. 37), the caput slopes down to the fovea from the eye tubercle and the thorax is even lower than the fovea. In contrast, in diplurids, *Pseudonemesia* (Raven and Platnick, 1981, fig. 53), and the Miginae (Raven, 1984c, fig. 5), the thoracic region is elevated as high behind the fovea as any point on the caput. That elevated thorax is considered a diplurid autapomorphy with parallelisms in the Miginae, *Pseudonemesia,* and perhaps also some barychelids.

ALTERNATIVE HYPOTHESES: This new diagnosis of the Dipluridae prompts the question of why genera previously placed in the Diplurinae are here transferred to the Anaminae (Nemesiidae). First, the Anaminae lack the above three synapomorphies: their PLS are short (e.g., fig. 51) and barely reach as high as the dorsal abdomen, and their bases are closer; their caput is arched and the thorax is lower, as in the plesiomorphic condition (fig. 157). Thus, minimally three reversals would be required.

Interposing the anamine genera between the Ischnothelinae and Diplurinae would also require at least one other parallelism (four steps) because pseudosegmented tarsi (a diplurinid autapomorphy) are not plesiomorphically present in female Anaminae. Conversely, the Anaminae plesiomorphically have tarsal scopulae and the palpal claw has teeth only on the prolateral face, rather than medially as in diplurids. Because neither character is plesiomorphically present in the Dipluridae two further parallelisms would be required (six steps). Finally, the diplurid labium is large and inclined (fig. 27), being almost as long as wide (see Raven, 1980b, for discussion in the Hexathelidae). In the Anaminae, as in other Nemesiidae, the labium is much shorter than wide and not inclined (fig. 34). Thus, whichever state (the short, wide and flat or the large and inclined) is accepted as apomorphic a further parallelism would be necessary. At this point, without accounting for the complexities of intrafamilial nemesiid relationships that would introduce even more homoplasies, seven additional steps would already be needed to juxtapose the Anaminae and Diplurinae. Two parallelisms—biserially dentate paired claws and edentate third claw—are eliminated at the cost of adding at least seven others.

Thus, the conclusion that biserially dentate paired claws have been independently developed at least in diplurids and nemesiids, if not also (for similar reasons) in a number of distantly related groups—Cyrtaucheniidae, Microstigmatidae, and males of the theraphosid *Ischnocolus* and many barychelids—is forced by a number of homoplasies that would need be otherwise introduced.

Within the Dipluridae, a number of monophyletic groups are immediately evident by their uniquely shared apomorphic characters. The Diplurinae include the diplurids with biserially dentate paired claws (character 12) and pseudosegmented tarsi (fig. 21) in both sexes (characters 9, 13). Ischnothelinae have two rows of teeth on the cheliceral furrow (character 20), and males have one of the cymbial lobes uniquely elongated (character 19) and a single cuticular process on the first tibia (character 10; Raven, 1983b). The Masteriinae have a round and compact eye group (character 8) with the AME reduced or absent (character 6), the teeth on the unpaired claw are elongate and originate on a single raised process (character 7), rather than directly from

TABLE 7

Diplurid Synapomorphies for Cladogram in Figure 6[a]

1. Caput low and hirsute [arched, and less hirsute or glabrous].
2. Posterior lateral spinnerets elongate [short].
3. Maxillary cuspules absent [present].
4. Tarsal spines absent [present].
5. Serrula a curvilinear raised comb [area of low spinules].
6. Anterior median eyes reduced in size [similar in size to other eyes].
7. Teeth on unpaired claw on a common raised process [all sessile on claw].
8. Eye group compact, rounded [rectangular].
9. Male tarsi pseudosegmented [integral].
10. Tibia I of males with single distal spur [spur absent].
11. Tarsal organ centrally raised [concave].
12. Paired claws with two rows of teeth [one row].
13. Tarsi of legs of female cracked or pseudosegmented [integral].
14. Unpaired claw edentate [toothed].
15. Scopuliform hairs present on leg tarsi of females [hairs absent].
16. Spines on cymbium absent [present].
17. Maxillary lyra present [absent].
18. Apical segment of posterior lateral spinnerets pseudosegmented [integral].
19. One lobe of cymbium very elongate [both lobes short].
20. Cheliceral furrow with teeth on both margins [on promargin only].
21. Bothria a crescent-shaped collar [corrugiform].
22. Tibia II of males with a copulatory spur [spur absent].
23. Australotheline crescent present near bases of posterior median spinnerets [crescent absent].
24. Unique conformation of male tibial spur.
25. Metatarsus I of males with short thornlike process proximoventrally [otherwise].
26. Unique conformation of male tibial spur.
27. Copulatory spur on tibia II absent [present].

[a] Plesiomorphic state in brackets.

the claw, and the serrula is a linear series of teeth (character 5; Raven, 1979). Males of the Euagrini, *Euagrus* and *Phyxioschema,* bear similar complex tibial spurs (Coyle, 1984; Raven, 1981a, fig. 7).

DIPLURINAE: Within the Diplurinae, *Diplura* and *Trechona* have a similar stridulatory lyra on the maxillae (character 17; first noted in the former by Blackwall, 1867; figs. 20, 30). Such a lyra occurs otherwise only in the Theraphosoidina (*Idiommata,* Barychelidae, and selenocosmiine theraphosids) and thus it is assumed synapomorphic for *Diplura* and *Trechona.*

Some *Linothele* species and *Trechona* share the presence of well-developed tarsal scopulae (character 15). In *Linothele,* the hairs of the scopulae are short and, for the length of the tarsi, interspersed with numerous setae. In *Diplura* and in most species of *Linothele,* the scopulae are merely rudimentary but always evident at least on tarsi I and II. However, the tarsal scopulae of *Trechona* are so dense that the species of the Chilean–Argentine nemesiid genus *Acanthogonatus* were often erroneously included in *Trechona.* Thus, although the occurrence of the tarsal scopulae and the lyra may appear to represent conflicting hypotheses, they do not. The lyra is an unequivocal synapomorphy, the leg scopulae are not; the two competing hypotheses are equally parsimonious. Thus, rather than propose that the lyra was gained twice, I prefer the hypothesis that the scopulae became more strongly developed twice.

Two other characters found only in the Diplurinae are the absence of teeth on the third claw (character 14; with parallelisms in the Crassitarsae and Rastelloidina) and of spines on the leg tarsi (character 4; with parallelisms in the Masteriinae and Crassitarsae). Spiders of the plesiomorphic tuberculote families all have at least one tooth on the third claw, whereas the Rastelloidina (save for *Actinopus* and female *Bolostromoides*) and Crassitarsae lack teeth on the third claw. Therefore, plesiomorphically the third claw is dentate and, as indicated by outgroup comparison with other diplurids and the hexathelids, the leg tarsi are spinose. Although the Diplurinae have biserially dentate paired claws, in nemesiids the associated character—teeth on the promargin of the palpal claw—is evident only in *Trechona* and some *Diplura* and *Linothele.* By outgroup comparison with other Diplurinae, Hexathelidae, and Mecicobothriidae, the plesiomorphic condition is teeth located mesally on the palpal claw.

ISCHNOTHELINAE: Despite Benoit's (1965a) study of African Ischnothelinae, only in *Lathrothele* have two autapomorphies—male with tibia I incrassate and metatarsus I ba-

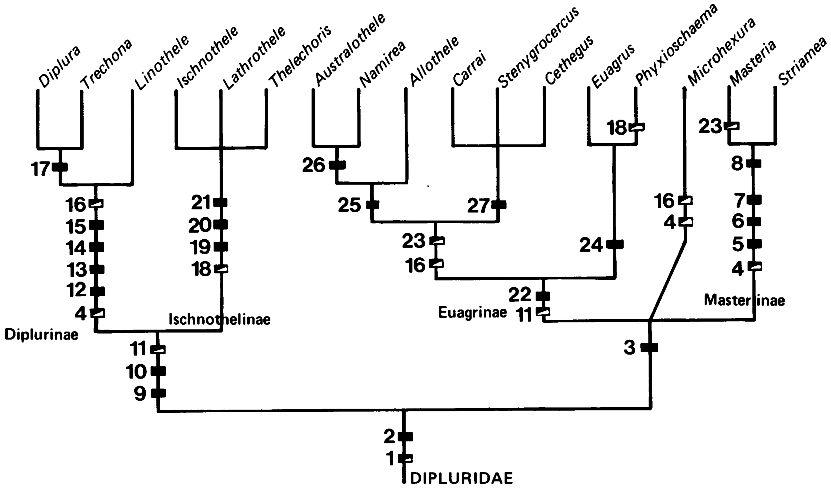


FIG. 6. Cladogram of diplurid genera. Numbers refer to characters in table 7 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

sally excavate—been identified. Thus, the relationships between the three ischnotheline genera cannot be resolved. A sister group relationship of the Ischnothelinae and Diplurinae is supported by two characters found in no other diplurids. Males of both subfamilies have pseudosegmented tarsi and a similar copulatory spur on distal tibia I (characters 9, 10; Raven, 1983a, fig. 2). At least one undescribed species of *Linothele* (in AMNH), all Ischnothelinae, Mecicobothriidae, and *Phyxioschema* (Euagrinae) share the pseudosegmentation of the apical segment of the PLS (character 18; Gertsch and Platnick, 1979; Raven, 1981a, 1983a, 1985). However, *Phyxioschema* and *Euagrus* share a number of unique characters including the complex structure of the tibial spur and associated structures (character 24; see Raven, 1981a, 1983a; Coyle, 1984). Therefore, it is unparsimonious to propose a relationship between the Mecicobothriidae and either of the Ischnothelinae or one species of *Linothele.* Equally, the presence of pseudosegmented apical segments of the PLS in only one species of *Linothele* is insufficient to propose that the character is plesiomorphic in the Diplurinae; thus, it is considered a parallelism in *Phyxioschema,* the Mecicobothriidae, and some *Linothele.*

The remaining taxa—the Euagrinae, *Microhexura,* and the Masteriinae—share the absence of maxillary cuspules (character 3), shown above (Interfamilial Relationships) to be parsimoniously present in the Orthopalpae. The second legs of males of *Allothele, Namirea,* and *Australothele,* like those of *Euagrus* and *Phyxioschema,* have a well-developed coupling spur (character 22), absent in *Stenygrocercus, Carrai,* and *Cethegus* (Raven, 1984b). In contrast, *Microhexura* has a spur only on the first leg (Coyle, 1981b). Within the Euagrinae, Raven (1983b, 1984b) found that the austral genera—*Allothele, Australothele, Namirea, Cethegus, Carrai,* and *Stenygrocercus*—possess an australotheline crescent (character 23; see Terminology), as does *Masteria*; the structure is absent in *Euagrus, Phyxioschema, Striamea,* and *Microhexura.* The third character that contributes to this analysis is the spination of the cymbium (character 16). Within the Dipluridae, the cymbium is spinose in the Ischnothelinae, Masteriinae, *Euagrus,* and *Phyxioschema*; the diplurids with an aspinose cymbium are the Diplurinae, austral Euagrinae, and *Microhexura.*

Coyle (1984) has indicated that males of *Allothele, Euagrus,* and *Phyxioschema* share two synapomorphies—"interlocking spinule patches on male femurs I and II and nonterminal tibia II mating apophysis." I regard only the first as synapomorphic. The second is a default type of character. In any case, *Allothele* and the Australian Euagrinae share two characters—the absence of cymbial spines and the presence of an australotheline crescent (characters 16, 23)—that falsify Coyle's hypothesis. Thus, one further synapomorphy for the Australian Euagrinae is possibly the loss of the femoral spinule patches. Equally, because male *Allothele* lack the double-keeled process on ventral metatarsus II of *Euagrus* and *Phyxioschema* (see Raven, 1981a, fig. 7) and share with *Australothele* and *Namirea* a low process in a similar position (character 25) that condition could be considered an apomorphic reduction of the double keel or some intermediate state.

At this point, several alternative hypotheses are possible. First, the spur on tibia II may be a synapomorphy for the spurred genera (one step), or it may be a synapomorphy for the Euagrinae (excluding *Microhexura*) with one loss in the three unspurred genera (two steps). Parsimoniously, the australotheline crescents in *Masteria* and Euagrinae are considered parallelisms (two steps). The alternative is that the australotheline crescent was acquired once in the Euagrinae and lost three times in *Striamea, Microhexura,* and *Euagrus* plus *Phyxioschema* (four steps). However, acceptance of the unreversed spur as a synapomorphy requires one more step than the spur loss. In itself, the distribution of the spur cannot clarify which hypothesis is more parsimonious. Thus, the contribution of the cymbial spination must be analyzed. The gain of spines on the cymbium in the plesiomorphic diplurids would require three subsequent losses (totally four steps), whereas only three gains need be proposed under the alternative hypothesis. Also, the apomorphic nature of the aspinose cymbium of the Euagrinae is congruent with the unreversed presence of an australotheline crescent. That congruence is considered sufficient to support the monophyly of *Allothele, Australothele, Namirea, Cethegus, Carrai,* and *Stenygrocercus*. Thus, it is presumed that the spur was secondarily lost (character 27) in *Cethegus, Carrai,* and *Stenygrocercus*.

The sister group of *Microhexura* is unclear but like the Masteriinae, it lacks true spines on the tarsi (character 4). However, careful examination of its legs and cymbium indicates that thickened setae on the ventral tarsi of the legs are probably degenerate spines. The absence of maxillary cuspules (character 3) associates the genus with the Euagrinae and the Masteriinae. Only the reduction of tarsal spines to those thickened setae tenuously relates *Microhexura* to the Masteriinae. Hence, I leave *Microhexura* in a trichotomy.

HEXATHELIDAE

HEXATHELID MONOPHYLY: The constitution of the Hexathelidae and its autapomorphy (with a parallelism in the Theraphosidae)—numerous labial cuspules—remain unchanged from Raven (1980b) except for the inclusion of *Mediothele. Mediothele* is considered the probable sister group of *Scotinoecus* because they share the presence of preening combs on metatarsi III and IV. The inclusion of *Mediothele* in the Dipluridae requires an excessive number of homplasies that are discussed above in the intrarelationships of the Ischnothelinae and Diplurinae. In contrast, the inclusion of *Mediothele* in the Hexathelidae requires only the reduction of the number of labium and maxillary cuspules and of a paraembolic apophysis. Pablo Goloboff (MACN) has observed that females of *Mediothele* that he has collected may have no cuspules or only a few on the maxillae and labium.

RELATIONSHIPS OF *ATRAX*: Both the position on the hexathelid cladogram (see Raven, 1980b, fig. 1a) and the familial assignment of *Atrax* are ambiguous because the genus shares several characters with the Rastelloidina. In both *Atrax* and the rastelloids, the caput is elevated; the eye tubercle varies from weakly elevated to distinctly so; the fovea is distinctly procurved; the sternal sigilla may be enlarged; the chelicerae have two rows of teeth; the spinnerets may be quite short; and the leg tarsi are very spinose. However, no classification of the species of *Atrax* has been proposed that allows the polarization of all those characters. Three of them do occur in hexathelids: some species of *Macrothele* (in BMNH) have large posterior sternal sigilla and two rows of teeth on the cheliceral furrow (new observ.); and *Plesiothele* has an arched caput (Raven, 1978). The fovea, although wide and procurved in *Atrax,* is not so much so as in *Cteniza* (fig. 254) or the cyrtaucheniid *Kiama* (Main and Mascord, 1971, fig. 1). Similarly, in *Atrax,* unlike the Rastelloidina, the tarsi of legs I and II are not more spinose than those of legs III and IV, legs I and II are not noticeably more slender than legs III and IV (*cf.* fig. 191), and the spines on legs III and IV are not confined to the upper surfaces (*cf.* fig. 258). Thus, two characters remain to be discussed. The variation in the elevation of the eye tubercle in *Atrax* is ambiguous only because it is not clear whether it is plesiomorphically low to absent or elevated. Similarly, the posterior lateral spinnerets of *Atrax* may be very short or as long as many Hexathelinae (see Forster and Wilton, 1968, fig. 474).

Within the rastelloids, *Atrax* would most parsimoniously be accommodated in the Cyrtaucheniidae, with some of which it shares the presence of a maxillary serrula (in some species), digitiform apical segments of the PLS, multidentate paired claws, and the absence of strong lateral spines on tibiae I and II and of a rastellum. However, within the Cyrtaucheniidae, only the Neotropical Aporoptychinae have both a serrula and digitiform apical segments of the PLS (as in *Atrax*). Equally, *Atrax* lacks three synapomorphies of those Aporoptychinae: the square maxillae, the long labium, and the presence of tarsal scopulae in females. Thus, *Atrax* would have to be accommodated separately from those aporoptychines, and the presence of a serrula would be a parallelism. In addition, the inclusion of *Atrax* in the Cyrtaucheniidae would require five reversals—the loss of a rastellum, the equalization of leg sizes, the very spinose tarsi I and II, the dentate third claw (bare in all rastelloids, save *Bolostromoides*), and the loss of scopulae in females—and two parallelisms—the elevation of an eye tubercle and the biserially dentate cheliceral furrow. Thus, minimally 11 additional steps would be needed to include *Atrax* in the Cyrtaucheniidae; its inclusion anywhere else in the Rastelloidina would require even more steps. In contrast, the inclusion of *Atrax* in the Hexathelidae requires at most five homoplasies—the arched caput, biserially dentate cheliceral furrow, very spinose tarsi I and II, broad procurved fovea, and lower eye tubercle. Other characters are variable within *Atrax*; thus, regardless of which polarity is selected for them, the same number of steps will be involved to accommodate reversals.

MECICOBOTHRIIDAE

MECICOBOTHRIID MONOPHYLY: The monophyly of the mecicobothriids is indicated by the elongate cymbium that encloses the bulb, the pseudosegmented apical segment of the PLS, and the longitudinal fovea, characters that, associated with the elevated eye tubercle, low caput, and modified maxillary lobes, are unique in the Mygalomorphae. The long cymbium is unusual in the mecicobothriids but is similarly long in atypids. Neither the hexathelids, diplurids, nor microstigmatids have such a long cymbium save those in which it is parsimoniously autapomorphic (Ischnothelinae, and also Barychelinae). In any case, those groups lack the palpal configuration of mecicobothriids, excluding them from further consideration. Thus, the distribution of that character does not falsify the hypothesis that the elongate cymbium is apomorphic in mecicobothriids and I will proceed on that assumption. In atypids, the cymbium encloses the bulb in the same way as in araneomorphs and mecicobothriids (Gertsch and Platnick, 1979) but is elongate only in *Atypus* and *Sphodros.* Platnick (1977) and Gertsch and Platnick (1979) considered that the elongate PLS and the serrula were synapomorphies for the Mecicobothriidae plus Dipluridae. However, only two diplurids (*Phyxioschema* and some *Linothele*) have the similarly pseudosegmented apical segment of the PLS. Most diplurids, as herein defined, nevertheless have the elongate PLS but as a result of an overall elongation of all three segments, rather than solely of the distal segment as in the mecicobothriids.

MECICOBOTHRIID INTRARELATIONSHIPS: Gertsch and Platnick (1979) gave two characters indicating that *Hexurella* is the sister group of all other mecicobothriids. Two more characters congruent with those are added here: males of all genera but *Hexurella* have pseudosegmented tarsi and a long embolus (Gertsch and Platnick, 1979); and in *Hexurella* the apical segment of the PLS is bipartite and pseudosegmented, whereas in other genera it is only pseudosegmented, and the distal haematodocha is not evident and may be absent. Pseudosegmented tarsi have a limited occurrence in other groups and other evidence indicates that it is independently derived in males of mecicobothriids, atypids, ischnothelinids, diplurinids, most antrodiaetids, and some pycnothelinids and anaminids, and also in female diplurinids, and *Stanwellia, Mygaloides, Diplothelopsis,* and most *Acanthogonatus* (all Nemesiidae).

The long embolus is not unusual in the mecicobothriids (save *Hexurella*) but is similarly long in atypids. No other mygalomorphs have such a long embolus, save those genera in which they are parsimoniously autapomorphic (Ischnothelinae, Macrothelinae). The unusual palpal configuration of mecicobothriids excludes those groups from further consideration. Thus, the elongate embolus is presumed apomorphic in mecicobothriids, save *Hexurella.*

The presence of a third haematodocha was considered elsewhere (Character Analysis, Palpal Bulb) to be plesiomorphically retained from the Mesothelae in the Atypoidina, Mecicobothriidae, and probably also in the Microstigmatidae. Its apparent presence in *Neocteniza* and other idiopids is considered an unrelated extension of the second haematodocha, isolated to form a false third. Thus, its absence or reduced state in *Mecicobothrium* and *Hexurella* is presumed apomorphic.

Among mygalomorphs, the quadri-articulated PLS are known otherwise only in the atypids (Gertsch and Platnick, 1980) and, following Gertsch and Platnick (1979), are presumed autapomorphic in *Hexurella.* Thus, the monophyly of all mecicobothriids, save *Hexurella,* is supported by two characters—the pseudosegmented tarsi of males and the long embolus—that would require reversals should they be considered apomorphic in the Mecicobothriidae.

I cannot improve upon Gertsch and Platnick's (1979) suggestion that *Megahexura* and *Hexura* share a synapomorphy in the spinose chelicerae of males. Because their additional suggestion—that the condition in *Mecicobothrium* is a further transformation—cannot be dismissed I can only follow their implication and leave *Mecicobothrium-Megahexura* plus *Hexura* as a trichotomy and the sister group of *Hexurella.*

MICROSTIGMATIDAE

MICROSTIGMATID MONOPHYLY: Microstigmatids are characterized by four autapomorphies—the booklung apertures are round, rather than oval; the thorax is elevated as high behind the fovea as the caput; the apical segments of the PLS are domed; and the cuticle is pustulose or scaly, not smooth as in most mygalomorphs. The combined presence of those characters is unique to the Microstigmatidae but, apart from the round booklung apertures, which I consider neotenic, all others are found in other mygalomorph groups. The monophyly of the Microstigmatidae is nevertheless unequivocal. Raven and Platnick (1981) and Platnick and Forster (1982) have completely analyzed the interrelationships of the respective genera.

In this analysis, the origin of maxillary and labial cuspules is considered to be a parallel acquisition in the Rastelloidina, Orthopalpae, and some atypids and microstigmatids; the less parsimonious alternative is one gain in the Mygalomorphae with several losses. However, depending on the intrarelationships of *Microstigmata* (which will be analyzed by C. Griswold in his pending revision), that hypothesis—at least in the Tuberculotae—will need to be re-assessed. The highly developed serrula of *Micromygale* is considered one of its autapomorphies; equally, parsimony dictates that the reduction of a serrula to ridged scales in *Ministigmata* (Raven and Platnick, 1981, fig. 26) is a reversal.

FORNICEPHALAE

MIGIDAE

MIGID MONOPHYLY: In a recent revision of the actinopodid genus *Neocteniza,* Platnick and Shadab (1976) proposed that the vertical inclination of the chelicerae was the migid autapomorphy. That may well be but after examining representatives of most migid genera, I am able to propose a more definitive character. Along the length of the outer surface of the cheliceral fangs are two low keels or ridges near the fang edge. That character occurs in all migid genera and the only remotely similar condition occurs in the Actinopodidae and Mesothelae. In the Actinopodidae, the fangs have rounded lateral extensions of the dorsal (outer) surface that recurves back under; they are not keels as in the Migidae. In the Mesothelae, the keels are much lower and in any case could not parsimoniously be considered synapomorphic with the migid condition. The keeled fangs of the Migidae are therefore an additional synapomorphy. Other synapomorphies, evident in the elucidation of their sister group, are the broad, recurved and tripartite fovea, and arastellate chelicerae. The plesiomorphic conditions for rastelloids are the strongly procurved fovea and the presence of a rastellum.

The Migidae fall into three groups. The Paramiginae have an excavate third tibia (with parallelisms in the Idiopinae and Pachylomerinae) and the caput is raised higher than the thorax (Schiapelli and Gerschman, 1973b). Although the excavated tibia occurs in two other groups, the possibility that it was acquired only once in the mygalomorphs and lost in all save three groups would introduce numerous extra steps. Thus, the character is also considered apomorphic in this group. In the Atypoidina and plesiomorphic rastelloids (Cyrtaucheniidae and Idiopidae) and in the Ctenizidae and Actinopodidae, the plesiomorphic condition of the caput is that it is elevated above the thoracic region. Thus, this condition—caput and thoracic region equally high, at least near the fovea—is considered apomorphic with a parallelism in the Microstigmatidae and some Barychelidae.

In the Miginae, the thorax is raised as high as the caput, and a small basal tooth occurs between the two longitudinal keels on the outer fang (see Raven, 1984c and Benoit, 1962, fig. 1). Such a tooth is also found in the hexathelid *Mediothele* (Raven and Platnick, 1978) and in some atypids (Gertsch and Platnick, 1980). Again, to assume other than that the tooth is a migine autapomorphy is highly unparsimonious.

The Calathotarsinae appear to lack a synapomorphy and share only the plesiomorphically raised caput (see Raven, 1984c, figs. 12, 13) of the Paramiginae. Thus, no cladogram is presented.

ACTINOPODIDAE

ACTINOPODID MONOPHYLY: The Actinopodidae herein include only *Actinopus* and *Missulena* which share a number of unique characters or combinations. Probably the most evident are the maxillae which are square or at least subquadrate; the plesiomorphic condition in mygalomorphs (fig. 10; as in the Mesothelae) is rectangular maxillae. Correlated with the maxillary shape are the very elongate labium and short diagonal fang. Those three conditions are approached otherwise only in the cyrtaucheniid Aporoptychinae. However, given the numerous differences in apomorphic states between the Aporoptychinae and the Actinopodidae, it would be very unparsimonious to consider the two as sister groups. Thus, the subquadrate maxillae, the elongate labium, the short diagonal fang, and associated short fang groove are considered actinopodid autapomorphies.

CTENIZIDAE

CTENIZID AUTAPOMORPHIES: As constituted here, the Ctenizidae are characterized by the presence of stout curved spines on the lateral faces of the anterior pairs of legs of females and none of the autapomorphies of either the Actinopodidae or Migidae. With the exception of the Pachylomerinae, no character apomorphic with respect to more plesiomorphic families or absent in the Migidae and Actinopodidae is known for the Ctenizidae. Possibly, as the Holarctic ctenizids are revised such a character may emerge. At present I have assumed that the curved thornlike form of the spines on the lateral surfaces of the anterior legs is apomorphic for the Ctenizidae.

Within the Ctenizidae, three groups are readily distinct. First, the Pachylomerinae have a distinct eye tubercle and an excavate third tibia. Because the tubercle is plesiomorphically absent in the Fornicephalae and in migids, actinopodids, and most other ctenizids, I conclude that its presence in the

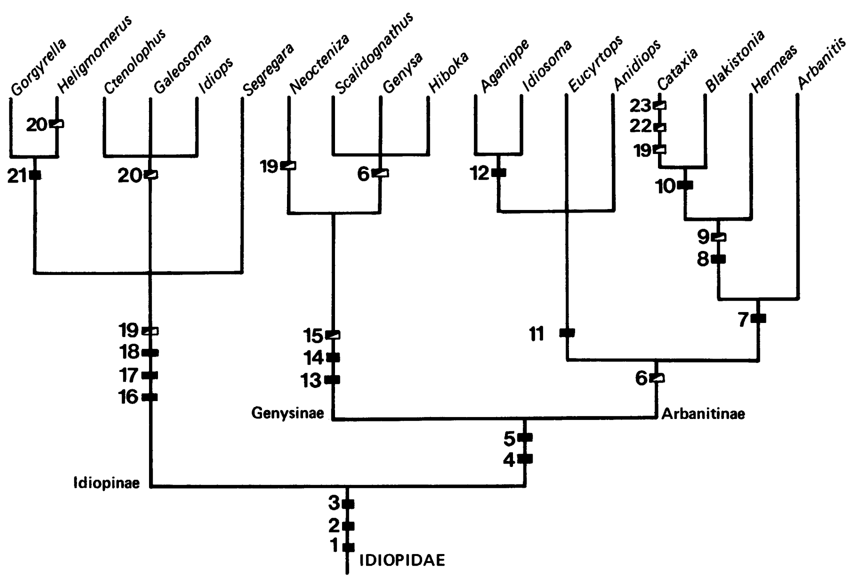


FIG. 7. Cladogram of idiopid genera. Numbers refer to characters in table 8 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

Pachylomerinae is apomorphic. Also, the excavate third tibia is otherwise known only in the Paramiginae and one idiopine genus and is thus presumed apomorphic in the Pachylomerinae, with a parallelism in the Idiopinae.

The second group is *Cyclocosmia* plus *Latouchia,* which share the presence of a distinct clypeus with the Pachylomerinae, and *Latouchia* and the Pachylomerinae share the presence of an eye tubercle. Thus, because both of those characters are plesiomorphically absent in the Ctenizoidina, they are presumed apomorphic, and the sister group of the Pachylomerinae is *Latouchia*; the sister group of those taxa is *Cyclocosmia* (which would indicate that its recognition as a subfamily may be warranted). The third group is *Aepycephalus* plus *Stasimopus,* which share an unusually distinct and produced anterior lobe on the maxillae. The remaining taxa cannot be resolved into further monophyletic groups because insufficient material is available; hence, no cladogram is presented.

IDIOPIDAE

Figure 7; table 8

IDIOPID MONOPHYLY: Three unique characters indicate the monophyly of the Idiopidae. First, the distal sclerite of the male palpal bulb, rather than being an attenuate cone as in most mygalomorphs, is open along one side so that the second haematodocha extends down the bulb almost to the embolus tip (character 1). No similar condition is known in any other mygalomorphs. The possibility that it is a plesiomorphic retention from the Mesothelae in which the predistal sclerite is an incomplete ring is very unparsimonious. Apart from requiring homoplasies in several rastelloid characters, such a hypothesis would also require yet another loss or fusion of the distal sclerites and the loss of the third haematodocha of the mesothelid palp.

The second character putatively unique to the Idiopidae is the conformation of one of the lobes of the male palpal tarsus or cymbium (character 2). In most mygalomorphs, the cymbium is not distally incised or if so the lobes are short and similar. In the Idiopidae, one of the lobes is rounded, whereas the other is almost acutely pointed. Dimorphic lobes also occur in other groups but that particular conformation seems unique to the Idiopidae.

The third character is the unusual excavation on the prolateral palpal tibia of the males that is usually highlighted by a region of short thornlike spines (character 3; Gerschman and Schiapelli, 1963, fig. 4) in the Idiopinae and Genysinae. In the Arbanitinae, those spines are raised on one or two processes of some length and the positions of those processes convey overall a crescent-shaped area (character 17). No similar condition occurs in any other mygalomorph group; thus, I consider that the configuration of the modified spines on the palpal tibia is another idiopid autapomorphy.

The Idiopinae are a very uniform and distinctive group of rastelloids in which the anterior lateral eyes are set close together on the clypeal edge (character 16; Gerschman and Schiapelli, 1963, figs. 1, 2), as in the Barychelinae. The remaining eyes are set well back on a low common mound. The intrarelationships of the Idiopinae have been intensively discussed by the South African arachnologist Hewitt (1916, 1919) who disagreed vigorously with Tucker (1917) but no consensus was reached. I do not intend to continue that discussion and intensively examine idiopine affinities because without revisions the relationships of the genera cannot be readily resolved. Nevertheless, the polarities of certain characters are immediately evident. The question that remains to be answered is whether the presence of those characters is significant at the species level or higher.

In most mygalomorph genera (including the idiopid subfamilies Genysinae and Arbanitinae), the posterior sternal sigilla are distinctly present but may be small and marginal. The absence of posterior sigilla in more derived Idiopinae is unique and presumed apomorphic. (Many migids lack all save the posterior sigilla.) Hewitt (1919) maintained that because the sigilla could be present or absent in one species of *Acanthodon* (=*Idiops*) the character was uninformative. The significance of his claim cannot be assessed without a revision of the group. However, one obvious possibility is that his species were paraphyletic assemblages. In any case, as far as I can determine parsimony is not violated by the hypothesis proposed here that the absence of the posterior pair of sternal sigilla in all Idiopinae, save *Segregara* and *Gorgyrella,* is considered apomorphic.

TABLE 8

Idiopid Synapomorphies for Cladogram in Figure 7[a]

1. Palpal bulb with distal sclerite open and second haematodocha extensive [sclerite closed, haematodocha small].
2. Cymbial lobes incised, with one lobe pointed [cymbium not incised or both lobes similar].
3. Male palpal tibia with short thornlike spines [spines elongate, normal].
4. Unique conformation of tibial spur.
5. Conformation of processes of male palpal tibia [processes absent].
6. Leg scopulae of females present [absent].
7. Fovea of males more or less straight [strongly procurved].
8. Fovea of females more or less straight [strongly procurved].
9. Caput not steeply arched [arched steeply].
10. Eye group subquadrate [transversely rectangular].
11. Labium short and wide [almost subquadrate].
12. Dorsal abdominal sigilla present [absent].
13. Fovea of males and females recurved [strongly procurved].
14. Eye group at least three times wider than long [twice wider than long].
15. Patella III with distinct comb of spines [comb absent or spines disordered].
16. Posterior and median eyes distant from anterior laterals [all grouped].
17. Spinules on male palpal tibia in crescentic area [disordered].
18. Unique conformation of tibial spur.
19. Tarsi I and II strongly spinose [weakly spinose, if at all].
20. Posterior sternal sigilla absent [present].
21. Distal chelicerae with narrow process [normal, rounded].
22. Tarsal scopulae of females reduced or absent [well developed].
23. Rastellum weak or absent [present].

[a] Plesiomorphic state in brackets.

The saddle-shaped third tibia of *Heligmomerus,* otherwise characteristic and unique in the paramigine migids and pachylomerine ctenizids, and the narrowed anterior region of the chelicerae (character 21) of *Heligmomerus* and *Gorgyrella* are unique within the Idiopidae, and are therefore considered apomorphic. Similarly, only in *Ctenolophus* is the outer row of cheliceral teeth lacking. Like the loss of the posterior sigilla, the absence of that tooth row is considered apomorphic, though for a different reason. As indicated by outgroup comparison with atypoids and cyrtaucheniids, the absence of the outer row is plesiomorphic. With two exceptions, *Cteno-*

lophus and some species of *Hermeas* (=*Dyarcyops*), all Idiopidae have two rows of cheliceral teeth although the teeth of the outer row are commonly smaller than the inner. No other evidence indicates that either *Ctenolophus* or *Hermeas* is the most plesiomorphic of the Idiopinae, or the Genysinae and Arbanitinae, together or separately. Therefore, the hypothesis that those genera have retained the plesiomorphic condition of only one row of teeth on the cheliceral furrow is untenable and must be rejected in favor of the more parsimonious alternative—the absence of teeth on the outer furrow of the chelicerae is presumably apomorphic and a reversal.

In all Idiopinae, Ctenizidae, and Actinopodidae, and most Cyrtaucheniidae, the fovea is strongly procurved, and in all (save the Cyrtaucheniidae) the anterior tarsi bear strong spines. Thus, it would appear that the reduced tarsal spination of the Genysinae and Arbanitinae (save *Neocteniza* and *Cataxia*) is apomorphic. Two alternatives are equally parsimonious. The first requires one gain in the Domiothelina and one loss in the Arbanitinae plus Genysinae; the second would need two parallelisms—one in the Idiopinae and one in the Ctenizoidina. Outgroup comparison favors the latter which also minimizes reversals and is therefore accepted. (Within the Arbanitinae and Genysinae, I later show that the spinose tarsi of *Cataxia* and *Neocteniza,* respectively, are their autapomorphies.)

ARBANITINAE: The arbanitine genera are a morphologically very homogeneous group and are endemic to Australia. Two structures are present in males of most genera. First, the tibial spur consists of two short curved cuticular processes, each with a group of short curved spines clustered together like the fingers of a hand (character 4; see Main, 1983a, fig. 9). Second, the retrolateral face of the palpal tibia has two attenuate cuticular processes (character 5); the most distal is usually spinose (see Main, 1983a, figs. 20, 21, 24–26). Those structures are unique in the Arbanitinae although possible precursors to both occur in *Genysa* (Simon, 1903a, figs. 1061, 1062). All genera include males that possess those characters. However, in *Arbanitis longipes* (L. Koch), the type species, the spur is absent. Because the spur is present in other *Arbanitis* species differing in little else, that absence in *A. longipes* is considered a species autapomorphy. Hence, the conformation of the tibial spur and palpal processes represent unequivocal synapomorphies for the Arbanitinae.

"HOMOGONINAE": Main (1983a) elevated the Australian "ctenizid" genus *Homogona* to a subfamily, and recognized otherwise only the nominate subfamily Ctenizinae. That promotion seems entirely based upon the absence of a rastellum in *Homogona* (p. 81): "I suggest that the definition of the Ctenizidae should be broadened to encompass genera which lack a rastellum. The Homogoneae Rainbow (1914) are here elevated to subfamilial rank and placed in the Ctenizidae, and at present contain only *Homogona.*" However, Simon (1892a, 1903a) had already included genera lacking a rastellum in his Ctenizidae and in the male of *Cataxia maculata* Rainbow (1914) (the type species of *Cataxia*), the rastellum is reduced to "very thin tapering spines (Fig. 18)" that are scarcely more than bristles and indifferentiable from the condition in *Homogona pulleinei* Rainbow (1914) (the type species of *Homogona*).

Main (1983a) then diminished the significance of the presence of a rastellum on the epistemological grounds that it is an adaptive character. (The hypothesis that a character is adaptive seems difficult to falsify in any particular case.) In my discussion of cyrtaucheniid intrarelationships, the absence of a rastellum was considered of significance at only the species or genus level. Nevertheless, the elevation of the Microstigmatidae (Raven and Platnick, 1981) was used by Main (1983a) as implicit support for the importance of a rastellum being absent. However, Raven and Platnick (1981) showed that the Microstigmatidae have no sister group below the family level and supported that with a number of characters—the presence of a serrula, the complete absence of tarsal spines, the reduced booklung apertures, the elevated thoracic region, and the multidentate claws. In contrast, *Homogona* and *Cataxia* are so similar that I consider them synonymous. They share the shorter back (rather than front) row of eyes (with the notable exception of only the female of *Cataxia spinipectoris* Main, in which the configuration of the male's eye group is similar to that of other congeners), the same spinose tibial processes on the male palp, and similar palpal bulbs, spinose legs, and tibial spurs. The two "genera" differ only in that some species placed in *Cataxia* have a reduced rastellum (absent in other species) consisting of a few long distal spines that are completely absent in the former, and also that all known *Cataxia* species add a trapdoor to the burrow whereas the burrow of *Homogona pulleinei* Rainbow is "closed" by the weight of the unsupported entrance. *Cataxia* (in its revised state) is characterized by the following three autapomorphies: the cheliceral rastellum is reduced or absent, the back row of eyes is narrower than the front, and the scopulae on the anterior tarsi are replaced by strong lateral spines. In all other Arbanitinae, the eye rows are as wide behind as in front or wider behind (save *Blakistonia*), and the anterior tarsi are scopulate, if only lightly. Thus, the "Homogoninae" are widened to include *Cataxia* and are themselves placed in the synonymy of the Arbanitinae.

I recognize four genysine genera—*Genysa, Hiboka, Scalidognathus,* and *Neocteniza.* Two characters are presumed apomorphic in all Genysinae. First, the fovea is broad and recurved (character 13); outgroup comparison with the Idiopinae and other rastelloids indicates that the plesiomorphic condition is a procurved fovea. Second, the eye group of the Genysinae is more than twice as wide as long (character 14); because that is unique in the Idiopidae it is considered apomorphic. Against that, *Genysa* has a similar spur type to that in the Arbanitinae although the accessory spines are slightly different. That similarity is an indication that *Genysa* alone may be the sister group of the Arbanitinae. The males of only one species of *Hiboka* and *Scalidognathus* are known; those males have no tibial spur and a single spur (fig. 179), respectively. Until more is known of those genera, I cannot be certain to what extent the differences in those spur states are informative. Because the strongly recurved fovea and the wide eye group are congruent and are presumed apomorphic, I consider the Genysinae a monophyletic group.

At present, the inclusion of *Neocteniza* in the Genysinae requires either that the Genysinae gained tarsal scopulae and *Neocteniza* lost them or that the scopulae were acquired independently in the Genysinae, save for *Neocteniza,* and the Arbanitinae; that the tarsi of *Neocteniza* independently became more spinose (characteristic of the Ctenizoidina, but with parallelisms in the Idiopinae and *Cataxia*); and that the distal sclerite of the palpal bulb has partially reclosed through an incomplete basal sclerotization. In the case of the scopulae, it is equally parsimonious to assume original absence with one gain in the Genysinae plus Arbanitinae and one loss in *Neocteniza.* I opt to minimize reversals and consider the scopulae parallel acquisitions. I am unable to ascertain whether one idiopid synapomorphy, the angular cymbial lobe, is present in any of the Argentine species being described by P. Goloboff in *Neocteniza.* If it is not, then three autapomorphies would be attributed to *Neocteniza.*

The monophyly of the Arbanitinae plus Genysinae is indicated by the similar processes (spurs) on the first tibiae of males. However, the absence of any tibial spur in *Hiboka,* the type species of *Arbanitis,* and *Neocteniza* requires the proposal of at least three reversals. Alternatively, that hypothesis can be falsified through a revision of *Arbanitis,* and the Afro-Indian Genysinae in which I predict the sister groups of the spurless taxa will be spurred. Thus, the absence of a spur in itself would not warrant generic status.

CYRTAUCHENIIDAE

Figure 8; table 9

CYRTAUCHENIID MONOPHYLY: Three characters are possible cyrtaucheniid autapomorphies but all are ambiguous. Scopulae are present, albeit weakly in some, on tarsi I and II of all cyrtaucheniine genera, except *Kiama* and *Rhytidicolus* in which their acceptance as reversals (character 13) is most parsimonious. Thus, rather than propose four separate acquisitions of the scopulae in the Euctenizinae, Cyrtaucheniinae, *Acontius,* and the serrulate Aporoptychinae, I propose that the presence of tarsal scopulae is synapomorphic for the Cyrtaucheniidae with two intrafamilial losses and two parallelisms in the idiopid Arbanitinae and Genysinae.

The second character, found in genera of

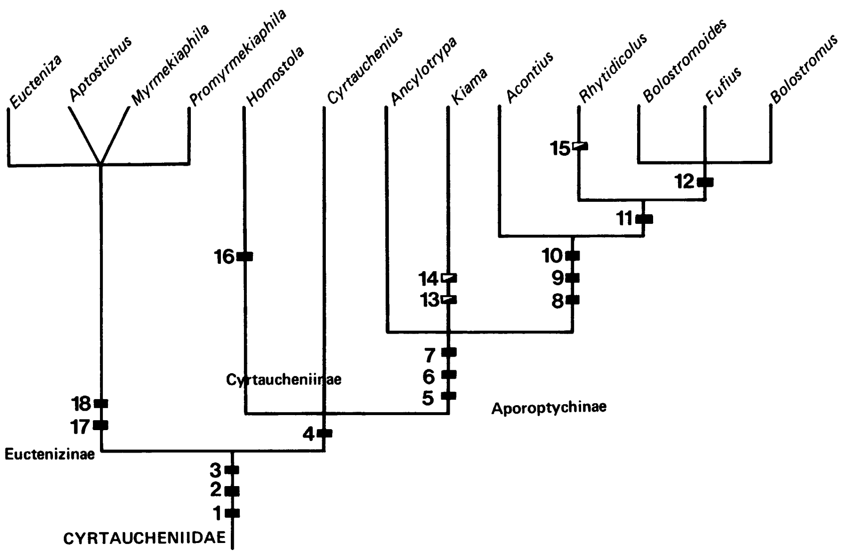


FIG. 8. Cladogram of cyrtaucheniid genera. Numbers refer to characters in table 9 that are discussed in text. Solid rectangles indicate synapomorphies without homoplasies within the family; only upper triangle solid indicates a parallelism; only lower triangle solid indicates a reversal.

all cyrtaucheniid subfamilies, is the presence of multilobular spermathecae (character 2) and is not known in the Ctenizidae, Migidae, Actinopodidae, or Idiopidae; nor is it plesiomorphically present in the Atypidae, Antrodiaetidae, Mecicobothriidae, or Hexathelidae. Otherwise, the character occurs only in isolated genera or species (e.g., *Porrhothele,* Hexathelidae; Forster and Wilton, 1968). Therefore, I propose that multilobular spermathecae are synapomorphic for the Cyrtaucheniidae with reversals in *Kiama* and some *Ancylotrypa.*

The third and weakest character is that the spination of tarsi I and II, which is strong in the outgroups Atypidae and Antrodiaetidae, is reduced (character 3) in all cyrtaucheniids, save *Rhytidicolus.* In the Idiopidae, Atypidae, Antrodiaetidae, and more so in Ctenizidae, Migidae, and Actinopodidae, the spines on the anterior legs are quite strong (and become further modified in the Ctenizidae and Migidae); thus, parsimony forces the conclusion that the weaker spination is an apomorphic reduction. However, it occurs a number of times in the Idiopidae, in which it was presumed apomorphic, and may be also in the Cyrtaucheniidae.

CYRTAUCHENIID SUBFAMILIES: The cyrtaucheniids fall into three groups. All Aporoptychinae (*sensu* Simon, 1892a) have maxillae that are subquadrate if not wider than long, and the labium is also subquadrate to longer than wide. The Euctenizinae have very short spinnerets, their caput is lower than in most other cyrtaucheniids, and their paired claws are scarcely denticulate. The remaining genera require analysis to establish their affinities.

The Aporoptychinae include *Acontius* (=*Aporoptychus*), *Bolostromus, Bolostromoides, Rhytidicolus,* and *Fufius* all of which share the unusual conformations of the labium and maxillae, the short diagonal fang (characters 8–10), and the associated short fang groove which are approached otherwise only in the Actinopodidae. Within the Aporoptychinae, three Neotropical genera—*Bolostromus, Bolostromoides,* and *Fufius*—possess a distinct serrula (character 12), which is their synapomorphy. The serrulate genera and *Rhytidicolus* share an unusually low and flattened labium (character 11); *Acontius* has a distinctly domed labium, as in other cyrtaucheniids and most mygalomorphs and which is therefore considered plesiomorphic.

The monophyly of the Euctenizinae is indicated by the shared presence (in all genera) of the stout conformation of the male palpal bulb and the bifid basal tooth on the paired claws of females (characters 17, 18)—characters absent in all other cyrtauchenids. Presumably, the plesiomorphic condition of the paired claws of females is that in the Tuberculotae and Antrodiaetidae—a sigmoid line of a few short teeth. Thus, the acquisition of biserially dentate claws (character 4) is presumably synapomorphic for all cyrtaucheniids excluding the Euctenizinae. Two other alternatives are less parsimonious: the biserially dentate claws are synapomorphic for the Cyrtaucheniidae with a loss in the Euctenizinae (two steps); or, they were acquired at least twice in each of the Cyrtaucheniinae and Aporoptychinae independently.

Four genera—*Kiama, Ancylotrypa, Cyrtauchenius,* and *Homostola*—remain to be placed. *Kiama* and *Ancylotrypa* share three characters with the Aporoptychinae. First, in both genera, the tooth rows on the paired claws are juxtaposed (character 5), whereas in *Homostola* and *Cyrtauchenius,* the "rows" are sequential—the outer rows arise on the ectal face of the claw and the inner rows on the ental face. That sequential arrangement is presumably derived from the plesiomorphic S-shaped row by the loss of teeth medially on the claws, i.e., the teeth that cross the claw and join the rows. I propose that the juxtaposed rows are derived from the sequential arrangement by the gain of opposed teeth on the STC.

A second character shared by *Ancylotrypa, Kiama,* and the Aporoptychinae is the digitiform apical segment of the PLS (character 7). The presumed plesiomorphic condition—that found in the Euctenizinae, *Cyrtauchenius, Homostola* and some *Ancylotrypa*—is that the PLS are short with a triangular apical segment. The triangular tipped PLS of some species of *Ancylotrypa* is either a reversal or a plesiomorphic retention; only by a revision of the genus can a choice be made.

The third character indicating the affinities of the unplaced genera is the number of teeth on the claws. Whereas *Homostola* and *Cyrtauchenius* have few (2–3) teeth on each face of each claw, *Ancylotrypa, Kiama,* and the Aporoptychinae have several (5–9) per row or face. The more numerous condition (character 6) is considered apomorphic because the rows must have extended beyond the distal-proximal condition that is plesiomorphic. The reduced dentition in *Rhytidicolus* (character 15) is parsimoniously considered a reversal.

TABLE 9

Cyrtaucheniid Synapomorphies for Cladogram in Figure 8[a]

1. Tarsi I and II of females with scopulae [absent].
2. Spermathecae multilobular [unilobular].
3. Tarsi I and II of females not or weakly spinose [more spinose].
4. Teeth on medial part of paired claws absent [present].
5. Tooth rows on paired claws juxtaposed [not].
6. Numerous teeth in each row of paired claws [few teeth per row].
7. Apical segment of posterior lateral spinnerets digitiform [triangular].
8. Fang short and diagonal [long and paraxial].
9. Labium relatively long [short or subquadrate].
10. Maxillae square or subquadrate [rectangular].
11. Labium flat in cross-section [domed].
12. Maxillary serrula present [absent].
13. Scopulae on tarsi I and II absent [present].
14. Rastellum absent [present].
15. Few teeth on paired claws [teeth numerous].
16. Apical segment of posterior lateral spinnerets domed [triangular].
17. Paired claws of females with bifid basal tooth [tooth absent].
18. Unique conformation of male palpal bulb.

[a] Plesiomorphic state in brackets.

Another character that may be a synapomorphy for *Ancylotrypa, Kiama,* and the Aporoptychinae (but is not included on the cladogram) is that the palpal claw of females has teeth only on the prolateral face. The plesiomorphic condition—found in most other cyrtaucheniids, the Atypoidina, all plesiomorphic Fornicephalae and Tuberculotae, and the Mesothelae—is that the teeth are located medially on the claw.

Thus, *Ancylotrypa, Kiama,* and the Aporoptychinae share four possible synapomorphies (characters 4–6). Rather than propose another name for *Ancylotrypa* and *Kiama,* I have widened the Aporoptychinae to include them as *incertae sedis* and retain only the nominate tribe within the subfamily. *Homostola* and *Cyrtauchenius* share with the Aporoptychinae only the loss of medial teeth on the paired claws (character 4). The shared apomorphic presence of the biserially dentate cheliceral furrow in *Homostola* and *Eucteniza* must be dismissed as parallelism. The alternative would introduce three homoplasies (characters 4, 17, 18). Similarly, the absence of a rastellum (character 14; considered by Main [1983a] sufficient to recognize the "Homogoninae") in *Kiama, Fufius,* and some species of *Acontius* and *Bolostromus* must be attributed to parallelisms; otherwise the result would be much less parsimonious.

ATYPIDAE

ATYPID MONOPHYLY: The three atypid genera (*Atypus, Calommata, Sphodros*) share four synapomorphies: the very elongate, curved maxillary lobes, the broad and obliquely truncated posterior median spinnerets (Gertsch and Platnick, 1980), the rotated nature of the maxillae, and the teeth on the paired and unpaired claws of males and females are raised on a common process giving the appearance of one multipectinate tooth. Lehtinen (1980) stated that trichobothria are absent on atypid tarsi; however, I have observed one trichobothrium on an atypid tarsus. Thus, the total absence of trichobothria on the tarsi cannot be considered a synapomorphy of antrodiaetids and atypids but the almost complete absence in both can be so claimed.

The length and shape of the atypid maxillary lobe are unparalleled in spiders, even in the Araneomorphae. Also, the maxillae are rotated forward through 90° such that the original posterior and vertical face is now ventral and horizontal; no such strongly rotated condition occurs in any other mygalomorph group. Similarly, the condition of the atypid claws is approached in the mygalomorphs only by the Masteriinae in which only the third claw is similarly dentate. Males with pseudosegmented tarsi are also found in all antrodiaetids and mecicobothriids, save *Hexurella*; a more complete list is given in the discussion of mecicobothriid interrelationships. The atypid condition is considered either one of their autapomorphies or is shared with the Antrodiaetidae, with a reversal in *Aliatypus*; the latter is more parsimonious.

Sphodros and *Atypus* have less elongate maxillary lobes than *Calommata* but share two unequivocal synapomorphies: the cymbium is short and acuminate, and the sternal muscle attachments (sigilla) that in most mygalomorphs and *Calommata* form a continuous labiosternal suture anteriorly on the sternum, have migrated posteriorly. In *Calommata,* the cymbium is short and truncate, as in the Antrodiaetidae. Thus, I consider *Calommata* the sister group of *Sphodros* plus *Atypus.*

ANTRODIAETIDAE

ANTRODIAETID MONOPHYLY: Two characters are possible autapomorphies for the Antrodiaetidae. First, unlike the Atypidae, Mesothelae, and plesiomorphic Tuberculotae, the antrodiaetid third claw lacks teeth (but so does that of Rastelloidina and Crassitarsae, in each of which it is considered a parallelism). Second, the form of the fovea is distinct from that of atypids, all Rastelloidina, and all Tuberculotae, save possibly for the mecicobothriids and the diplurids *Microhexura* and *Carrai.* If the conditions are similar the antrodiaetid condition cannot, without considerable loss of parsimony, be considered homologous with those in the Tuberculotae. The antrodiaetid fovea may be longitudinal, pitlike, or totally absent; the latter arose presumably through the closure of the pitlike form. Apart from those characters, the antrodiaetids are characterized by the combination of plesiomorphic retentions, shared also with the atypids, and none of the atypid autapomorphies.

Coyle (1971) suggested that, with some reservations perhaps at the species level, *Atypoides* plus *Antrodiaetus* is the sister group of *Aliatypus.* I concur with that hypothesis and consider that the two possible synapomorphies of *Atypoides* and *Antrodiaetus* are the reduction of the anterior lateral spinnerets and the acquisition of an anterodorsal process on the chelicerae of males. Coyle (*in litt.*) suggests that the strongly developed inner conductor that surrounds the embolus is another synapomorphy for those two genera. *Antrodiaetus* and *Atypoides* also share the presence of pseudosegmented tarsi of males, found also in atypids. It is as parsimonious to propose one gain in the Atypoidina, with a reversal in *Aliatypus,* as it is to propose two gains, one in *Antrodiaetus* plus *Atypoides* and one in the atypids. I accept the reversal because that hypothesis is congruent with two others. A character apparently conforming with that distribution is the similar conformation of the bulb in *Antrodiaetus* and *Atypoides.* But that conformation is also found in *Sphodros coylei* Gertsch and Platnick which I have previously (Character Analysis, Palpal Bulb) considered the most plesiomorphic condition in mygalomorphs including atypoids.

A CRITIQUE

Several groupings in the foregoing classification, by virtue of the equivocal nature of their synapomorphies, require special consideration. The first is the Microstigmatidae plus Mecicobothriidae. The basal position of the Mecicobothriidae is in little doubt; their association with the Microstigmatidae is misleading. The reason, as already suggested, that the two families appear to be sister groups is that several microstigmatid characters—the round booklung apertures, the monoserial dentition of the claw, the aspinose leg tarsi, and the terminal and "parallel" insertion of the palpal bulb—that are putatively neotenic, prevent the microstigmatids from being placed higher in the cladogram (fig. 1). In adult mygalomorphs, the booklung apertures are broadly slitlike, whereas in microstigmatids and juvenile mygalomorphs they are round. Plesiomorphically, the paired claws have one row of teeth, and the tarsi are aspinose—characters found otherwise only in juveniles. Of the other characters in microstigmatids, only the elevated eye tubercle, slender legs, and serrulate maxillae are apomorphic and indicate affinities with the Tuberculotae.

The combination of an elevated thorax and short PLS with the apical segment domed is found also in barychelids, nemesiids, and the Miginae. The remaining characters of interest—biserially dentate paired claws and pustulose or scaly cuticle—are synapomorphic for the Microstigmatinae (Raven and Platnick, 1981, figs. 5–16) but are found also in the Ixamatinae (Nemesiidae; Raven, 1981c). The possibility that the microstigmatids are closely related to one or both of the Barychelidae or Nemesiidae is indicated also by the concentrically ridged tarsal organ and corrugiform bothria. In the most plesiomorphic microstigmatid *Micromygale,* the bothria are deeply corrugiform and the tarsal organ has deep concentric ridges typical of the Dipluridae (see Gertsch and Platnick, 1979, fig. 18). In contrast, genera of its sister group, the Microstigmatinae, have an elevated tarsal organ (Raven and Platnick, 1981, figs. 29–36) and bothria that are either smooth and collariform or corrugiform with very shallow grooves.

The relationships of the Microstigmatidae can thus be determined only by ignoring the apparently neotenic characters and using what characters remain; but that would violate parsimony. However, most of the remaining characters are polythetic. The number of spinnerets varies from six, to four, or two; the paired claws are uniserially or biserially dentate; the serrula, cuspules, and palpal conductor are present or absent. The most apomorphic conditions of those characters in the Microstigmatidae may then be the original adult characters. If that is so, then the reduced or absent serrula of *Ministigmata* and *Pseudonemesia* (Raven and Platnick, 1981, figs. 26–28), and the biserially dentate paired claws of the Microstigmatidae are congruent with the hypothesis of a relationship with the nemesiids and/or barychelids.

The second groups are the rastelloid families Cyrtaucheniidae and Ctenizidae. The Euctenizinae are included in the Cyrtaucheniidae because tarsi I and II of females are scopulate with few if any spines, the paired claws have up to several teeth, and the second row of cheliceral teeth is evident (and then weakly so) only in *Eucteniza* and *Promyrmekiaphila,* and the PLS are not as short as in the Domiothelina. With the possible exception of the scopulae and leg spination, all of those characters are plesiomorphic and only prevent the group from being included in a more apomorphic group on the cladogram. One character—teeth on the promargin of the female palpal claw—may provide further evidence of monophyly of the group, as here constituted. That character occurs in *Eucteniza, Cyrtauchenius, Ancylotrypa, Promyrmekiaphila,* and all Aporoptychini, save *Rhytidicolus*. It is absent also in *Aptostichus, Myrmekiaphila, Homostola,* or *Kiama*. On the tenuous grounds that it is present in two of the four euctenizid genera, I suggest that the inclusion of the Euctenizinae in the Cyrtaucheniidae is valid. However, simply by the acceptance of two homoplasies (the leg scopulae and reduction of tarsal spines), the Euctenizinae could be included in the Ctenizidae.

Therein lies another possibly paraphyletic group, the Ctenizidae itself. A revision of the group is needed to establish autapomorphies of genera and genus groups, if any exist. At present, the stout curved spines on the lateral faces of tibiae, metatarsi, and tarsi I and II seem synapomorphic although a similar condition does occur in the Migidae. The distinction could be in the shape of those spines. Answers to those and similar questions can be obtained only by revisions of the groups to establish to what extent the characters are informative and which states are apomorphic.

The other groups wherein lie possible misplacements are isolated genera and the alternative hypotheses are discussed in their intrafamilial relationships. The genera (first, with the familial placement adopted here, and second a possible alternative family position, given in parentheses) are *Neodiplothele* (Nemesiidae, Barychelidae), *Homostola* (Cyrtaucheniidae, Nemesiidae), *Neocteniza* (Idiopidae, Actinopodidae), and *Glabropelma* (Paratropididae, Theraphosidae).

SYSTEMATICS

INFRAORDER MYGALOMORPHAE POCOCK

Mygalomorphae Pocock, 1892b, p. 314.
Avicularoidea Comstock, 1913, pp. 221, 228.
Mygaloidea Berland, 1932, pp. 306, 308, 322.
Theraphosomorphae Caporiacco, 1938, pp. 128, 146.

Diagnosis: Differs from Mesothelae in terminal position of spinnerets and in having only 12 neuromeres in the suboesophageal ganglia, and also from the Araneomorphae in the complete absence of anterior median spinnerets, and anterior lateral spinnerets being absent or much smaller than posterior lateral pair.

Four booklungs (except *Micromygale*). Cheliceral fangs paraxial. Spinnerets terminal. Anterior median spinnerets absent. Anterior lateral spinnerets absent or much smaller than posterior laterals. Posterior lateral spinnerets with three or four segments with diagonal subsegmentation of basal segment. Abdomen lacking segmentation and sternite of first abdominal segment absent. Suboesophageal ganglia with 12 neuromeres. Sternum broad, flat; sternal sigilla present. Labial and maxillary cuspules usually present.

Order of Treatment: The cladogram gives the sequence in which the systematics of the taxa are discussed, such that the more plesiomorphic Tuberculotae (i.e., at the bottom of the cladogram) are presented first; the Fornicephalae follow the same sequence.

KEY TO MYGALOMORPH FAMILIES

1. Claw tufts present 2
   Claw tufts absent 9
2. Anterior maxillary lobe distinct and produced (fig. 16) 3
   Anterior maxillary lobe short, if present (fig. 34) 4
3. Little or no scopulae on tarsi III and leg cuticle noticeably scalelike .... Paratropididae, part
   Distinct scopulae on tarsi III and leg cuticle more or less smooth ..... Theraphosidae
4. One row or no teeth on paired claws of males or females 5
   Two rows of teeth on paired claws of males or females 6
5. Clypeus wide and posterior median spinnerets absent .... Nemesiidae, part
   Clypeus absent and/or posterior median spinnerets present .... Barychelidae, part
6. Third claw present on fourth leg .... Cyrtaucheniidae, part
   Third claw absent on all legs 7

7. Scopulae well developed on legs I and II .... Barychelidae, part
Scopulae on legs I and II thin, if present .. 8
8. Numerous cuspules on labium or eye group subquadrate .... Barychelidae, part
No cuspules on labium and eye group rectanguloid .... Nemesiidae, part
9. Booklung apertures small, round .... Microstigmatidae
Booklung apertures normal, slitlike 10
10. Trichobothria absent on most tarsi 11
Trichobothria present on all tarsi 12
11. Anterior maxillary lobe elongate and posterior median spinnerets apically truncate .... Atypidae
Anterior maxillary lobe short, posterior median spinnerets apically rounded, normal .... Antrodiaetidae
12. Eyes in a compact group on a very steeply elevated tubercle and leg scopulae entirely absent .... Paratropididae, part
Eye tubercle arched, low, or absent, or leg scopulae present 13
13. Labium much longer than wide and eyes occupy at least half of head width .... Actinopodidae
Labium wider and/or eyes occupy less than half of head width 14
14. Apical segment of PLS short, domed, or triangular (fig. 259) 15
Apical segment of PLS digitiform or longer (fig. 38) 31
15. Cheliceral fangs with two longitudinal keels and rastellum absent .... Migidae
Fangs smooth, rastellum present or absent 16
16. Males 17
Females 23
17. Median haematodocha extends down embolus and sometimes divided basally by narrow sclerotized band (fig. 243) .... Idiopidae, part
Median haematodocha small, normal .. 18
18. Cheliceral furrow with two rows of teeth 19
Cheliceral furrow with one row of teeth .. 20
19. Caput short and arched high (fig. 258) ...... Ctenizidae, part
Caput long and arched but low (fig. 226); Africa, Madagascar, South and Central America .... Cyrtaucheniidae, part
20. Each paired claw with teeth on both lateral faces 21
Each paired claw with one row of teeth or one tooth 22
21. Caput arched and fovea broad and strongly procurved .... Cyrtaucheniidae, part
Caput low and fovea short, and weakly procurved, straight, recurved .... Nemesiidae, part
22. Metatarsus I with distinct process or rastellum on a distinctly raised mound; North and Central America .. Cyrtaucheniidae, part
Metatarsus I without process and rastellum consists of long spines on a low mound; Africa, Madagascar, India, Oriental region .... Nemesiidae, part
23. A pair of eyes (ALE) set far in advance of others so making the group longer than wide .... Idiopidae, part
Eyes not in such a long group 24
24. Scopula present on tarsi I 25
Scopula absent on tarsi I 29
25. Each paired claw with teeth on both faces 21
Each paired claw with teeth only on medial keel 26
26. Fovea straight or recurved 27
Fovea strongly procurved 28
27. Preening combs present; North and Central America .... Cyrtaucheniidae, part
Preening combs absent; Madagascar, India, Australia, New Zealand .. Idiopidae, part
28. Cuspules extend for full length of maxillae; North and Central America .... Cyrtaucheniidae, part
Cuspules extend only to half length of maxillae; North and Central America .... Idiopidae, part
29. Tarsi I without spines; Australia .... Cyrtaucheniidae, part
Tarsi I with spines 30
30. Fovea strongly procurved .. Ctenizidae, part
Fovea recurved or straight .: Idiopidae, part
31. Each paired claw with teeth only on medial keel 32
Each paired claw with teeth on both faces 36
32. Fovea longitudinal 33
Fovea transverse or absent 34
33. Apical segment of PLS bipartite or pseudosegmented .... Mecicobothriidae
Apical segment of PLS integral .... Dipluridae, part
34. Six spinnerets .... Hexathelidae, part
Four or two spinnerets 35
35. Cuspules numerous on labium .... Hexathelidae, part
Cuspules very few or absent on labium .... Dipluridae, part
36. PLS very long, extending higher than abdomen .... Dipluridae, part
PLS shorter 37
37. Labium and maxillae subquadrate and fangs short; Africa, South and Central America .... Cyrtaucheniidae, part

Labium wide, maxillae rectangular, fangs long 21

Previous Keys and the Use of This Key

The two groups of keys used most frequently in identifying mygalomorphs are probably Simon (1892a, 1903a) and Petrunkevitch (1928, 1933). The problem with those and other previous keys of all mygalomorph families has been that they did not account for all of the variation within the families known at the time. That was either through authors not including a number of genera or overlooking some of the characters of included genera. The most notable was Petrunkevitch (1933, but not 1928) in which the Paratropididae are said to lack a third claw. However, of the three paratropidid genera then recognized, *Paratropis* and *Anisaspoides* have a third claw on the first or first and second legs, respectively. Simon (1903a) created similar internal inconsistencies by adding genera to groups and not revising his key to subfamilies (Simon, 1892a).

In the above key, I have added distributions of the taxa that key out at that point (and not the entire families) where the character of the key couplet may be unclear. Also, keys are constructed strictly according to logic: "and" requires that both characters must be present, "or" does not. In intrafamilial keys where a genus is likely to be miskeyed (in the above) to a family the genus is included in the keys of both families of the key couplet.

MECICOBOTHRIIDAE HOLMBERG

Mecicobothrioidea Holmberg, 1882, p. 160.

Diagnosis: Differs from Hexathelidae and most Dipluridae in the longitudinal fovea, and from *Microhexura* in the presence of abdominal sclerites and long pseudosegmented apical segment of the PLS.

Fovea longitudinal; caput low; eye tubercle distinctly raised. Maxillae and labium without cuspules; serrula present; maxillae about as wide as long or wider, anterior lobe distinctly produced; labium wider than long. Spines and scopulae absent from leg tarsi. Distal segment of PLS pseudosegmented. Dorsal abdominal sclerites present. Cymbium acuminate and spoon-shaped; conductor present on palp.

Description: Carapace glabrous. Eight eyes in two rows occupying about one-third of head width. Chelicerae with one row of teeth on furrow; rastellum absent. Chelicerae of males with copulatory modification (*Mecicobothrium*) or unmodified (all other genera); intercheliceral tumescence absent. Labiosternal suture a distinct groove; all sigilla small and marginal. Tarsi of males entire (*Hexurella*) or pseudosegmented (all other genera). Copulatory spurs absent. Tarsal organ low with concentric ridges. STC and female palpal claw with sigmoid line of teeth; ITC curved with few short or no teeth. Spermathecae consisting of two separated bilobed receptacula (*Mecicobothrium, Megahexura*), one quadrilobate receptaculum (*Hexurella*), or four separated receptacula (*Hexura*). Third haematodocha of male palp distinct (*Hexura, Megahexura*), small but concealed (*Mecicobothrium*), or very reduced if present (*Hexurella*); bulb lies in spoon-shaped cymbium and is attached proximally on cymbium; cymbium bilobed (*Mecicobothrium*) or integral (all other genera); spinose (*Hexura rothi*) or aspinose (all other genera and *Hexura picea*). Four (*Hexura rothi*) or six (all other genera and *Hexura picea*) spinnerets; ALS, if present, one- (*Hexura picea*) or two-segmented (all other genera); PMS separated by about twice their basal diameter; PLS with two short, subequal preapical segments; apical segment pseudosegmented. Dorsal abdomen with one (*Hexura*) or two dorsal sclerites (all other genera).

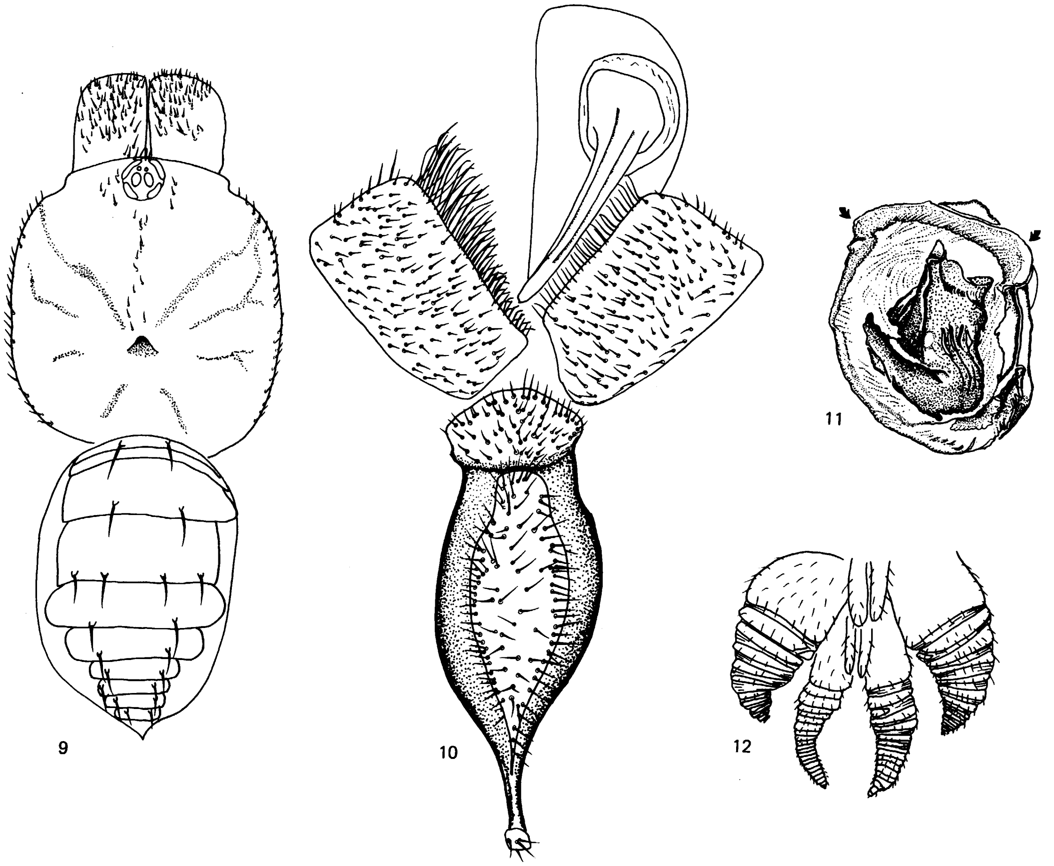
Genera Included: *Mecicobothrium* Holmberg (1882), *Hexura* Simon (1884), *Megahexura* Kaston (1972), *Hexurella* Gertsch and Platnick (1979).

Distribution: Argentina (*Mecicobothrium*), western North America (*Megahexura, Hexura, Hexurella*).

Remarks: The family Mecicobothriidae was recently revised by Gertsch and Platnick (1979).

KEY TO GENERA OF THE MECICOBOTHRIIDAE

1. Apical segment of PLS biarticulated . . . . *Hexurella*
   Apical segment of PLS multiarticulated . . . 2



FIGS. 9–12. *Liphistius desultor* Schiödte. 9. Cephalothorax and abdomen, dorsal view. 10. Chelicera, sternum, maxillae, and labium. 11. Bulb showing fusion of tegulum and embolic portion at right and two possible mygalomorph conductor homologs (arrows), axial view. 12. Spinnerets, ventral view.

2. Abdomen with one dorsal sclerite ... *Hexura*
   Abdomen with two dorsal sclerites 3
3. Posterior cephalothorax with pronounced chitinous extensions; California .... *Megahexura*
   Posterior cephalothorax normal; Argentina .. .. *Mecicobothrium*

MICROSTIGMATIDAE ROEWER

Microstigmateae Roewer, 1942, p. 194.

Pseudonemesiinae Caporiacco, 1955, p. 265.

DIAGNOSIS: Differs from Dipluridae and Hexathelidae by the small round booklung apertures and the very short PLS with a domed or triangular apical segment.

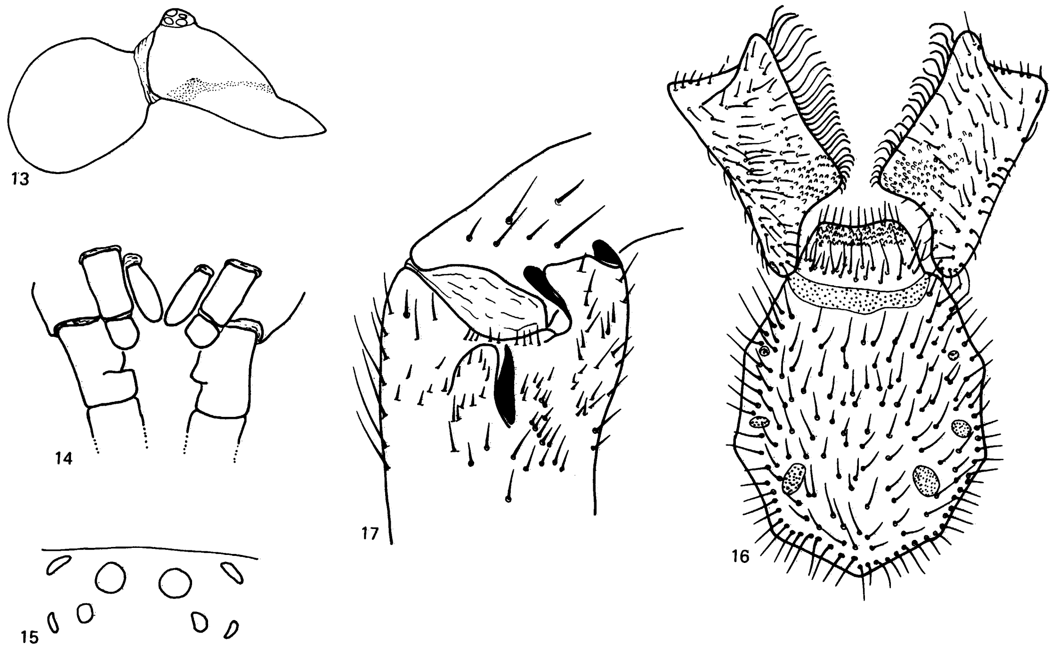
Thoracic region as high as caput. Booklung apertures small and round. Eyes on tubercle. Serrula present or vestigial. Three claws; STC with numerous teeth; ITC toothed or bare. PLS very short; apical segment domed. Spines absent from leg tarsi. One row of teeth on chelicerae. Sternal sigilla small, marginal, if evident. Third haematodocha not evident on male bulb. Cheliceral rastellum absent.

REMARKS: Because the Microstigmatidae have been recently revised by Raven and Platnick (1981) and Platnick and Forster (1982), no further description or discussion of relationships are given.

SUBFAMILIES INCLUDED: Micromygalinae, Microstigmatinae.

GENERA INCLUDED: *Microstigmata* Strand (1932), *Micromygale* Platnick and Forster (1982), *Ministigmata* Raven and Platnick (1981), *Pseudonemesia* Caporiacco (1955).

DISTRIBUTION: South Africa (*Microstigmata*), South America (*Pseudonemesia, Ministigmata*), Panama (*Micromygale*).



FIGS. 13–17. 13, 14. *Plesiothele fentoni* (Hickman), female. 13. Cephalothorax, lateral view. 14. Spinnerets, ventral view. 15. *Genysa* sp., female, eyes. 16, 17. *Glabropelma gracilis* (Schenkel), male holotype. 16. Sternum, maxillae, and labium. 17. Tibia and metatarsus I, prolateral view.

KEY TO GENERA OF THE MICROSTIGMATIDAE

1. Six spinnerets and only two eyes present .... *Micromygale*
   Four or two spinnerets and eight eyes present 2
2. Four spinnerets; Africa ..... *Microstigmata*
   Two spinnerets; South America 3
3. Leg cuticle with broad scales *Pseudonemesia*
   Leg cuticle with fine pustules .. *Ministigmata*

HEXATHELIDAE SIMON

Hexatheleae Simon, 1892a, pp. 176, 188.
Scotinoeceae Simon, 1903a, pp. 960, 970.

DIAGNOSIS: Differs from Mecicobothriidae in the absence of dorsal abdominal sclerites, the numerous labial and maxillary cuspules, and/or the transverse or pitlike fovea, and from the Dipluridae in the arched caput and glabrous carapace.

Numerous cuspules usually present on labium and maxillae. Serrula present. Three claws; one row of teeth on paired claws; ITC short, curved with few fine teeth. Scopulae absent in males and females. Dorsal abdominal sclerite and third haematodocha of male palp absent. Cymbium similarly bilobed. Apical segment of PLS digitiform or longer. Carapace glabrous with broad pitlike or transverse fovea. Caput arched. Few if any spines on anterior tarsi. Rastellum absent.

DESCRIPTION: Fovea an open, broad pit (Hexathelinae, *Plesiothele, Macrothele, Porrhothele*) or transverse and procurved (*Atrax*). Caput arched, low (most genera) or high (*Plesiothele, Atrax*). Eye tubercle distinct (most genera) or low and set on forwardly directed mound (some species of *Atrax*). Chelicerae porrect, with teeth on one (most genera) or both (*Atrax* and some *Macrothele, Porrhothele*) furrows; intercheliceral tumescence present (*Atrax, Macrothele*) or absent. Outer surface of fang smooth or with one tooth (*Mediothele*). Labium wider than long (most genera) or almost square (*Plesiothele, Atrax, Teranodes, Hexathele*); cuspules numerous (most genera) or few to absent (*Mediothele*). Maxillae longer than wide; serrula present (most genera) or absent (some *Atrax*), anterior lobe indistinct (most genera) or coniform (*Atrax*); cuspules present (most genera) or absent (some *Mediothele*). Labiosternal sigilla narrow to broad groove. Sternum cordate; six sigilla, all marginal (most genera) or submarginal to subcentral (*Atrax, Porrhothele,* some *Macrothele*). Cymbium short, similarly bilobed, spinose (*Mediothele, Porrhothele, Hexathele,* some *Macrothele*) or bare (most genera). Bulb pyriform; paraembolic apophysis present (*Scotinoecus, Paraembolides*) or absent (most genera); embolus short (*Plesiothele*) or elongate (most genera). Tarsi of legs strongly spinose (*Atrax, Porrhothele,* some *Macrothele*), weakly spinose (most genera) with fewest spines on anterior tarsi, or entirely aspinose (*Porrhothele*). Scopulae absent in females; in males present (some *Atrax* species) or absent (all other taxa). Tibia I of males incrassate (*Porrhothele*), with two (*Hexathele*) or one spur plus megaspine (all other Hexathelinae), or unmodified (*Plesiothele, Macrothele, Porrhothele*). Metatarsus I of males proximally excavate (*Hexathele, Teranodes*), proximally flanged (*Bymainiella*), short, with pointed ventral process (*Mediothele*), or bent (*Plesiothele*). Tibia II of males normal and cylindrical (most genera) or with medial, strongly spinose process (some *Atrax*). Paired claws of males and females with sigmoid row of long teeth; ITC curved, with few fine teeth. Trichobothria in two rows on tibiae, one row on metatarsi and tarsi. Bothria collariform. Tarsal organ low, domed with several shallow concentric ridges. Metatarsal preening combs present (*Scotinoecus, Mediothele*) or absent (most genera). ALS present, larger than (*Plesiothele*) or smaller than PMS (most genera), one- (some *Scotinoecus*) or two-segmented (most genera), or absent (Macrothelinae). Bases of PMS separated by about one diameter. PLS very elongate (*Porrhothele, Macrothele*), long but hardly reaching higher than top of abdomen (most genera), or very short (*Atrax*); apical segment digitiform. Spermathecae consist of two undivided (*Macrothele,* some *Hexathele*) or divided (most genera) receptacula or four separate receptacula (*Scotinoecus*). Two or three pairs of coxal gland outlets.

SUBFAMILIES INCLUDED: Plesiothelinae, Macrothelinae, Hexathelinae.

GENERA INCLUDED: *Atrax* O. P.-Cambridge (1877), *Bymainiella* Raven (1978), *Hexathele* Ausserer (1871), *Macrothele* Ausserer (1871), *Mediothele* Raven and Platnick (1978), *Paraembolides* Raven (1980b), *Plesiothele* Raven (1978), *Porrhothele* Simon (1892a), *Scotinoecus* Simon (1892a), *Teranodes,* new name.

DISTRIBUTION: Eastern Australia (*Atrax, Paraembolides, Bymainiella, Teranodes*), Tasmania (*Atrax, Plesiothele, Teranodes*), New Zealand (*Hexathele, Porrhothele*), Chile (*Scotinoecus, Mediothele*), southern Europe, West Africa, India, China, Malaysia, Burma, Vietnam, Japan, Java (*Macrothele*).

SYNONYMY: *Terania* Raven (1980b) is preoccupied in the Hemiptera by *Terania* Pirán, 1963, and is here replaced by *Teranodes, nomen novum.*

REMARKS: The constitution of the hexathelid subfamilies is essentially unchanged from that of Raven (1980b) except that *Mediothele* is considered the sister group of *Scotinoecus* because they share metatarsal preening combs and the same reduction of the tibial spurs. The inclusion of *Mediothele* in the Dipluridae requires an excessive number of homoplasies that are discussed with the intrarelationships of the Ischnothelinae.

As here defined, *Mediothele* lacks three diplurid synapomorphies—the raised thoracic region, and the elongate and widely spaced PLS—and cannot be parsimoniously included in the Dipluridae. *Mediothele* could be part of a trichotomy including the Hexathelidae and the Quadrithelina. That would require several homoplasies including the corrugiform bothria, the loss of maxillary cuspules, and the reduction of the anterior lateral spinnerets, and would also reduce the information content of subsequent groups. Therefore, I propose this alternative. With three reversals—the reduction in the number of labial and maxillary cuspules, and the paraembolic apophysis—*Mediothele* could be considered the sister group of *Scotinoecus,* with which it shares the unusual form of the tibial apophysis and metatarsal preening combs (that, contrary to Schiapelli and Gerschman [1968a] and Calderon [1973], *are* present in both species of *Scotinoecus*). Another possibility is that by virtue of lacking cuspules but having an orthogonal bulb insertion, *Mediothele* could constitute a family as sister group of the Orthopalpae. However, that too is unparsimonious. Hence, I transfer *Mediothele* to the Hexathelinae as the sister genus of *Scotinoecus.*

KEY TO GENERA OF THE HEXATHELIDAE

1. Six spinnerets 2
   Four spinnerets 8
2. ALS distinctly larger than PMS (fig. 14) .... *Plesiothele*
   ALS smaller than PMS 3
3. Labial and maxillary cuspules few or absent .... *Mediothele*
   Numerous cuspules present 4
4. Preening combs present on metatarsi; Chile .... *Scotinoecus*
   Preening combs absent; Australia, New Zealand 5
5. Tarsal trichobothria in an irregular line; New Zealand .... *Hexathele*
   Tarsal trichobothria in a straight line; Australia 6
6. Males with a proximal flange on metatarsus I .... *Bymainiella*
   Males without a flange on metatarsus I ... 7
7. Proximal metatarsus I of males excavate; labium subquadrate .... *Teranodes*
   Metatarsus I of males not modified; labium much wider than long .... *Paraembolides*
8. PLS short; Australia .... *Atrax*
   PLS very long and slender 9
9. Spines present on tarsi IV; Africa, Asia .... *Macrothele*
   Spines absent on all tarsi; New Zealand .... *Porrhothele*

DIPLURIDAE SIMON

Diplurinae Simon, 1889d, pp. 173, 187.

DIAGNOSIS: Differs from Hexathelidae and Nemesiidae in the very flat caput, and the elongate and widely spaced posterior lateral spinnerets.

Carapace very low and hirsute. Four spinnerets; PLS elongate. Maxillary serrula present, distinct. Three claws; numerous teeth on paired claws.

PLESIOMORPHIC STATES: Caput very low, thorax sloping, hirsute. Four spinnerets; australotheline crescent absent. Maxillary serrula present. Three claws; paired claws with one row of teeth; unpaired claws with few fine teeth. Leg tarsi spinose but least on anterior legs; scopulae entirely absent. Fovea small or pitlike. Eye tubercle raised; eight eyes in group about twice as wide as long. Chelicerae porrect, without rastellum; fang elongate with smooth or unridged outer surface; tooth row only on promargin. Intercheliceral tumescence absent. Dorsal abdominal sclerites absent. Male palp lacking articulated conductor and distal haematodocha, but spines present on cymbium. Tarsal organ low, domed, with concentric ridges. Tarsi long, slender. Tarsal trichobothria in irregular line; metatarsal trichobothria on retrolateral face proximally; all trichobothria filiform with corrugiform bothria. Booklung apertures wide slits. Tarsal cuticle smooth or not pustulose. Labium wider than long with few if any cuspules. Maxillae with short or indistinct lobe, not greatly modified. Labiosternal suture distinct groove.

SUBFAMILIES INCLUDED: Diplurinae, Ischnothelinae, Euagrinae, Masteriinae.

MISPLACED GENERA: *Mediothele* is transferred to the Hexathelidae where the action is discussed. The removal of numerous nemesiid genera (the Australian Anamini, *Brachythele, Entypesa,* and *Tryssothele*) from the Diplurinae is based upon the hypothesis that those genera are more closely related to other nemesiid genera than to *Diplura.* Close examination of *Diplura,* its related genera, and those nemesiids reveals that the supposedly long spinnerets that putatively characterized all diplurids are, with rare exceptions, as short as those of theraphosids or hexathelids. Also, the spinnerets of *Diplura* and closely related genera are much more widely separated than those of nemesiids or theraphosids. In both cases, only the true diplurid conditions can be considered apomorphic.

KEY TO GENERA OF THE DIPLURIDAE

1. Two rows of teeth on paired claws 2
   One row of teeth on paired claws 4
2. Maxillary lyra present 3
   Maxillary lyra absent .... *Linothele*
3. Lyra consists of few clavate setae; tarsal scopulae thin and interspersed with setae .... *Diplura*
   Lyra forms a large black shield of numerous clavate setae; tarsal scopulae dense and entire .... *Trechona*

4\. No maxillary cuspules; one row of cheliceral teeth 5
   Cuspules present; two rows of cheliceral teeth 15
5\. Spines absent on tarsi IV 6
   Spines present on tarsi IV 8
6\. Fovea a small pit; anterior median eyes very small or absent 7
   Fovea longitudinal; anterior median eyes normal .... *Microhexura*
7\. Australotheline crescent present ... *Masteria*
   Australotheline crescent absent .. *Striamea*
8\. Australotheline crescent absent 9
   Australotheline crescent present 10
9\. Apical segment of PLS pseudosegmented .. .. *Phyxioschema*
   Apical segment of PLS entire ..... *Euagrus*
10\. Metatarsal preening combs present 11
   Metatarsal preening combs absent 12
11\. Spines few or absent on tarsi II; tibia II of males without spur ...... *Stenygrocercus*
   Several spines on tarsi II; tibia II of males with distinct spur .... *Namirea*
12\. Fovea present, pitlike 13
   Fovea absent .... *Carrai*
13\. Tibia II of males with spur 14
   Tibia II of males without spur ... *Cethegus*
14\. Metatarsus II of males with ventral thorn .. .. *Australothele*
   Metatarsus II of males without thorn .... *Allothele*
15\. Cephalic margin with stiff setae; tibia I of males incrassate .... *Lathrothele*
   Cephalic margin with soft hair; tibia I of males cylindrical 16
16\. Sternum cordate; bulb pyriform with distally and gradually demarcated embolus .... *Ischnothele*
   Sternum subrotund; bulb spheroidal with proximally and sharply demarcated embolus; Madagascar and southern Africa .... *Thelechoris*

DIPLURINAE SIMON

Diplurinae Simon, 1889d, pp. 173, 187.
Trechoneae Simon, 1889d, p. 204. First synonymized by Simon, 1892a, p. 176.
Trechoninae Mello-Leitão, 1923, pp. 76, 78.

DIAGNOSIS: Differs from all other diplurids by the presence of two rows of teeth on the paired claws.

Two rows of teeth on paired claws; unpaired claw long, curved, bare. Maxillae with cuspules and broad serrula. Tarsi of males pseudosegmented; at least tarsi IV of females cracked ventrally. Leg formula 4123. Eye group about twice as wide as long. Tarsi of male palp short, with two similar lobes, aspinose. Males without intercheliceral tumescence. One row of teeth on cheliceral furrows.

DESCRIPTION: Carapace almost flat with short, straight, or recurved fovea. Eyes on distinct tubercle with slight rounded anterior process; group about twice as wide as long. Clypeus absent or narrow and indistinct. Chelicerae broad, porrect; only cheliceral promargin with row of teeth. Cuspules present, numerous on maxillae in close group in inner corner; lyra absent (*Linothele*), consisting of up to 12 clavate setae (*Diplura*), or of dense area of 50 or more clavate setae (*Trechona*). Maxillae longer than wide with short or indistinct anterior lobe. Labium large, about two-thirds as long as wide, with few or no cuspules; labiosternal suture wide, deep. Sternum wide with small, oval, marginal sigilla. Legs elongate, generally spinose except for tarsi. Tibia I of males with one or two low spurs and megaspines (*Trechona,* some *Diplura*) or unarmed (some *Diplura*). Cymbium aspinose, divided into two short lobes; bulb pyriform, with elongate embolus circular in distal cross-section. Scopulae on tarsi I–IV dense (*Trechona,* some *Linothele*), thin but divided on tarsi I and II and more divided and thinner on tarsi III and IV (some *Linothele*), or sparse and divided by scattered setae (*Diplura*). Paired claws of all legs with two rows of short teeth situated proximally and low on claw; claws narrow (*Diplura*), or wider (*Linothele, Trechona*). Unpaired claws long, curved, bare. Palpal claw of females with one row of teeth on medial (some *Linothele, Diplura*) or proximal keel (*Linothele, Trechona*). Tarsi of males elongate and pseudosegmented; tarsi of females with medial ventral weakness (cracked) on at least leg IV (some *Diplura*) or all pseudosegmented (*Linothele, Trechona,* some *Diplura*). Spermathecae of females bilobed. Posterior lateral spinnerets with three subequal segments or apical segment very long and slender (some *Linothele*).

GENERA INCLUDED: *Diplura, Trechona, Linothele.*

DISTRIBUTION: Caribbean islands (*Diplura*), Central and northeast South America (*Linothele*), Central and South America (*Trechona, Diplura*).

REMARKS: Aligning the Diplurinae with any or all the Nemesiidae would require considerable increase in the number of steps necessary and would only unite the biserially pectinate genera, so forming a group based upon one character. Homoplasies required for such a phylogeny involve the elongation of the posterior lateral spinnerets in the Ischnothelinae, Euagrinae, and Diplurinae; pseudosegmented tarsi in male Diplurinae and Ischnothelinae; the plesiomorphically narrow paired claws; the very low caput; and the absence of spines on the male tarsi—characters that are parsimoniously apomorphic when the Ischnothelinae are considered the sister group of the Diplurinae.

DIPLURA C. L. KOCH

Figures 18–23

Diplura C. L. Koch, 1851, p. 75 (type species by monotypy *Mygale macrura* C. L. Koch; male holotype in ZMB, examined).

Thalerothele Bertkau, 1880, p. 24 (type species by monotypy *Thalerothele fasciata* Bertkau; holotype lost). First synonymized by Simon, 1892a, p. 178.

Harmonicon F. O. P.-Cambridge, 1896, p. 756 (type species by monotypy *Harmonicon rufescens* F. O. P.-Cambridge; juvenile holotype in BMNH, examined). NEW SYNONYMY.

Melodeus F. O. P.-Cambridge, 1896, p. 758 (type species designated by Simon, 1903a, p. 963, *Melodeus sanguineus* F. O. P.-Cambridge; male and female syntypes in BMNH, examined). First synonymized with *Thalerothele* by Simon, 1903a, p. 963.

Achetopus Tullgren, 1905, p. 14 (type species by monotypy *Achetopus erlandi* Tullgren; male and female syntypes in RMS, examined). NEW SYNONYMY.

Euharmonicon Mello-Leitão, 1920a, p. 60 (type species by monotypy *Euharmonicon studiosum* Mello-Leitão; female holotype in IBB, examined). NEW SYNONYMY.

Evagrella Mello-Leitão, 1923, p. 88 (type species by original designation *Evagrella garbei* Mello-Leitão; male and female syntypes in MZSP, examined). NEW SYNONYMY.

Taunayella Mello-Leitão, 1923, p. 97 (type species by original designation *Taunayella taunayi* Mello-Leitão; male and female syntypes in MZSP, examined). NEW SYNONYMY.

Paraharmonicon Mello-Leitão, 1926, p. 316 (type species by monotypy *Harmonicon nigridorsi* Mello-Leitão; type in MRJ, not examined). First synonymized with *Harmonicon* by Bonnet, 1957, p. 2100.

Pseudhermachura Mello-Leitão, 1927, p. 402 (type species by original designation *Pseudhermachura catharinensis* Mello-Leitão; female holotype in MZSP, examined). First synonymized with *Harmonicon* by Bücherl, 1962, p. 260.

Parathalerothele Canals, 1931, p. 358 (type species by original designation *Parathalerothele argentina* Canals; type in MACN, examined). First synonymized with *Achetopus* by Schiapelli and Gerschman, 1968b, p. 185.

Prosharmonicon Mello-Leitão, 1938, p. 313 (type species by original designation, *Prosharmonicon maculatum* Mello-Leitão; female holotype in IBB, examined). First synonymized with *Harmonicon* by Bücherl, 1962, p. 261.

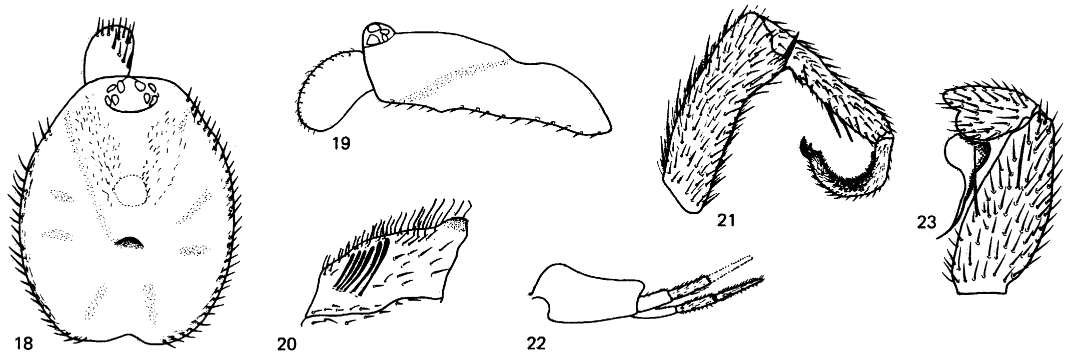
DIAGNOSIS: Differs from *Linothele* in the possession of a lyra and from *Trechona* in having only about 12 clavate lyra setae and thin tarsal scopulae.

Maxillary lyra consisting of up to about 12 clavate setae. Scopulae on tarsi I and II thin and interspersed with setae.

REMARKS: Simon (1892a) first diagnosed *Diplura* from related genera by the weak scopulae on the tarsi. Subsequently, F. O. P.-Cambridge (1896) discovered the lyra in *Melodeus,* and Simon (1903a) then considered *Diplura* alyrate. Since then, Simon and all other authors have placed all lyrate species in other genera. However, in my examination (presumably the first since C. L. Koch, 1842) I found that *Diplura* is in fact lyrate, thus inverting the previous concept of the genus. Consequently, when following the above synonymy, all species previously placed in the lyrate diplurid genera (save *Trechona*) are here transferred to *Diplura,* and all alyrate Diplurinae (all species of *Uruchus* and *Diplura,* save *D. macrura*) are transferred to *Linothele.*

Males of *Diplura* have a distal spur on tibia I and usually an accompanying process on metatarsus I. However, since that character also appears in *Trechona* and some *Linothele* its phylogenetic significance remains to be demonstrated.

SYNONYMY: None of the characters used to establish any of the synonymized genera differ from those of *Diplura* or *Thalerothele.* The genera elevated by Mello-Leitão are based either upon minor differences in the number of setae in the lyra or, as in the case of *Eva-*



FIGS. 18–23. *Diplura macrura* (C. L. Koch), male holotype. 18, 19. Cephalothorax. 18. Dorsal. 19. Lateral. 20. Right maxilla, oblique view of anterior face showing lyra. 21. Tibia, metatarsus, and tarsus I showing spur and pseudosegmented tarsi, retrolateral view. 22. Abdomen, lateral view. 23. Palpal tibia, cymbium, and bulb, prolateral view.

grella, upon incorrect observations. Mello-Leitão stated that no lyra was present and that only one row of teeth was present on the paired claws of *Evagrella* and so placed it in the Macrothelinae. In examining the types of *Evagrella,* I found the lyra setae were present on some maxillae but broken on others. Similarly, although the two tooth rows on the claws are closely set, there are two.

MISPLACED TAXA (apart from the taxa involved in the confusion concerning the lyra): *Diplura brachythele* Mello-Leitão (1937), and *D. dolichosternum* Mello-Leitão (1938) (types of both in IBB, examined) are transferred to *Rachias,* with which they share the setose intercheliceral tumescence, short apical segment of the PLS, and the soft keels on the palpal bulb.

LINOTHELE KARSCH

Linothele Karsch, 1879b, p. 546 (type species by monotypy *Linothele curvitarsis* Karsch; male holotype in ZMB, examined).

Uruchus Simon, 1889f, p. 400 (type species by monotypy *Uruchus gaujoni* Simon; male and female syntypes in MNHP, examined). NEW SYNONYMY.

Neodiplura F. O. P.-Cambridge, 1896, p. 755 (type species by monotypy *Neodiplura jelksii* F. O. P.-Cambridge; male and female syntypes in BMNH, examined). First synonymized with *Uruchus* by Simon, 1903a, p. 964.

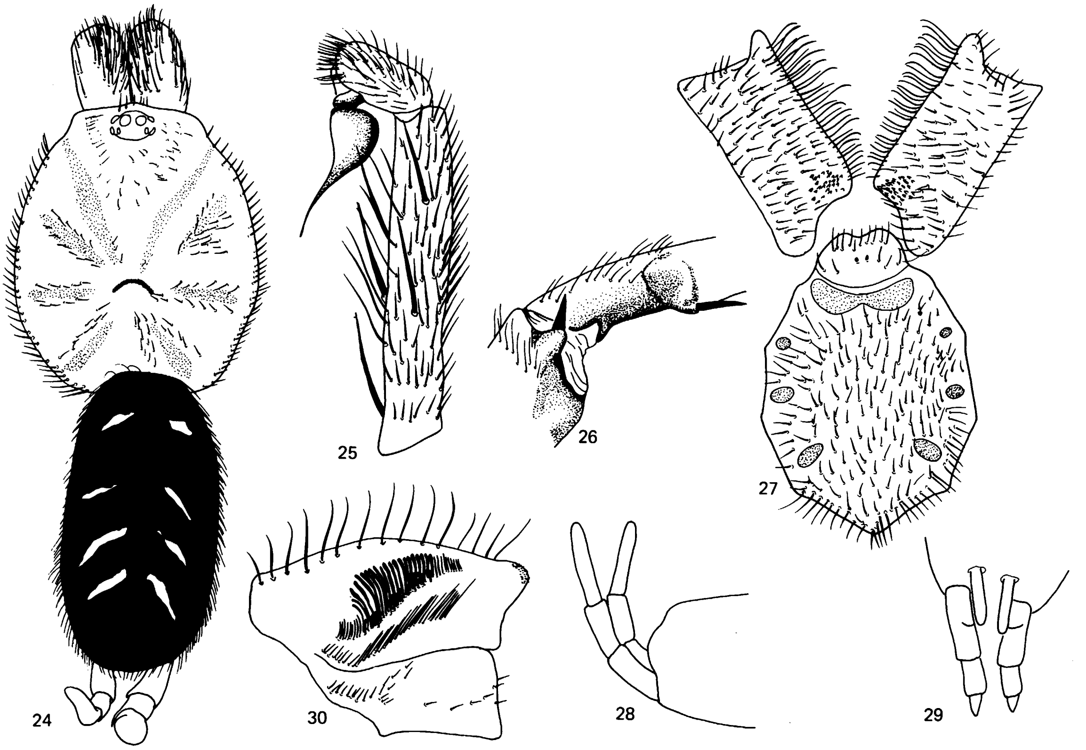
DIAGNOSIS: Differs from both *Diplura* and *Trechona* by the absence of a maxillary lyra. Maxillary lyra absent. Tarsi of males and females pseudosegmented or cracked. Scopulae on tarsi I and II divided by narrow line of setae and widely divided on tarsi III and IV.

SYNONYMY: Simon (1903a) erroneously diagnosed *Diplura* as lacking a lyra and distinguished *Uruchus* from it by the thicker tarsal scopulae. Raven (1980b) as a result placed the alyrate genus *Linothele* in the synonymy of *Diplura* because it also had thin and scattered scopulae. The reduced scopulae of *Linothele* do not warrant the continued recognition of *Uruchus* (in which the scopulae are denser) because the similarly reduced condition in *Diplura* and absence in other diplurids, save *Trechona,* indicates that the latter is the plesiomorphic state. Moreover, the distinction between having the scopulae narrowly divided, as in the type species of *Uruchus,* or widely divided and scattered, as in *Linothele,* overlooks problematical intergrades.

TRECHONA C. L. KOCH
Figures 24–30

Trechona C. L. Koch, 1851, p. 74 (type species subsequently designated by O. P.-Cambridge, 1902, *Mygale venosa* Latreille; holotype female lost?).

Onysopelma Simon, 1864, p. 68 (type species subsequently designated by Bonnet, 1958, p. 3187, *Mygale zebrata* Walckenaer). Synonymy first noted by Bonnet, 1958, p. 4860.



FIGS. 24–30. *Trechona rogenhoferi* (Ausserer). 24–29. Male. 24. Cephalothorax and abdomen, dorsal view. 25. Palpal tibia, cymbium, and bulb, retrolateral view. 26. Distal tibia and proximal metatarsus I, retrolateral view. 27. Sternum, maxillae, and labium. 28. Posterior abdomen, lateral view. 29. Spinnerets, ventral view. 30. Female, holotype. 30. Maxillae showing lyra, prolateral view.

Eudiplura Simon, 1892a, p. 179 (type species by original designation *Diplura rogenhoferi* Ausserer; female holotype in NHMV, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Diplura* in the much greater number of setae in the lyra and in having dense and undivided tarsal scopulae, and from *Linothele* in the possession of a lyra.

Maxillary lyra with a dense black field of 60–80 clavate setae. Scopulae on tarsi I and II dense, entire.

MISPLACED SPECIES: Specimens identified as *Trechona venosa* (Latreille) have long been recorded as Chilean. The first such record appears to have been in C. L. Koch (1851). However, *Trechona*—the lyrate diplurid—is not known from Chile but closely resembles the nemesiid species *Acanthogonatus subcalpeiana* (Nicolet), New Combination, presumably with which it has been confused, especially in venom studies.

REMARKS: Considerable confusion has surrounded the diagnosis of *Trechona* and *Eudiplura.* That arose from Simon's (1903a) diagnosis of those genera as having up to 17 (7–9 in *Eudiplura* and 17 in *Trechona*) clavate setae in the lyra. In the type of *Diplura rogenhoferi,* the specimen (in BMNH) regarded by Pocock (1895e) as C. L. Koch's type of *Mygale* (=*Trechona*) *zebrata,* and in a male identified by Simon as *Eudiplura rogenhoferi* in his Paris (MNHP) collection, the lyra is so extensive that it almost covers the entire front face of the maxilla and includes at least 20 large and many more smaller clavate setae (fig. 30).

ISCHNOTHELINAE F. O. P.-CAMBRIDGE

Ischnothelinae F. O. P.-Cambridge, 1897, p. 35.

DIAGNOSIS: Differs from all other diplurids in having two rows of teeth on the cheliceral furrow and elongate cymbium.

One row of teeth on paired claws; unpaired claw elongate, curved, finely dentate. Maxillae with cuspules; serrula broad. Both cheliceral margins with teeth. Cymbium divided into one short and one very elongate and spinose lobe. Spines present on leg tarsi. Male tarsi pseudosegmented. Eye group about twice as wide as long. Apical segment of posterior lateral spinnerets pseudosegmented. Leg formula 4321. Bothrium with crescentic hood.

DESCRIPTION: Carapace very flat, hirsute, with small pitlike or very short, subcentral fovea. Eye group wider than long. Clypeus absent or indistinct. Chelicerae small, porrect; both margins with teeth; retromarginal teeth stronger, more numerous. Intercheliceral tumescence absent. Maxillae rectangular, anterior lobe indistinct; numerous cuspules in long triangular area. Labium much wider than long, without cuspules. Labiosternal suture laterally wide, deep. Sternum cordate, narrow, or wide (*Lathrothele, Thelechoris*); all sigilla oval, marginal. Third leg longer than first or second. Legs elongate, spinose. Tarsi of legs and palp of both sexes spinose. Males with pseudosegmented tarsi; cymbium bilobed, one very elongate lobe. Palpal bulb pyriform with elongate embolus, proximal on tarsus; tibia incrassate. Tibia I of males with elongate distal cuticular process and short thornlike spine; metatarsus I with proximal bicarinate (*Lathrothele*) or unicarinate process. Paired claws with one S-shaped row of teeth; unpaired claw curved with few long, fine teeth. Bothrium with crescent-shaped hood. Scopulae entirely absent in both sexes. Posterior lateral spinnerets elongate; lateral and middle segments subequal, apical segment pseudosegmented. Spermathecae consisting of four lobes discharging separately.

GENERA INCLUDED: *Ischnothele, Thelechoris, Lathrothele.*

DISTRIBUTION: Africa (*Thelechoris, Lathrothele*), Madagascar (*Thelechoris*), India, South and Central America, Taiwan, and Turkey (*Ischnothele*).

REMARKS: Benoit (1964b) diagnosed *Lathrothele* in a key (prior to its formal description) as distinct from *Thelechoris* in the possession of stiff setae (rather than thin hairs) on the lateral carapace, and in males having an incrassate tibia I and a flattened embolus tip. Those characters also distinguish *Lathrothele* from *Ischnothele.* However, it is unclear, without a revision of *Ischnothele* and *Thelechoris,* whether the latter is a distinct genus. Nevertheless, I retain *Thelechoris* as distinct from *Ischnothele* in a number of characters which need to be confirmed as apomorphic.

ISCHNOTHELE AUSSERER

Ischnothele Ausserer, 1875, p. 163 (type species by monotypy *Ischnothele caudata* Ausserer; female holotype in BMNH, examined).

Entomothele Simon, 1889b, p. 239 (type species by original designation *Mygale guianensis* Walckenaer). First synonymized by Simon, 1903a, p. 968.

DIAGNOSIS: *Ischnothele* is distinguished from *Lathrothele* in having soft downy hairs on the lateral margins of the carapace, and in males having a slender cylindrical tibia I, and from *Thelechoris* by the incrassate male palpal tibia, the less sharply demarcated embolus, and the cordate sternum.

DISTRIBUTION: India, southeastern Asia and Indomalaysia, South and Central America.

THELECHORIS KARSCH

Thelechoris Karsch, 1881b, p. 196 (type species by original designation *Thelechoris rutenbergi* Karsch; female holotype in ZMB, examined).

DIAGNOSIS: Differs from *Lathrothele* in lacking the incrassate tibia I of males and having soft downy hairs rather than stiff setae on the lateral carapace. Resembles *Lathrothele* and differs from *Ischnothele* in having the bulb globose with a sharply demarcated embolus, and lacking a distoventral concavity on the male palpal tibia that is not incrassate.

DISTRIBUTION: Southern Africa and Madagascar.

REMARKS: Simon (1892a) first placed *Thelechoris* in the synonymy of *Ischnothele.* On the grounds of the above diagnosis, Benoit (1965a) restored the genus and created *Lathrothele.* Clearly, the diagnostic characters of *Lathrothele* are unique in the group and indicate that the species included are monophyletic. However, the two species of *Thelechoris* lack a synapomorphy and share no unequivocal synapomorphies with either *Ischnothele* or *Lathrothele.* A revision of the species included in *Ischnothele* is needed to clarify the question of whether *Thelechoris* warrants separation from *Lathrothele*.

LATHROTHELE BENOIT

Lathrothele Benoit, 1964b, p. 418 (*nomen nudum*).

Lathrothele Benoit, 1965a, p. 113 (type species by original designation *Lathrothele grabensis* Benoit; holotype male and female allotype in MRAC, examined).

DIAGNOSIS: Differs from *Ischnothele* and *Thelechoris* in having the first tibia of the male incrassate.

DISTRIBUTION: Tropical west Africa.

EUAGRINAE RAVEN

Euagrini Raven, 1979, p. 635.

DIAGNOSIS: Differs from the Diplurinae and Ischnothelinae by the absence of maxillary cuspules, and from the Masteriinae by the serrula being a broad area of short denticles.

Maxillary cuspules absent; serrula broad. One row of teeth on paired claws; unpaired claw elongate, curved, finely dentate. One tooth row on cheliceral margins. Male palpal tarsi divided into two equal and spinose lobes. Spines present on at least tarsi III and IV. Male tarsi unsegmented. Eye group about twice as wide as long. Apical segment of posterior lateral spinnerets digitiform. Leg formula 4321. Bothrium corrugiform.

DESCRIPTION: Carapace very flat, hirsute; fovea small, pitlike, very short, subcentral (most genera), longitudinal (*Microhexura*), or absent (*Carrai*). Eye group wider than long. Clypeus absent or indistinct. Chelicerae small, porrect; only one margin with teeth. Intercheliceral tumescence present (some *Australothele*) or absent. Maxillae rectangular, anterior lobe indistinct; cuspules absent. Labium large (*Cethegus*) or much wider than long, without cuspules. Labiosternal suture laterally wide. Sternum cordate, narrow or wide; all sigilla oval, marginal, or large and subcentral (*Carrai* and some *Cethegus*). Third leg usually longer than first or second. Legs elongate, at least tarsi III and IV spinose. Metatarsal preening combs present (*Stenygrocercus, Namirea*) or absent. Males with unsegmented tarsi; cymbium bilobed, spinose (*Euagrus, Phyxioschema, Allothele*) or aspinose (*Cethegus, Stenygrocercus, Carrai, Namirea, Australothele, Microhexura*). Palpal bulb pyriform with short (*Carrai*) or elongate embolus. Tibia I of males with raised pectinate process (most *Australothele*), dorsally flattened (*Namirea*), with mid-distal spur (*Microhexura*), or bare; metatarsus I with proximal thorn (*Australothele*) or bare. Tibia II bare (*Cethegus, Carrai, Stenygrocercus, Microhexura*), with distal pectinate process (*Euagrus, Phyxioschema, Allothele*), or with pre-distal spur and megaspine (*Namirea, Australothele*). Paired claws with one S-shaped row of teeth; unpaired claw curved with few long, fine teeth. Bothrium corrugiform. Scopulae entirely absent in both sexes. PMS with australotheline crescent of hirsute cuticle isolated by pallid glabrous tissue anterior to bases (*Cethegus, Stenygrocercus, Carrai, Namirea, Australothele, Allothele*) or crescent absent (*Euagrus, Phyxioschema*). PLS elongate; lateral and middle subsegments subequal, apical segment pseudosegmented (*Phyxioschema*) or elongate. Spermathecae consisting of two entire (*Carrai*) or divided lobes discharging separately.

GENERA INCLUDED: *Allothele* Tucker (1920), *Australothele* Raven (1984b), *Carrai* Raven (1984b), *Cethegus* Thorell (1881), *Euagrus* Ausserer (1875), *Microhexura* Crosby and Bishop (1925), *Namirea* Raven (1984b), *Phyxioschema* Simon (1889h), *Stenygrocercus* Simon (1892a).

DISTRIBUTION: North America (*Euagrus, Microhexura*), Central America (*Euagrus*), western Eurasia (*Phyxioschema*), Africa (*Allothele*), Australia (*Cethegus, Stenygrocercus, Carrai, Namirea, Australothele*), New Caledonia (*Stenygrocercus*), and Chile (undescribed genus).

REMARKS: Raven (1979, 1981a), on the misapprehension that Bonnet's (1956, 1958) changes in the original spellings of *Euagrus* (to *Evagrus*) and *Phyxioschema* (to *Phyxioschaema*) were valid, originally named the tribe derivative from the former, Evagrini. The original spellings are correct and the subfamily name is here modified to agree with that of *Euagrus*.

Like the Masteriinae, *Microhexura* lacks tarsal spines but because the setae on the cymbium and on the leg tarsi are slightly thicker (suggesting weak spines) and the genus lacks the distinctive eye arrangement, serrula, bulbous maxillae, and third claw of the masteriines, I have included it in the Euagrinae until further information can yield a more definitive synapomorphy.

MASTERIINAE SIMON

Masterieae Simon, 1889d, pp. 188, 191.

DIAGNOSIS: Differs from the Diplurinae and Ischnothelinae in the absence of maxillary cuspules, and all other diplurids in the reduced size of the AME and the linear maxillary serrula.

Maxillary cuspules absent; maxillae short, bulbous; serrula consisting of single row of long, erect pointed teeth. One row of teeth on paired claws; unpaired claw elongate, curved, with several fine teeth on common process. One tooth row on cheliceral margins. Cymbium divided into two equal, spinose lobes. Spines absent on all leg tarsi. Male tarsi unsegmented. Eye group compact, rounded; anterior median eyes very small or absent. Apical segment of posterior lateral spinnerets digitiform. Leg formula 4123. Bothrium corrugiform.

DESCRIPTION: Carapace very flat with long erect bristles; fovea small pitlike or very short. Eye group small, compact, with six or eight eyes (anterior median eyes very small or absent). Clypeus absent. Chelicerae small, porrect; only one margin with teeth. Intercheliceral tumescence absent. Maxillae stout, bulbous, or barrel-shaped, anterior lobe indistinct; cuspules absent; serrula single, straight, or curving row of long erect teeth. Labium much wider than long, without cuspules. Labiosternal suture laterally wide, deep. Sternum cordate, narrow; all sigilla oval, marginal (if discernible). Third leg usually shortest. Legs elongate but weakly spinose, without preening combs. Males with unsegmented tarsi; cymbium bilobed, spinose. Palpal bulb pyriform with short embolus with elongate paraembolic apophysis (some *Masteria*). Tibia I of males with bipartite cuticular process (some *Masteria*) or bare (*Striamea* and some *Masteria*). Paired claws with one S-shaped row of teeth; unpaired claw long, curved with several long, fine teeth on common process. Tarsal organ with three exposed receptors in concave depression surrounded by concentric ridges. Bothrium deeply corrugiform. Scopulae entirely absent in males and females. Posterior median spinnerets with crescent of hirsute cuticle isolated by pallid glabrous tissue anterior to bases (*Masteria*). Posterior lateral spinnerets long; all segments subequal. Spermathecae consisting of two entire (*Striamea*) or divided lobes (some *Masteria*).

GENERA INCLUDED: *Masteria* L. Koch (1873), *Striamea* Raven (1981b).

DISTRIBUTION: Southeast Asia, New Guinea, northern Australia, the Marianas Islands, Fiji, northern South America and West Indies and parts of Central America (*Masteria*), and Colombia (*Striamea*).

MISPLACED SPECIES: *Accola australis* Mello-Leitão (1939), reported from Chile, belongs to a new euagrine genus being described by Coyle; it has a broad serrula, tarsal spines, and the teeth on the unpaired claws are not raised on a common process, as in *Masteria*.

NEMESIIDAE SIMON

Nemesieae Simon, 1889d, p. 179.

DIAGNOSIS: Differs from the Dipluridae by the shorter, closer PLS, and by the presence of scopulae on integral leg tarsi in association with alyrate maxillae.

STC of females broad with two rows of teeth or bare and claw tufts present; ITC bare, if present; female palpal claw with row of teeth on promargin. Four spinnerets; PLS digitiform or shorter, middle segment as long as basal; bases of PMS separated by two diameters or less. Bothria corrugiform. Carapace low, hirsute; caput slightly arched.

PLESIOMORPHIC CHARACTERS: Two rows of teeth on STC of both sexes; STC broad; female palpal claw with row of teeth on promargin. Three claws. Chelicerae porrect, broad, without rastellum; outer fang surface smooth; fang long; only cheliceral promargin with teeth; intercheliceral tumescence weakly developed. Maxillary cuspules present, raised on low common mound. Serrula present on anterior maxillary face. Labium wider than long, with few cuspules. Tarsal organ low with concentric ridges. Labiosternal sigilla distinct groove. Leg scopulae weakly developed on tarsi I. Leg formula 4123. Tarsi of females short but slender, without subsegmentation.

Eight eyes in group about twice as wide as long, in two rows on low tubercle. Fovea transverse. Cymbium short, bilobed, spinose; bulb pyriform with short if differentiated embolus. Conductor and paraembolic apophysis absent. Abdominal sclerites absent. Four spinnerets; PMS bases close together; apical segment of PLS digitiform.

DESCRIPTION: Carapace ovate, hirsute, rarely glabrous (*Teyl, Ixamatus*), with caput slightly arched, longer than wide (most genera), or as long as wide (Diplothelopsinae). Eye tubercle arched, well defined (most genera) or low (*Teyl,* some *Mygaloides*). Clypeus wide (*Neodiplothele, Prorachias, Chaco, Androthelopsis, Pycnothele,* Diplothelopsinae) or narrow to absent (most genera). Fovea broad and recurved (*Nemesia, Brachythele*), strongly procurved but short (*Damarchus, Atmetochilus*), or short, more or less straight, and transverse (most genera). Chelicerae with rastellum of stout spines on raised mound (*Prorachias*), of weak spines on low mound (*Nemesia, Spiroctenus, Atmetochilus,* Diplothelopsinae, *Damarchus, Pionothele*), on inner edge (*Xamiatus,* some *Aname, Teyl, Kwonkan, Merridinia*), or absent (most genera). Upper cheliceral face with clavate setae (*Calisoga*) or setae normal (all other genera). Intercheliceral tumescence weakly developed (some *Nemesia, Teyl, Ixamatus, Entypesa, Hermacha, Nemesia*), pallid and soft (*Stanwellia, Acanthogonatus, Chaco,* Diplothelopsinae), small to large and setose (*Neodiplothele, Pselligmus, Stenoterommata, Rachias, Androthelopsis, Pycnothele*), or absent (*Aname, Xamiatus,* Bemmerinae, *Calisoga*). Fang long, paraxial. Maxillae with serrula on anterior face (some *Ixamatus, Entypesa, Hermacha, Stanwellia, Acanthogonatus*), on edge and posterior face of anterior lobe (Pycnothelinae), or not evident (*Xamiatus,* some *Ixamatus,* most Anamini, Nemesiinae, Bemmerinae). Anterior maxillary lobe short or indistinct. Maxillae with cuspules on low, common mound (*Ixamatus, Xamiatus, Entypesa, Stanwellia, Calisoga, Teyl, Diplothelopsis,* Pycnothelinae), extending back onto produced heel (Anamini, *Damarchus*), or confined to inner corner of rounded heel (all other genera). Labium wider than long with numerous (*Spiroctenus*), few, or no cuspules (most genera). Sternum cordate with small marginal (most genera), or subcentral and larger posterior sternal sigilla (*Xamiatus, Aname, Teyl,* Bemmerinae, Diplothelopsinae). Tarsi of females spinose (*Kwonkan*) or aspinose (all other genera); tarsi III and IV of males spinose (*Rachias, Kwonkan*) or unarmed (all other genera). Preening combs present (*Entypesa, Hermacha, Hermachura, Prorachias, Pselligmus,* Bemmerinae, *Stenoterommata, Rachias,* and some species of *Nemesia, Mygaloides, Acanthogonatus,* and *Stanwellia*) or absent (all other genera). Scopulae thin to absent on tarsi I (*Neodiplothele,* Bemmerinae, *Hermachura, Ixamatus, Entypesa,* male *Teyl,* and some *Namea* and *Pselligmus*), entire but narrow (Diplothelopsinae), or broad (all other genera) on tarsi I and II; scopulae present also on tarsi III and IV (*Stenoterommata, Hermacha, Calisoga, Acanthogonatus,* Diplothelopsinae, *Rachias, Chaco, Androthelopsis, Pycnothele,* most Anamini, some *Stanwellia*). Female leg tarsi short, integral (most genera) or with ventral weakness (*Diplothelopsis, Rachias, Chaco,* and some species of *Mygaloides, Stanwellia,* and *Acanthogonatus*); male leg tarsi long, ventrally pallid (*Xamiatus, Teyl, Pionothele*) or pseudosegmented (*Neodiplothele, Stanwellia, Calisoga, Acanthogonatus,* Diplothelopsinae, *Stenoterommata, Rachias, Androthelopsis, Pycnothele*). Females with two rows of teeth on broad paired claws; males with one S-shaped row (Bemmerinae), bare (*Neodiplothele*), or two rows of teeth (all other genera). Inferior claw bare, long (some *Hermacha, Entypesa, Ixamatus, Prorachias*), reduced (*Pionothele,* Pycnothelinae, all other Anaminae), absent on tarsi I and II (*Rachias, Pselligmus,* and some species of *Aname, Stanwellia, Acanthogonatus, Stenoterommata,* and *Mygaloides*), or absent on all tarsi (*Neodiplothele, Diplothelopsis, Chaco, Androthelopsis, Pycnothele,* and some *Acanthogonatus* and *Mygaloides*). True claw tufts present (*Neodiplothele* and an undescribed genus from Mexico) or absent (all other genera). Distal extensions of tarsal scopulae dense (Pycnothelinae except *Pselligmus* and *Stenoterommata,* Diplothelopsinae, *Aname, Acanthogonatus, Calisoga*) or thin to absent (all other genera). Palpal bulb pyriform; embolus elongate (most genera), very short (*Lepthercus,* some *Aname*), strongly reflexed at its origin (*Teyl,* most *Namea*), distally flanged (*Stanwellia, Pselligmus, Stenoterommata,* and some *Xamiatus, Entypesa,* and *Hermacha*), distally with keels (*Neodiplothele,* Diplothelopsinae, Pycnothelinae, and some *Stanwellia, Atmetochilus,* and *Nemesia*); keels soft, wide (*Androthelopsis, Pycnothele*) or short (*Rachias*). Tarsi of male palp spinose (some *Ixamatus,* some *Hermacha,* some *Entypesa,* some *Spiroctenus,* some *Nemesia,* some *Brachythele*), with modified setae (Diplothelopsinae), or aspinose (all other genera); elongate (*Namea, Merridinia, Entypesa,* some *Namea*) or short (all other genera). Palpal bulb unusually large (*Pycnothele, Androthelopsis*) or of normal size (all other genera). Tibia of males with distal spur on low mound (*Entypesa,* some *Acanthogonatus,* some *Hermacha, Damarchus, Atmetochilus, Xamiatus*), with dense distal shield of spines (some *Acanthogonatus*), with distal or predistal megaspine on raised spur (*Lepthercus, Aname, Kwonkan,* Nemesiinae, some *Namea*), or without spurs (all other genera). Two (*Diplothelopsis, Neodiplothele*) or four spinnerets, all close together (all other genera); apical segment of PLS digitiform (Anaminae, *Calisoga, Damarchus, Hermachura,* some *Pselligmus*), triangular (*Atmetochilus, Rachias,* and some *Acanthogonatus* and *Hermacha*), or domed (*Neodiplothele,* Nemesiinae, *Prorachias, Chaco, Androthelopsis, Pycnothele, Pionothele, Spiroctenus, Stenoterommata*). Tarsal organ raised, smooth (Ixamatinae) or low with concentric ridges (most genera). Female spermathecae either entire or bilobed. Leg cuticle pustulose (Ixamatinae) or smooth. Trichobothria in two rows on tibiae, one sometimes slightly diagonal row on metatarsi, and broad band or line on tarsi. Bothria corrugiform.

SUBFAMILIES INCLUDED: Anaminae, Ixamatinae, Bemmerinae, Nemesiinae, Diplothelopsinae, Pycnothelinae.

REMARKS: *Troglodiplura* is not assigned to a subfamily because it is known only from fragments of the carapace and legs; Main and Gray are describing the recently discovered male. *Speloctenizа* is included in the key but also left unplaced until a male is known.

KEY TO GENERA OF THE NEMESIIDAE

1. Eyes absent 2
Eyes present 3
2. Leg tarsi long, thin, curved; Australia .... *Troglodiplura*
Leg tarsi long but stout; Ecuador .... *Speloctenizа*
3. True claw tufts present; teeth absent on claws .... *Neodiplothele*
True claw tufts absent; claws pectinate .. 4
4. Apical segment of PLS domed or triangular (fig. 96) 5
Apical segment of PLS digitiform or longer (figs. 38, 157) 24
5. Third claw absent on tarsi I; tarsi I and II densely scopulate 6
Third claw present on tarsi I; tarsal scopulae variable 15
6. Sternum and carapace wide (figs. 92, 94); few or no maxillary cuspules 7
Sternum and carapace narrow (figs. 148, 151); at least 20 maxillary cuspules 8
7. Two spinnerets .... *Diplothelopsis*
Four spinnerets .... *Mygaloides,* part
8. Third claw present on leg IV 9
Third claw absent on leg IV 12
9. Scopulae weak or absent on tarsi II, thin on tarsi I 10
Tarsi I and II densely scopulate 11
10. ITC absent or very small on legs I–III .... *Pselligmus,* part
ITC long on all legs .... *Hermachura,* part
11. Bulb with hard low ridges *Stenoterommata*
Bulb with soft folded keels .... *Rachias*
12. Clypeus absent (figs. 31, 35) .... *Acanthogonatus,* part
Clypeus present, distinct (figs. 103, 113, 126) 13
13. All tarsi of females cracked and of males pseudosegmented 14
All tarsi of females entire and of males at most cracked; bulb with high vanes (fig. 109) .... *Pycnothele*
14. Bulb of male palp with several low vanes (fig. 130) .... *Chaco*
Bulb of male palp with high vanes (fig. 115) .... *Androthelopsis*
15. Fovea broad and distinctly recurved (figs. 79, 85); Eurasia 16
Fovea narrow, procurved, or more or less straight 17
16. Inner surface of fang serrate ... *Brachythele*
Inner surface of fang smooth ..... *Nemesia*
17. Clypeus wide or distinct (figs. 99, 161); South America 18

Clypeus narrow or absent 19

18\. Sternum and carapace wide (figs. 92, 94); rastellum weak if present .... *Mygaloides,* part

Sternum and carapace narrow (figs. 148, 151); rastellum very strong (fig. 163) .... *Prorachias*

19\. Cuspules (few to numerous) present on labium; Africa .... *Spiroctenus*

Cuspules absent on labium 20

20\. Fovea short, strongly procurved; sternal sigilla large and medial (figs. 56, 59); Asia .... *Atmetochilus*

Fovea more or less straight or slightly procurved 21

21\. Palpal bulb with keels; South America .. 22

Palpal bulb without keels; Africa 23

22\. Scopulae absent on tarsi III and IV .... *Pselligmus,* part

Scopulae present on tarsi III and IV .... *Stenoterommata,* part

23\. Preening combs present on metatarsi; male tarsi normal, integral ... *Hermacha,* part

Preening combs absent on metatarsi; male tarsi very slender .... *Pionothele*

24\. Tarsal organ distinctly elevated 25

Tarsal organ low and domed 26

25\. Plumose hairs present on trochanter of palp .... *Xamiatus*

Plumose hairs entirely absent .... *Ixamatus*

26\. Scopula on tarsus I thin or absent 27

Scopula on tarsus I entire 29

27\. Preening combs present 28

Preening combs absent; Australia .... *Teyl*

28\. Enlarged spigots present on ventral surface of PLS (fig. 159); Brazil .. *Hermachura,* part

Spigots normal; Africa, Madagascar .... *Entypesa*

29\. Maxillary cuspules along inner edge of heel; Australia 30

Maxillary cuspules confined to anterior corner 35

30\. Tarsi III and IV spinose .... *Kwonkan*

Tarsi of all legs aspinose 31

31\. Cymbium elongate 32

Cymbium short and truncate .. *Aname,* part

32\. Embolus reflexed at base ..... *Namea,* part

Embolus more or less straight 33

33\. Tibia I of males with long medial spur and megaspines .... *Aname,* part

Tibia I without long medial spur 34

34\. Posterior sternal sigilla elongate; PLS short; Western Australia .... *Merridinia*

Posterior sternal sigilla oval; PLS moderately long; Eastern Australia ..... *Namea,* part

35\. Upper surface of inner chelicerae of males and females with enlarged clavate setae; U.S.A. .... *Calisoga*

Entire chelicerae with normal setae 36

36\. Male tarsi entire 40

Male tarsi pseudosegmented 38

37\. Embolus short, stout (fig. 49) .... *Lepthercus*

Embolus elongate .... *Hermacha,* part

38\. Embolus tip broad (fig. 43) ..... *Stanwellia*

Embolus elongate and pointed (fig. 37) ... 39

39\. Intercheliceral tumescence pallid, distinct, soft; South America .....*Acanthogonatus,* part

Intercheliceral tumescence indistinct, if present; Africa .... *Hermacha,* part

40\. Fovea U-shaped .... *Damarchus*

Fovea not U-shaped 37

ANAMINAE SIMON

Anameae Simon, 1889d, p. 178.

Dolichosterneae Rainbow and Pulleine, 1918, p. 168. First synonymized by Main, 1983b.

Dolichosterninae: Petrunkevitch, 1923, p. 1.

Anamini Raven, 1980a, p. 48.

Dolichosternini: Raven, 1981c, p. 327.

Teylini Main, 1982c, p. 273; Main, 1983b, p. 925 (*nomen nudum*).

DIAGNOSIS: Differs from other Nemesiidae in the presence of an entire scopula on tarsi II of females or in the maxillae having a strongly produced heel with cuspules upon it.

Apical segment of PLS digitiform. Scopulae present on tarsi I–III of males. Males with two rows of teeth on paired claws; palpal bulb with broadly flanged embolus or tapering but with keels.

GENERA INCLUDED: *Aname, Teyl, Namea, Kwonkan, Merridinia, Hermacha, Lepthercus, Stanwellia, Acanthogonatus, Entypesa.*

SYNONYMY: See Anamini.

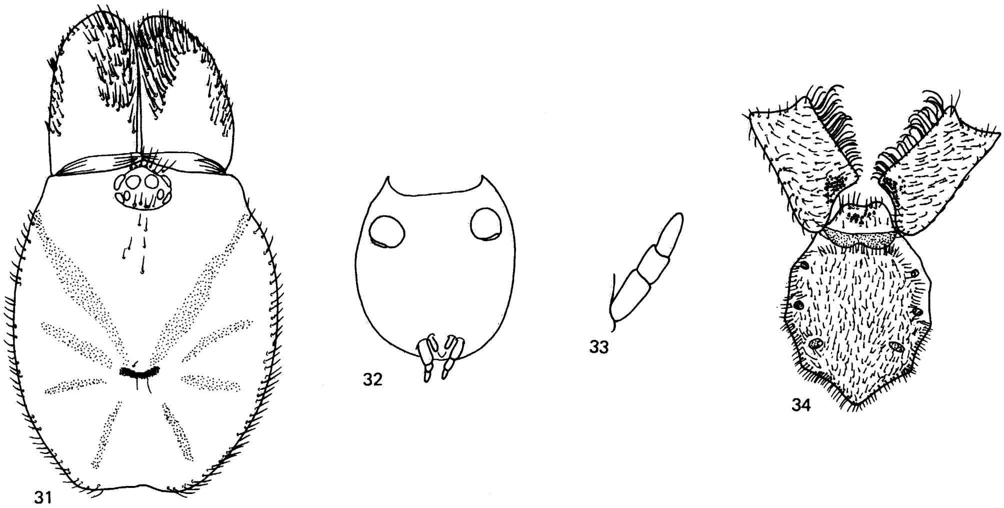
REMARKS: Genera not included in the Anamini are considered Anaminae *incertae sedis.* Because Main (1982c, 1983b) gave no statement differentiating the tribe Teylini, under Article 13a (i) of the International Code of Zoological Nomenclature the name is not yet available.

STANWELLIA RAINBOW AND PULLEINE

Figure 43

Stanwellia Rainbow and Pulleine, 1918, p. 164 (type species by monotypy *Stanwellia decora* Rainbow and Pulleine; female holotype in AMS, examined).

Aparua Todd, 1945, p. 390 (type species by original designation *Aparua bipectinata* Todd). First synonymized by Main, 1983b, p. 923.



FIGS. 31–34. *Acanthogonatus frankii* Karsch, female holotype. 31. Cephalothorax, dorsal view. 32. Abdomen, ventral view. 33. Posterior lateral spinneret, lateral view. 34. Sternum, maxillae, and labium.

DIAGNOSIS: Differs from *Acanthogonatus* by the broadly tipped embolus; males differ from those of other Anaminae by the pseudosegmented tarsi and asetose intercheliceral tumescence.

DESCRIPTION: Apical segment of PLS digitiform. Fovea short, more or less straight. Clypeus narrow. Eye tubercle low. Few or no cuspules on labium. Serrula present. Maxillae rectangular; anterior lobe rounded. Numerous cuspules on maxillae on inner corner on mound. Chelicerae without rastellum; intercheliceral tumescence small, soft, pallid. Posterior sternal sigilla small, oval, marginal. Cymbium and leg tarsi of both sexes without spines. Palpal bulb pyriform with broadly flanged embolus. Tibia I of males with sessile megaspines or unmodified. Males with two rows of teeth on all paired claws; third claw short, curved, or absent on tarsi I and II. Scopulae of males entire on distal metatarsi I and II and tarsi I–III, divided on tarsi IV; scopulae in females entire on metatarsi and tarsi I and II, divided on tarsi III and IV. Tarsal organ low. Tarsi I–IV of males pseudosegmented; tarsi of females similar or integral. Metatarsal preening combs present or absent. Spermathecae entire.

DISTRIBUTION: Southeastern and southern Australia and New Zealand.

REMARKS: *Stanwellia* was revised by Main (1972) but with the inclusion of New Zealand species of *Aparua,* the generic diagnosis regarding the pseudosegmentation of female tarsi becomes vague. Once again, until the species of *Stanwellia* as presently defined are revised and found to form a monophyletic group the genus diagnosis remains without an autapomorphy.

ACANTHOGONATUS KARSCH

Figures 31–39

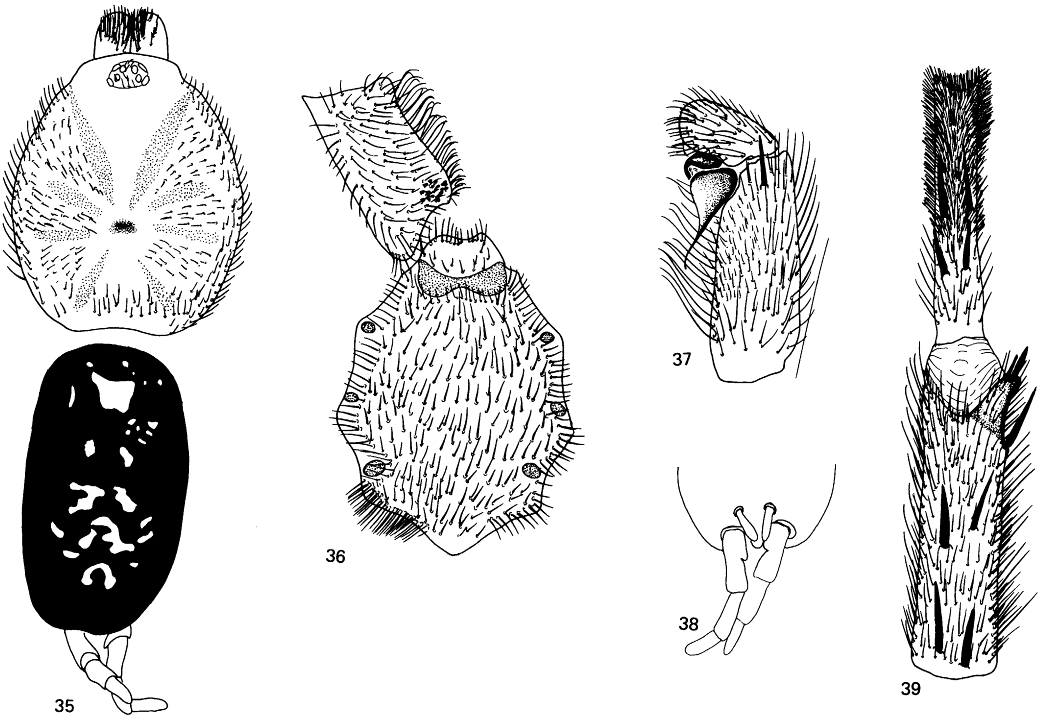
Acanthogonatus Karsch, 1880, p. 391 (type species by original designation *Acanthogonatus franckii* Karsch; female holotype in ZMB, examined).

Tryssothele Simon, 1902b, p. 6 (type species by original designation *Mygale subcalpeiana* Nicolet; syntypes lost?). NEW SYNONYMY.

Chubutia Mello-Leitão, 1940a, p. 2 (type species by original designation *Chubutia notata* Mello-Leitão). First synonymized with *Tryssothele* by Gerschman and Schiapelli, 1970a, p. 152.

DIAGNOSIS: Differs from *Stanwellia* by males having a tapering rather than broadly tipped embolus.

DESCRIPTION: Apical segment of PLS digitiform or triangular. Fovea short, more or less straight. Clypeus narrow. Eye tubercle raised, well defined. Few or no cuspules on labium. Serrula present. Maxillae trapezoidal; anterior lobe rounded. Numerous cuspules on maxillae on inner corner on mound.



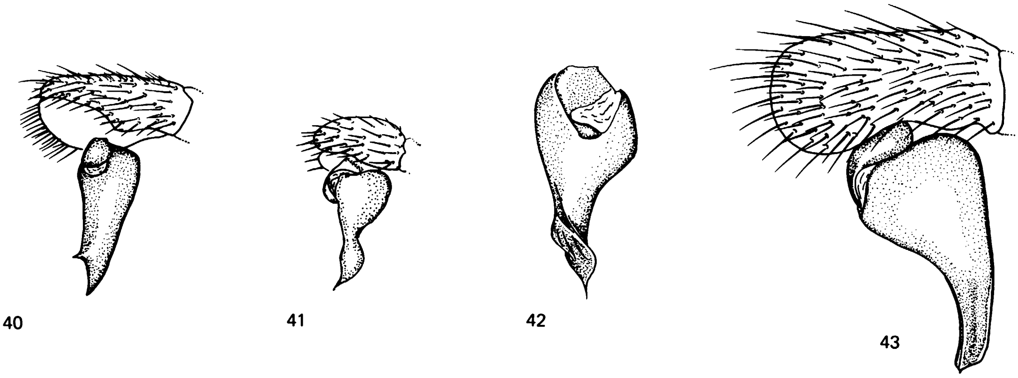
FIGS. 35–39. *Acanthogonatus subcalpeiana* (Nicolet), male. 35. Cephalothorax and abdomen, dorsal view. 36. Sternum, maxilla, and labium. 37. Palpal tibia, cymbium, and bulb, retrolateral view. 38. Spinnerets, ventral view. 39. Right tibia and metatarsus I, ventral view.

Chelicerae without rastellum; intercheliceral tumescence small, soft, pallid. Posterior sternal sigilla small, oval, marginal. Cymbium and leg tarsi of both sexes without spines. Palpal bulb pyriform with long, tapering embolus. Tibia I of males with low distal spur bearing megaspine or with dense black shield of spines. Males with two rows of teeth on all paired claws; third claw short, curved or absent on some or all tarsi. Scopulae of males entire on distal metatarsi I and tarsi I–III, divided on tarsi IV, absent on metatarsi II; scopulae in females entire on metatarsi and tarsi I and II, divided on tarsi III and IV. Tarsal organ low. Tarsi I–IV of males pseudosegmented; tarsi of females similar or integral. Metatarsal preening combs present. Two spermathecal receptacula, each two- or three-lobed; basal lobe sometimes indistinct.

DISTRIBUTION: Chile, Uruguay, and southern Argentina.

REMARKS: *Acanthogonatus* has always been placed in the Barychelidae, presumably because Karsch's original description was very uninformative and he incorrectly assumed that claw tufts were present. A number of species that lack the pseudosegmented tarsi of females and possess a third claw are included in *Acanthogonatus* until a revision allows the delimitation of a monophyletic group for them. *Tryssothele* was revised by Gerschman and Schiapelli (1968). Although the type specimen of *Mygale subcalpeiana* does not exist and is presumed to have been represented in Simon's time only by fragments, I have followed Gerschman and Schiapelli (1968) in assuming that Simon (1902b) had sufficient parts of the Nicolet type to identify a conspecific male in his collection.

Gerschman and Schiapelli (1968) considered that because of its short PLS *Tryssothele fuegiana* Simon (1902b) should be transferred to the Ctenizidae. Having examined the types (in ZMH) I have no hesitation in



FIGS. 40–43. 40. *Aname trevallynia* (Hickman), cymbium and bulb, proventral view. 41. *Entypesa schoetedeni* Benoit, cymbium and bulb, ventral view. 42. *Hermacha* sp., bulb, ventral view. 43. *Stanwellia* sp., cymbium and bulb, retrolateral view.

following Simon's original placement (with the reservation that *Tryssothele* is a junior synonym of *Acanthogonatus*).

HERMACHA SIMON
Figure 42

Hermacha Simon, 1889g, p. 408 (type species by monotypy *Hermacha caudata* Simon; holotype lost from MNHP).

Brachytheliscus Pocock, 1902b, p. 317 (type species by original designation *Brachythele bicolor* Pocock; female holotype in BMNH, examined). First synonymized by Hewitt, 1915a, p. 125.

Damarchodes Simon, 1903b, p. 43 (type species by monotypy *Damarchodes purcelli* Simon; female holotype in MNHP, examined). First synonymized by Tucker, 1917, p. 112.

Hermachola Hewitt, 1915b, p. 314 (type species by monotypy *Hermachola grahami* Hewitt; male holotype in AMG, not available). NEW SYNONYMY.

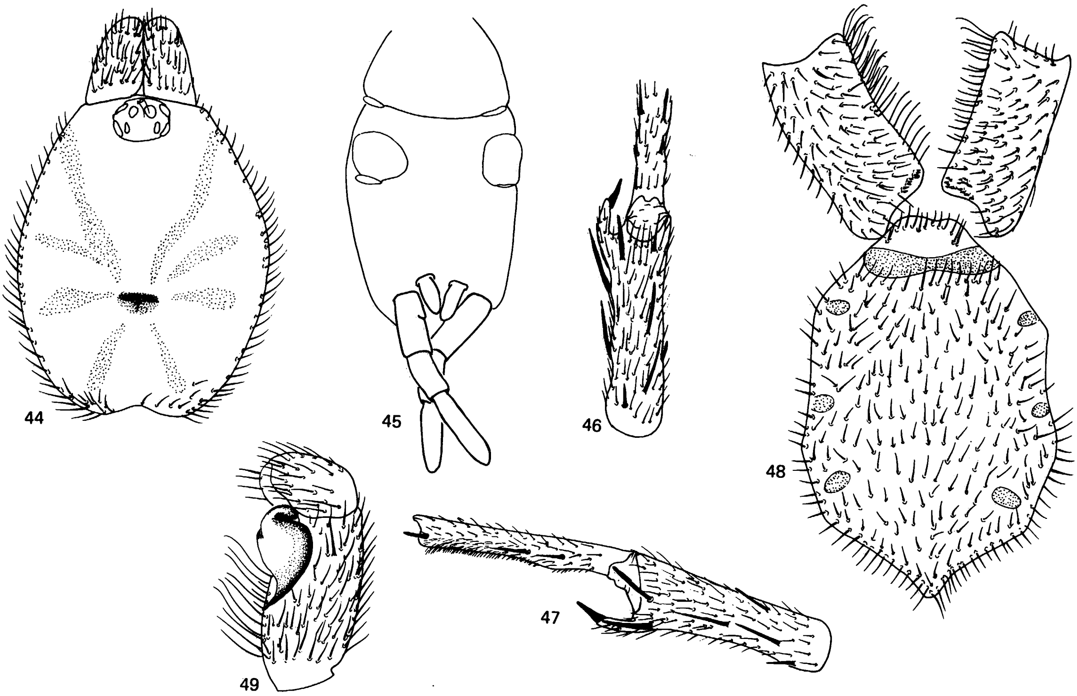
DIAGNOSIS: Differs from *Entypesa* in the presence of strong scopulae on tarsi I–III, and from *Lepthercus* in lacking a cuticular spur on tibia I of males.

DESCRIPTION: Apical segment of PLS digitiform or triangular. Fovea short, more or less straight. Clypeus narrow. Eye tubercle raised, defined well. No cuspules on labium. Serrula present, small. Maxillae rectangular; anterior lobe rounded. Numerous cuspules on maxillae on inner corner, not on mound. Chelicerae without rastellum; intercheliceral tumescence small, pallid, and setose or absent. Posterior sternal sigilla small, oval, marginal. Cymbium with or without spines; leg tarsi of both sexes aspinose. Palpal bulb pyriform with long tapered or broadly flanged embolus. Distal tibia I of males with one megaspine on low mound or unmodified. Males with two rows of teeth on all paired claws; third claw short, curved. Scopulae of males entire on metatarsi I and II and tarsi I–III, divided on tarsi IV, distal on metatarsi I–III; scopulae in females entire on metatarsi and tarsi I and II, divided on tarsi III and IV. Tarsal organ low. Ventral tarsi III and IV of males pallid; otherwise tarsi integral. Metatarsal preening combs present. Spermathecae entire.

DISTRIBUTION: Southern Africa.

REMARKS: Although the type of *Hermachola* was unavailable I have identified a conspecific male in the collection of the California Academy of Sciences. Because the only difference between *Hermachola* and other species of *Hermacha* is the spiraled form of the palpal embolus and there is insufficient information to determine whether that warrants generic status, the two genera are synonymized.

The variation in the bulb of *Hermacha* causes considerable problems both in the phylogeny and diagnosis of the genus. The embolus is filiform without any modifications or broadly flanged, as in *Stanwellia* and *Entypesa*. I propose that the broadly flanged state is plesiomorphic.



FIGS. 44–49. *Lepthercus dredgei* Purcell, male holotype. 44. Cephalothorax, dorsal view. 45. Abdomen, ventral view. 46, 47. Right tibia and metatarsus I. 46. Ventral view. 47. Retrolateral view. 48. Sternum, maxillae, and labium. 49. Palpal tibia, cymbium, and bulb, retrolateral view.

LEPTHERCUS PURCELL

Figures 44–49

Lepthercus Purcell, 1902b, p. 379 (type species by original designation *Lepthercus dregei* Purcell; male holotype in SAMC, examined).

DIAGNOSIS: Differs from *Hermacha* in lacking preening combs and in possessing a raised cuticular spur on the first tibia of males.

DESCRIPTION: Females unknown. Apical segment of PLS digitiform. Fovea short, more or less straight. Clypeus narrow. Eye tubercle raised, defined well. No cuspules on labium. Serrula indeterminate. Maxillae rectangular; anterior lobe rounded. Numerous cuspules on maxillae on inner corner, not on mound. Chelicerae without rastellum; intercheliceral tumescence indeterminate. Posterior sternal sigilla small, oval, marginal. Cymbium and leg tarsi of both sexes without spines. Palpal bulb pyriform with long tapered or short acuminate embolus. Distal tibia I of males with one megaspine on raised cuticular spur. Males with two rows of teeth on all paired claws; third claw short, curved. Scopulae of males entire on metatarsi I and II and tarsi I–III, divided on tarsi IV, distal on metatarsi I–III. Tarsal organ low. Tarsi integral. Metatarsal preening combs absent.

DISTRIBUTION: Southern Africa.

ENTYPESA SIMON

Figure 41

Entypesa Simon, 1902a, p. 599 (type species by monotypy *Entypesa nebulosa* Simon; female holotype?, in MNHP, examined).

Pseudohermacha Strand, 1907a, p. 549 (type species by original designation *Pseudohermacha annulipes* Strand; female holotype destroyed). NEW SYNONYMY.

DIAGNOSIS: Differs from *Hermacha* in the elongate male palpal tarsi and scopulae that are very thin on tarsi I and weak or absent on tarsi II–IV.

DESCRIPTION: Apical segment of PLS elongate. Fovea short, more or less straight. Caput very low; clypeus narrow. Eye tubercle low. No cuspules on labium. Maxillae rectangular; anterior lobe rounded; heel rounded. Numerous cuspules on maxillae on inner corner, not on mound. Serrula present on anterior face of lobe. Chelicerae without rastellum; intercheliceral tumescence small, pallid, and setose or absent. Posterior sternal sigilla small, oval, marginal. Cymbium short or elongate, with or without spines. Palpal bulb pyriform with long, tapered or flanged embolus. Distal tibia I of males with one megaspine on low spur or unmodified. Males with two rows of teeth on all paired claws; third claw short, curved. Scopulae of males thin and divided on tarsi I and II and on distal metatarsi I and II, elsewhere absent; scopulae in females thin and divided on tarsi I and II, distal and thin on metatarsi I, elsewhere absent. Tarsal organ low. All leg tarsi integral and aspinose. Metatarsal preening combs present on legs II–IV. Spermathecae entire.

DISTRIBUTION: Madagascar and southern Africa.

REMARKS: Strand (1907a) distinguished *Pseudohermacha* from *Hermacha* by the lesser scopulae; thus it is closer to *Entypesa,* from which it does not differ in any characters of generic significance given by Strand.

ANAMINI SIMON

Anameae Simon, 1889d, p. 178.

Dolichosterneae Rainbow and Pulleine, 1918, p. 168.

Anamini Raven, 1980a, p. 48. First synonymized by Main, 1983b, p. 924.

DIAGNOSIS: Differs from all other Nemesiidae by the maxillary heel being strongly produced over labium, and cuspules present on heel.

GENERA INCLUDED: *Aname, Namea, Teyl, Kwonkan, Merridinia.*

REMARKS: Unaware that Simon (1889d) had already created a group based on *Aname,* Raven (1980a) established a new tribe based on the same genus and later (Raven, 1981c) synonymized Anamini Raven with the Dolichosternini because the latter had priority. Simon (1892a) abandoned his Anameae and since then Simon's Anameae has not appeared in any publication except Main (1983b), who confused it with that of Raven (1980a).

SYNONYMY: Main (1982c), in an ecological study of desert mygalomorphs, erected the Teylini solely for *Teyl* and without providing any reason. The tribal name serves no grouping function and also lacks any characters distinguishing the tribe; thus, the International Code of Zoological Nomenclature requires that the name be considered a *nomen nudum.*

ANAME L. KOCH

Figure 40

Aname L. Koch, 1873, p. 465 (type species by monotypy *Aname pallida* L. Koch, penultimate male holotype in ZMH, examined).

Chenistonia Hogg, 1901, p. 262 (type species by original designation *Chenistonia maculata* Hogg, male and female syntypes in BMNH, examined). First synonymized by Raven, 1981c, p. 328.

Dekana Hogg, 1902, p. 138 (type species by original designation *Dekana diversicolor* Hogg, male holotype lost). First synonymized by Raven, 1981c, p. 328.

Proshermacha Simon, 1908, p. 363 (type species subsequently designated by Rainbow, 1911, p. 113, *Proshermacha subarmata* Simon; juvenile syntype in ZMB, examined). First synonymized with *Chenistonia* by Main, 1982a, p. 84.

Sungenia Rainbow and Pulleine, 1918, p. 162 (type species by monotypy *Chenistonia* (*Dekana*) *atra* Strand; male holotype in SMF, examined). First synonymized by Raven, 1981c, p. 328.

Dolichosternum Rainbow and Pulleine, 1918, p. 168 (type species by monotypy *Dolichosternum attenuatum* Rainbow and Pulleine; female? holotype in AMS, examined). First synonymized by Raven, 1981c, p. 328.

DIAGNOSIS: Differs from *Kwonkan* only by lacking spines on the leg tarsi.

DESCRIPTION: Apical segment of PLS digitiform. Fovea broad and procurved or straight, or short and more or less straight. Clypeus absent. Eye tubercle raised, defined well, especially in males. Few or no cuspules on labium. Serrula present or absent. Maxillae trapezoidal; heel strongly produced over labium; anterior lobe rounded. Numerous cuspules on maxillae extending from inner corner onto heel, not on mound. Chelicerae with rastellum of conical spines on inner distal margins or without rastellum; intercheliceral tumescence absent. Posterior sternal sigilla small, oval, marginal, or elongate, subcentral. Cymbium elongate or short, with or without spines. Palpal bulb pyriform with long, tapered embolus or embolus short, with or without paraembolic apophysis. Tibia I of males with one megaspine on low spur or unmodified. Males with two rows of teeth on all paired claws; third claw short, curved or absent on tarsi I and II. Scopulae of males and females entire or divided on metatarsi and tarsi I and II, divided or absent on tarsi III and IV, distal on metatarsi I–III. Tarsal organ low. All tarsi integral. Metatarsal preening combs absent. Spermathecae entire or divided.

DISTRIBUTION: Australia.

REMARKS: I have discussed the relationships of the Anamini previously (Nemesiidae, Intrarelationships) and found that the most parsimonious classification leaves the *Aname pallida* species group without a synapomorphy. Because of that and the unrevised status of the southern species of the *Aname maculata* (Hogg) group, the questionable monophyly of *Chenistonia,* and the plesiomorphic status of the *Aname pallida* group, no name changes are made.

KWONKAN MAIN

Kwonkan Main, 1983b, p. 925 (type species by original designation *Dekana wonganensis* Main; female holotype in WAM, examined).

DIAGNOSIS: Differs from *Aname* in the possession of spines on the leg tarsi of females.

DESCRIPTION: Apical segment of PLS digitiform. Fovea broad and procurved or straight. Clypeus absent. Eye tubercle raised. No cuspules on labium. Serrula absent. Maxillae trapezoidal; heel strongly produced over labium; anterior lobe rounded. Numerous cuspules on maxillae extending from inner corner onto heel, not on mound. Chelicerae with rastellum of conical spines on inner distal margins; intercheliceral tumescence absent. Posterior sternal sigilla elongate and subcentral. Cymbium aspinose. Palpal bulb pyriform with long, tapered embolus. Tibia I of males with one megaspine on low spur. Males with two rows of teeth on all paired claws; third claw short, curved. Scopulae of males and females entire or divided on metatarsi and tarsi I and II, divided on tarsi III and IV, absent elsewhere. Tarsal organ low. All tarsi integral. Metatarsal preening combs absent. Spermathecae entire.

DISTRIBUTION: Southwestern Australia.

TEYL MAIN

Teyl Main, 1975, p. 74 (type species by monotypy *Teyl luculentus* Main; male holotype and female paratype in WAM, examined).

DIAGNOSIS: Differs from *Namea* in the elongate subcentral posterior sternal sigilla and in the tarsal scopulae of females being very weak or absent.

DESCRIPTION: Apical segment of PLS digitiform. Fovea short and procurved, straight, or recurved. Clypeus narrow. Eye tubercle low but well defined, especially in males. No cuspules on labium. Serrula absent. Maxillae trapezoidal; heel strongly produced over labium; anterior lobe rounded. Numerous cuspules on maxillae extending from inner corner onto heel, not on mound. Chelicerae with rastellum of small conical teeth; intercheliceral tumescence small, pallid. Posterior sternal sigilla slender, elongate, subcentral. Cymbium elongate, aspinose. Bulb pyriform, with long, reflexed embolus. Tibia I of males unmodified. Males with two rows of teeth on all paired claws; third claw very small, curved. Scopulae of males entire on metatarsi and tarsi I and II, absent elsewhere in males, very thin or entirely absent in females. Tarsal organ low. All tarsi integral. Legs of males very long, all tarsi ventrally pallid but not curved or pseudosegmented. Metatarsal preening combs absent. Spermathecae entire.

DISTRIBUTION: Southwestern Australia.

NAMEA RAVEN

Namea Raven, 1984a, p. 2 (type species by original designation *Namea capricornia* Raven; holotype male and female paratype in QMB, examined).

DIAGNOSIS: Differs from *Merridinia* in the reflexed embolic origin and from *Teyl* in the presence of a modified conical spine on the male palpal tibia and tarsal scopulae in females.

DESCRIPTION: Apical segment of PLS digitiform. Fovea more or less straight. Clypeus absent. Eye tubercle raised, defined well, especially in males. No cuspules on labium. Serrula absent. Maxillae trapezoidal; heel strongly produced over labium; anterior lobe rounded. Numerous cuspules on maxillae extending from inner corner onto heel, not on mound. Chelicerae without rastellum; intercheliceral tumescence absent or very slight. Posterior sternal sigilla small, oval, marginal. Males with stout conical spine on retroventral palpal tibia, cymbium elongate, without spines. Palpal bulb pyriform with long, tapered, reflexed embolus. Tibia I of males unmodified or with two or more megaspines sessile, or on low spur. Males with two rows of teeth on all paired claws; third claw short, curved. Scopulae of both sexes entire or divided on metatarsi and tarsi I and II, divided or absent on tarsi III and IV, distal on metatarsi I–III. Tarsal organ low. All tarsi integral. Metatarsal preening combs absent. Spermathecae entire.

DISTRIBUTION: Eastern Australia.

REMARKS: The possible alternate affinities of *N. dahmsi* Raven (1984a) and *N. callemonda* Raven (1984a) are discussed with *Merridinia.*

MERRIDINIA MAIN

Merridinia Main, 1983b, p. 931 (type species by original designation *Merridinia damsonoides* Main; holotype male and female paratype in WAM, examined).

DIAGNOSIS: Differs from *Teyl* and *Namea* in the straight embolic origin, and from *Namea* in the elongate tarsi III and IV of males.

DESCRIPTION: Apical segment of PLS digitiform. Fovea straight or slightly procurved. Clypeus narrow or absent. Eye tubercle steeply raised. Serrula not evident. No cuspules on labium. Maxillae trapezoidal; heel strongly produced over labium; with numerous cuspules extending from inner corner onto heel; anterior lobe absent. Chelicerae without rastellum. Cheliceral interfaces of males without tumescence but upper inner faces with shallow crescentic depression. Posterior sternal sigilla elongate, subcentral. Cymbium elongate, aspinose. Bulb pyriform with straight tapering embolus without keels. Tibia I of males with two megaspines on low mounds, not spurs; metatarsus I bowed, with proximal process. Males with two rows of teeth on all paired claws; third claw small, bare. Scopulae of males thin but entire on tarsi I–IV, very thin to absent on metatarsi I and II, absent elsewhere; of females thin and divided on palpal tarsi and tarsi I and II, distal on metatarsi I and II; elsewhere absent. Tarsal organ low. Tarsi III and IV of males very elongate but integral. Metatarsal preening combs absent. Spermathecae undivided.

DISTRIBUTION: Southwestern Australia.

REMARKS: Raven (1984a) indicated that two species of *Namea*—*N. dahmsi* Raven and *N. callemonda* Raven—may be better placed elsewhere; *Merridinia* initially seems the best place. An apparent reversal from the reflexed embolus, synapomorphic for *Namea,* to a straight embolus in *Namea callemonda* and *Namea dahmsi* is required without transferring the species. Because *N. callemonda* has one other synapomorphy of *Namea*—a stout conical spine on the proximoventral corner of the male palpal tibia—it is more parsimonious to regard the one divergence, the straight embolus, as a reversal. However, *N. dahmsi* lacks such a spine and, unlike other *Namea* species, lacks the elongate male palpal tarsus. Because only one species of *Merridinia* is known, it is unclear whether the characters of the species are those of the genus. Consequently, I retain *N. dahmsi* in *Namea* with *N. callemonda* until more is known of other possible sister groups.

IXAMATINAE, NEW SUBFAMILY

TYPE GENUS: *Ixamatus* Simon.

DIAGNOSIS: Differs from all other Nemesiidae in the presence of a rodlike tarsal organ.

Tarsal scopulae reduced or absent on posterior tarsi of females. Tarsal organ elevated, rodlike. PLS with digitiform apical segment. Third claw present. Males with two rows of teeth on paired claws.

GENERA INCLUDED: *Ixamatus, Xamiatus.*

IXAMATUS SIMON

Ixalus L. Koch, 1873, p. 469 (type species by monotypy *Ixalus varius* L. Koch, male and female syntypes in ZMH, examined). Preoccupied by *Ixalus* Ogilby, 1837 (Mammalia).

Ixamatus Simon, 1887a, p. 195 (*nomen novum*).

DIAGNOSIS: Differs from *Xamiatus* in lacking feathery hairs on the basal segments of the anterior limbs.

DESCRIPTION: Apical segment of PLS digitiform. Fovea broad, more or less straight. Clypeus absent. Eye tubercle low. Few or no cuspules on labium. Serrula present or absent. Maxillae rectangular; anterior lobe indistinct. Numerous cuspules on maxillae on mound on inner corner. Chelicerae without rastellum; intercheliceral tumescence small and pallid or absent. Posterior sternal sigilla oval, submarginal. Cymbium and leg tarsi of both sexes with or without spines. Palpal bulb smooth, pyriform with long or short embolus. Predistal tibia I of males with twin megaspines on low spur or unmodified. Males with two rows of teeth on paired claws of at least legs I and II; leg IV sometimes bare; third claw curved. Scopulae entire on tarsi I and II of males, thin and divided on tarsi I of females; absent or very thin on metatarsi of males and females. Tarsal organ smooth, raised rod. Cuticle of legs pustulose. All hairs simple. Ventral tarsi I and II of males pallid; otherwise tarsi integral. Metatarsal preening combs absent. Spermathecae entire or divided.

DISTRIBUTION: Eastern Australia.

REMARKS: *Ixamatus* was revised by Raven (1982a).

XAMIATUS RAVEN

Xamiatus Raven, 1981c, p. 343 (type species by original designation *Xamiatus rubrifrons* Raven; holotype male and female paratypes in QMB, examined).

DIAGNOSIS: Differs from *Ixamatus* in possession of feathery hairs on basal segments of leg I and palp of adults, and the presence of adpressed spatulate setae on carapace.

DESCRIPTION: Apical segment of PLS digitiform. Fovea broad, procurved. Clypeus absent. Eye tubercle raised. Few or no cuspules on labium. Serrula absent. Maxillae trapezoidal; anterior lobe distinct. Numerous cuspules on maxillae on mound on inner corner. Chelicerae with rastellum consisting of short conical spines on distal interface; intercheliceral tumescence absent. Posterior sternal sigilla moderately large, oval, submarginal. Cymbium and leg tarsi of both sexes without spines. Palpal bulb smooth, pyriform with long, tapered or broadly flanged embolus. Distal tibia I of males with one megaspine on low spur or unmodified. Males with two rows of teeth on all paired claws; third claw short, straight. Scopulae of males entire on metatarsi and tarsi I and II, divided on tarsi III and IV; scopulae in females similar but thin and divided on III, absent on IV. Tarsal organ smooth, raised rod or low dome. Cuticle of legs pustulose. Plumose hairs present on basal segments of palp and leg I of adult males and females. Ventral tarsi I–IV of males pallid; otherwise tarsi integral. Metatarsal preening combs absent. Spermathecae entire.

DISTRIBUTION: Rainforest or open montane forests of tropical and subtropical eastern Australia.

REMARKS: Four species of *Xamiatus* were described by Raven (1981c) and a further one by Raven (1982b).

BEMMERINAE SIMON

Bemmereae Simon, 1903a, pp. 885, 894 (type genus *Bemmeris* Simon = *Spiroctenus*).

DIAGNOSIS: Differs from all other Nemesiidae by males having an S-shaped row of teeth on the paired claws; females with two rows of teeth on paired claws.

Apical PLS domed or digitiform. Posterior sternal sigilla submarginal to central. Paired claws of males with one S-shaped row of teeth.

GENERA INCLUDED: *Spiroctenus, Damarchus, Atmetochilus, Pionothele.*

REMARKS: *Hapalothele* could be placed in this group because it has a raised caput and broad fovea as in *Spiroctenus*; males will be needed to confirm its inclusion in this subfamily. At present, the characters given in the original description do not agree with any known genus. The inclusion of *Pionothele* in this group is tentative until the characters of the genus can be established from material that is better preserved than the holotype.

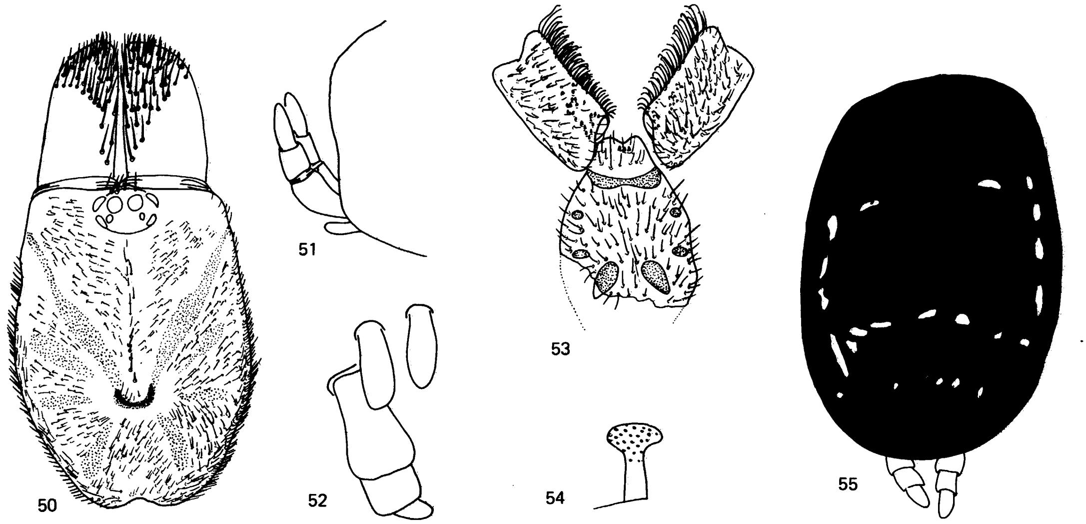
DAMARCHUS THORELL

Figures 50–55

Damarchus Thorell, 1892, p. 14 (type species by original designation *Damarchus workmani* Thorell; female holotype in RMS, examined).

DIAGNOSIS: Differs from *Atmetochilus* in subcentral or submarginal posterior sternal sigilla and digitiform apical segment of the PLS, and from *Aname* in males having an S-shaped row of teeth on tarsal claws and in females having a short almost U-shaped fovea.

DESCRIPTION: Apical segment of PLS digitiform. Fovea short, U-shaped. Eye tubercle raised, well defined. Few cuspules on labium.



FIGS. 50–55. *Damarchus workmani* Thorell, female holotype. 50. Cephalothorax, dorsal view. 51. Posterior abdomen, lateral view. 52. Spinnerets, ventral view. 53. Sternum (posteriorly damaged), maxillae, and labium. 54. Spermatheca, right side. 55. Abdomen, dorsal view.

Serrula not evident. Maxillae rectangular with slightly produced heel; anterior lobe absent; with numerous cuspules. Chelicerae with rastellum of short spines on low mound; intercheliceral tumescence absent. Posterior sternal sigilla large, elongate, oval, subcentral. Cymbium and leg tarsi of both sexes without spines. Palpal bulb pyriform, smooth, with elongate embolus. Distal tibia I of males with proventral spur and megaspine. Males with one S-shaped row of teeth on paired claws; third claw elongate curved. Scopulae entire on tarsi I of females and on tarsi I and II of males, divided on tarsi II of females; distal and thin on female metatarsi I and male metatarsi I and II. One spine on tarsi III of males; otherwise leg tarsi aspinose. Tarsal organ low. Male and female tarsi integral. Metatarsal preening combs present on legs III and IV. Spermathecae consist of two undivided lobes.

DISTRIBUTION: India, Burma, Malaysia, Sumatra.

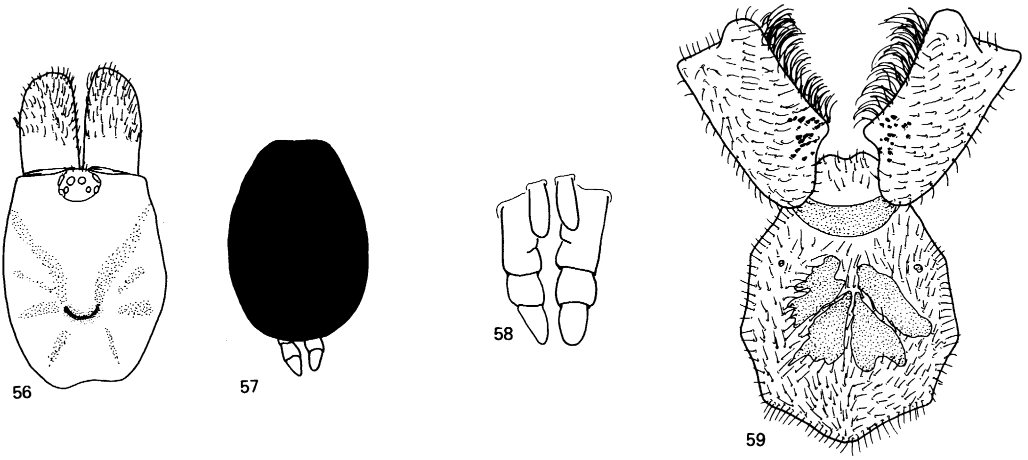
REMARKS: Main (1981a) suggested, presumably on the basis of the superficially similar fovea, that *Damarchus* is related to *Kiama*. However, *Kiama* agrees well with the Cyrtaucheniidae and not with the Nemesiidae in lacking an eye tubercle, and in having a broad fovea and a steeply arched caput in males and females. *Damarchus* has a well-developed eye tubercle, a short fovea, and a long and arched but nevertheless low caput in females and an even lower caput in males. Also all paired claws of male *Damarchus* have an S-shaped row of teeth; in *Kiama* the paired claws of the anterior legs are biserially dentate, and the claws of legs III and IV are almost bare.

ATMETOCHILUS SIMON
Figures 56–59

Atmetochilus Simon, 1887b, p. 109 (type species by monotypy *Atmetochilus fossor* Simon; holotype in ?Zoological Survey of India, unavailable).

DIAGNOSIS: Differs from *Damarchus* in having posterior sternal sigilla centrally confluent.

DESCRIPTION: Apical segment of PLS triangular. Fovea short, U-shaped. Eye tubercle low, well defined. No cuspules on labium. Serrula not evident. Maxillae rectangular with slightly produced heel; anterior lobe absent; numerous cuspules present. Chelicerae with rastellum of short spines on low mound; intercheliceral tumescence absent. Posterior sternal sigilla large, central, contiguous. Cymbium and leg tarsi of both sexes without



FIGS. 56–59. *Atmetochilus atriceps* Pocock, female holotype. 56. Cephalothorax, dorsal view. 57. Abdomen, dorsal view. 58. Spinnerets, ventral view. 59. Sternum, maxillae, and labium.

spines. Palpal bulb pyriform with broad rounded distal process with diagonal keels; embolus elongate. Distal tibia I of males with proventral spur and megaspine. Males with one S-shaped row of teeth on paired claws; third claw elongate, curved. Scopulae thin and divided on tarsi I and II of females; entire on tarsi I and II of males; distal and thin on metatarsi I of females and on metatarsi I and II of males. Spines present on tarsi III and IV of males; otherwise leg tarsi aspinose. Tarsal organ low. Male and female tarsi integral. Metatarsal preening combs present on legs III and IV. Spermathecae consist of two undivided lobes.

DISTRIBUTION: Burma.

REMARKS: The above diagnosis is based upon males and females of *Atmetochilus* in BMNH.

SPIROCTENUS SIMON
Figures 60–72

Spiroctenus Simon, 1889g, p. 409 (type species by monotypy *Spiroctenus personatus* Simon; male holotype in MNHP, examined).

Hermachastes Pocock, 1900a, p. 319 (type species by monotypy *Hermachastes collinus* Pocock; male and female syntypes in BMNH, examined). First synonymized by Purcell, 1904, p. 121.

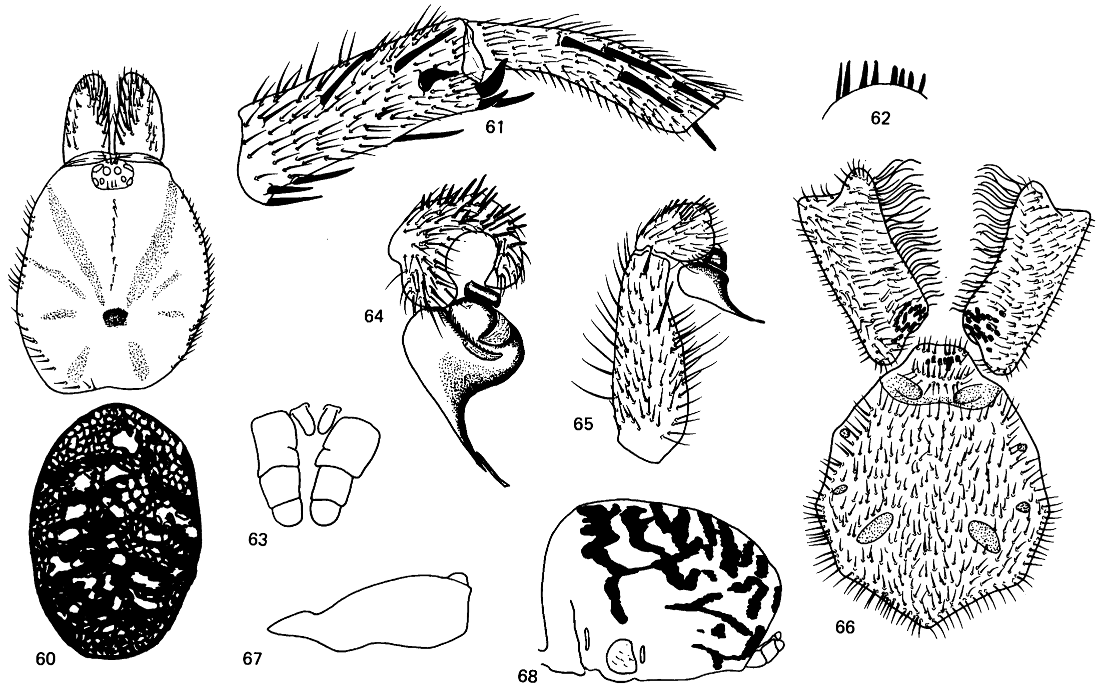
Bessia Pocock, 1900a, p. 320 (type species by monotypy *Bessia fossoria* Pocock; female holotype in BMNH, examined). First synonymized by Hewitt, 1916, p. 221.

Bemmeris Simon, 1903b, p. 43 (type species by monotypy *Bemmeris pardalina* Simon; female holotype in MNHP, examined). First synonymized by Purcell, 1904, p. 121.

Ctenonemus Simon, 1903b, p. 43 (type species by monotypy *Ctenonemus pectiniger* Simon; female holotype in MNHP, examined). First synonymized by Purcell, 1904, p. 121.

DIAGNOSIS: Differs from *Damarchus* and *Atmetochilus* by lacking the short procurved fovea and the theraphosoid bipartite spur in males.

DESCRIPTION: Apical segment of PLS domed. Fovea short, more or less straight. Eye tubercle low. Few to numerous cuspules on labium. Serrula small to absent. Maxillae rectangular. Numerous cuspules present on maxillae. Chelicerae with rastellum of short spines on low mound; intercheliceral tumescence absent. Posterior sternal sigilla oval, not marginal. Cymbium with or without spines; leg tarsi of both sexes aspinose. Palpal bulb pyriform with short embolus and low ridges on bulb. Prolateral distal tibia I of males with short upper process and associated lower spine, and lower upcurved spur and associated upper spine. Males with one S-shaped row of teeth on paired claws; third claw very small. Scopulae thin to absent on tarsi I of females; in males, thin but entire on tarsi I and II, very thin and divided on tarsi III and IV; distal or absent on metatarsi I and II. Tarsal organ low. Male and female tarsi integral. Metatarsal preening combs present on



FIGS. 60–68. *Spiroctenus personatus* Simon, male holotype. 60. Cephalothorax and abdomen, dorsal view. 61. Tibia and metatarsus I, prolateral view. 62. Chelicera, anteriorly showing rastellum viewed from below. 63. Spinnerets, ventral view. 64. Cymbium and bulb, ventral view. 65. Palpal tibia, cymbium, and bulb, prolateral view. 66. Sternum, maxillae, and labium. 67. Cephalothorax, lateral view. 68. Abdomen, lateral view.

legs III and IV. Spermathecae consist of two undivided lobes.

DISTRIBUTION: Southern Africa.

REMARKS: In agreement with Hewitt (1916), *Bessia* is placed in the synonymy of *Spiroctenus* because it has no characters that are unusual to it or otherwise indicate that it may warrant generic status. However, considerable work is needed on this group to ascertain whether any of the taxa placed in the synonymy of *Spiroctenus* represent the female of *Pionothele*. For a discussion of the resolution of Hewitt's proposed synonymy of *Spiroctenus* with *Homostola* (Cyrtaucheniidae), see that genus.

PIONOTHELE PURCELL
Figures 73–78

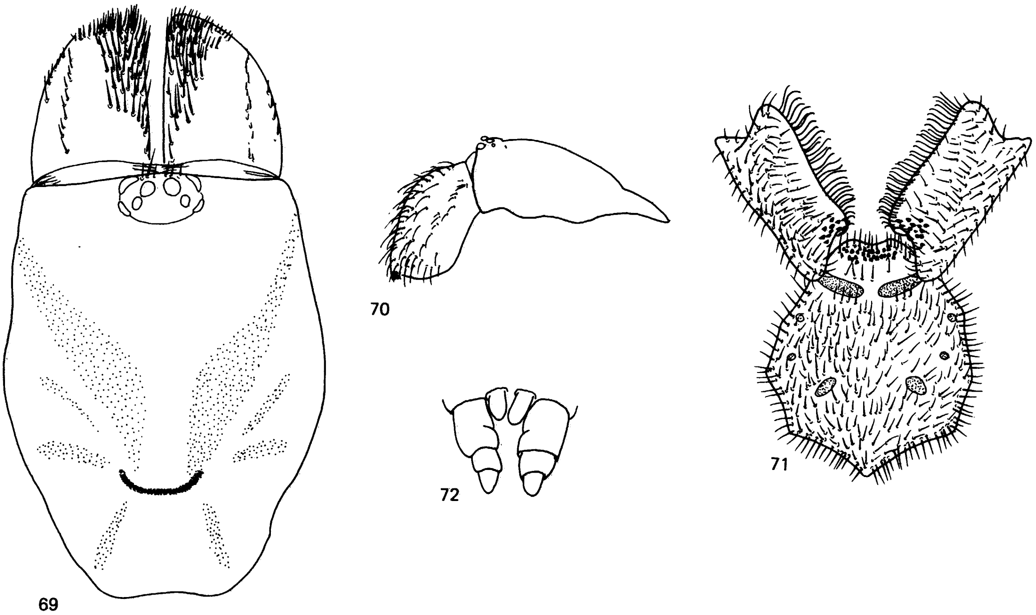
Pionothele Purcell, 1902b, p. 380 (type species by original designation *Pionothele straminea*; male holotype in SAMC, examined).

DIAGNOSIS: Differs from *Hermacha* and *Lepthercus* in the domed apical PLS and in the very reduced third claw.

DESCRIPTION: Apical segment of PLS domed. Fovea short, more or less straight. Eye tubercle raised, well defined. No cuspules on labium. Serrula not evident. Maxillae rectangular. Few cuspules on maxillae. Chelicerae without rastellum; intercheliceral tumescence apparently absent. Posterior sternal sigilla oval, not marginal. Cymbium and leg tarsi of males without spines. Palpal bulb smooth, pyriform, with long embolus. Distal tibia I of males with low spur and short megaspine. Males with two rows of teeth on all paired claws; third claw very small. Males with scopulae thin on tarsi I and II; distal or absent on metatarsi I and II. Tarsal organ low, barely discernible. Males with tarsi III and IV long, curved, possibly pseudosegmented. Metatarsal preening combs absent. Females unknown.

DISTRIBUTION: Southern Africa.

REMARKS: Because the male holotype is



FIGS. 69–72. *Spiroctenus fossorina* (Pocock), female holotype. 69, 70. Cephalothorax and chelicerae. 69. Dorsal view. 70. Lateral view. 71. Sternum, maxillae, and labium. 72. Spinnerets, ventral view.

bleached, a number of structures are not discernible with certainty.

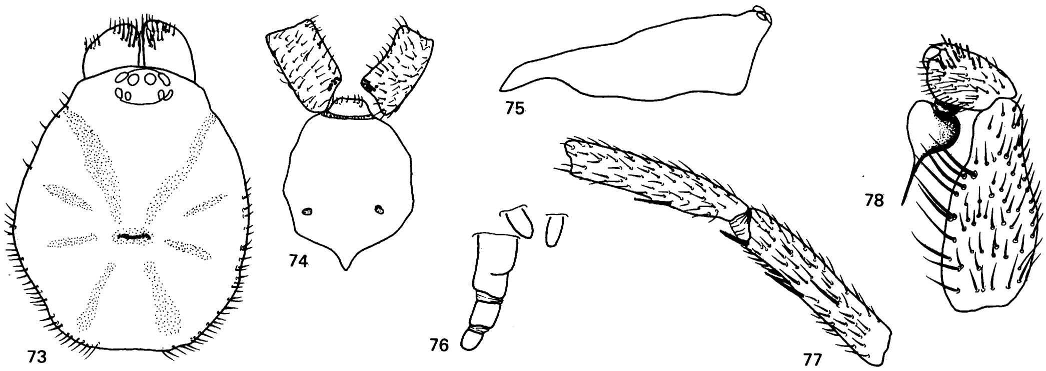
NEMESIINAE SIMON

Nemesieae Simon, 1889d, p. 179.
Brachytheleae Hogg, 1901, p. 250. NEW SYNONYMY.

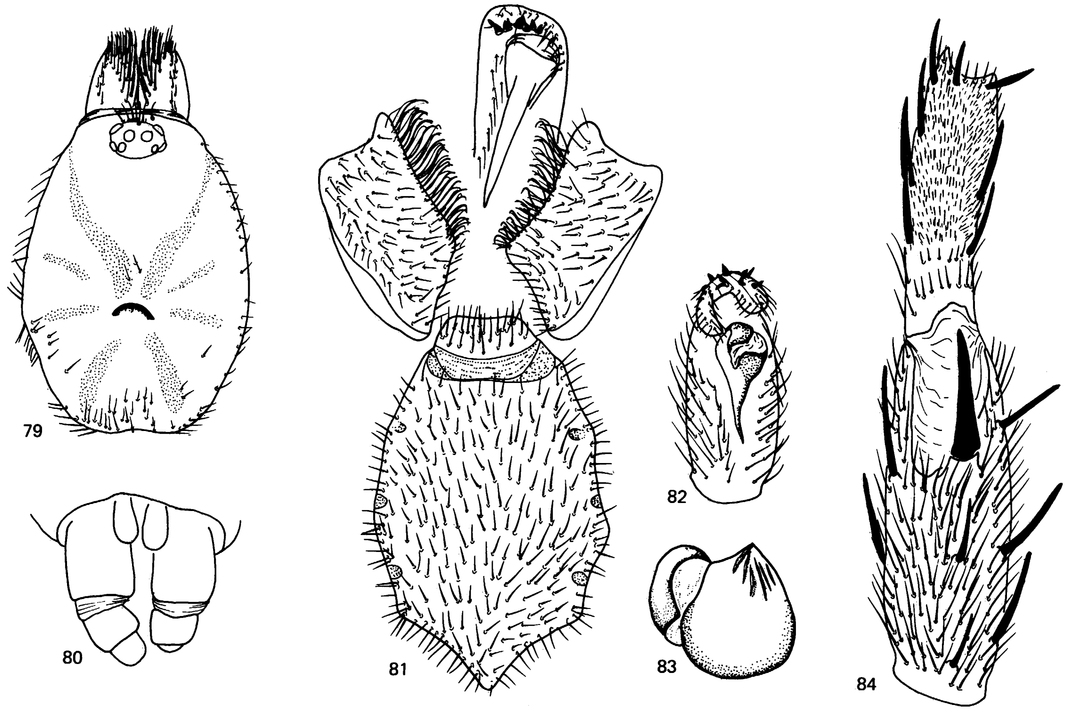
DIAGNOSIS: Differs from other Nemesiidae by the absence of a serrula and the presence of two rows of teeth on the paired claws of males and cuspules confined to the inner corner of the maxillae.

Apical segment of PLS domed or digitiform. Third claw present. Serrula absent. Males with two rows of teeth on paired claws and strong distal spur and megaspines on tibia I. Scopulae present on tarsi I and II.

GENERA INCLUDED: *Nemesia, Brachythele, Calisoga.*



FIGS. 73–78. *Pionothele straminea* Purcell, male holotype. 73. Cephalothorax, dorsal view. 74. Sternum, maxillae, and labium. 75. Carapace, lateral view. 76. Spinnerets, ventral view. 77. Tibia and metatarsus I, retrolateral view. 78. Palpal tibia, cymbium, and bulb, prolateral view.



FIGS. 79–84. *Nemesia cellicola* (Audouin), male. 79. Cephalothorax, dorsal view. 80. Spinnerets, ventral view. 81. Chelicera, sternum, maxillae, and labium. 82. Palpal tibia, cymbium, and bulb, ventral view. 83. Bulb, axial view. 84. Tibia and metatarsus I, ventral view of left.

SYNONYMY: Because *Brachythele* is considered the sister genus of *Nemesia* no grouping function is served by maintaining two separate tribes.

NEMESIA AUDOUIN
Figures 79–84

Nemesia Audouin, 1826, p. 107 (type species by subsequent designation of Thorell, 1870, p. 166, *Mygale cellicola* Audouin; type lost?).

Mygalodonta Simon, 1864, pp. 75, 453 (type species *Aranea caementaria* Fabricius). First synonymized by Simon, 1892a, p. 112.

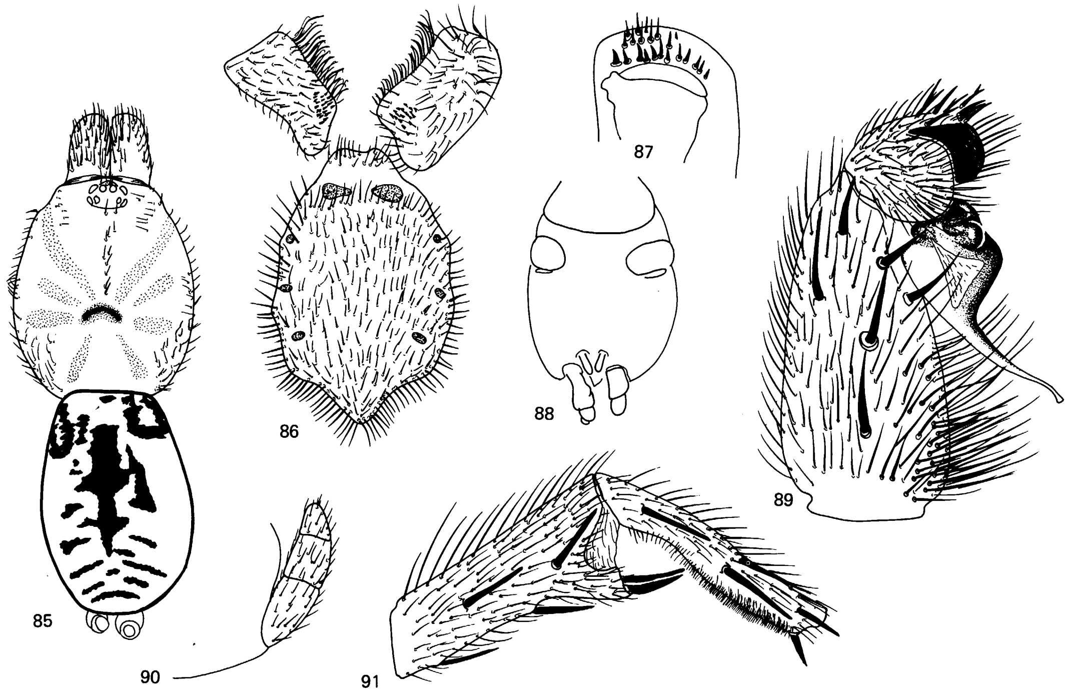
Anemesia Pocock, 1895d, p. 194 (type species by original designation *Nemesia tubifex* Pocock; female holotype in BMNH, examined). NEW SYNONYMY.

Nemesia (*Haplonemesia*) Simon, 1914, p. 5 (type species subsequently designated by Bonnet, 1957, p. 2097, *Nemesia simoni* O. P.-Cambridge).

Nemesia (*Pronemesia*) Simon, 1914, p. 16 (type species subsequently designated by Bonnet, 1958, p. 3777, *Nemesia caementaria* (Latreille)).

DIAGNOSIS: *Nemesia* differs from *Brachythele* in the presence of a cheliceral rastellum, a single megaspine on the tibial spur of males, and in lacking serration on the inner surface of the cheliceral fang.

DESCRIPTION: Apical segment of PLS domed. PMS present or absent. Fovea broad, recurved. Clypeus narrow. Eye tubercle raised. Few or no cuspules on labium. Serrula not evident. Maxillae trapezoidal. Few or no cuspules on maxillae. Chelicerae with rastellum of short or long spines on low mound; intercheliceral tumescence small, pallid, and setose or absent; inner surface of fang smooth. Posterior sternal sigilla small, oval, marginal. Leg tarsi of females with or without spines. Males with spinose or aspinose cymbium; bulb pyriform with long embolus; low ridges present or absent on bulb; predistal tibia I with single megaspine on distinct spur. Males with two rows of teeth on all paired claws; third claw curved. Scopulae thin to absent on tarsi I and II of both sexes; distal, thin on metatarsi I and II. Tarsal organ low. Male



FIGS. 85–91. *Brachythele varrialei* (Dalmas), male holotype. 85. Cephalothorax and abdomen, dorsal view. 86. Sternum, maxillae, and labium. 87. Chelicera, anterior viewed from below showing rastellum. 88. Abdomen, ventral view. 89. Palpal tibia, cymbium, and bulb, prolateral view. 90. Posterior lateral spinneret, lateral view. 91. Tibia and metatarsus I, prolateral view.

and female tarsi integral. Metatarsal preening combs present or absent on legs III and IV. Two spermathecal receptacula, each with short, broad, basal lobe bearing longer, mesal lobe.

DISTRIBUTION: Southern Europe, northern Africa, and China.

SYNONYMY: *Anemesia* differs from *Nemesia* only in the narrow posterior sternal sigilla and in the triangularly produced clypeus. Pocock (1895d) considered the absence of a trapdoor sufficient to warrant the elevation of a new genus, even in the absence of the spinneret-bearing portion of the abdomen. None of the characters mentioned is considered to warrant generic status.

BRACHYTHELE AUSSERER
Figures 85–91

Brachythele Ausserer, 1871, p. 173 (type species subsequently designated by Simon, 1892a, *Mygale icterica* C. L. Koch; male holotype lost).

Nemesiothele Dalmas, 1920, p. 61 (type species by original designation *Nemesiothele varrialei* Dalmas; male holotype in CMG, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Nemesia* in having the lower (inner) edge of cheliceral fang serrated.

DESCRIPTION: Apical segment of PLS domed. Fovea broad, recurved. Clypeus narrow. Eye tubercle raised. Few or no cuspules on labium. Serrula not evident. Maxillae trapezoidal. Numerous cuspules on maxillae. Chelicerae without rastellum; intercheliceral tumescence absent; lower (inner) edge of cheliceral fang serrated. Posterior sternal sigilla small, oval, marginal. Cymbium spinose; leg tarsi of both sexes aspinose. Palpal bulb smooth, pyriform, with long embolus. Predistal tibia I of males with single megaspine on distinct spur. Males with two rows of teeth on all paired claws; third claw small, curved. Scopulae thin to absent on tarsi I and II of females, entire on tarsi I–III of males; metatarsi I and II with distal scopulae in females, entire in males. Tarsal organ low. Male and female tarsi integral. Metatarsal preening combs absent. Two undivided spermathecal receptacula.

DISTRIBUTION: Southern Europe.

SYNONYMY: *Nemesiothele* shares with *Brachythele* the tibial spur on the first leg of males and the serrate inner edge of the fangs, and differs in no character of generic significance.

MISPLACED SPECIES: *Brachythele incursa* Chamberlin (1916) (type in MCZ, examined) is a female with claw tufts and three claws. Until males are known, I consider that the species is best transferred to the cyrtaucheniid genus *Bolostromus. Brachythele antillensis* F. O. P.-Cambridge (1898) (type in BMNH, examined), transferred by Roewer (1942) to *Tryssothele,* shares with the Neotropical Aporoptychinae the long labium, subquadrate maxillae, arched caput, and low eye tubercle, and with *Fufius,* to which it is here transferred, the broad recurved fovea. *Brachythele theveneti* Simon (1891a) (type in MNHP, examined) has the characters of *Calisoga,* including the diagnostic intercheliceral clavate setae.

CALISOGA CHAMBERLIN

Calisoga Chamberlin, 1937, p. 4 (type species by original designation *Calisoga longitarsis* Chamberlin; male holotype in AMNH, examined).

Hesperopholis Chamberlin and Ivie, 1939, p. 3 (type species by original designation *Hesperopholis centronethus* Chamberlin; male holotype in AMNH, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Nemesia* and *Brachythele* in the digitiform apical segment of the PLS and upper inner cheliceral faces with 4–6 clublike setae.

DESCRIPTION: Apical segment of PLS digitiform. Fovea broad, more or less straight. Clypeus absent. Eye tubercle low. Few or no cuspules on labium. Serrula absent. Maxillae rectangular; anterior lobe indistinct. Numerous cuspules on maxillae on mound on inner corner. Chelicerae with rastellum on low mound; intercheliceral tumescence absent; upper inner surfaces of both sexes with 4–6 thick, clublike setae. Posterior sternal sigilla oval, marginal. Cymbium and leg tarsi of both sexes without spines. Palpal bulb smooth, pyriform with long embolus. Predistal tibia I of males with twin megaspines on low spur. Males with two rows of teeth on all paired claws; third claw curved. Scopulae of males and females entire on metatarsi and tarsi I and II, divided on tarsi III and IV. Tarsal organ low. Ventral tarsi of females pallid; tarsi I–IV of males pseudosegmented. Metatarsal preening combs absent. Two spermathecal receptacula, each longitudinal, with one to four short, lateral lobes.

DISTRIBUTION: California.

DIPLOTHELOPSINAE
SCHIAPELLI AND GERSCHMAN

Diplothelopsinae Schiapelli and Gerschman, 1967, pp. 53, 60.

DIAGNOSIS: Differs from the Pycnothelinae by the broad carapace, short elevated caput, and by males having the anterior sternal margin rebordered, and having modified blunt setae on the cymbium.

GENERA INCLUDED: *Mygaloides, Diplothelopsis.*

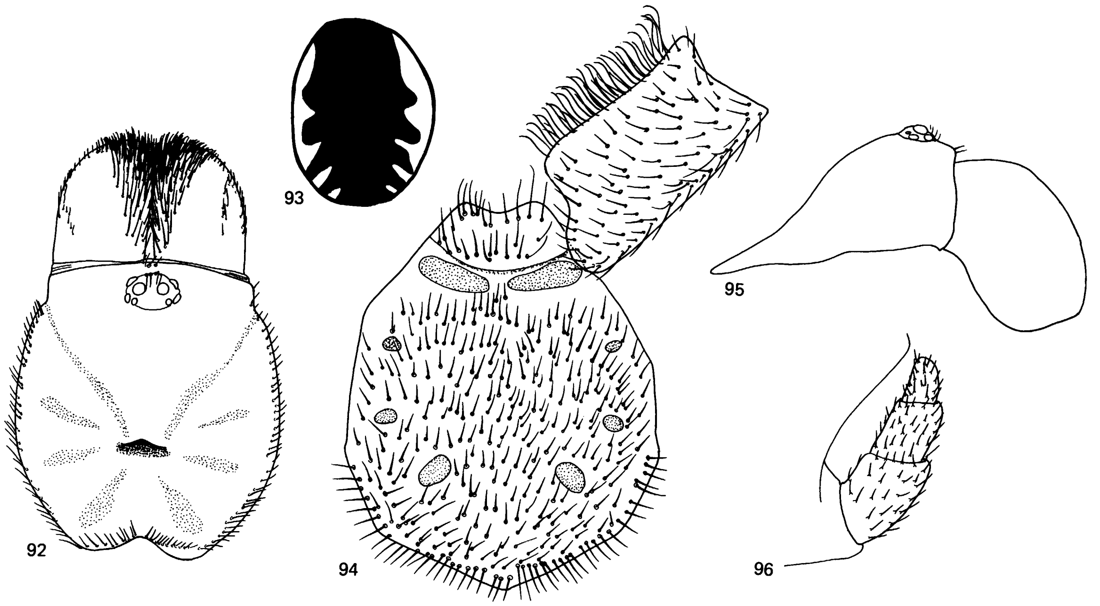
REMARKS: Schiapelli and Gerschman (1967) included only *Diplothelopsis* in the subfamily. However, because *Mygaloides* differs from *Diplothelopsis* only in the presence of the posterior median spinnerets the group membership is widened.

DIPLOTHELOPSIS TULLGREN
Figures 92–96

Diplothelopsis Tullgren, 1905, p. 4 (type species by monotypy *Diplothelopsis ornatus* Tullgren; female syntypes in RMS, examined).

DIAGNOSIS: Differs from *Mygaloides* in lacking the posterior median spinnerets.

DESCRIPTION: Apical segment of PLS domed. Posterior median spinnerets absent. Caput short, raised; clypeus narrow but distinct. Fovea broad, recurved. Eye tubercle raised. No cuspules on labium or maxillae. Serrula on edge of and behind anterior lobe. Maxillae rectangular, anterior lobe distinct. Chelicerae with rastellum on low mound; intercheliceral tumescence large, soft, pallid, reaching almost to dorsal surface; outer margin of cheliceral furrow with small teeth.



FIGS. 92–96. *Diplothelopsis ornatus* Tullgren, female syntype. 92. Cephalothorax, dorsal view. 93. Abdomen, dorsal view. 94. Sternum, maxilla, and labium. 95. Cephalothorax, lateral view. 96. Posterior lateral spinneret, lateral view.

Males with anterior sternal margin rebordered. Posterior sternal sigilla oval, not marginal. Cymbium with numerous thick modified setae. Palpal bulb smooth, pyriform with short embolus. Distal tibia I of males without spur. Males with two rows of teeth on all paired claws; third claw absent. Males and females with entire scopulae on tarsi I and II, scopulae distal on metatarsi I and II, thin and divided on tarsi III and IV. Tarsal organ low. Cymbium and leg tarsi of males I–IV long, curved, pseudosegmented; female tarsi long, curved, cracked. Metatarsal preening combs absent. Two spermathecal receptacula, each broad, basal with small anterior projection.

DISTRIBUTION: Southern Argentina.

REMARKS: *Diplothelopsis* was revised by Gerschman and Schiapelli (1966) and Schiapelli and Gerschman (1967), who founded a monotypic subfamily of the Pycnothelidae for the genus. The similarities of the genus with *Mygaloides* are several: the cymbium has modified setae; the anterior half of the sternum of males is rebordered; the sternum is wide with elongate oval sigilla distinctly separated from the margins; and the carapace is broad with a short, noticeably arched caput (fig. 95).

MYGALOIDES NICOLET

Figures 97–102

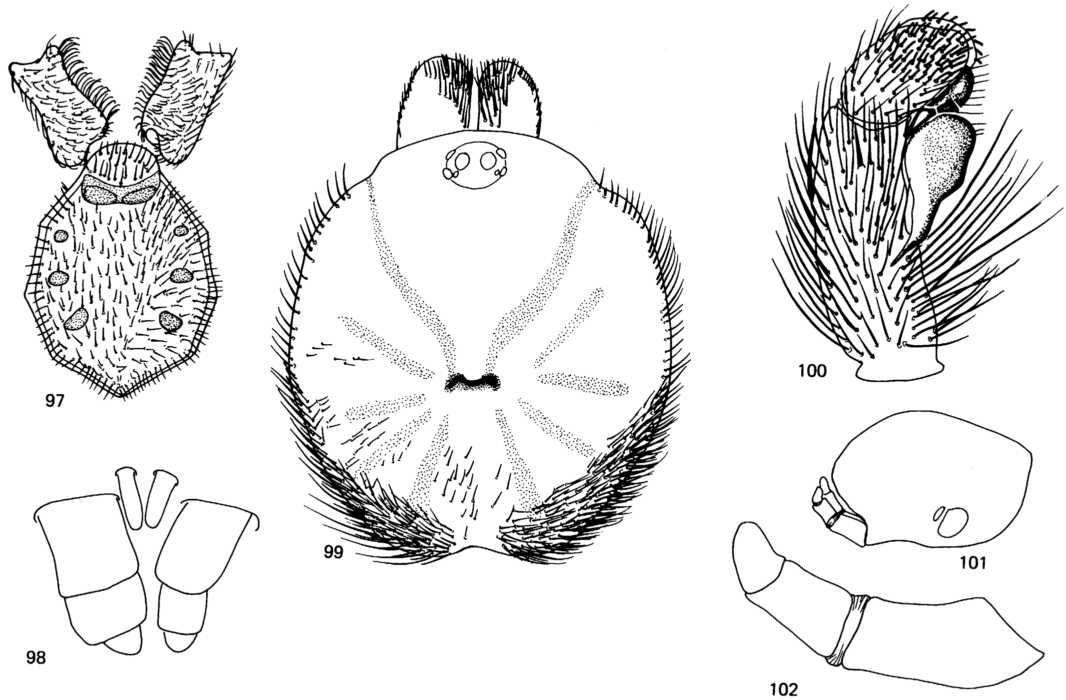
Mygaloides Nicolet, 1849, p. 337 (type species by monotypy *Mygaloides nubila* Nicolet; types lost).

Mygalina Simon, 1864, p. 68 (type species by monotypy *Mygaloides nubila* Nicolet; superfluous *nomen novum* for *Mygaloides,* erroneously believed to be invalid because the types were broken pieces of juveniles).

Lycinus Thorell, 1894, p. 36 (type species by original designation *Lycinus longipes* Thorell; male holotype in RMS, examined). NEW SYNONYMY.

Parachubutia Mello-Leitão, 1940b, p. 233 (type species by original designation *Parachubutia gajardoi* Mello-Leitão). First synonymized with *Lycinus* by Schiapelli and Gerschman, 1967, p. 65.

Levina Zapfe, 1963, p. 125 (type species by monotypy *Levina epipiptusa* Zapfe; male holotype lost). First synonymized with *Lycinus* by Schiapelli and Gerschman, 1973b, p. 291.



FIGS. 97–102. *Mygaloides longipes* (Thorell), male. 97. Sternum, maxillae, and labium. 98. Spinnerets, ventral view. 99. Cephalothorax, dorsal view. 100. Palpal tibia, cymbium, and bulb, retrolateral view. 101. Abdomen, lateral view. 102. Posterior lateral spinneret, lateral view.

DIAGNOSIS: Differs from *Diplothelopsis* in the possession of posterior median spinnerets.

DESCRIPTION: Apical segment of PLS domed. Posterior median spinnerets present. Caput short, raised; clypeus narrow but distinct. Fovea short, more or less straight. Eye tubercle low or raised. No cusuples on labium. Serrula on edge of and behind anterior lobe. Maxillae trapezoidal, anterior lobe distinct, produced. Few or no cuspules on maxillae. Chelicerae with rastellum on low mound or absent; intercheliceral tumescence large, soft, pallid, reaching almost to dorsal surface. Males with rebordered anterior sternal margin. Posterior sternal sigilla oval, not marginal. Cymbium with numerous thick modified setae; tarsi III and IV of males with long spines. Palpal bulb pyriform with few low ridges on underside, with short embolus. Distal tibia I of males without spur or with dense black shield of spines. Males with two rows of teeth on all paired claws; third claw very small or absent. Males and females with entire scopulae on tarsi I and II, scopulae distal on metatarsi I and II, thin and divided on tarsi III and IV. Tarsal organ low. Leg tarsi of males I–IV long, curved, pseudosegmented; female leg tarsi aspinose, long, curved, cracked or entire. Metatarsal preening combs present or absent. Two spermathecal receptacula, each short, undivided.

DISTRIBUTION: Chile and southern Argentina.

SYNONYMY: At first the identity of *Mygaloides* appeared irretrievable but it is evident from Nicolet's description that it differed from all other Chilean mygalomorphs in a character mentioned but not stressed in that context by Nicolet. The first clue to the identity lay in the minute posterior median eyes; of the Chilean mygalomorph genera, only "*Lycinus*" has that character. The second clue to its identity lay in Nicolet's repetition of the roundness of the carapace, sternum, and abdomen; his descriptions of species of *Mygale* (the only other mygalomorph genus he recognized) are explicit in the shapes of those structures being oval or cordate. The third clue lay in the arched caput. The specific mention of a compact eye group and a tubercle in *Mygaloides* eliminates the possibility that it is a migid or actinopodid—the only other possible groups in which the posterior median eyes are small, and the sternum, carapace, and abdomen are rounded.

REMARKS: *Mygaloides* (as *Lycinus*) was revised with other Pycnothelinae by Schiapelli and Gerschman (1967). However, females have not previously been recognized because the increased abdominal setation of males conceals the dark foliate pattern readily evident in many females.

PYCNOTHELINAE CHAMBERLIN

Pycnothelinae Chamberlin, 1917, p. 25.

Pselligmeae Mello-Leitão, 1923, pp. 53, 58. NEW SYNONYMY.

DIAGNOSIS: Differs from all other Nemesiidae by the presence of a well-developed intercheliceral tumescence and keels near the embolus and from the Diplothelopsinae by the long, oval carapace, the presence of modified setae on the intercheliceral tumescence, and the more numerous keels near the embolus.

Spines absent on cymbium. Eye tubercle steeply sloping in front and behind. Serrula present on edge and behind lobe of maxilla. Male palpal bulb with several keels near embolus. Intercheliceral tumescence large, pallid or small but well-developed.

GENERA INCLUDED: *Neodiplothele, Pycnothele, Chaco, Androthelopsis, Rachias, Pselligmus, Stenoterommata, Hermachura, Prorachias.*

SYNONYMY: Mello-Leitão (1923) used two characters—dense tarsal scopulae and arastellate chelicerae—to diagnose Pselligmeae but they are also found in *Pycnothele.*

PYCNOTHELE CHAMBERLIN

Figures 103–112

Pycnothele Chamberlin, 1917, p. 27 (type species by original designation *Pycnothele perditus* Chamberlin; male holotype and female paratype in MCZ, examined).

Heteromma Mello-Leitão, 1935, p. 356 (type species by original designation *Heteromma anomala* Mello-Leitão; male holotype in IBB, examined). Preoccupied by *Heteromma* Karsch (1888).

Agersborgia Strand, 1936, p. 167 (*nomen novum* for *Heteromma* Mello-Leitão). First synonymized by Lucas and Bücherl, 1973, p. 241.

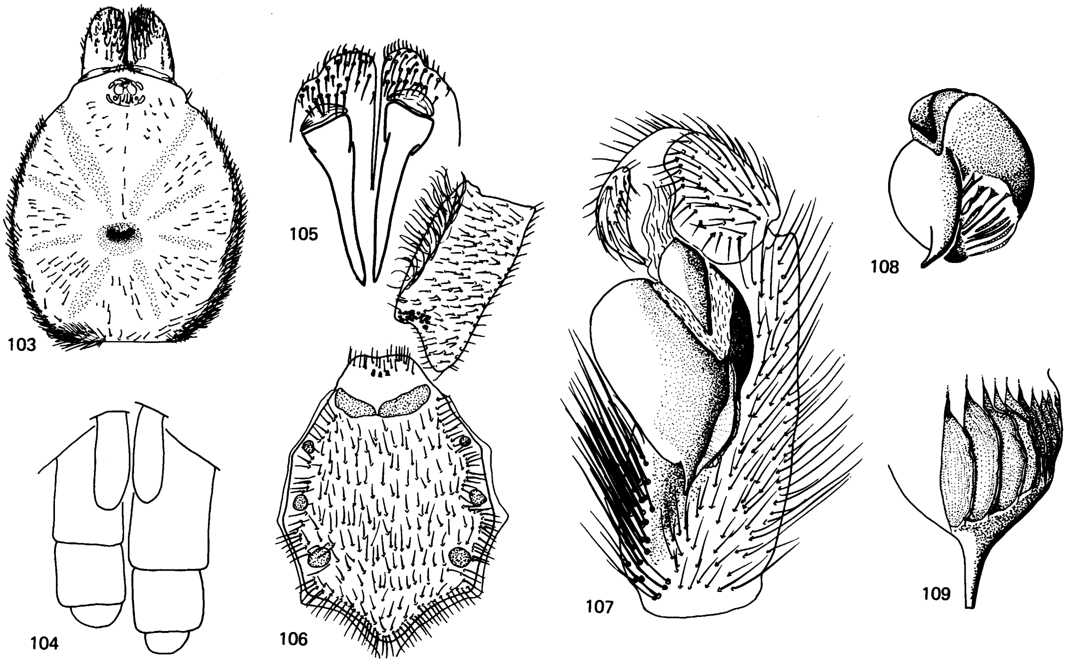
DIAGNOSIS: Differs from *Chaco* in the raised vanes on bulb and from *Androthelopsis* in the tarsi of females being integral.

DESCRIPTION: Apical segment of PLS domed. Fovea short, procurved. Clypeus wide. Eye tubercle raised, well defined. No cuspules on labium. Serrula present on front edge and behind anterior lobe. Maxillae rectangular; anterior lobe rounded; heel produced. Numerous cuspules on maxillae on inner corner on low mound. Chelicerae without rastellum; intercheliceral tumescence large, soft, covered with long thick setae, pallid. Posterior sternal sigilla small, oval, marginal. Leg tarsi of males and females without spines; cymbium aspinose. Palpal bulb pyriform with several, soft, closely set, very high vanes near embolus on upperside. Tibia I of males unmodified. Males with two rows of teeth on all paired claws; third claw absent on all legs. Scopulae of males entire on tarsi I–IV and distal metatarsi I and II; scopulae of females entire on tarsi and metatarsi I and II, divided on tarsi III and IV. Tarsal organ low. Tarsi I and II of males pseudosegmented; female tarsi integral. Metatarsal preening combs absent. Two spermathecal receptacula, each slender, undivided.

DISTRIBUTION: Southern Brazil.

REMARKS: *Pycnothele* was revised by Schiapelli and Gerschman (1967) and Pérez-Miles and Capocasale (1983) (see *Chaco*).

MISPLACED SPECIES: Pérez-Miles and Capocasale (1982, 1983) transferred *Trechona auronitens* Keyserling (1891) (type in BMNH, examined) from *Pycnothele* (where Gerschman and Schiapelli [1970b] had transferred it) to *Pycnothelopsis.* No substantial reason was given for the change and having seen the type I have no hesitation in replacing the species in *Pycnothele,* with which it shares the absence of pseudosegmented tarsi in males and the elevated vanes on the bulb. As far as I can establish no authors have mentioned the unusual tarsi of male *Androthelopsis* (reflected to a lesser extent in females); Pérez-



FIGS. 103–109. *Pycnothele perdita* Chamberlin, male holotype. 103. Cephalothorax, dorsal view. 104. Spinnerets, ventral view. 105. Chelicerae, ventral view. 106. Sternum, maxilla, and labium. 107. Palpal tibia, cymbium, and bulb, ventral view. 108, 109. Bulb. 108. Axial view along embolus. 109. Apical underside.

Miles and Capocasale (1983) did not discuss either the tarsi or the low vanes on the male palp in *Pycnothelopsis* (=*Androthelopsis*).

I have also examined the types of a new species placed by Pérez-Miles and Capocasale (1982) in *Pycnothelopsis, P. tacauriensis* (type in IBCE, examined); it is transferred here to *Acanthogonatus* (=*Tryssothele*), with which it shares the tibial spur, the keel-less bulb, the pseudosegmented tarsi in females, the asetose intercheliceral tumescence, and the elongate PLS with a digitiform apical segment. Those authors placed this species in *Pycnothelopsis* despite indications from Platnick (*in litt.*) that the palpal morphology unambiguously excludes it from that genus; their reasons for doing so remain obscure.

ANDROTHELOPSIS MELLO-LEITÃO

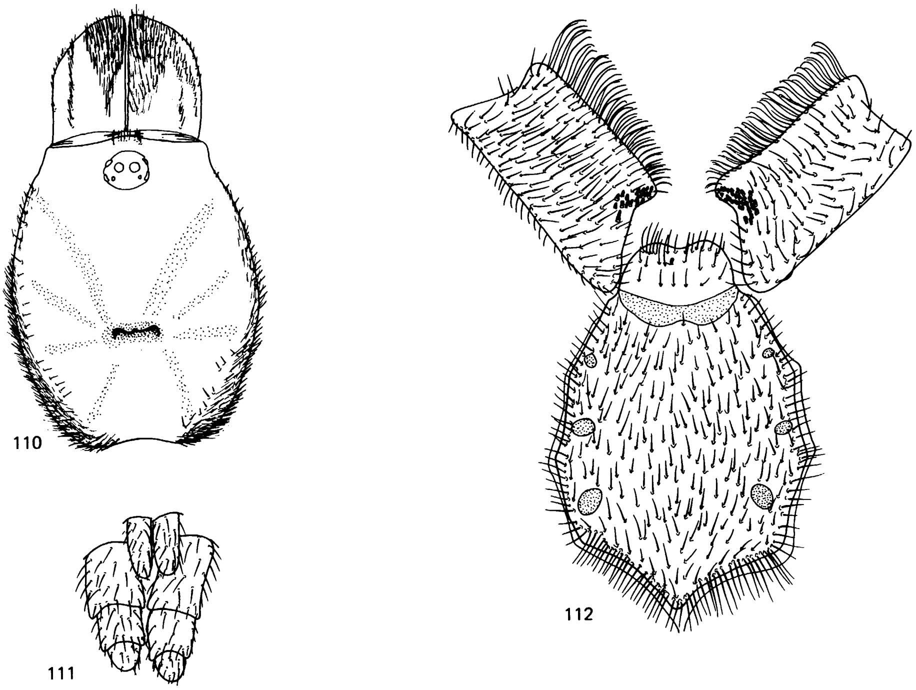
Figures 113–119

Androthelopsis Mello-Leitão, 1934, p. 402 (type species by original designation *Androthelopsis singularis* Mello-Leitão; male holotype in IBB, examined).

Pycnothelopsis Schiapelli and Gerschman, 1942, p. 319 (type species by original designation *Pycnothelopsis modestus* Schiapelli and Gerschman; male holotype in MACN, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Pycnothele* only in males having pseudosegmented tarsi.

DESCRIPTION: Apical segment of PLS domed. Fovea broad, more or less straight. Clypeus wide. Eye tubercle raised, well defined. No cuspules on labium. Serrula present on front edge and behind anterior lobe. Maxillae rectangular; anterior lobe rounded. Numerous cuspules on maxillae on inner corner on mound. Chelicerae without rastellum; intercheliceral tumescence moderately large, soft, pallid, with enlarged setae. Posterior sternal sigilla small, oval, marginal. Leg tarsi of males and females and cymbium without spines. Palpal bulb pyriform with several closely set, high vanes on upperside; embolus very short. Tibia I of males unmodified. Males with two rows of teeth on all paired claws; third claw absent on all legs. Scopulae of males entire on tarsi I–III and distal metatarsi I and II, divided on tarsi IV. Females unknown.



FIGS. 110–112. *Pycnothele perdita* Chamberlin, female paratype. 110. Cephalothorax, dorsal view. 111. Spinnerets, ventral view. 112. Sternum, maxillae, and labium.

Tarsal organ low. Tarsi I–IV of males ventrally pallid. Metatarsal preening combs absent.

DISTRIBUTION: Southern Argentina.

SYNONYMY: *Pycnothelopsis,* originally compared only to *Pycnothele,* is indistinguishable on generic characters from *Androthelopsis.*

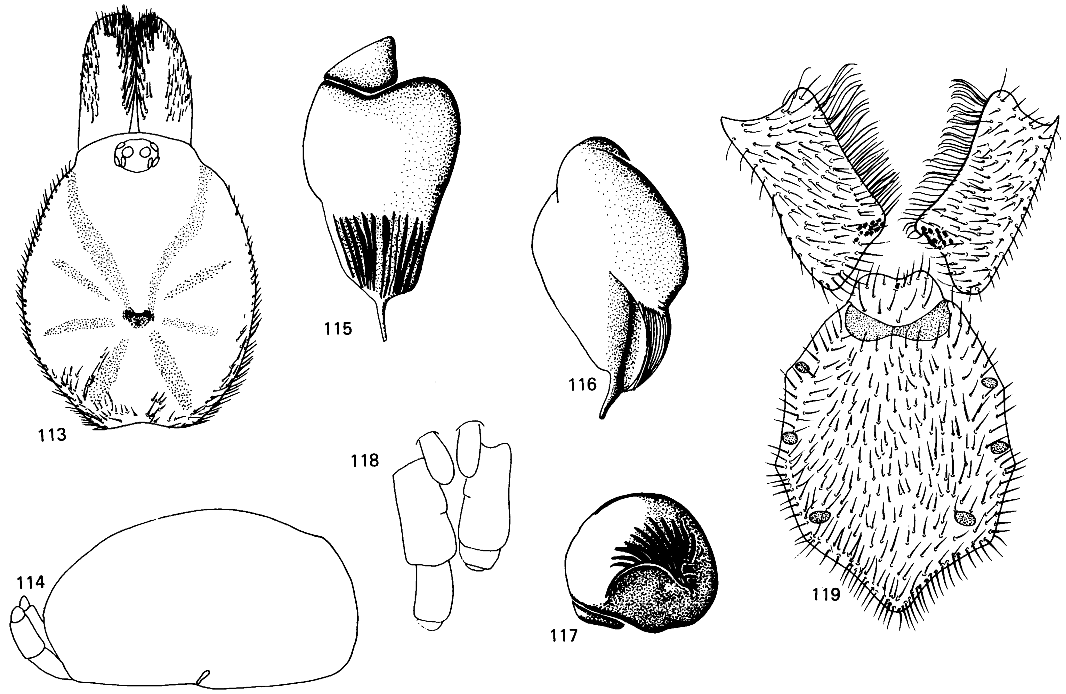
MISPLACED SPECIES: *Psalistops auripilus* Mello-Leitão (1946) (type in IBCE, examined) is transferred from *Pycnothelopsis,* where it was placed by Capocasale and Pérez-Miles (1979), to *Androthelopsis,* where it is not clear whether it is even specifically distinct from *A. modestus* (Schiapelli and Gerschman).

NEODIPLOTHELE MELLO-LEITÃO
Figures 120–125

Neodiplothele Mello-Leitão, 1917, p. 76 (type species by original designation *Neodiplothele irregularis* Mello-Leitão; female holotype in MRJ, examined).

DIAGNOSIS: Differs from all other nemesiids in the presence of true claw tufts and edentate paired claws in males.

DESCRIPTION: Apical segment of PLS domed. Posterior median spinnerets absent. Fovea short, straight, or procurved. Clypeus about as wide as MOQ length. Eye tubercle raised, well defined. No cuspules on labium. Serrula not evident. Maxillae rectangular; anterior lobe angular but not well defined. Few cuspules on inner corner of maxillae, not on mound. Chelicerae with rastellum of 10–15 short conical spines on mound; intercheliceral tumescence small, soft, asetose, pallid. Posterior sternal sigilla small, oval, marginal; sternum narrow, about 1.5 times longer than wide. Leg tarsi of males and females and cymbium without spines. Palpal bulb pyriform with several closely set, low keels near embolus on upperside. Tibia I of males unmodified. Paired claws of males and females without teeth; third claw absent on all legs. Scopulae of males very thin and divided on all tarsi; absent on metatarsi; scopulae of females thin but entire on tarsi and metatarsi I and II, and divided on tarsi III and widely



FIGS. 113–119. *Androthelopsis modesta* (Schiapelli and Gerschman), male holotype. 113. Cephalothorax, dorsal view. 114. Abdomen, lateral view. 115–117. Palpal bulb. 115. View of underside. 116. Lateral view. 117. Axial view. 118. Spinnerets, ventral view. 119. Sternum, maxillae, and labium.

on IV, for distal third of metatarsi III, absent on metatarsi IV. Tarsal organ low. Tarsi I–IV of males pseudosegmented; female tarsi integral. Metatarsal preening combs absent. Spermathecae unknown.

DISTRIBUTION: Brazil.

REMARKS: The familial placement of *Neodiplothele* seems equivocal. *Neodiplothele* shares with *Stenoterommata* the numerous keels on the bulb and the small, setose, intercheliceral tumescence. With *Androthelopsis, Neodiplothele* shares the wide clypeus, the absence of a third tarsal claw, and the pseudosegmented tarsi of males. It differs from all Nemesiidae but resembles many Barychelidae in lacking teeth on the paired claws and in possessing claw tufts. However, it differs from most Barychelidae in males lacking metatarsal and true tarsal scopulae. The inclusion of *Neodiplothele* in the Pycnothelinae requires two reversals—the scopulae and the claw dentition—and one parallelism, the claw tufts. Its inclusion in the Barychelidae also requires two reversals—the scopulae and the wide clypeus—and two parallelisms, the palpal keels and the intercheliceral tumescence. Therefore, although untidy, it is more parsimonious to include *Neodiplothele* in the Pycnothelinae. The above description is based partially upon males of *Neodiplothele fluminensis* Mello-Leitão (1924) in MRJ and MNHP.

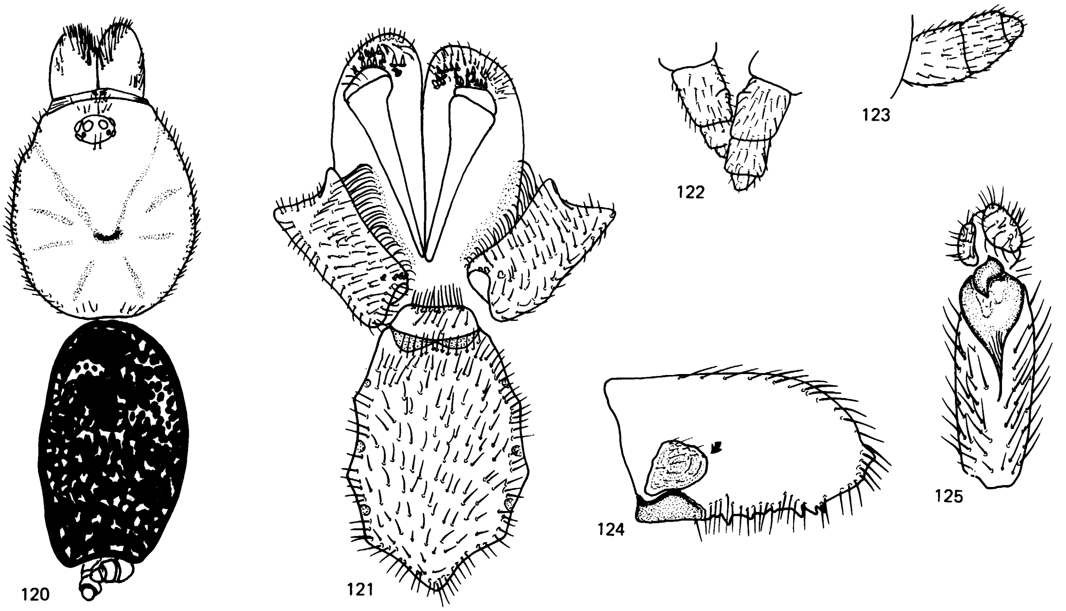
CHACO TULLGREN
Figures 126–131

Chaco Tullgren, 1905, p. 7 (type species by monotypy *Chaco obscura* Tullgren; female holotype in RMS, examined).

Neostothis Vellard, 1925, p. 79 (type species by original designation *Neostothis gigas* Vellard; male and female syntypes, ?lost). NEW SYNONYMY.

DIAGNOSIS: Differs from *Pycnothele* and *Androthelopsis* in having keels (rather than elevated vanes) on bulb.

DESCRIPTION: Apical segment of PLS domed. Fovea broad, more or less straight.



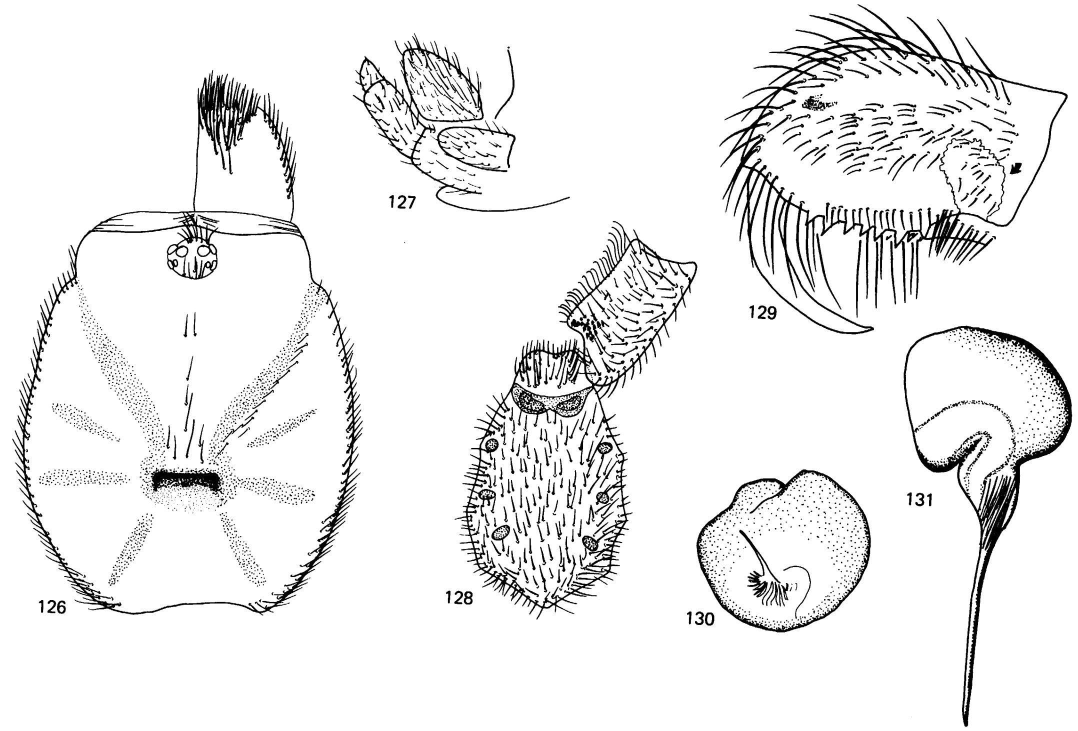
FIGS. 120–125. 120–123. *Neodiplothele irregularis* Mello-Leitão, female holotype. 120. Cephalothorax and abdomen, dorsal view. 121. Chelicerae, sternum, maxillae, and labium. 122, 123. Posterior lateral spinnerets. 122. Ventral view. 123. Lateral view. 124, 125. *Neodiplothele fluminensis* Mello-Leitão, male holotype. 124. Chelicera, prolateral view showing intercheliceral tumescence, arrow. 125. Palpal tibia, cymbium, and bulb, ventral view showing keels on bulb.

Clypeus wide. Eye tubercle raised, well defined. No cuspules on labium. Serrula present on front edge and behind anterior lobe. Maxillae rectangular; anterior lobe rounded. Numerous cuspules on maxillae on inner corner on mound. Chelicerae with rastellum of short spines on distinct mound; intercheliceral tumescence moderately large, soft, asetose, pallid. Posterior sternal sigilla small, oval, marginal. Cymbium and leg tarsi of males and females without spines. Palpal bulb pyriform with several closely set, low keels near embolus on upperside. Tibia I of males with low retroventral spur. Males and females with two rows of teeth on all paired claws; third claw absent on all legs. Scopulae of males entire on tarsi I–III and distal metatarsi I and II, divided on tarsi IV; scopulae of females entire on tarsi and metatarsi I and II, divided on tarsi III and IV. Tarsal organ low. Tarsi I–IV of males ventrally pallid; female tarsi I–IV cracked. Metatarsal preening combs absent. Two spermathecal receptacula, each long, sinuous.

DISTRIBUTION: Southern Argentina.

SYNONYMY: Tullgren (1905) placed *Chaco* in the Barychelidae, presumably because of the extensive tarsal scopulae that resemble claw tufts; Gerschman and Schiapelli (1965) later transferred it to the Ctenizidae and figured the spermathecae. On the basis of differences between males and females of *Pycnothele,* I originally concluded that *Chaco* was the senior synonym of *Pycnothelopsis,* each being known only from a female and male, respectively. However, through the gracious co-operation of Mr. Pablo Goloboff (MACN), who provided me with a male and female that he correctly concluded were *Chaco obscura* Tullgren, I reassessed that decision. (Although the palpal bulb and prolateral chelicera of that male are figured here [with permission], Goloboff will soon describe the male in full.) As a result, I must conclude that *Androthelopsis* rather than *Chaco* is the senior synonym of *Pycnothelopsis.* However, as with many pycnotheline genera, the concept of *Chaco* will no doubt change as more material becomes available and the group is revised.

According to Vellard (1925), *Neostothis* has



FIGS. 126–131. *Chaco obscura* Tullgren. 126–128. Female holotype. 126. Cephalothorax, dorsal view. 127. Spinnerets and anal tubercle (above), lateral view. 128. Sternum, maxilla, and labium. 129–131. Male, Argentina: Salta: La Quena (coll. P. Goloboff). 129. Chelicera, prolateral view showing basoposterior tumescence (arrow). 130, 131. Palpal bulb. 130. Axial view along embolus. 131. Lateral view.

a wide clypeus, a slight rastellum, and only the scopulae of the fourth tarsi of the female are divided. In the absence of the types, the diagnostic characters of *Neostothis* are those of *Chaco*. Bücherl, da Costa, and Lucas (1971) placed *Neostothis* as the senior synonym of *Psalistopoides,* seemingly only because they came from the same locality. However, Lucas and Bücherl (1973) later restored *Psalistopoides* (with no mention of *Neostothis*).

RACHIAS SIMON

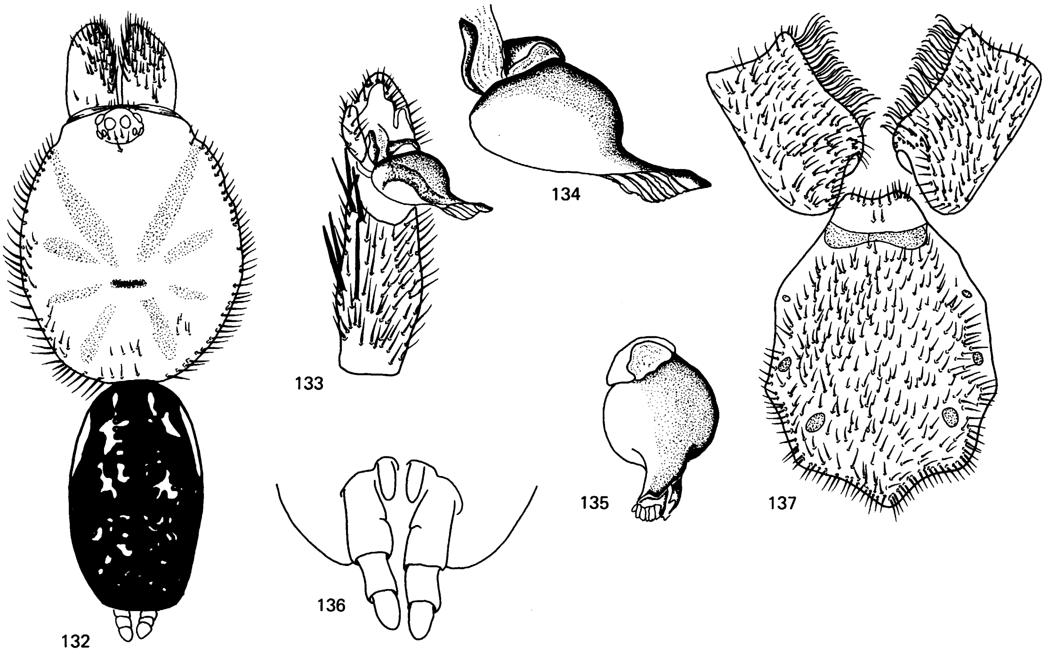
Figures 132–141

Rachias Simon, 1892a, p. 114 (type species by original designation *Hermacha dispar* Simon; male and female syntypes in MNHP, examined).

Parapselligmus Toledo Piza, 1939, p. 3 (type species by original designation *Parapselligmus caudatus* Toledo Piza; male holotype not located). NEW SYNONYMY.

DIAGNOSIS: Differs from other Pycnothelinae by the small folded vanes on bulb and by the spinose fourth tarsi of males.

DESCRIPTION: Apical segment of PLS triangular. Fovea short, procurved. Clypeus absent. Eye tubercle raised, well defined. Few cuspules on labium. Serrula present on front edge and behind anterior lobe. Maxillae trapezoidal; anterior lobe rounded. Numerous cuspules on maxillae on inner corner on mound. Chelicerae without rastellum; intercheliceral tumescence moderately large, soft, setose, pallid. Posterior sternal sigilla small, oval, marginal. Palpal bulb pyriform, distal region with several soft, closely set keels near embolus on upperside. Tibia I of males unmodified. Males with two rows of teeth on all paired claws; third claw absent on legs I–III, short, curved on leg IV. Males with spines on tarsi III and IV, otherwise leg tarsi aspinose. Scopulae of males entire on tarsi I–III



FIGS. 132–137. *Rachias dispar* (Simon), male syntype. 132. Cephalothorax and abdomen, dorsal view. 133. Palpal tibia, cymbium, and bulb, ventral view. 134, 135. Bulb. 134. Ventral view. 135. Axial view along embolus. 136. Spinnerets, ventral view. 137. Sternum, maxillae, and labium.

and distal metatarsi I and II, divided on tarsi IV; scopulae of females entire on tarsi and metatarsi I and II, divided on tarsi III and IV. Tarsal organ low. Tarsi I–IV of males pseudosegmented; female tarsi IV cracked, otherwise integral. Metatarsal preening combs present on legs III and IV of females, absent in males. Two spermathecal receptacula, each long, slender, undivided.

DISTRIBUTION: Southern Brazil.

SYNONYMY: *Parapselligmus* is placed in synonymy because, according to Toledo Piza (1939), the maxillary cuspules are dense, and the scopula of only the fourth tarsus is divided by setae. Those characters are diagnostic of *Rachias,* in the absence of a wide clypeus.

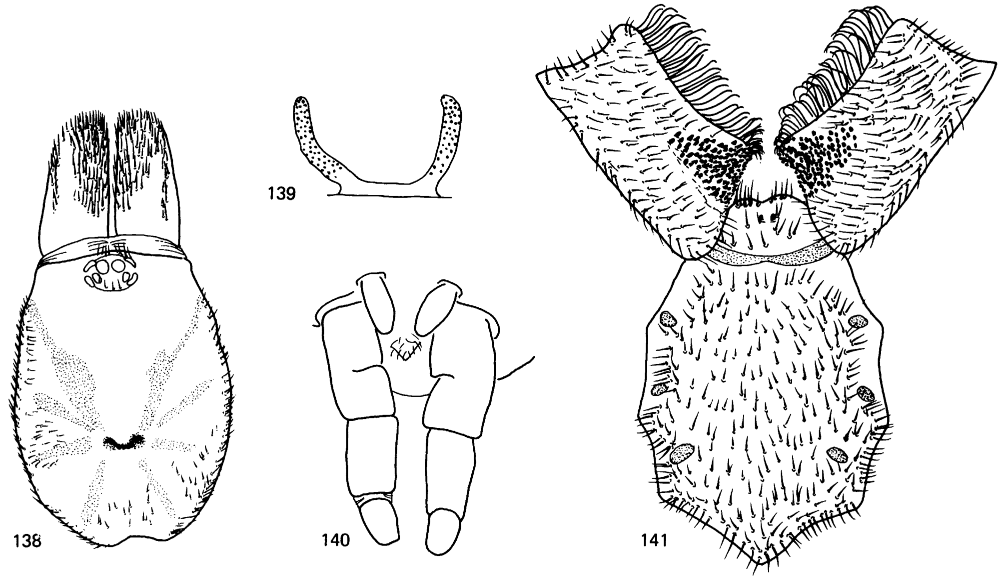
MISPLACED SPECIES: Because of the short palpal bulb, ascopulate metatarsi, and pseudosegmented tarsi of the male, *Rachias intermedia* Soares (1944) is transferred to *Androthelopsis. Cyrtauchenius maculatus* Bertkau (1880), transferred to *Rachias* by Mello-Leitão (1926), is transferred to *Bolostromus* because of its wider eye group and subquadrate labium.

STENOTEROMMATA HOLMBERG

Stenoterommata Holmberg, 1881, p. 126 (type species by monotypy *Stenoterommata platensis* Holmberg; male and female syntypes lost).

DIAGNOSIS: *Stenoterommata* differs from *Pselligmus* in the short domed apical segment of the PLS and in the presence of scopulae on tarsi III and IV.

DESCRIPTION: Apical segment of PLS short, domed. Fovea short, procurved. Clypeus very narrow to absent. Eye tubercle raised, well defined. Few cuspules on labium. Serrula present on front edge. Maxillae trapezoidal; anterior lobe distinct. Numerous cuspules on maxillae on inner corner on mound. Chelicerae with weak rastellum of long setae; intercheliceral tumescence present. Posterior sternal sigilla small, oval, marginal. Males and females with two rows of teeth on all paired claws; third claw present on all legs or



FIGS. 138–141. *Rachias dispar* (Simon), female syntype. 138. Cephalothorax, dorsal view. 139. Spermathecae. 140. Spinnerets, ventral view. 141. Sternum, maxillae, and labium.

absent on legs I and II. Scopulae of males and females entire on metatarsi and tarsi I and II, divided widely on tarsi III and IV; absent elsewhere. Tarsal organ low. Cymbium aspinose. Tibia I of male with one megaspine. Female tarsi integral; male tarsi III and IV pseudosegmented. Metatarsal preening combs on legs III and IV. Spermathecae two clusters of one separate and three grouped lobes.

DISTRIBUTION: Southern Argentina.

REMARKS: From the very precise description of *Stenoterommata* by Holmberg (1881), it is clear that the spider has the characteristic keels (carinula) of the pycnothelines. The absence of tarsal spines in the male distinguishes it from *Rachias,* and the presence of a third claw and scopulae on the third and fourth tarsi indicates that it is distinct from *Pselligmus.* The above description is compiled from Holmberg's (1881) original description and my observation of *Stenoterommata argentinensis* (Schiapelli and Gerschman, 1958), New Combination, here transferred from *Pselligmus.*

MISPLACED SPECIES: *S. segne* Simon (1886) and *S. gounelli* Simon (1886) (types of both in MNHP, examined) are transferred to *Acanthogonatus* because they have digitiform apical segments to the PLS and have no characters supporting their closer relationship with *Stenoterommata.*

PSELLIGMUS SIMON
Figures 142–156

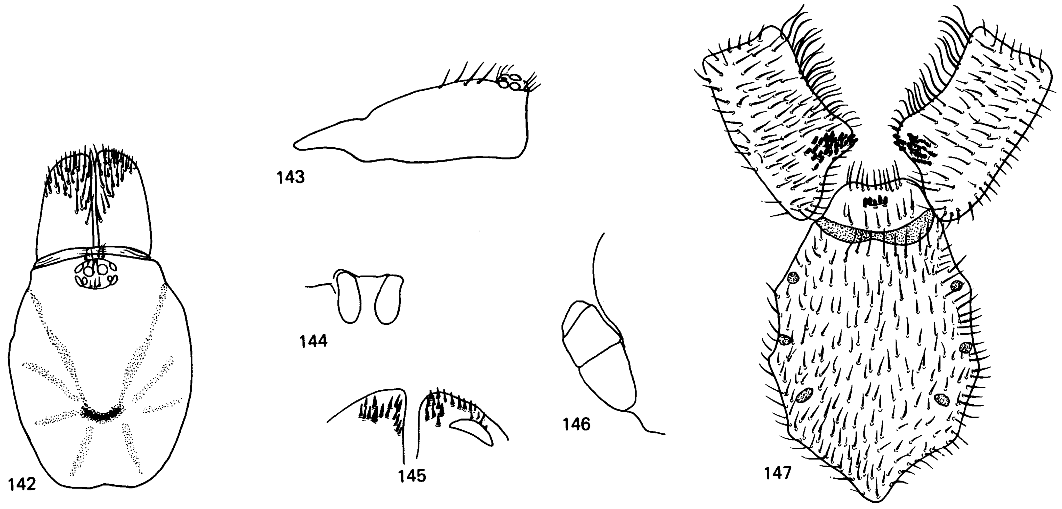
Pselligmus Simon, 1892c, p. 273 (type species by monotypy *Pselligmus infaustus* Simon; holotype female in USNM collection was housed in AMNH, examined).

Petropolisia Mello-Leitão, 1920a, p. 59 (type species by original designation *Petropolisia aurea* Mello-Leitão; female holotype in MRJ, examined). NEW SYNONYMY.

Psalistopoides Mello-Leitão, 1934, p. 404 (type species by original designation *Psalistopoides fulvimanus* Mello-Leitão; female holotype in IBB, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Stenoterommata* in the absence of scopulae on tarsi III and IV.

DESCRIPTION: Apical segment of PLS triangular to digitiform. Fovea short, procurved. Clypeus very narrow. Eye tubercle raised, well defined. Few cuspules on labium. Serrula present on front edge and behind anterior lobe. Maxillae trapezoidal; anterior lobe distinct. Numerous cuspules on maxillae on



FIGS. 142–147. *Pselligmus infaustus* Simon, female holotype. 142, 143. Cephalothorax. 142. Dorsal view. 143. Lateral view. 144. Posterior median spinnerets, ventral view. 145. Chelicerae, viewed from below showing rastellum. 146. Posterior lateral spinneret, lateral view. 147. Sternum, maxillae, and labium.

inner corner on mound. Cheliceral rastellum weak; intercheliceral tumescence small, soft, setose, pallid. Posterior sternal sigilla small, oval, marginal. Cymbium and leg tarsi of males and females without spines. Palpal bulb pyriform with 6–8 long low chitinous ridges on upperside, with long, flanged embolus. Tibia I of males unmodified. Males and females with two rows of teeth on all paired claws; third claw absent at least on tarsi I–III. Scopulae of males entire on distal metatarsi I and II and tarsi I, divided on tarsi II, very thin to absent on tarsi III and IV; scopulae of female entire on metatarsi and tarsi I and II, otherwise absent. Tarsal organ low. Tarsi I–IV of males integral. Metatarsal preening combs present on leg IV.

DISTRIBUTION: Southern Brazil.

REMARKS: *Pselligmus* differs from *Hermachura* only in lacking a third claw on the anterior three tarsi. Previous studies on Australian *Aname* species indicate that the loss of a third claw may happen within a species group or as in other Pycnothelinae in several apparently independent genera. Therefore, since *Hermachura* is known only from a female it may be synonymous with *Pselligmus*.

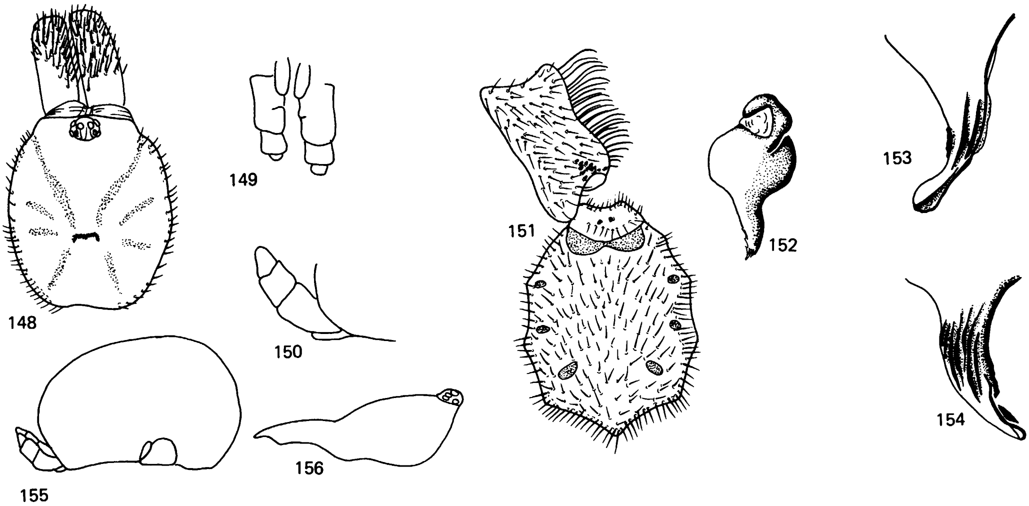
Mygale conspersa Walckenaer (1837) (possible type in BMNH, examined) shares all of the generic characters of *Pselligmus* to which it is tentatively transferred.

MISPLACED SPECIES: *Pselligmus argentinensis* Schiapelli and Gerschman (1958) differs from *Pselligmus infaustus* Simon in having tarsi III and IV scopulate and each spematheca consists of three to five short lobes (see Schiapelli and Gerschman, 1962). Thus, I transfer *P. argentinensis* to *Stenoterommata*, in which the apical segment of the PLS is at least triangular to short and digitiform. However, that species accentuates the doubtful significance of the PLS character because the form of the keels on the bulb in *Pselligmus fulvimanus*, New Combination, *Pselligmus argentinensis*, and that described by Holmberg for *Stenoterommata platensis* Holmberg (1881) are all very similar. Thus, my diagnoses of *Stenoterommata* and *Pselligmus* may be based on artificial differences.

HERMACHURA MELLO-LEITÃO
Figures 157–160

Hermachura Mello-Leitão, 1923, p. 70 (type species by original designation *Hermachura leuderwaldti* Mello-Leitão; female syntypes in MZSP, examined).

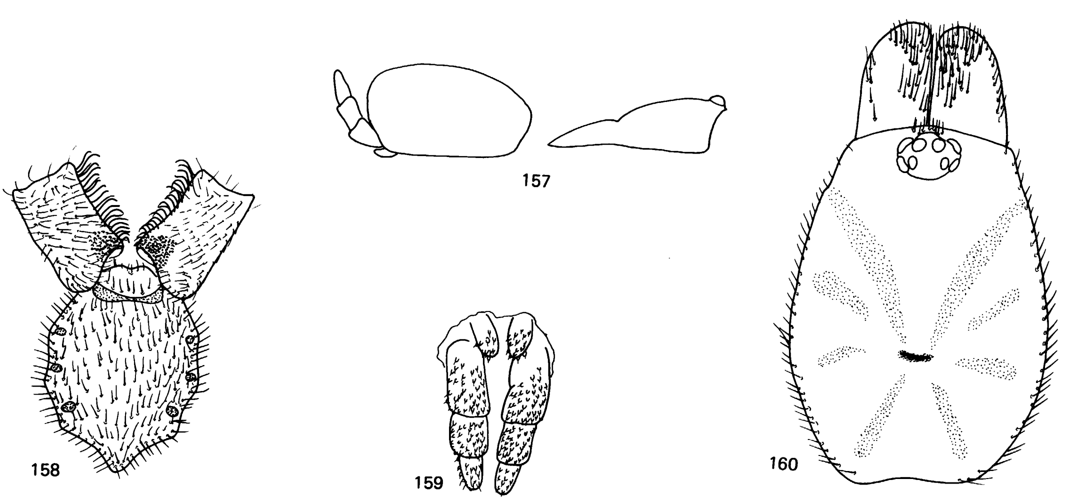
DIAGNOSIS: Differs from other Pycnothe-



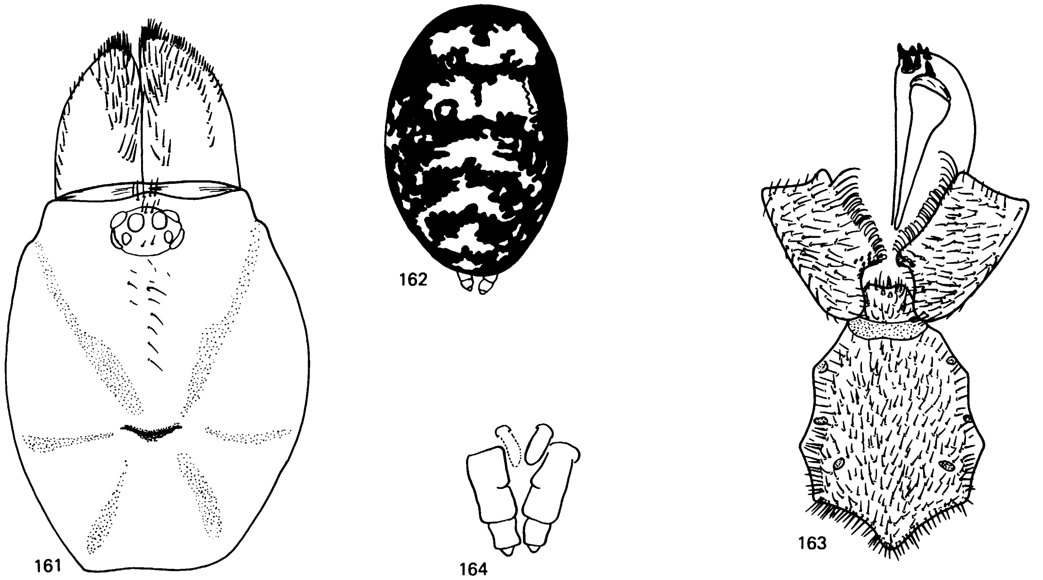
FIGS. 148–156. *Pselligmus fulvimanus* (Mello-Leitão), male holotype. 148. Cephalothorax, dorsal view. 149, 150. Spinnerets. 149. Ventral view. 150. Lateral view. 151. Sternum, maxilla, and labium. 152–154. Palpal bulb. 152. Entire. 153. Outer view of apical. 154. Inner view of apical. 155. Abdomen, lateral view. 156. Cephalothorax, lateral view.

linae by the weak tarsal scopulae, well-developed third tarsal claw, and short but apically digitiform spinnerets with enlarged spigots ventrally.

DESCRIPTION: Males unknown. Apical segment of PLS triangular. Fovea short, procurved. Clypeus very narrow. Eye tubercle raised, well defined. No cuspules on labium. Serrula present on front edge of maxilla. Maxillae trapezoidal; anterior lobe distinct. Numerous cuspules on maxillae on inner corner on distinct mound. Chelicerae without rastellum. Posterior sternal sigilla small, oval, marginal. Females with two rows of teeth on



FIGS. 157–160. *Hermachura leuderwaldti* Mello-Leitão, female syntype. 157. Cephalothorax and abdomen, lateral view. 158. Sternum, maxillae, and labium. 159. Spinnerets, ventral view. 160. Cephalothorax, dorsal view.



Figs. 161–164. *Prorachias bristowei* Mello-Leitão, female holotype. 161. Cephalothorax, dorsal view. 162. Abdomen, dorsal view. 163. Chelicera (showing rastellum), sternum, maxillae, and labium. 164. Spinnerets, ventral view.

all paired claws; third claw long on all tarsi. Scopulae of females thin and divided by setae on distal metatarsi I and II and tarsi I, thinner and more divided on tarsi II, elsewhere absent. Tarsal organ low; leg cuticle appears reticulate, possibly pustulose. Tarsi of females integral. Metatarsal preening combs present on legs II–IV. Large spigots on ventral surface of spinnerets. Spermathecae unknown.

Distribution: Southern Brazil.

PRORACHIAS MELLO-LEITÃO

Figures 161–164

Prorachias Mello-Leitão, 1924, p. 184 (type species by original designation *Prorachias bristowei* Mello-Leitão; female holotype in MRJ, examined).

Diagnosis: *Prorachias* differs from all other Pycnothelinae by the very strong rastellum on a mound.

Description: Apical segment of PLS short, domed. Males unknown. Fovea short, procurved. Clypeus narrow but distinct. Eye tubercle raised, well defined. Few cuspules on labium. Serrula not evident. Maxillae trapezoidal with distinct heel; anterior lobe rounded. Several cuspules on maxillae on inner corner, not on mound. Chelicerae with rastellum of six stout coniform spines on distinct mound. Posterior sternal sigilla small, oval, marginal to submarginal. Females with two rows of teeth on all paired claws; third claw present on all legs. Scopulae of females entire on metatarsi and tarsi I and II; absent on legs III and IV. Tarsal organ low. Female tarsi integral. Metatarsal preening combs present on legs III and IV. Spermathecae unknown.

Distribution: Brazil.

NEMESIIDAE *INCERTAE SEDIS*

SPELOCTENIZA GERTSCH

Speloctenize Gertsch, 1982, p. 84 (type species by original designation *Speloctenize ashmolei* Gertsch; female holotype in AMNH, not examined).

Diagnosis: Differs from other Nemesiidae by the almost complete absence of an eye tubercle, if not also eyes, and from *Troglodiplura* by the domed apical segment of the PLS.

Description: Males unknown. Apical segment of PLS domed; posterior median spinnerets present. Fovea short, straight, transverse. Clypeus short; eyes evanescent, group rectangular, tubercle low, only six eyes obviously present. Few cuspules on labium. Serrula unknown. Maxillae trapezoidal; anterior lobe low. Several cuspules on maxillae on inner corner. Chelicerae with rastellum of two heavy spines. Posterior sternal sigilla small, oval, marginal. Females with two rows of teeth on all paired claws; third claw short, curved, bare. Scopulae of females entirely absent. Tarsal organ low. Tarsi of females integral. Metatarsal preening combs absent. Large spigots on ventral surface of spinnerets. Spermathecae bilobed.

DISTRIBUTION: Ecuador.

TROGLODIPLURA MAIN

Troglodiplura Main, 1969, p. 9 (type species by monotypy *Troglodiplura lowryi* Main; female holotype in WAM, examined).

DIAGNOSIS: Differs from all other Nemesiidae except *Spelocteniza,* which has shorter legs, by lacking eyes.

DESCRIPTION: Eyes absent. Spinnerets unknown. Fovea unknown. Caput low. No cuspules on labium. Serrula absent or very reduced. Maxillae rectangular; heel slightly produced over labium; anterior lobe indistinct. Numerous cuspules on maxillae extending from inner corner toward but not onto heel, not on mound. Chelicerae without rastellum; teeth on cheliceral promargin only, with basal row of small granules. Sternum unknown. Two rows of teeth on paired claws; third claw small, curved. Scopulae thin but present on at least two tarsi. Small spines present on one distal ventral leg tarsus. Tarsal organ low. Tarsi of females elongate, curved, pseudosegmented.

DISTRIBUTION: Southwestern Australia.

REMARKS: In the elongate tarsi *Troglodiplura* may be related to the Diplurinae and represent the only extra-Neotropical representative and therefore a relic. Obviously, more material is necessary to test that hypothesis. Presumably, Main and Gray, in their intended description of the newly discovered male of *T. lowryi* will be able to answer that question. The genus is not included in any cladogram.

BARYCHELIDAE SIMON

Barycheleae Simon, 1889d, p. 192.

DIAGNOSIS: Differs from Theraphosidae in the short apical segment of the PLS and in the weakly produced anterior lobe of the maxillae.

PLS short; apical segment domed to short and digitiform. Cymbium bilobed. Unpaired claw absent. Carapace and legs uniformly setose. Four or two spinnerets. Eyes absent or eight eyes in two or three rows forming rectangular, subquadrate, or trapezoidal group. Anterior lobe of maxillae indistinct or absent. Scopulae well developed on metatarsi and tarsi I and II. Paired claws of females with few short teeth. Cheliceral rastellum on low process to absent. Carapace as high in front of fovea as behind.

DESCRIPTION: Eyes absent (*Troglothele*) or eight in rectangular group of two (*Sipalolasma, Sasonichus, Thalerommata, Cosmopelma, Paracenobiopelma*), or three rows (*Sason,* Barychelinae) in subquadrate (*Atrophothele, Rhianodes, Monodontium, Cyphonisia, Cyrtogrammomma, Plagiobothrus*) or trapezoidal group wider in front than behind (Barychelinae). Eye tubercle distinct (Barychelinae, Trichopelmatinae), low (Sasoninae), or absent (*Ammonius, Sason*). Clypeus absent (most genera) or wide (*Cosmopelma, Paracenobiopelma, Eubrachycercus*). Rastellum small to absent (most genera), strong (some *Trittame, Idiophthalma, Barychelus*), or consisting of numerous short spines (*Plagiobothrus, Strophaeus*). Intercheliceral tumescence weak or absent. Maxillae with cuspules numerous (*Zophoryctes, Trittame,* Trichopelmatinae) or few (most genera); lyra present (*Idiommata*) or absent (all other genera). Maxillary heel strongly produced (Trichopelmatinae) or rounded (most genera). Labium wider than long with few or no cuspules (most genera) or subquadrate with numerous cuspules (*Zophoryctes,* Trichopelmatinae). Sternum broad (most genera) or narrow (*Idioctis*), with six more or less distinct but small, marginal sigilla. Labiosternal suture a distinct groove. Legs of females short, with tarsi as wide as or longer than metatarsi (*Diplothele, Tigidia*). Scopulae: on metatarsi and tarsi I and II long, thin, and divided by setae (*Cyphonisia, Ammonius, Troglothele*), or entire (most genera); thin and widely divided (most genera) on tarsi III and IV, or absent on tarsi IV (*Psalistops, Ammonius, Thalerommata, Sasonichus,* some Sasoninae); generally thin and distal if present on metatarsi III and IV. Preening combs present (*Encyocrypta, Strophaeus, Tigidia*) or absent (most genera). Paired claws of females with teeth on one face of the claws (*Pisenor, Cyrtogrammomma, Encyocrypta, Trichopelma*), with two rows of teeth (*Troglothele, Monodontium*), or few medial teeth or bare (most genera); paired claws of males with two rows of teeth (*Cyrtogrammomma, Encyocrypta, Cyphonisia, Pisenor, Sipalolasma, Trichopelma*) or bare (*Ammonius,* Sasoninae, *Thalerommata, Tigidia*). Paired claws of females of similar size on legs I and IV (most genera) or noticeably smaller on front pairs (*Diplothele, Tigidia, Synothele*). Palpal claw of females with few teeth or bare. Spines reduced or absent on all legs of females. Leg tarsi of males and females entire (most genera) or cracked (*Trichopelma*). Palpal bulb of males with small second haematodocha and coniform distal sclerite lacking conductor or paraembolic apophysis; distal sclerite a tapering cone (most genera), with spiraled keels (*Idiommata*) or distally broad (*Tigidia, Cyphonisia, Pisenor*). Cymbium without spines (most genera) or spinose (*Thalerommata*), short, bilobed (most genera) or with one very elongate lobe (*Ammonius, Pisenor, Cyphonisia, Sipalolasma, Sasonichus*). Tibia I of males without spur (*Ammonius, Barychelus, Sipalolasma*), with single spur (*Cyrtogrammomma*), or with dual coupling spur composed of short dorsal process with short lower spine and longer spinose upcurved process (most genera). Trichobothria filiform, in two rows on tibiae, one row on metatarsi; in broad band of filiform and clavate (most genera) on tarsi. Bothria corrugiform. Tarsal organ low with concentric ridges. PMS well developed (most genera), reduced (*Atrophothele,* some *Encyocrypta,* some *Idiommata*), or absent (*Pisenor, Tigidia, Diplothele,* some *Monodontium*). PLS short with apical segment domed (most genera), short and triangular (Trichopelmatinae, *Thalerommata*), or digitiform (*Ammonius*). Two entire or divided spermathecal receptacula.

MISPLACED GENERA: Through the application of the above diagnosis some genera, *Brachionopus, Harpactirella, Zophopelma* (=*Euphrictus*), and *Euthycaelus,* placed by Benoit (1965c) in the Leptopelmatinae are transferred to the Theraphosidae. *Neodiplothele,* although included in the barychelid key, is transferred to the Nemesiidae (see discussion of nemesiid intrarelationships). *Acanthogonatus* lacks claw tufts and is transferred to the Nemesiidae where it becomes the senior synonym of *Tryssothele.*

Troglothele is unlike most other barychelid genera in having two rows of teeth on the claws of females and may be better accommodated in the Nemesiidae if the male is found to lack the dissimilarly bilobed cymbium. Here it is left in the Barychelidae *incertae sedis.*

SYNONYMY: *Rhianus* Thorell (1890) is preoccupied by *Rhianus* Pascoe, 1889, in the Coleoptera, thus the new name *Rhianodes* is proposed as its replacement; Bonnet (1958) invalidly rejected the homonymy.

Two species were originally included in *Pisenor* and the type species was later (Simon, 1892a) designated as *P. notius* Simon (1889g), the type of which lacks the posterior median spinnerets (no scars are evident). Evidently, however, Simon and subsequent revisers always diagnosed *Pisenor* from the second species, *P. nigellus* Simon (1889g), in which four spinnerets are present. (As in several other descriptions by Simon, the number of spinnerets was not mentioned.) Consequently, *Urothele* Tullgren falls into the synonymy of *Pisenor,* and *Pisenorodes* Pocock would be revalidated for all species previously attributed to *Pisenor,* except of course *P. notius.* However, *Pisenorodes* and *Pisenor sensu* Benoit are placed in the synonymy of *Cyphonisia.*

Simon (1892a) and later revisers always attributed *Tigidia* to the Barychelinae because it putatively had four spinnerets. In fact, once again the holotype of the type species has only two spinnerets. Therefore, *Acropholius sensu* Benoit (1965d) falls into the synonymy of *Tigidia.* In *Cestotrema,* the anterior lateral eyes are set somewhat more in advance of the remaining eyes than in *Tigidia* but because that difference is not consistent with any other difference between the two genera, *Cestotrema* is also placed in the synonymy of *Tigidia*. The type of *Nossibea* is lost and was left unplaced by Benoit (1965d). Strand (1907a) gave no characters by which *Nossibea* differs from *Tigidia*.

As far as I can determine the recognition of *Atrophonysia* arose through several misunderstandings of the characters of *Idioctis* that are elaborated in my pending revision of *Idioctis*. Therefore, *Idioctis* becomes the senior synonym.

The recognition of a new genus for *Lampropodus* Rainbow and Pulleine (1918) was based once again upon the fallacious observation that the posterior median spinnerets were absent. Judged by the pair of large scars in the holotype, they were probably inadvertently torn off while the spider was being collected. Simon (1908) allied *Synothele* with *Cestotrema* primarily on the grounds that it had two spinnerets. However, the posterior median spinnerets, although small, are present on the holotype. Nevertheless, I have recognized *Synothele* and include it in the subtribe Diplothelina, with which it shares the very reduced paired claws on legs I and II (compared with legs III and IV). These matters will be discussed more fully in my pending revision of the Australian Barychelidae.

In a revision of *Sason* (Raven, in prep.), *Chrysopelma maculata* Roewer (1963) (the type species; types in USNM and SMF, examined) was found to be only specifically distinct from other *Sason* species. *Psalistops corozali* Petrunkevitch (1929) (type in AMNH, examined) has the fourth tarsi cracked, as in *Trichopelma,* and also agrees in other generic characters; thus, it is transferred to that genus.

REMARKS: *Ammonius* Thorell (1899), *Eubrachycercus* Pocock (1897b), *Sasonichus* Pocock (1900c), *Sipalolasma* Simon (1892a), *Thalerommata* Ausserer (1875), and *Troglothele* Fage (1929) are left as genera *incertae sedis* in the Barychelidae.

KEY TO GENERA OF THE BARYCHELIDAE

1\. Females with two rows of teeth on paired claws 2
Females with one row of teeth or claws bare 3

2\. Eyes absent .... *Troglothele*
Eyes present .... *Monodontium*

3\. Eye group as wide in front as behind or almost so 4
Eye group clearly wider behind than in front 20

4\. Clypeus wide and distinct 5
Clypeus narrow, indistinct or absent 8

5\. Apical segment of PLS digitiform; numerous cuspules on labium and maxillae (Theraphosidae) .... *Harpactirella*
Apical segment of PLS domed or triangular; cuspules variable 6

6\. Two spinnerets (Nemesiidae) .... *Neodiplothele*
Four spinnerets 7

7\. Cuspules in a line on tip of labium and on inner corner of maxillae .... *Paracenobiopelma*
Cuspules absent on labium and only on posterior half of maxillae .... *Cosmopelma*

8\. Eye group about twice as wide as long and in two or three rows 9
Eye group subquadrate to longer than above and in three rows 15

9\. At least 10 cuspules on subquadrate labium 10
Less than 10 cuspules on labium about twice as wide as long 16

10\. Scopula present but divided on tarsi IV of females; tarsi IV of males and females usually with a transverse pallid weakness ... . *Trichopelma*
Scopula absent on tarsi IV of females; tarsi IV always integral .... *Psalistops*

11\. Eye tubercle absent; AME reduced in size .. .. *Ammonius*
Eye tubercle present; AME normal 12

12\. Apical segment of PLS domed; up to 10 cuspules on maxillae 13
Apical segment of PLS digitiform or not domed; much more than 10 cuspules on maxillae 15

13\. Tibial spur absent in male; no labial cuspules .... *Sasonichus*
Tibial spur present; labial cuspules present .... *Sipalolasma*

14\. Tarsi III and IV scopulate; rastellum present .... *Eubrachycercus*
Tarsi III and IV ascopulate; rastellum absent .... *Thalerommata*

15\. Apical segment of PLS digitiform 16
Apical segment of PLS domed or triangular 17

16\. Teeth medial on paired claw .. *Atrophothele*
Teeth on outer faces of claw .... *Cyrtogrammomma*

17\. Eye group wider than long; labial cuspules strong and linear .... *Sason*

Eye group subquadrate; labial cuspules not as above 18
18. Fovea procurved; at least 10 maxillary cuspules 19
Fovea more or less straight; fewer cuspules .... *Cyphonisia,* part
19. Rastellum of numerous spines; scopula on tarsus IV undivided .... *Plagiobothrus*
Rastellum weak or absent; scopulae of tarsi III and IV divided by setae .. *Rhianodes*
20. Two spinnerets 21
Four spinnerets 25
21. STC of legs I and II much smaller than on legs III and IV 22
All paired claws of similar size 23
22. Eye group about as wide behind as in front .... *Diplothele*
Eye group clearly wider behind than in front .... *Tigidia*
23. Maxillary lyra present ... *Idiommata,* part
Maxillary lyra absent 24
24. Metatarsal preening combs present .... *Encyocrypta,* part
Metatarsal preening combs absent ... *Pisenor*
25. STC of legs I and II much smaller than on legs III and IV .... *Synothele*
All paired claws of similar size 26
26. Eye group about twice as wide behind as long 27
Eye group not so wide 28
27. Rastellum strong; sternum cordate .... *Idiophthalma*
Rastellum weak; sternum noticeably narrow .... *Idioctis*
28. About 40 or more cuspules on maxillae 29
Few cuspules on maxillae 30
29. Cuspules present on labium; Madagascar .. .. *Zophoryctes*
Cuspules absent on labium; Australia .... *Trittame*
30. Preening combs present on metatarsi III and IV 31
Preening combs absent 32
31. Scopula absent on metatarsus IV; South America .... *Strophaeus*
Scopula present on metatarsus IV; Australia .... *Encyocrypta,* part
32. Rastellum on a low mound or absent ... 33
Rastellum on a raised process .... *Barychelus*
33. Maxillary lyra present ... *Idiommata,* part
Maxillary lyra absent .... *Cyphonisia,* part

BARYCHELINAE SIMON

Barycheleae Simon, 1889d, p. 193.
Diplotheleae Simon, 1903a, p. 908. NEW SYNONYMY.

DIAGNOSIS: Differs from all other Barychelidae by the elongate or wide but not rectangular eye group and from the Sasoninae by the presence of an eye tubercle.

Anterior lateral eyes on clypeus edge; front row strongly procurved or divided into two rows. Apical segment of PLS domed. Cuspules reduced or absent on labium. Labium much wider than long.

INCLUDED GENERA: *Atrophothele* Pocock (1903d), *Barychelus* Simon (1889c), *Cyphonisia* Simon (1889g), *Cyrtogrammomma* Pocock (1895c), *Diplothele* O. P.-Cambridge (1890), *Encyocrypta* Simon (1889c), *Idioctis* L. Koch (1874), *Idiommata* Ausserer (1871), *Idiophthalma* O. P.-Cambridge (1877), *Monodontium* Kulczynski (1908), *Pisenor* Simon (1889g), *Plagiobothrus* Karsch (1891), *Rhianodes,* new name, *Synothele* Simon (1908), *Strophaeus* Ausserer (1871), *Tigidia* Simon (1892c), *Trittame* L. Koch (1874), *Zophoryctes* Simon (1902b).

SYNONYMY: The character upon which the Diplothelina was based was the absence of the posterior median spinnerets. In revisions of Australian Barychelidae (in prep.), I found that within each genus, species may lose the posterior median spinnerets. The strong similarities of the subtribes Barychelina and Diplothelina are indicated by Simon (1892a) and Benoit (1965d) who failed to place the diplotheline holotype female of the type species of *Pisenor* into the Diplothelina.

SASONINAE SIMON

Sasoneae Simon, 1892a, p. 117.
Sasoninae Petrunkevitch, 1928, pp. 33, 36.

DIAGNOSIS: Differs from all other Barychelinae by the presence of a clypeus or the eye group being less than twice as wide as long in association with the domed apical segment of the PLS and linear cuspules on the labium of females and some males.

Apical segment of posterior lateral spinnerets short and domed. Four spinnerets. Eye group about twice as wide as long behind. Clypeus absent. Females with line of cuspules on anterior edge of labium. Two claws and claw tufts.

GENERA INCLUDED: *Sason* Simon (1887a), *Cosmopelma* Simon (1889d), and *Paracenobiopelma* Feio (1952).

REMARKS: *Sason* was erroneously listed and discussed in the Theraphosidae by Main (1981b).

TRICHOPELMATINAE, NEW SUBFAMILY

TYPE GENUS: *Trichopelma* Simon.

DIAGNOSIS: Differs from all other Barychelidae by the very produced maxillary heel in association with the rectangular eye group set on the carapace margin.

Clypeus absent. Eyes in two rows in a rectangular group. Labium subquadrate with numerous cuspules; maxillae with noticeably produced heel. Apical segment of PLS short, triangular or domed.

INCLUDED GENERA: *Trichopelma* Simon (1888), *Psalistops* Simon (1889d).

THERAPHOSIDAE THORELL

Theraphosoidae Thorell, 1869, p. 16.
Aviculariidae Simon, 1874, p. 14.

DIAGNOSIS: Differs from Barychelidae by the presence of a distinct lobe on the anterior maxillae.

Apical segment of PLS digitiform. Carapace and legs uniformly hirsute. Four spinnerets. Eight eyes in two rows forming rectangular group, except *Spelopelma*. Anterior lobe of maxillae distinctly produced into conical process. Sternum with moderately small, oval, marginal to subcentral posterior sigilla. Paired claws with few small teeth. Cheliceral rastellum weak or absent.

DESCRIPTION: Eye tubercle distinct or eyes absent or almost so (*Spelopelma*). Clypeus absent or wide (Harpactirinae, some Selenocosmiinae). Fovea short, closed, procurved, recurved, distinctly spheroid (*Sphaerobothria*), or a tubercle (*Ceratogyrus*). Chelicerae with no rastellum or with short conical spines prolaterally (*Euphrictus*); outer face basally with erect stiff setae (lyra strikers) (Selenocosmiinae), curved spatulate setae (Ornithoctoninae, Thrigmopoeinae), dense scopula (Harpactirinae, Ornithoctoninae), or bare. Intercheliceral face bare or with broad spatulate setae dorsally (*Coremiocnemis, Selenogyrus*), dense scopula (*Harpactira*); intercheliceral face of males with small, pallid tumescence (*Heterothele, Euphrictus, Ichnocolus*) or bare (most genera). Maxillae with numerous cuspules; prolateral face bare, with bacilliform setae forming lyra (Selenocosmiinae), or with stiff conical setae (Ornithoctoninae, Thrigmopoeinae); retrolateral maxilla and trochanter of palp bare with dense scopula pad (*Stichoplastus*). Plumose hairs on palpal trochanter (*Cyrtopholis, Grammostola*), prolateral maxilla and coxa I (*Theraphosa, Lasiodora*), retrolateral trochanter of palp and first leg (*Acanthoscurria, Phormictopus*), or retrolateral maxillae and prolateral coxae I and II (*Grammostola* and Eumenophorinae). Serrula present (*Heterothele, Stromatopelma, Harpactira, Cyriocosmus, Ischnocolus, Pterinochilus, Brachionopus*) or absent (most genera). Stridulatory lyra absent or consisting of one or two clavate setae on prodorsal coxae I and II with short thornlike setae forming strikers on prolateral trochanters (Eumenophorinae) or leg coxae with stout thorns (*Citharacanthus, Schizopelma*). Labium wider than long (most genera) or elongate (*Citharischius*), with numerous cuspules (most genera) or bare (*Harpactirella*). Labiosternal suture consisting of deep groove or also with two distinct lateral, sometimes multilobate, mounds (Eumenophorinae, Ornithoctoninae, Thrigmopoeinae, and some Selenocosmiinae). Sternum broad with six distinct small to large (*Ozopactus*), marginal to subcentral sigilla. Tarsal scopulae: widely divided by setae (many Ischnocolinae), or dense and undivided on tarsi I and II, and similar on tarsi III and IV (most genera) or divided; uniformly broad (most genera), or broadest proximally and narrowed and confined to ventral surface (Harpactirinae). Metatarsal scopulae: distal and divided or entire (most genera) on legs I and II; distal and sometimes also divided on legs III and IV. Tarsi more slender than metatarsi or wider (Aviculariinae). Dorsal abdomen posteriorly with urticaceous hairs (some Theraphosinae) or hairs normal. Unpaired claws present (*Heterothele, Phlogiellus,* and some *Selenocosmia*) or absent (most genera). Paired claws of females with few if any short teeth, of males similar or with two rows of teeth (*Ischnocolus*). Leg tarsi with enlarged spinelike setae (*Acanthopelma*) or aspinose (all other genera). Spines reduced or absent on legs (at least anterior pairs). Palpal bulb with small second haematodocha and coniform distal sclerite; subtegulum small, twisted (most genera), or large, dominant

(Theraphosinae). Embolus elongate (most genera) or broad and acuminate (Theraphosinae); paraembolic apophysis present (*Cyriocosmus*) or absent (most genera). Cymbium: similarly (most genera) or dissimilarly bilobed, or with interlobular spinose mound (Aviculariinae). Male palpal tibia slender or strongly incrassate (*Holothele*), with ventral sigmoid groove (*Ischnocolus, Cratorrhagus*), or unmodified (most genera). Tibia I of males without spur (many genera), with dual coupling spur (most genera) composed of short dorsal process with short lower spine and longer spinose upcurved process, with one conical spur (Harpactirinae), or with distally broad single process with many long spines (Eumenophorinae, Aviculariinae). Tibia II bare or with spinose spur (*Pachistopelma*). Trichobothria in two rows on tibiae, one row on metatarsi, and broad band on tarsi. Clavate and filiform trichobothria on tarsi; bothria corrugiform. Four spinnerets; PLS moderately long or very long (*Heterothele*).

SUBFAMILIES INCLUDED: Aviculariinae, Eumenophorinae, Harpactirinae, Ornithoctoninae, Selenocosmiinae, Theraphosinae, Thrigmopoeinae, Ischnocolinae.

REMARKS: *Chaetopelma* Ausserer (1871), *Cratorrhagus* Simon (1892a), *Hemirrhagus* Simon (1903a), *Heterothele* Karsch (1879a), *Ischnocolus* Ausserer (1871), *Nesiergus* Simon (1903a), *Ozopactus* Simon (1889d), *Plesiophrictus* Pocock (1899b), and *Spelopelma* Gertsch (1982) are keyed but are considered Theraphosidae *incertae sedis,* as are also the other Ischnocolinae.

KEY TO TAXONOMIC GROUPS OF THE THERAPHOSIDAE

1. Eyes present 2
   Eyes absent .... *Spelopelma*
2. Outer cheliceral face scopulate 3
   No scopula on outer cheliceral face 4
3. Outer chelicerae with curved paddle setae; prolateral maxillae with several horizontal thorns basally .... Ornithoctoninae
   No paddle setae on outer chelicerae .... Harpactirinae
4. Outer chelicerae proximobasally with horizontal thorn or curved paddle setae; prolateral maxillae with numerous horizontal thorns .... Thrigmopoeinae
   Chelicerae and maxillae not as above 5
5. Prolateral maxillae with distinct area of bacilliform setae forming lyra .... Selenocosmiinae
   Maxillae not as above 6
6. Prolateral dorsal coxae I (and sometimes II) with one or two long horizontal paddle or elongate spike setae ..... Eumenophorinae
   No horizontal paddle or spike setae on coxae 7
7. Leg tarsi clearly broader than metatarsi; few, if any, leg spines; males with spinose lobe between lobes of cymbium ... Aviculariinae
   Leg tarsi narrower than metatarsi; spines variable; no such lobe on cymbium 8
8. Prolateral face of femur IV with distinct scopula .... Theraphosinae, part
   No scopula on femur IV 9
9. All tarsal scopulae divided by rigid spinelike setae .... *Acanthopelma*
   Tarsal scopulae entire or divided only by normal setae .... Group I

ORNITHOCTONINAE POCOCK

Ornithoctonidae Pocock, 1895b, pp. 167, 179.

DIAGNOSIS: Outer chelicerae with short scopula; lower surface with curved paddle setae that act against horizontally aligned thorn setae on prolateral maxillae.

GENERA INCLUDED: *Citharognathus* Pocock (1895b), *Cyriopagopus* Simon (1887b), *Haplopelma* Simon (1892a), *Lampropelma* Simon (1892a), *Ornithoctonus* Pocock (1892a), *Phormingochilus* Pocock (1895b).

DISTRIBUTION: Oriental and Indian regions.

SYNONYMY: *Melopoeus* is synonymized with *Haplopelma* because both share the two key characters which are putatively apomorphic.

KEY TO GENERA OF THE ORNITHOCTONINAE

1. Clypeus as wide as MOQ length or wider... 2
   Clypeus not so wide 4
2. Clypeus as wide as eye group length; legs short .... *Ornithoctonus*
   Clypeus only as wide as MOQ length; long slender legs 3
3. Eye tubercle small, highest in front; caput distinctly arched .... *Haplopelma*
   Eye tubercle wide, highest medially; caput low .... *Phormingochilus*
4. Tibia and metatarsus IV incrassate .... *Citharognathus*
   Tibia and metatarsus IV slender 5
5. Retrolateral palpal femur with long retrolateral brush of hair .... *Lampropelma*
   No such brush present .... *Cyriopagopus*

THRIGMOPOEINAE POCOCK

Thrigmopoeinae Pocock, 1900c, pp. 178, 184.

DIAGNOSIS: Outer cheliceral face with basal posterior group of short modified setae; prolateral maxillae with group of numerous horizontally aligned thorn setae in diffuse or curved group.

GENERA INCLUDED: *Thrigmopoeus* Pocock (1899b), *Haploclastus* Simon (1892a).

DISTRIBUTION: Oriental region.

REMARKS: Pocock (1899b) indicated that *Thrigmopoeus* differs from *Haploclastus* in the curved band of the thorn setae on the prolateral maxillae, but after examining the type it is evident that his character is too nebulous to be used in a key. A revision of the groups may indicate that the character used here is equally ineffective. In that case the genera should probably be synonymized.

KEY TO GENERA OF THE THRIGMOPOEINAE

1. Outer basal chelicerae with curved clavate setae .... *Haploclastus*
   Outer basal chelicerae with short straight setae .... *Thrigmopoeus*

HARPACTIRINAE POCOCK

Harpactirinae Pocock, 1897b, pp. 744, 748.

DIAGNOSIS: Clypeus wide; chelicerae with scopula on outer surface.

GENERA INCLUDED: *Brachionopus* Pocock (1897b), *Ceratogyrus* Pocock (1897b), *Coelogenium* Purcell (1902a), *Eucratoscelus* Pocock (1898), *Harpactira* Ausserer (1871), *Harpactirella* Purcell (1902a), *Pterinochilus* Pocock (1897b).

DISTRIBUTION: Africa.

REMARKS: Although *Brachionopus* lacks the cheliceral scopula—one characteristic of the Harpactirinae—like *Harpactira* it has a wide clypeus and a serrula. For similar reasons *Harpactirella* is tentatively transferred here also.

KEY TO GENERA OF THE HARPACTIRINAE, PART

1. Fovea an elevated tubercle or dome .... *Ceratogyrus*
   Fovea a transverse groove 2
2. Fovea strongly procurved, U-shaped .... *Coelogenium*
   Fovea more or less straight 3
3. Chelicerae with scopula of plumose hairs on inner upper faces .... *Harpactira*
   Chelicerae without such scopula 4
4. Tibia IV strongly incrassate .. *Eucratoscelus*
   Tibia IV cylindrical .... *Pterinochilus*

EUMENOPHORINAE POCOCK

Eumenophorinae Pocock, 1897b, p. 772.
Phoneyuseae Simon, 1903a, pp. 918, 948.

DIAGNOSIS: Prolateral coxa I dorsally with a long paddle- or spike-shaped seta aligned along the coxa and acting against numerous short transverse spike setae in dorsoventral series on retrolateral surface of maxillae; also lyra similar to that (usually) on interface of coxae I and II.

GENERA INCLUDED: *Citharischius* Pocock (1900b), *Encyocrates* Simon (1892c), *Eumenophorus* Pocock (1897b), *Heteroscodra* Pocock (1899a), *Hysterocrates* Simon (1892a), *Loxomphalia* Simon (1889g), *Loxoptygus* Simon (1903a), *Monocentropus* Pocock (1897b), *Myostola* Simon (1903a), *Phoneyusa* Karsch (1884), *Stromatopelma* Karsch (1881a).

DISTRIBUTION: Africa and Madagascar.

SYNONYMY: Laurent (1946) placed *Myostola* and *Loxoptygus* in the synonymy of *Phoneyusa* on the strength of Simon's (1903a) key characters. However, Simon appears often to have avoided using the autapomorphy of his genus in keys and *Myostola* differs in several characters more significant than those artificial (key) characters.

REMARKS: *Stromatopelma* (=*Scodra*) shares the presence of a distinct brush of hair extending downwards from the retrolateral face of the palpal femora. Because that condition also occurs in other eumenophorines, I include the genus with them on the hypothesis that the characteristic lyra has been lost. Similarly, *Heteroscodra* is included here because of its similarity with *Stromatopelma,* especially in the presence of mounds in the labiosternal suture (see discussion of theraphosid intrarelationships).

KEY TO GENERA OF THE EUMENOPHORINAE, PART

1. Labium much longer than wide .... *Citharischius*
   Labium wider than long 2
2. Coxae II without paddle or spike setae .... *Monocentropus*

Coxae II with either of such setae 3
3. Tibia III incrassate; only long spikes on coxae II and III .... *Myostola*
Tibia III normal; coxae I and II with paddle setae 4
4. Scopula on tarsi IV divided by setae .... *Eumenophorus*
All tarsal scopulae integral 5
5. Retrolateral palpal femora with a brush of hair 6
No such brush present 8
6. Scopula confined to distal one-third of metatarsus IV .... *Phoneyusa*
Metatarsus IV with scopula for its length ... 7
7. Tibia IV incrassate .... *Hysterocrates*
Tibia IV normal .... *Loxomphalia*
8. Legs with long sparse erect hairs .... *Encyocrates*
Leg hairs close to cuticle........ *Loxoptygus*

SELENOCOSMIINAE SIMON

Selenocosmieae Simon, 1889d, p. 204.
Poecilotherieae Simon, 1889d, p. 204.
Phlogieae Simon, 1892a, pp. 132, 144.

Diagnosis: Prolateral surface of maxillae with numerous bacilliform setae acting against a short or long line of short spike setae (strikers) on the retromargin of the cheliceral furrow.

Genera Included: *Annandaliella* Hirst (1909), *Chilobrachys* Karsch (1891), *Coremiocnemis* Simon (1892a), *Euphrictus* Hirst (1908), *Lyrognathus* Pocock (1895b), *Orphnaecus* Simon (1892b), *Phlogiellus* Pocock (1895c), *Poecilotheria* Simon (1885), *Psalmopoeus* Pocock (1895b), *Selenocosmia* Ausserer (1871), *Selenogyrus* Pocock (1897b), *Selenotholus* Hogg (1902), *Selenotypus* Pocock (1895b).

Distribution: Central America (*Psalmopoeus*), Africa (*Euphrictus, Selenogyrus*), and Oriental, Indian, and Australian regions (all other genera).

Remarks: Although *Annandaliella, Euphrictus,* and *Selenogyrus* lack a maxillary lyra, they share with *Coremiocnemis* a number of characters and the apomorphic modified setae on the upper chelicerae. Those genera are, however, not included in the key to the Selenocosmiinae.

Synonymy: *Selenotholus* was placed by Main (1981a) in the synonymy of *Selenocosmia.* As the fovea of other selenocosmiines is either straight or procurved, the recurved fovea of *Selenotholus* is presumed to warrant generic recognition.

KEY TO GENERA OF THE SELENOCOSMIINAE, PART

1. Tarsi IV cracked and bent 2
All tarsi integral 3
2. Two to three lyra setae on maxillae enlarged, the others small; ALE very small; unpaired claw absent .... *Orphnaecus*
All lyra setae similar; ALE similar in size to PLE; unpaired claw present on leg IV .... *Phlogiellus*
3. Maxillary lyra with bacilliform and peg setae or only enlarged paddle setae 4
All lyra setae bacilliform 5
4. Lyra setae include short blunt pegs .... *Poecilotheria*
Lyra setae are enlarged paddle setae .... *Chilobrachys*
5. Tibia and metatarsus IV strongly incrassate .... *Lyrognathus*
Tibia and metatarsus IV not incrassate ... 6
6. Prolateral cheliceral face with peglike setae .. .. *Coremiocnemis*
No such setae present 7
7. Lyra with less than 20 separated clavate setae .... *Psalmopoeus*
Lyra a large area of numerous black setae..8
8. Fovea recurved .... *Selenotholus*
Fovea procurved or straight 9
9. First leg thicker and shorter than fourth .... *Selenocosmia*
Fourth leg as thick and long as first .... *Selenotypus*

THERAPHOSINAE THORELL

Theraphosoidae Thorell, 1870, p. 164.
Crypsidromeae Simon, 1889d, p. 204. NEW SYNONYMY.
Homoeommeae Simon, 1892a, pp. 133, 161. NEW SYNONYMY.
Lasiodoreae Simon, 1903a, pp. 919, 937. First synonymized by Bonnet, 1959, p. 4427.
Grammostoleae Mello-Leitão, 1923, pp. 129, 171. NEW SYNONYMY.

Diagnosis: Male palpal bulb with modified embolus distally stout and broad or keeled; subtegulum large, extending down the bulb for half of the tegulum. Femur IV sometimes with scopula on retrolateral face.

Genera Included: *Acanthopelma* F. O. P.-Cambridge (1897), *Acanthoscurria* Ausserer

(1871), *Ceropelma* Mello-Leitão (1923), *Citharacanthus* Pocock (1901b), *Crypsidromus* Ausserer (1871), *Cyclosternum* Ausserer (1871), *Cyriocosmus* Simon (1903a), *Cyrtopholis* Simon (1892a), *Dryptopelma* Simon (1889f), *Ephebopus* Simon (1892a), *Euathlus* Ausserer (1875), *Eupalaestrus* Pocock (1901b), *Grammostola* Simon (1892a), *Hapalopus* Ausserer (1875), *Hapalotremus* Simon (1903a), *Holothele* Karsch (1879a), *Homoeomma* Ausserer (1871), *Lasiodora* C. L. Koch (1851), *Megaphobema* Pocock (1901b), *Mygalarachne* Ausserer (1871), *Oligoxystre* Vellard (1924), *Pamphobeteus* Pocock (1901b), *Paraphysa* Simon (1892b), *Phormictopus* Pocock (1901b), *Phrixotrichus* Simon (1889a), *Rhechostica* Simon (1892a), *Schizopelma* F. O. P.-Cambridge (1897), *Sphaerobothria* Karsch (1879b), *Stichoplastus* Simon (1889d), *Theraphosa* Walckenaer (1805), *Xenesthis* Simon (1891b).

DISTRIBUTION: South and Central America and southern North America.

SYNONYMY: The Grammostolinae, Crypsidromeae, and Homoeommeae are based upon artificial and/or characters of only tribal significance. A number of genera are tentatively included in the Theraphosinae pending the confirmation of the diagnostic characters in their males.

REMARKS: This diagnosis and key arise from Schiapelli and Gerschman (1979) and Valerio (1980).

KEY TO GENERA OF THE THERAPHOSINAE, PART

1. Plumose hairs present on at least coxae I and II and/or maxillae 2
   Plumose hairs absent 5
2. Plumose hairs only on coxae of palp or leg I 3
   Plumose hairs on both trochanters and coxae of palp or leg I 4
3. Tibia I of males with spur; plumose hairs with different orientation above and below the suture .... *Lasiodora*
   Tibia I of males without spur; plumose hairs similarly directed above and below suture .... *Theraphosa*
4. Plumose hairs on coxae and trochanters of palp and leg I .... *Phormictopus*
   Plumose hairs only on one or both trochanters of palp and leg I .... *Acanthoscurria*
5. Metatarsus IV very incrassate .. *Eupalaestrus*
   Metatarsus IV not incrassate 6
6. Scopula for full length of metatarsus IV .... *Xenesthis*
   Scopula on metatarsus IV only apical or absent 7
7. Femur III very incrassate ... *Megaphobema*
   Femur III not incrassate 8
8. Clypeus as wide as MOQ length or tibia I of males with spur; two spermathecal receptacula .... *Pamphobeteus*, part
   Clypeus narrow or absent and tibia I of males without spur; one broad indistinct spermathecal receptacula........ *Mygalarachne*, part

AVICULARIINAE SIMON

Aviculariidae Simon, 1874, pp. 14, 15.

DIAGNOSIS: Legs weakly spined or aspinose. Tarsi as broad as or broader than metatarsi. A spinose process between lobes of male palpal tarsi.

GENERA INCLUDED: *Avicularia* Lamarck (1818), *Iridopelma* Pocock (1901b), *Pachistopelma* Pocock (1901b), *Tapinauchenius* Ausserer (1871).

SYNONYMY: Through the courtesy of Dr. M. Moritz (ZMB) I have illustrations of the spur and palp of the holotype (too fragile to mail) of *Mygale plumipes* C. L. Koch, the type species of *Tapinauchenius*. Although the form of the bulb and legs are aviculariine, no modified setal mound is evident on the palpal tarsus of the type. Therefore, I suggest that the structure is weakly developed and continue to include the genus in the Aviculariinae. Its similarity with *Lasiopelma* (type in NHMV, examined), its junior synonym, in which the spinose mound is readily evident, supports that decision.

KEY TO GENERA OF THE AVICULARIINAE

1. Males with spurs on tibia I and II .... *Iridopelma*
   No spurs on tibia II 2
2. Front row of eyes strongly procurved .... *Avicularia*
   Front row of eyes weakly curved 3
3. Tibia I of males with black shield of spines .... *Pachistopelma*
   Tibia I of males with two hooked spurs .... *Tapinauchenius*

KEY TO GENERA OF GROUP I

1. Eye group wider behind than in front and anterior tarsal scopulae divided by setae ... 2
Eye group as wide in front as behind; scopulae variable ... 3
2. Coxae entally with posterior heel produced; Mexico ... *Hemirrhagus*
Ental coxae with rounded rectanguloid corners; North Africa ... *Cratorrhagus*
3. Tarsi IV cracked and bent ... 4
Tarsi IV integral ... 7
4. Male tibia I with spur; Venezuela *Holothele*
Male tibia I without spur ... 5
5. Rastellum present on prolateral chelicerae; Congo ... *Euphrictus*
Rastellum absent ... 6
6. PLS short; tibia of male palp with sigmoid depression ventrally .... *Ischnocolus,* part
PLS very long; depression not sigmoid; Congo ... *Heterothele*
7. Labiosternal suture with two low lateral mounds; leg IV strongly incrassate; Africa ... *Heteroscodra*
Labiosternal suture a depression; leg IV not incrassate ... 8
8. Scopula of tarsi II divided by setae ... Group II
Scopula of tarsi II integral ... Group III

KEY TO GENERA OF GROUP II

1. Embolus distally filiform and without distal keels or paraembolic apophysis ... 2
Embolus broad, keeled, or with paraembolic apophysis; South America ... 8
2. Clypeus wide; Africa ... 3
Clypeus narrow or absent ... 4
3. Serrula present; no tibial spur in males ... *Brachionopus,* part
Serrula absent; single tibial spur in males ... *Harpactirella,* part
4. Tibia of male palp with ventral sigmoid depression; North Africa, Mediterranean region ... *Ischnocolus,* part
Ventral depression on male palp not sigmoid ... 5
5. Prolateral face of chelicerae with clavate setae; tibia I of males without spur; Oriental region ... *Annandaliella*
No clavate setae on chelicerae; tibia I with one or two spurs ... 6
6. Lower tibial spur of males with large megaspine; South America ... *Oligoxystre*
Lower tibial spur with conical spiniform setae ... 7
7. Bulb without tegular keel; PME larger than PLE; North Africa ... *Chaetopelma*
Bulb with one diagonal tegular keel; PME smaller than PLE; Oriental region ... *Plesiophrictus*
8. Paraembolic apophysis present ... *Cyriocosmus*
Paraembolic apophysis absent ... 9
9. Metatarsus I of male bent or curved ... *Hapalotremus*
Metatarsus I of male straight ... 10
10. Bulb constricts to embolic portion and then strongly widens ... *Homoeomma*
Bulb tapers uniformly to tip without constriction ... 11
11. Tibial spur absent ... *Crypsidromus*
Tibial spur present ... 12
12. Bulb distally broad, hardly tapering from first constriction ... *Cyclosternum*
Bulb distally narrow ... 13
13. Metatarsus I of males with basoventral process ... *Ceropelma,* part
Metatarsus I of males without basoventral process ... *Dryptopelma,* part

KEY TO GENERA OF GROUP III

1. Large plumose hairs present on trochanter I; South America ... 2
Plumose hairs absent or not large on trochanter I ... 3
2. Embolus distally broad; male tibial spur small ... *Cyrtopholis*
Embolus distally narrow; male tibial spur large ... *Grammostola*
3. Sternum and maxillae domed and appear inflated; Venezuela ... *Ozopactus*
Sternum and maxillae appear normal 4
4. Prolateral face of upper chelicerae with large clavate setae; Africa ... *Selenogyrus*
No enlarged setae on upper cheliceral interface ... 5
5. Maxillary serrula present; Africa ... *Brachionopus,* part
Maxillary serrula indistinct or absent 6
6. Prolateral palpal femur with dense pad of distal hairs; Brazil ... *Ephebopus*
No such pad of hairs ... 7
7. Rastellum present; Africa (Barychelidae) ... *Eubrachycercus*
Rastellum absent ... 8
8. Scopula of tarsus IV divided by some setae ... 9
Scopula of tarsus IV integral ... 16
9. Male tibial spur absent; South America ... *Mygalarachne,* part
Male tibial spur present ... 10
10. Tibial spur single; clypeus wide and distinct; Central and North America ... *Schizopelma*

Males with bipartite tibial spur; clypeus narrow or absent 11
11. Embolus narrow tapering and without keels; Seychelles .... *Nesiergus*
Embolus broad and keeled; South and Central America 12
12. Embolus distally broad almost to tip ... 13
Embolus slender from junction at bulb .. 14
13. Embolus taper extends to tip .... *Pamphobeteus*, part
Embolus constricts and rewidens .... *Hapalopus*
14. Keels confined to distal embolus .... *Stichoplastus*
Keels extend for full length of embolus .... *Dryptopelma*, part
15. Metatarsus I of males with basoventral process .... *Ceropelma*, part
Metatarsus I of males without basoventral process .... *Dryptopelma*, part
16. Fovea a spheroidal dome; Central America .... *Sphaerobothria*
Fovea a transverse groove 17
17. Male tibial spur absent; legs with broad lateral fringes of hair; Africa ... *Stromatopelma*
Male tibial spur present; leg setation normal 18
18. Only lower process of spur present .... *Harpactirella*, part
Upper process of spur also present 19
19. Lower spur widens apically 20
Lower spur tapers apically 21
20. Retrolateral maxilla or palpal coxa with area of plumose or spatulate hairs; Central and North America .... *Rhechostica*
No such pad present; Central America .... *Citharacanthus*
21. Embolus distally wide and flat; Brazil .... *Euathlus*
Embolus tapers distally; Chile 22
22. Sternum posteriorly truncate; lower tibial spur of male slender .... *Phrixotrichus*
Sternum not posteriorly truncate; lower tibial spur of male broad .... *Paraphysa*

PARATROPIDIDAE SIMON

Paratropidinae Simon, 1889d, pp. 173, 214.

DIAGNOSIS: Differs from the Theraphosidae and Barychelidae in the soil encrusted or scaly cuticle, the weakly or ascopulate tarsi I and II, and absence of scopulae elsewhere.

DESCRIPTION: Entire leg and body cuticle encrusted with soil. Eye tubercle highly elevated (Paratropidinae) or arched (*Glabropelma*). Caput arched, separated from thoracic region by broad, transverse, open (Paratropidinae) or closed (*Glabropelma*) fovea. Chelicerae without rastellum; narrow cheliceral furrow with teeth on both margins in two juxtaposed rows (*Paratropis, Anisaspoides*), in two diagonally opposed rows (*Anisaspis*), or one row (*Glabropelma*). Fang long, ectally smooth. Anterior lobe of maxillae elongate, conical (Paratropidinae) or less produced (*Glabropelma*); posterior ventral edge distinct; serrula absent; cuspules along anterior half. Labium wider than long or square; numerous cuspules densely clustered on anterior edge. Labiosternal suture a narrow groove. Sternum short, rounded (Paratropidinae) or cordate (*Glabropelma*); posterior sigilla of moderate size, oval. Scopulae weak **(Glabropelma)** or absent. Males with theraphosoid bipartite spur on tibia I (*Glabropelma*) or without mating spurs; bulb simple, pyriform; second haematodocha small, distal sclerite an elongate tapering cone; palpal tarsi with two short similar lobes. Paired claws of males and females with one long tooth (Paratropidinae) or with 3–4 small teeth (*Glabropelma*). ITC absent on legs III and IV, present and bare on legs I (*Paratropis*) and II (*Anisaspoides*), or entirely absent (*Anisaspis, Glabropelma*). Numerous short spines present on at least tarsi I. Trichobothria present on tibiae, metatarsi, and tarsi. Bothria smooth. Tarsal organ slightly raised, smooth. Abdominal sclerites lacking. Four booklungs present. Four (*Paratropis, Glabropelma*) or two (*Anisaspis, Anisaspoides*) spinnerets; PLS short with apical segment digitiform (*Paratropis, Anisaspoides, Glabropelma*) or triangular (*Anisaspis*). Abdomen with numerous symmetrically disposed, erect, modified setae encrusted with soil, each raised on a distinct tubercle (Paratropidinae) or covered with short thornlike setae (*Glabropelma*).

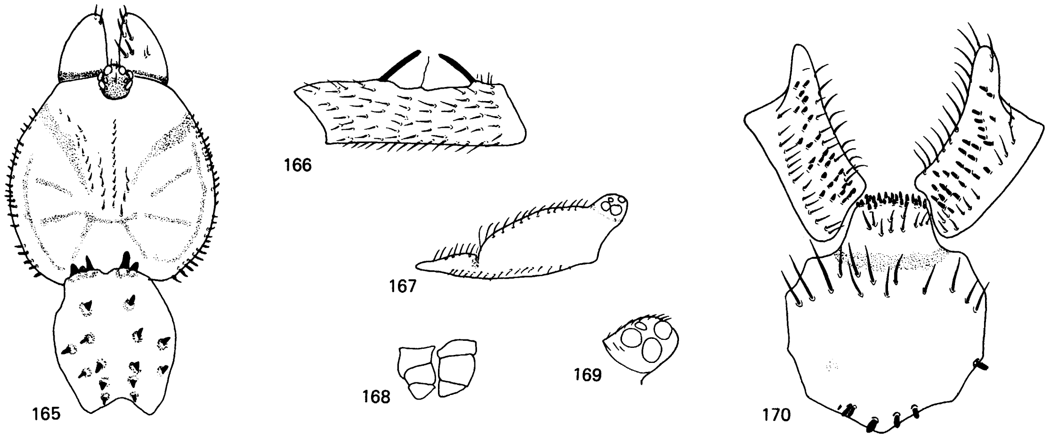
SUBFAMILIES INCLUDED: Paratropidinae, Glabropelmatinae.

PARATROPIDINAE SIMON

Figures 165–178

DIAGNOSIS: Differs from Glabropelmatinae in the long, single tooth on the claws, the steeply elevated eye tubercle, and the absence of a tibial spur and of claw tufts.

GENERA INCLUDED: *Paratropis* Simon (1889d), *Anisaspis* Simon (1891c), *Anisaspoides* F. O. P.-Cambridge (1896).



FIGS. 165–170. *Anisaspis tuberculata* Simon, female holotype. 165. Cephalothorax and abdomen, dorsal view. 166. Tibia IV, prolateral view showing trichobothrial "cradle." 167. Cephalothorax, lateral view. 168. Spinnerets, ventral view. 169. Eye tubercle, lateral view. 170. Sternum, maxillae, and labium.

DISTRIBUTION: Central and northern South America (*Paratropis, Anisaspoides*), West Indies (*Anisaspis*).

GLABROPELMATINAE, NEW SUBFAMILY
Figures 16, 17

TYPE GENUS: *Glabropelma,* new name.

DIAGNOSIS: Differs from Paratropidinae in the presence of thin claw tufts, a normally elevated eye tubercle, and shorter anterior maxillary lobes.

GENERA INCLUDED: *Glabropelma,* new name.

DISTRIBUTION: Venezuela.

SYNONYMY: *Melloa* Schenkel (1954) (type in NHMB, examined) is preoccupied by the opilionid *Melloa* Roewer, 1930, and is replaced by *Glabropelma.*

REMARKS: Preliminary studies of Paratropidinae in the American Museum of Natural History indicate that the loss of the posterior median spinnerets has occurred more than once; therefore I have avoided using the character in the key. The inclusion of *Glabropelma* in the Paratropididae is discussed with the family affinities of Theraphosoidea.

KEY TO GENERA OF THE PARATROPIDIDAE

1. Claw tufts present .... *Glabropelma*
   Claw tufts absent 2
2. Spine present on dorsal leg tarsi distally .... *Anisaspis*
   No spine on dorsal leg tarsi 3
3. Third claw present on leg II .. *Anisaspoides*
   Third claw absent on leg II ..... *Paratropis*

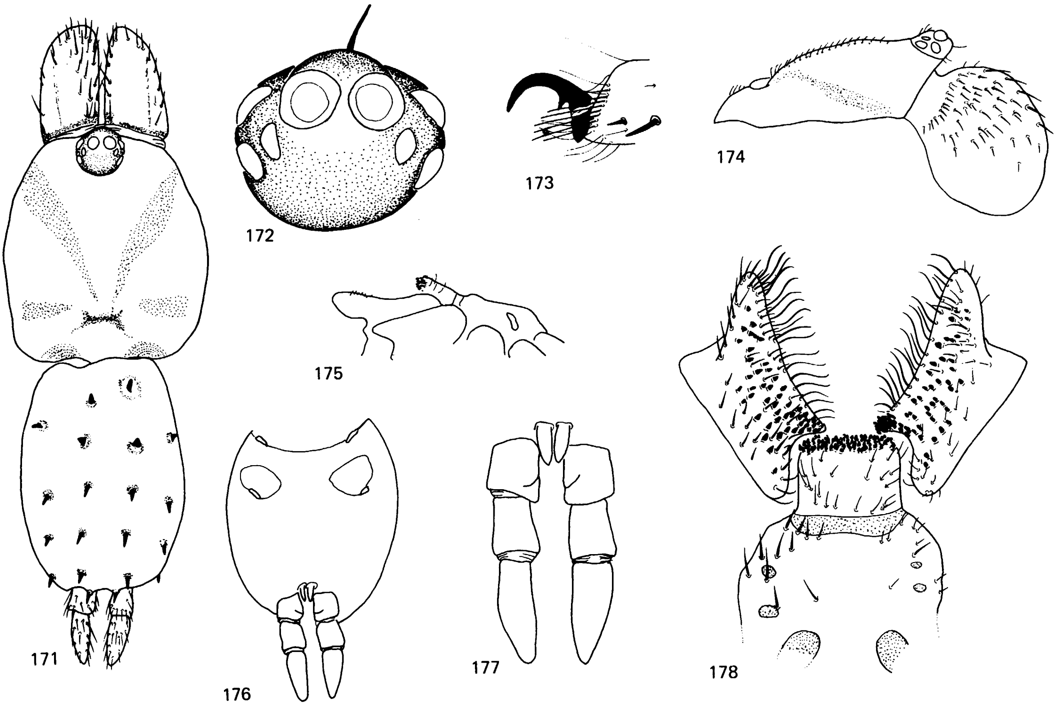
ATYPIDAE THORELL

Atypinae Thorell, 1870, p. 164.
Calommatoidae Thorell, 1887, p. 23.

DIAGNOSIS: Differs from the Antrodiaetidae by the elongate maxillary process and the obliquely truncate posterior median spinnerets.

Maxillae rotated forward with elongate anterior aserrulate lobe. PMS with very broad obliquely truncated tips; ALS present. Cymbium short and acuminate. Male tarsi pseudosegmented.

DESCRIPTION: Carapace glabrous, strongly arched. Eight eyes in two rows; group about three (*Sphodros, Atypus*) times wider than long or AME set far in advance of all others on triangular prominence and group about eight times as wide as length from outer margins of lateral eyes (*Calommata*); group occupying about one-third (*Sphodros, Atypus*) to one-half (*Calommata*) of head width. Fovea broad, deep, transverse (*Sphodros, Atypus,* some *Calommata*), or longitudinal (*Calommata*). Chelicerae broad, without rastellum; fang ectally with two basal teeth



FIGS. 171–178. *Paratropis scruposa* Simon, female holotype. 171. Cephalothorax and abdomen, dorsal view. 172. Eyes and tubercle, dorsal view. 173. Paired claw of leg III, prolateral view. 174. Cephalothorax, lateral view. 175. Sternum, maxilla, and inclined labium, lateral view. 176. Abdomen, ventral view. 177. Spinnerets, ventral view. 178. Sternum (damaged posteriorly), maxillae, and labium.

(*Sphodros, Atypus*) or with curving transverse ledge (*Calommata*); lower and inner faces with serrate edge. Cheliceral furrow narrow with one row of teeth. Maxillae broad, rotated forward so that true posterior face is ventral; anterior lobe elongate (*Sphodros, Atypus*) or very elongate and arcuate (*Calommata*), serrula absent; cuspules present (*Sphodros, Atypus*) or absent (*Calommata*). Labium wider than long, without cuspules. Labiosternal suture a narrow groove with or without rounded sigilla laterally (*Calommata*) or a shallow depression extending posteromedially onto sternum with corresponding sigilla subcentral (*Sphodros, Atypus*). Sternum with six (*Calommata*) or eight (*Sphodros, Atypus*) large subcentral to central sigilla; males rebordered (*Sphodros*) or not (*Calommata, Atypus*). Bulb with distinct distal (third) haematodocha and two basal sclerites; embolus and conductor free (*Atypus*), one or both hinged (most *Sphodros, Atypus*) or fused (*Sphodros coyleï*). Legs of females short, stout, laterally narrow; anterior tarsi and metatarsi with numerous short, thornlike spines (*Sphodros, Atypus*), or aspinose (*Calommata*); spines on posterior legs mostly dorsal. Paired and unpaired claws of legs and palps of female with one row of several long teeth on single process (*Sphodros, Atypus*) or with few teeth (*Calommata*). Three claws on all legs. Scopulae absent in females, thin but present on all tarsi of males. Tarsal organ low, domed, without concentric ridges. Trichobothria absent on most tarsi; one row on metatarsi, two rows on tibiae. Bothria smooth. Abdomen with irregularly shaped dorsal sclerite. Spermathecae consist of two or more paired receptacula with uncoiled (*Atypus, Calommata*) or coiled lobes (*Sphodros*). Six spinnerets; ALS one-segmented, more slender than PMS; PMS as broad as PLS basally, apically truncate; PLS short with three subequal segments, apical segment digitiform.

GENERA INCLUDED: *Calommata* Lucas (1837), *Sphodros* Walckenaer (1833), *Atypus* Latreille (1804).

DISTRIBUTION: Africa, Oriental region (*Calommata*); southern Europe and Asia (*Atypus*) and North America (*Sphodros, Atypus* [possibly introduced]).

KEY TO GENERA OF THE ATYPIDAE

1. Maxillary lobes strongly elongate and curved; labiosternal junction a narrow groove and only three sigilla pairs evident .... *Calommata*
   Maxillary lobes not as above; labiosternal junction with groove and fourth sigilla pair evident 2
2. Sternal margin of males normal ...... *Atypus*
   Sternal margin of males rebordered .... *Sphodros*

ANTRODIAETIDAE GERTSCH

Figures 179–184

Brachybothriinae Simon, 1892a, p. 193.
Acattymidae Kishida, 1930, p. 34.
Antrodiaetinae Gertsch, 1940, p. 236.

DIAGNOSIS: Differs from the Atypidae by the small maxillary lobes and the closed, pitlike, or longitudinal fovea.

Fovea small closed pit or longitudinal groove. Thorn spines absent from tarsi. Maxillae broad with slightly produced anterior aserrulate lobe; cuspules absent. PMS narrow tapering. Metatarsal preening combs present. Three claws on all legs. Third claw bare.

DESCRIPTION: Carapace glabrous, strongly arched. Eight eyes; eye group about two or three (*Aliatypus*) times as wide as long, occupying about one-third to one-half (males) of head width. Fovea longitudinal (*Antrodiaetus, Atypoides*) or pitlike to absent (*Aliatypus*). Chelicerae broad, with rastellum of several long distal spines; fang ectally smooth, entally flat; males with dorsal process absent (*Aliatypus*, most *Antrodiaetus*), small (some *Antrodiaetus*), or elongate (*Atypoides*). Cheliceral furrow narrow with one (*Atypoides, Antrodiaetus*) or two (*Aliatypus*) rows of teeth. Maxillae about as wide as long with slightly produced anterior lobe. Labium wider than long, without cuspules. Labiosternal suture narrow groove from which sigilla are sometimes isolated. Sternum with six small to large marginal to subcentral sigilla. Bulb with distinct distal (third) haematodocha and two basal sclerites; embolus and conductor both fused to common basal sclerite. Conductor smooth and tapering (some *Antrodiaetus, Aliatypus*), denticulate (some *Antrodiaetus*), or broad for its length (*Atypoides, Antrodiaetus roretzi*). Legs of females slender; spines absent on all tarsi (*Atypoides, Antrodiaetus*) or few on tarsi I and II (*Aliatypus*); spines on posterior legs mostly dorsal. Paired and unpaired claws of legs and palpi of females bare (some *Aliatypus*) or with one row of few short teeth (*Antrodiaetus, Atypoides*); males with row of long teeth on medial keel. Scopulae absent in females, present on tarsi III and IV in males. Tarsi of males integral (*Aliatypus*) or pseudosegmented (*Atypoides, Antrodiaetus*). Tarsal organ low, domed, without concentric ridges. Trichobothria absent on tarsi; one row on metatarsi, two rows on tibiae. Bothria smooth. Abdomen with one to four dorsal sclerites. Spermathecae consisting of four receptacula. ALS absent (*Antrodiaetus*), reduced (*Atypoides*), or one- or two-segmented and as broad as PMS; PLS short with three subequal segments, apical segment digitiform.

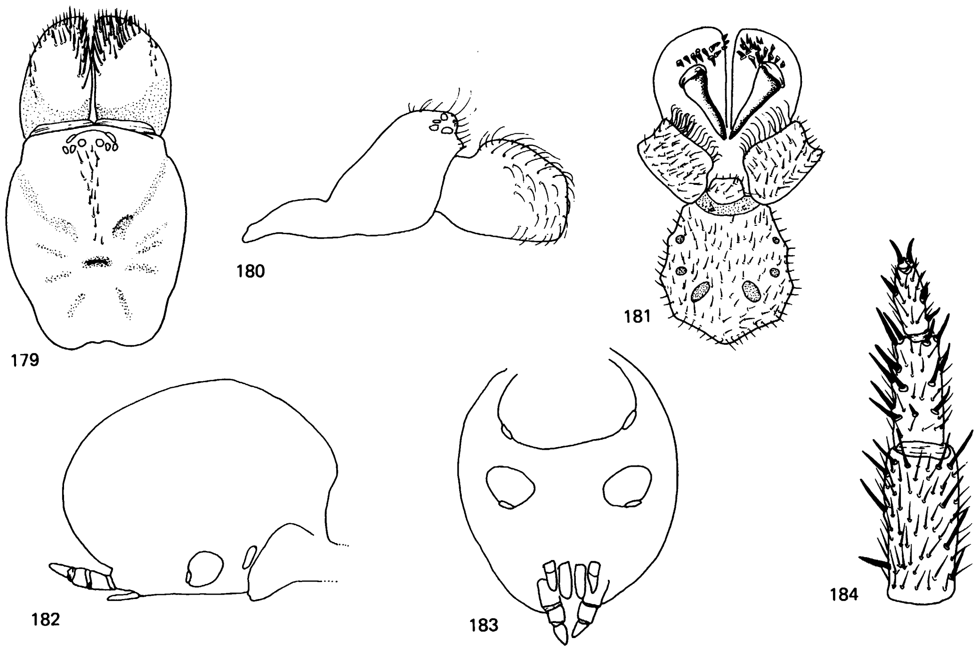
GENERA INCLUDED: *Antrodiaetus* Ausserer (1871), *Atypoides* O. P.-Cambridge (1883), *Aliatypus* Smith (1908).

DISTRIBUTION: Western and eastern North America, and Japan.

REMARKS: Coyle (1971) discussed the selection of the most junior synonym of the Antrodiaetidae as the valid name. Coyle (1968, 1971, 1975) has revised the antrodiaetids and given keys to genera and species.

KEY TO GENERA OF THE ANTRODIAETIDAE

1. Fovea longitudinal; one row of cheliceral teeth 2
   Fovea pitlike or absent; two rows of cheliceral teeth .... *Aliatypus*
2. ALS present .... *Atypoides*
   ALS absent .... *Antrodiaetus*



FIGS. 179–184. *Aliatypus erebus* Coyle, female paratype. 179, 180. Cephalothorax. 179. Dorsal view. 180. Lateral view. 181. Chelicerae, sternum, maxillae, and labium. 182, 183. Abdomen and spinnerets. 182. Lateral view. 183. Ventral view. 184. Tibia, metatarsus, and tarsus I, ventral view.

CYRTAUCHENIIDAE SIMON

Cyrtauchenieae Simon, 1889d, p. 179.

DIAGNOSIS: Differs from the Idiopidae in that the distal sclerite of the male palp is a complete cone with a small medial haematodocha, and either by the biserially dentate claws or uniserially dentate cheliceral furrow.

Apical segment of PLS triangular or digitiform. Distal segments of legs I and II of females with fewer spines than leg IV. Spines few or absent on lightly scopulate anterior tarsi. Male palpal bulb with small median haematodocha and conical distal sclerite. Rastellum on mound or process or absent. Paired claws of females wide, with numerous teeth on two faces or teeth on one face and medially.

DESCRIPTION: Carapace glabrous with raised caput. Fovea broad, procurved (most genera) or recurved (*Fufius, Aptostichus*). Eyes in two rows forming rectangular group or wider behind than in front (*Cyrtauchenius, Bolostromoides*). Eye tubercle raised (*Homostola, Myrmekiaphila*), low (some species of *Ancylotrypa, Promyrmekiaphila*), or absent (most genera). Cheliceral rastellum distinct (most genera), reduced to few spines (*Bolostromus, Aptostichus*), or absent (some *Acontius, Kiama, Fufius*); rastellar mound present in all genera. Teeth on one margin (most genera) or both margins of cheliceral furrow (*Homostola,* some *Eucteniza,* and some *Promyrmekiaphila*). Maxillae rectangular or broad (Aporoptychini), cuspules absent (*Kiama*), few (most genera), or numerous (Euctenizinae). Serrula present (*Bolostromus, Fufius, Bolostromoides*) or not evident (all other genera). Labium wider than long (most genera), as long as wide (most Aporoptychini), or longer than wide (*Acontius*); cuspules present (*Homostola, Eucteniza, Fufius, Rhytidicolus*) or absent (most genera). Labiosternal suture narrow groove. Sternum with three pairs of sigilla; posterior pair vary from small, oval, and marginal (*Bolostromus*) to confluent centrally (Euctenizinae). Legs with few if any spines on anterior tarsi of females. Femur IV usually with prolateral spinose mound on prodistal edge. Tarsi I (and to a lesser extent II) of females scopulate (most genera) or ascopulate (*Kiama, Bolostromus, Rhytidicolus*). Paired claws of females wide with two tooth rows (Aporoptychini, Cyrtaucheniinae, *Kiama*) or with one enlarged bicuspid tooth and sometimes several others on one face of each claw (Euctenizinae). Paired claws of males similar to females (most genera) or with one long S-shaped row of teeth (Euctenizinae). Preening combs present (*Homostola, Eucteniza, Myrmekiaphila*) or absent (all other genera). Males: all tarsi scopulate (*Eucteniza, Promyrmekiaphila*), or tarsi I and II thinly scopulate (*Aptostichus*, most genera), or ascopulate (*Kiama*); tarsi integral (most genera) or pseudosegmented (*Aptostichus*); tibia I without spur (most genera) or with predistal spur (*Eucteniza*); bulb simple, pyriform, without conductor or paraembolic apophysis; cymbium simple, similarly bilobed (most genera), or with one pointed lobe (*Aptostichus, Myrmekiaphila*) and spinose (*Aptostichus*) or bare (all other genera). Bases of spinnerets approximate. Apical segments of PLS domed (*Homostola*), triangular (*Eucteniza, Aptostichus, Promyrmekiaphila, Myrmekiaphila, Cyrtauchenius*, some *Ancylotrypa*), or digitiform (*Kiama*, Aporoptychini). Spermathecae with one divided (most genera) or undivided (*Ancylotrypa, Cyrtauchenius*) receptaculum on each side.

DISTRIBUTION: North and Central America (Euctenizinae), southern Europe (*Cyrtauchenius*), Africa (*Cyrtauchenius, Homostola, Ancylotrypa, Acontius*), South America (*Fufius, Rhytidicolus, Bolostromus, Bolostromoides*), and Australia (*Kiama*).

SUBFAMILIES INCLUDED: Euctenizinae, new subfamily, Aporoptychinae, Cyrtaucheniinae.

KEY TO GENERA OF THE CYRTAUCHENIIDAE

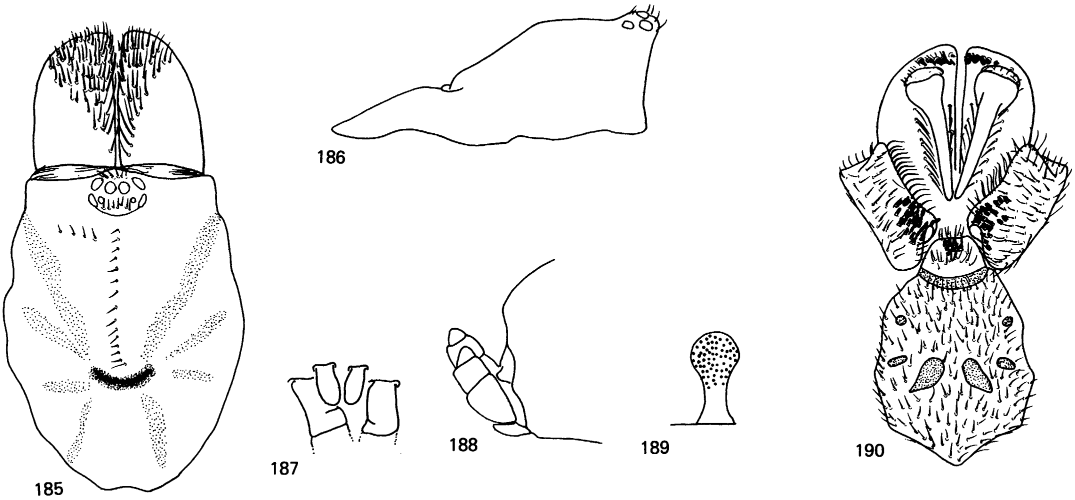
1. Apical segment of PLS domed or short and triangular 2
   Apical segment of PLS digitiform 8
2. Cheliceral furrow with two rows of teeth . . 3
   Cheliceral furrow with one row of teeth . . 4
3. Metatarsi III and IV with preening combs . . . . *Homostola*
   Preening combs entirely absent 6
4. All legs with one row of teeth on STC . . . 5
   Legs I and II with two rows of teeth on STC 13
5. Cuspules occur along length of maxilla . . . 6
   Cuspules confined to ental maxilla 7
6. All eyes on a low tubercle . . . . *Promyrmekiaphila*
   At most AME on a tubercle . . . . *Eucteniza*
7. Rastellum on a distinct process; cheliceral tooth row and fang long, normal . . . . *Myrmekiaphila*
   Rastellum not on a process; cheliceral tooth row and fang noticeably short . . . . *Aptostichus*
8. Maxillae almost square; labium at least as long as wide 9
   Maxillae much longer than wide; labium shorter 14
9. STC of legs I and II with few teeth on outer edge; inner edge with one or no teeth . . . . *Rhytidicolus*
   STC of legs I and II with two full rows of teeth 10
10. Fovea broad and recurved . . . . *Fufius*
    Fovea broad and procurved 11
11. Serrula absent; labium longer than wide . . . . *Acontius*
    Serrula broad and distinct; labium subquadrate 12
12. Eye group trapezoidal and about three times wider behind than long . . *Bolostromoides*
    Eye group rectangular and about twice as wide behind as long . . . . *Bolostromus*
13. Eye group much wider behind than in front or about three times as wide behind as long . . . . *Cyrtauchenius*
    Eye group about as wide in front as behind and about twice as wide as long . . . . *Ancylotrypa*, part
14. Rastellum absent; tarsal scopulae absent . . . . *Kiama*
    Rastellum present; tarsal scopulae present . . . . *Ancylotrypa*, part

CYRTAUCHENIINAE SIMON

Cyrtauchenieae Simon, 1889d, p. 179.
Amblyocareneae Simon, 1903a, pp. 885, 889. NEW SYNONYMY.

DIAGNOSIS: Differs from Aporoptychinae by the short domed apical segment of the PLS, and from the Euctenizinae by having a row of teeth on both faces of the paired claws.

A row of teeth on both faces of paired claws. Labium wider than long; maxillae rectangular.



FIGS. 185–190. *Homostola vulpecula* Simon, female holotype. 185, 186. Cephalothorax. 185. Dorsal view. 186. Lateral view. 187. Spinnerets, ventral view showing posterior medians and basal segment of posterior laterals. 188. Posterior abdomen, lateral view. 189. Spermatheca. 190. Chelicerae, sternum, maxillae, and labium.

GENERA INCLUDED: *Cyrtauchenius* Thorell (1869), *Homostola* Simon (1892c).

SYNONYMY: As first diagnosed the Amblyocareneae were a group defined by plesiomorphic characters—rectanguloid eye group and small, marginal, posterior sternal sigilla—and all the other genera previously included in the group have been transferred elsewhere.

HOMOSTOLA SIMON
Figures 185–190

Homostola Simon, 1892c, p. 271 (type species by monotypy *Homostola vulpecula* Simon; female holotype in USNM collection at AMNH, examined).

Stictogaster Purcell, 1902b, p. 362 (type species by original designation *Stictogaster reticulatus* Purcell; female holotype in SAMC, examined). NEW SYNONYMY.

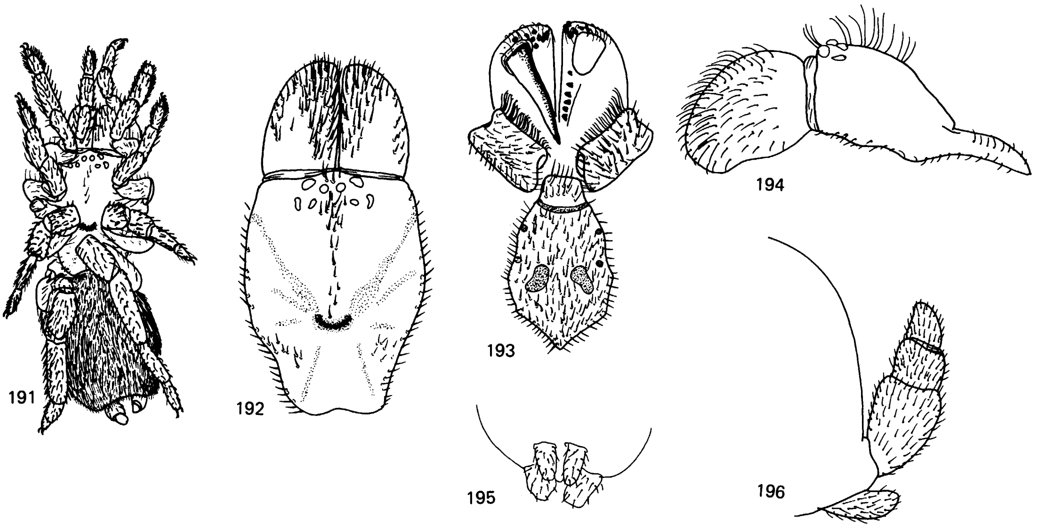
Paromostola Purcell, 1903, p. 93 (type species by original designation *Paromostola abernethyi* Purcell; female holotype not located in SAMC). NEW SYNONYMY.

DIAGNOSIS: Differs from *Ancylotrypa* in the biserially dentate cheliceral furrow and preening combs on the metatarsi.

DESCRIPTION: Males unknown. Carapace lightly hirsute; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle distinct, raised. Chelicerae broad; rastellum consisting of several short blunt spines on low mound on inner distal surface, some transversely directed spines between fangs; teeth on both margins of furrow. Labium wider than long, with few cuspules. Maxillae broadly rectangular; anterior lobe distinct; serrula absent; about 30–40 cuspules in area toward heel and along maxilla length. Sternum posteriorly broad; posterior sigilla large, oval, central, but not confluent. Female palpal claw with three long medial teeth; STC of female with few teeth on outer, one on inner keels on all legs. Leg tarsi of females short, broad; all legs similar in width. Scopulae of females entire on tarsi I and II, distal on metatarsi I and II, elsewhere absent. Tarsal organ low, indistinct. Preening combs present. PMS at most one diameter apart; PLS short with domed apical segment. Two undivided spermathecal receptacula.

DISTRIBUTION: South Africa.

REMARKS: Considerable disagreement existed between Hewitt and Purcell on the status of *Homostola* and its relationship with *Spiroctenus* (see Hewitt, 1915a, 1919, p. 108). Neither author had seen the types of either genus; and only now has the type of *Homostola,* which is part of Marx's collection, been



FIGS. 191–196. *Cyrtauchenius* sp., female. 191. Entire spider, dorsal view showing smaller legs I and II. 192. Cephalothorax, dorsal view. 193. Chelicerae, sternum, maxillae, and labium. 194. Cephalothorax, lateral view. 195. Spinnerets, ventral view. 196. Posterior abdomen, lateral view showing spinnerets.

relocated. Hewitt considered that *Homostola* was a junior synonym of *Spiroctenus* on the grounds that the presence of a row of teeth on the outer cheliceral furrow was simply a specific character. As far as I can determine Hewitt never had any material referable to *Homostola*. (Judged by the original description, a male attributed to *H. zebrina* Purcell by Hewitt [1915a] is a *Spiroctenus*.) Purcell and Tucker were correct in maintaining the validity of *Homostola* based upon the only other known specimens (which were the types of *Homostola zebrina*) but which I find questionably different at the species level from *H. vulpecula*.

SYNONYMY: None of the characters Purcell used to separate *Paromostola* or *Stictogaster* are considered of generic importance.

CYRTAUCHENIUS THORELL
Figures 191–196

Cyrtauchenius Thorell, 1869, p. 37 (type species by original designation *Cyrtocephalus walckenaerii* Lucas; replacement name for *Cyrtocephalus* Lucas, *nomen nudum*).

Dolichoscaptus Simon, 1889e, p. 383 (type species subsequently designated by Simon, 1892a, *Cyrtocephalus terricola* Lucas). First synonymized by Simon, 1892a, p. 104.

Amblyocarenum Simon, 1892a, p. 106 (type species by original designation *Cyrtocephalus walckenaerii* Lucas; type ?lost). NEW SYNONYMY.

DIAGNOSIS: Differs from *Ancylotrypa* in the eye group being trapezoidal and/or about three times wider than long.

DESCRIPTION: Carapace lightly to strongly hirsute, posteriorly narrowed; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group trapezoidal, wider behind than in front, about twice as wide as long; tubercle absent but ALE and PLE sometimes on low mounds. Chelicerae broad; rastellum consisting of several short blunt spines on low mound on inner distal surface, some transversely directed spines between fangs; teeth only on promargin of furrow. Labium wider than long, without cuspules. Maxillae broadly rectangular; anterior lobe indistinct; serrula absent; cuspules if present few on inner corner in females. Sternum posteriorly broad; posterior sigilla large, oval, subcentral to small, marginal. Female palpal claw with one tooth row on promargin; STC of female with two rows of only few teeth on legs I and II, few teeth on outer and one on inner keels on legs III and IV; males with two rows on STC of all legs; ITC curved, bare. Males without spur on tibia I; cymbium without spines, with two similar lobes; bulb pyriform with tapering embolus. Leg tarsi of females slender; legs I and II noticeably more slender than legs III and IV. Scopulae of females entire on metatarsi and tarsi I and II, elsewhere absent. Scopulae of males entire on tarsi I–IV, distal on metatarsi I and II, elsewhere absent. Spines strong, present on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short; apical segment of PLS domed or short, triangular. Two spermathecal receptacula, each trilobed or undivided.

DISTRIBUTION: Africa and southern Mediterranean.

REMARKS: Gertsch (*in litt.*) agreed with Buchli's unpublished conclusion that *Amblyocarenum talpa* Simon (1891a), reputedly from California, is based upon a label error.

SYNONYMY: A nomenclatural problem exists concerning the type species of *Cyrtauchenius* and *Amblyocarenum*. Contrary to Bonnet (1956), Thorell (1869) designated the type species of *Cyrtauchenius* as *Cyrtocephalus walckenaerii* Lucas. However, Simon (1892a) also nominated that as the type species of *Amblyocarenum*. Thus, *Amblyocarenum* is an objective synonym of *Cyrtauchenius*. Either Simon's concept of *Cyrtauchenius* was inconsistent with that of Thorell or one of the authors misidentified the type species. The concept of *Amblyocarenum* of Buchli (1966) differs substantially from that of Simon. Buchli shows the eye group of *A. walckenaerii* (Lucas) as trapezoidal but Simon distinguished *Amblyocarenum* by its rectangular eye group. However, Buchli's description of *A. simile* (Ausserer, 1871) does fit Simon's diagnosis of *Amblyocarenum* and agrees with that of the probable type of that species in the Keyserling collection (BMNH). Therefore, it would appear that Simon's concept of *Amblyocarenum* was based upon a misidentified type species. However, the rectangular eye group and marginal sigilla (diagnostic of *Amblyocarenum*) are plesiomorphic, so *Amblyocarenum* is placed in the synonymy of *Cyrtauchenius*.

APOROPTYCHINAE SIMON

Aporoptycheae Simon, 1889d, pp. 179, 182.
Rhytidicoleae Simon, 1903a, pp. 885, 909.

DIAGNOSIS: Differs from the Cyrtaucheniinae by the numerous (more than six) teeth in each row of the paired claws.

GENERA INCLUDED: *Acontius, Ancylotrypa, Bolostromoides, Bolostromus, Fufius, Kiama, Rhytidicolus.*

REMARKS: *Ancylotrypa* and *Kiama* are considered Aporoptychinae *incertae sedis.*

ANCYLOTRYPA SIMON

Figures 197–205

Ancylotrypa Simon, 1889g, p. 406 (type species subsequently designated by Simon, 1892a, *Ancylotrypa fossor* Simon; female holotype in MNHP, examined).

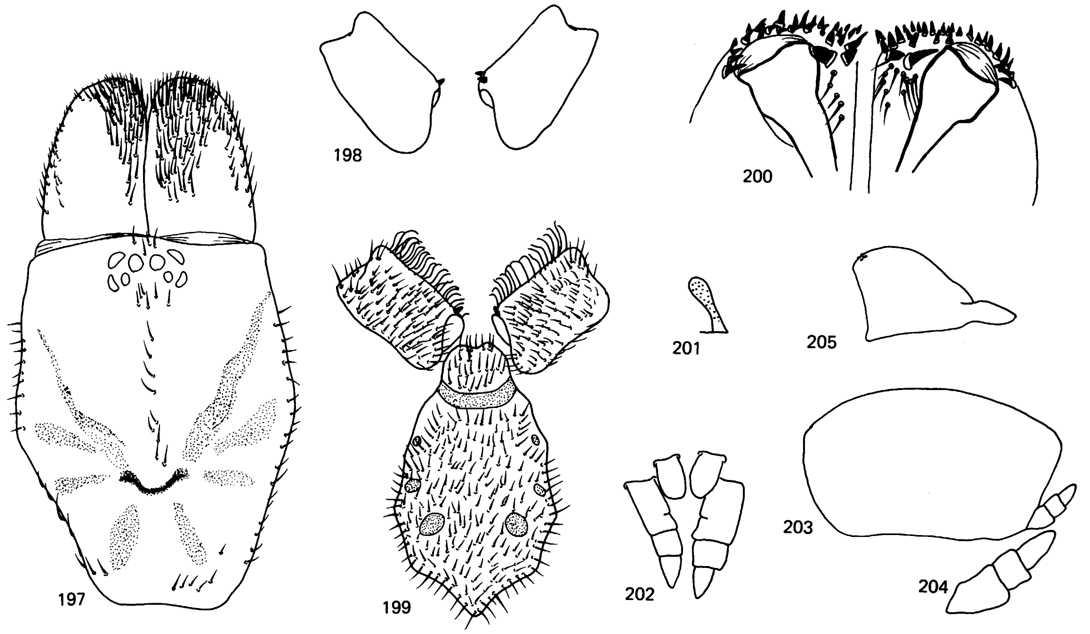
Pelmatorycter Pocock, 1902a, p. 12 (type species by original designation *Cyrtauchenius flaviceps* Pocock; female holotype in BMNH, examined). NEW SYNONYMY.

Clitotrema Simon, 1904, p. 444 (type species by monotypy *Clitotrema zeltneri* Simon; female holotype in MNHP, examined). NEW SYNONYMY.

Stasimopella Roewer, 1953, p. 34 (type species by original designation *Stasimopella kateka* Roewer; female holotype in MRAC, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Cyrtauchenius* in the rectanguloid eye group and triangular or short digitiform apical segment of the PLS.

DESCRIPTION: Carapace glabrous, posteriorly narrowed; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle low or absent. Chelicerae broad; rastellum consisting of several short, blunt spines on low mound on inner distal surface, some transversely directed spines between fangs; teeth only on furrow promargin. Labium wider than long, without cuspules. Maxillae broadly rectangular; anterior lobe indistinct; serrula absent; few cuspules present on inner corner in females; cuspules absent or incipient in males. Sternum posteriorly broad; posterior sigilla large, oval, subcentral to small, marginal. Females with one tooth row on promargin of palpal claw; STC of both sexes with two rows of teeth on legs I and II, few teeth on outer and one on inner keels on legs III and IV; males with two rows on STC of all legs; ITC curved, bare. Males without spur on tibia I; palpal tarsus aspinose, with two similar lobes; bulb pyriform with tapering embolus. Leg tarsi of fe-



FIGS. 197–205. 197–204. *Ancylotrypa fossor* Simon, female holotype. 197. Cephalothorax, dorsal view. 198. Maxillae with ventral faces horizontal. 199. Sternum, maxillae, and labium. 200. Chelicerae, distal and viewed from below showing rastellum. 201. Spermatheca, left. 202. Spinnerets, ventral view. 203. Abdomen, lateral view. 204. Posterior lateral spinneret, lateral view. 205. *Ancylotrypa zeltneri* (Simon), holotype female, cephalothorax, lateral view.

males short; legs I and II noticeably more slender than legs III and IV. Scopulae of females entire on tarsi I and II, distal on metatarsi I and II, elsewhere absent. Scopulae of males entire on tarsi I–IV, distally on metatarsi I and II, thin to absent on metatarsi III and IV. Spines strong, present on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short; apical segment of PLS triangular or short but digitiform. Spermathecal receptacula undivided.

DISTRIBUTION: Africa.

SYNONYMY: *Pelmatorycter, Clitotrema,* and *Stasimopella* differ from *Ancylotrypa* only in the relative sizes of the sigilla and elevation of the eye tubercle. Because those differences are respectively considered specific or plesiomorphic, those genera are placed in the synonymy of *Ancylotrypa. Ancylotrypa panamana* Petrunkevitch (1925) is transferred to *Bolostromus* because it has the typical broad maxillae and long labium of the Aporoptychini and lacks any of the autapomorphies of the other Neotropical genera.

KIAMA MAIN AND MASCORD

Kiama Main and Mascord, 1971, p. 24 (type species by original designation *Kiama lachrymoides* Main and Mascord; male holotype and female paratype in AMS, examined).

DIAGNOSIS: Differs from other Cyrtaucheniidae in the combined absence of a rastellum, serrula, and scopulae, and in the presence of numerous teeth in each of two rows on STC of legs I and II.

DESCRIPTION: Carapace lightly hirsute; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle very low or absent in females, AME of males on low common mound. Chelicerae broad; rastellum absent; teeth only on furrow promargin. Labium wider than long, with few cuspules. Maxillae broadly rectangular; serrula absent. Sternum posteriorly broad; posterior sigilla elongate, submarginal. Females with two outwardly directed teeth on palpal claw; STC with two rows of teeth on legs I and II, few teeth on medial keel on legs III and IV; males with two rows on STC of all legs; ITC elongate, curved, bare. Males without spur on tibia I; cymbium aspinose with two similar lobes; bulb pyriform with tapering embolus. Leg tarsi of females short, broad. Scopulae very thin and widely divided by setae on tarsi I in females, I and II in males, elsewhere absent. Spines generally slender, absent on all leg tarsi. Tarsal organ broad, distally elevated. Preening combs absent. PMS at most one diameter apart; apical segment of PLS digitiform, but not extending up posterior face of abdomen. Spermathecal receptacula divided.

DISTRIBUTION: Eastern Australia.

REMARKS: The ctenizoid appearance of *Kiama* was noted by Main and Mascord (1971) although they placed the genus in the Diplurinae. Subsequently, Raven (1981a), in discussing the relationships of Australian spiders placed in the Diplurinae, found that *Kiama* did not agree well with other Australian Diplurinae, although based on the elevated tarsal organ it was allied with *Ixamatus* and *Xamiatus*. Presumably, *Kiama* represents a relict cyrtaucheniine. It certainly differs far less from other Cyrtaucheniidae than from the Australian "Diplurinae" (here transferred to the Anaminae, Nemesiidae). The broad, strongly procurved fovea, the absence of any eye tubercle, and the strongly elevated caput (even in males) immediately remove it from the Tuberculotae.

APOROPTYCHINI SIMON

Aporoptycheae Simon, 1889d, pp. 179, 182.
Rhytidicoleae Simon, 1903a, pp. 885, 909.

DIAGNOSIS: Differ from other cyrtaucheniids by the broad subquadrate maxillae and long labium.

Maxillae almost square; labium almost as long as wide or longer. Cheliceral fang short, diagonal; furrow very short. Two rows of teeth on STC.

GENERA INCLUDED: *Acontius, Fufius, Rhytidicolus, Bolostromus, Bolostromoides.*

REMARKS: Simon (1892a, 1903a) stated that the eye group of the Aporoptycheae was about three times wider than long. Measurements of the type specimens in his collection do not support that and *Bolostromoides* only approaches that condition.

SYNONYMY: The Rhytidicoleae include only *Rhytidicolus* and thus serve no grouping function and the genus shares the broad maxillae, long labium, and short, diagonal fang with all other Aporoptychini.

ACONTIUS KARSCH

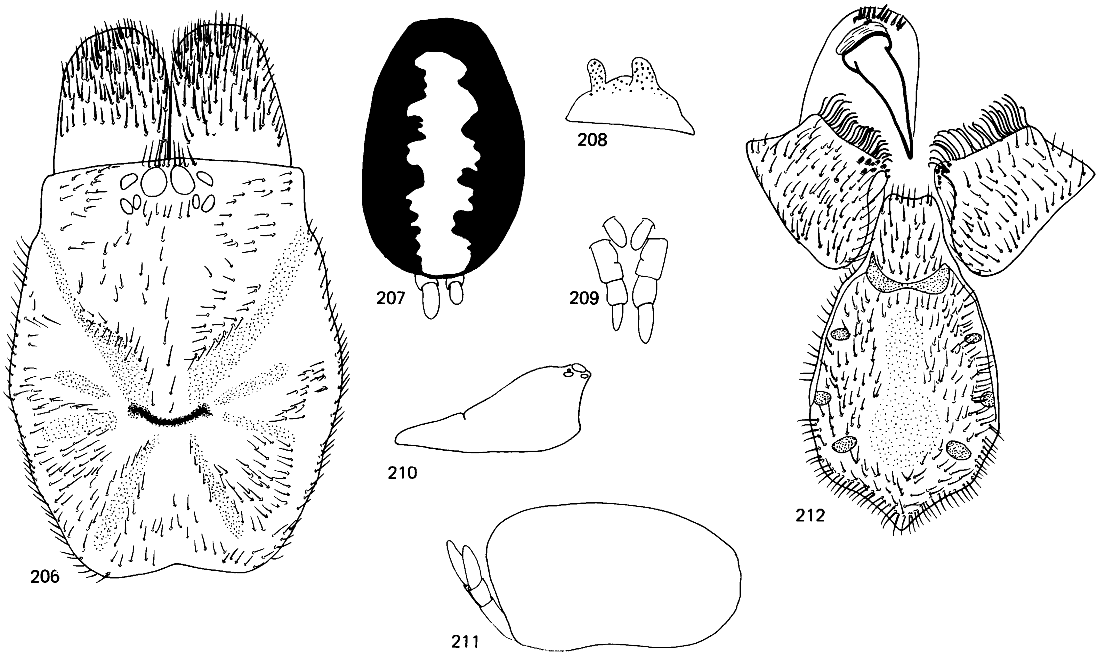
Figures 206–212

Acontius Karsch, 1879a, p. 64 (type species by original designation *Acontius hartmanni* Karsch; female holotype in ZMB, examined).

Aporoptychus Simon, 1886, p. 572 (type species by monotypy *Aporoptychus australis* Simon; female holotype in MNHP, examined). NEW SYNONYMY.

DIAGNOSIS: Differs from *Bolostromus* in lacking a serrula.

DESCRIPTION: Carapace glabrous, posteriorly narrowed; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle low or absent. Chelicerae broad; rastellum absent, weak or consisting of several short, blunt spines on low mound on inner distal surface; teeth only on promargin of furrow; fangs short with noticeably diagonal orientation. Labium longer than wide, without cuspules. Maxillae broad, almost square; anterior lobe indistinct; serrula absent; few cuspules on inner angle of females; cuspules present or absent in males. Sternum posteriorly broad; posterior sigilla moderately large, oval, and subcentral to small, marginal. Female palpal claw with one tooth row on promargin; STC of both sexes with two rows of teeth on all legs; ITC curved, bare. Males without spur on tibia I; cymbium aspinose with two similar lobes; bulb pyriform with tapering embolus. Leg tarsi of females short; legs I and II noticeably more slender than legs III and IV. Scopulae of females entire on tarsi I and II, distal on metatarsi I and II, elsewhere absent. Scopulae of males entire on tarsi I–IV, distal on metatarsi I and II, thin to absent on metatarsi III and



FIGS. 206–212. *Acontius hartmanni* Karsch, female holotype. 206. Cephalothorax, dorsal view. 207. Abdomen, dorsal view. 208. Spermathecae. 209. Spinnerets, ventral view. 210. Cephalothorax, lateral view. 211. Abdomen, lateral view. 212. Chelicera, sternum, maxillae, and labium.

IV. Spines strong, absent on all leg tarsi. Tarsal organ broad, domed, low with shallow concentric ridges. Preening combs absent. PMS at most one diameter apart; PLS short but almost reaching to dorsal abdomen and with distinctly digitiform apical segment of PLS. Two spermathecal receptacula, each with two or three apical lobes.

DISTRIBUTION: Tropical West Africa.

SYNONYMY: The type species of *Aporoptychus* is putatively from Patagonia, southern Argentina. All subsequent species of *Aporoptychus* described by Simon and others have been from West Africa and are congeneric either with *Acontius* or *Ancylotrypa*. Moreover, no further material of either *Aporoptychus* or *Heterothele* has ever been reported from Patagonia or anywhere in South America. As with the theraphosid *Heterothele* (described as *Mitura caudicula* Simon [1886]), all other species known are from tropical West Africa. *Aporoptychus australis* has a similar abdominal pattern to *Acontius hartmanni* and the two species appear to differ only in the number of apical lobes in the spermathecae. I can conclude only that some confusion existed in the labeling of the material and that both *Mitura* and *Aporoptychus* erroneously received the locality data of the Lebrun Expedition. Thus, all evidence indicates that the original locality given was erroneous, and because the diagnosis given of *Aporoptychus* does not differ from that of *Acontius* the two are synonymized.

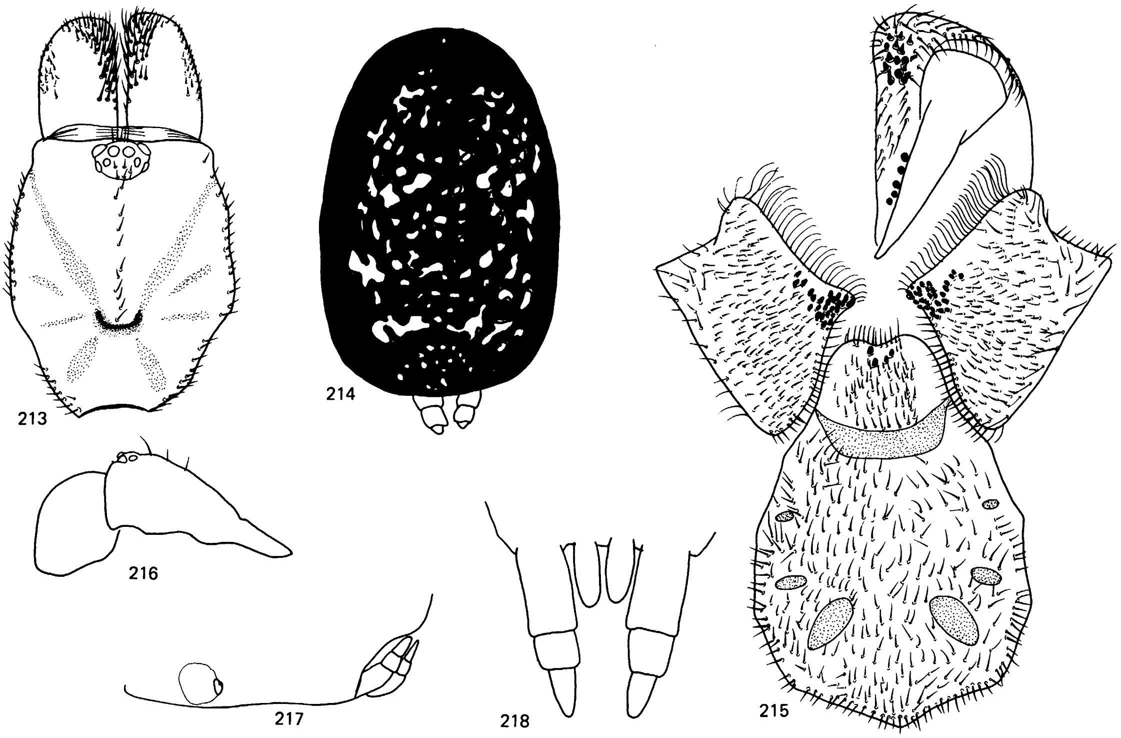
RHYTIDICOLUS SIMON

Figures 213–218

Rhytidicolus Simon, 1889d, p. 185 (type species by monotypy *Rhytidicolus structor* Simon; female syntypes in MNHP, examined).

DIAGNOSIS: Differs from all other Aporoptychini in the very spinose tarsi and less dentate paired claws.

DESCRIPTION: Males unknown. Carapace glabrous, narrow; caput arched; fovea broad, transverse, U-shaped; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle raised, well defined. Chelicerae broad; rastellum consisting of several short,



FIGS. 213–218. *Rhytidicolus structor* Simon, female syntypes. 213. Cephalothorax, dorsal view. 214. Abdomen, dorsal view. 215. Chelicera, sternum, maxillae, and labium. 216. Cephalothorax, lateral view. 217. Abdomen, lateral view of lower portion. 218. Spinnerets, ventral view.

strong spines on low mound on inner distal surface; teeth only on promargin of furrow; fangs short with noticeably diagonal orientation. Labium subquadrate but longer than wide, with several cuspules. Maxillae broad, almost square; anterior lobe indistinct; serrula absent; about 30 cuspules on inner angle of females. Sternum posteriorly broad; posterior sigilla moderately large, oval, submarginal to subcentral. Females with teeth on medial keel of palpal claw, STC with two rows of teeth—one tooth on inner faces and three on outer faces of legs I and II; similar on legs III and IV but lacking teeth on inner faces; ITC curved, bare. Leg tarsi of females short; legs I and II as thick as legs III and IV. Scopulae widely divided by setae on tarsi I and II of females; elsewhere absent. Spines numerous, short, strong on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short, apical segment short but digitiform. Two spermathecal receptacula, each with four short indistinct lobes.

DISTRIBUTION: Venezuela.

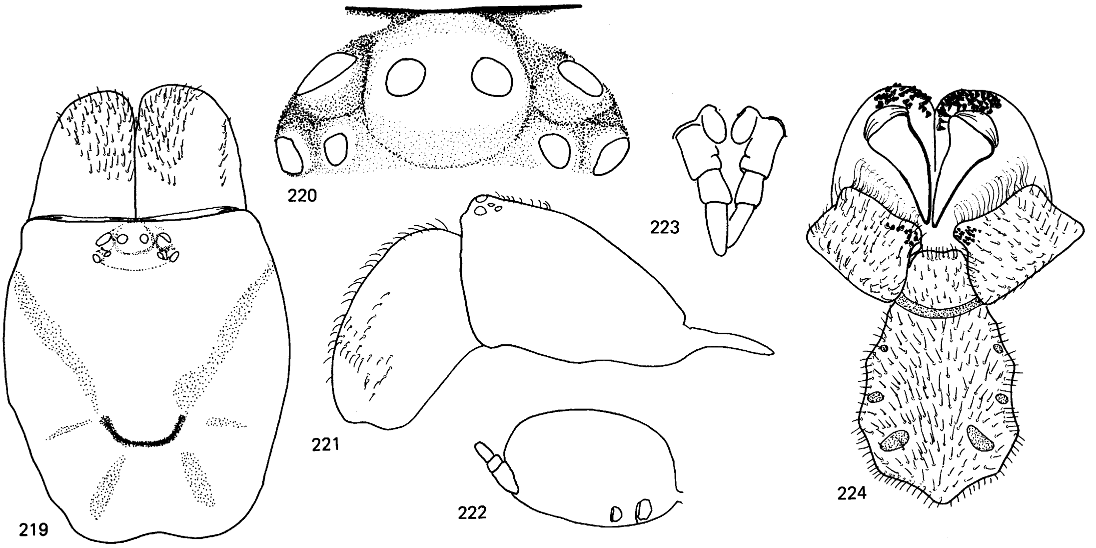
REMARKS: *Rhytidicolus* presents two characters—the more spinose leg tarsi and reduced claw dentition—that are considered reversals. However, the four aporoptychine synapomorphies support the present classification.

BOLOSTROMOIDES
SCHIAPELLI AND GERSCHMAN
Figures 219–224

Bolostromoides Schiapelli and Gerschman, 1945, p. 169 (type species by original designation *Bolostromoides summorum* Schiapelli and Gerschman; female holotype in MACN, examined).

DIAGNOSIS: Differs from other Aporoptychinae in the broad and trapezoidal eye group.

DESCRIPTION: Males unknown. Carapace



FIGS. 219–224. *Bolostromoides summorum* Schiapelli and Gerschman, female holotype. 219. Cephalothorax, dorsal view. 220. Eye group, dorsal view. 221. Cephalothorax, lateral view. 222. Abdomen, lateral view. 223. Spinnerets, ventral view. 224. Chelicerae, sternum, maxillae, and labium.

glabrous, broad; caput strongly arched; fovea broad, transverse, procurved; clypeus absent. Eye group trapezoidal, noticeably wider behind than in front, about three times as wide as long; tubercle absent but AME on low mound. Chelicerae broad; rastellum consisting of several short, blunt spines on low mound on inner distal surface; teeth only on promargin of furrow; fangs short with noticeably diagonal orientation. Labium subquadrate but longer than wide, without cuspules. Maxillae broad, almost square; anterior lobe indistinct; serrula present on anterior face; about 15–20 cuspules on inner angle of females. Sternum posteriorly broad; posterior sigilla large, oval, submarginal. Female palpal claw unknown; STC of females with two rows of teeth on all legs; ITC curved and bare on leg I but with distinct, long tooth on leg IV. Leg tarsi of females short; legs I and II noticeably more slender than legs III and IV. Scopulae of females entire but thin on tarsi I, distal on metatarsi I and II, elsewhere absent. Spines strong, absent on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short, apical segment short but digitiform. Spermathecae unknown.

DISTRIBUTION: Venezuela.

REMARKS: The holotype is the only specimen known and in lacking some legs is in poor condition. Thus, it was not possible to determine whether the presence of a long tooth on the unpaired claw of the fourth leg, unique in female rastelloids, was simply an aberration. The claw bases of other legs did not appear to possess a scar from which the tooth may have been broken.

FUFIUS SIMON
Figures 225–228

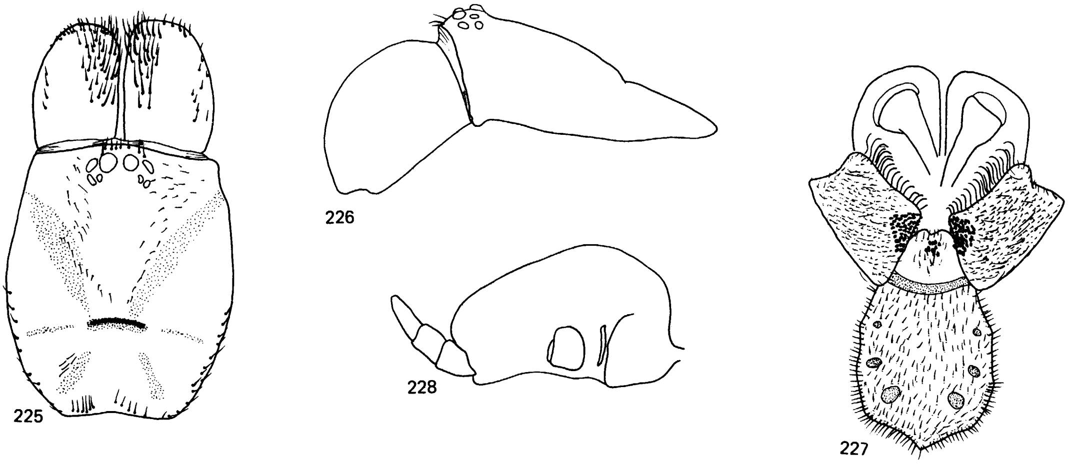
Fufius Simon, 1888, p. 212 (type species by monotypy *Fufius atramentarius* Simon; female holotype in MNHP, examined).

Phrissaecia Simon, 1892c, p. 274 (type species by monotypy *Phrissaecia ecuadorensis* Simon). First synonymized by Simon, 1903a, p. 967.

Hermorhachias Mello-Leitão, 1941b, p. 234 (type species by original designation *Hermorhachias annuiipes* Mello-Leitão; female holotype not located). NEW SYNONYMY.

DIAGNOSIS: Differs from all other Aporoptychini in the broad, recurved fovea.

DESCRIPTION: Carapace lightly hirsute, broad; caput arched; fovea broad, transverse, recurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle a low mound. Chelicerae broad; rastellum ab-



FIGS. 225–228. 225–227. *Fufius atramentarius* Simon, female holotype. 225, 226. Cephalothorax. 225. Dorsal view. 226. Lateral view. 227. Chelicerae, sternum, maxillae, and labium. 228. *Fufius* sp., male, abdomen, lateral view showing spinneret.

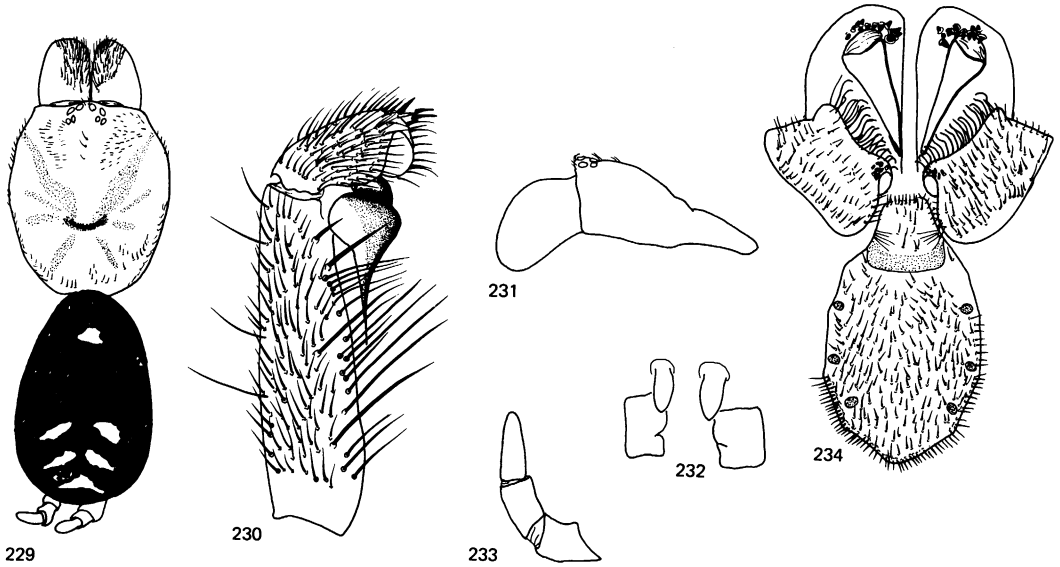
sent but low mound evident on inner distal surface; teeth only on promargin of furrow; fangs short with slightly diagonal orientation. Labium subquadrate but longer than wide, with several cuspules. Maxillae broad, almost square; anterior lobe indistinct; serrula present on anterior face; about 50–60 cuspules on inner ridge of females. Sternum posteriorly broad; posterior sigilla moderately large, oval, submarginal to subcentral. Females with teeth on promargin of palpal claw; STC of both sexes with two rows of teeth on all legs; ITC curved, bare. Males with incrassate tibia I with short retroventral distal spur and megaspine; metatarsus I proximally arcuate, prolaterally sigmoid; spines absent on palpal tarsus; bulb pyriform with elongate embolus. Leg tarsi of females short; legs I and II as broad as legs III and IV. Scopulae in females entire on tarsi I, thin and divided by setae on tarsi II; distal and thin on metatarsi I and II; elsewhere absent. Scopulae in males entire on tarsi I and II, distal on metatarsi I and II, elsewhere absent. Spines slender, absent on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short; apical segment of PLS short but digitiform. Two quadrilobate spermathecal receptacula.

DISTRIBUTION: Central and northern South America.

REMARKS: Simon (1892a) first placed *Fufius* in the Diplurinae and *Phrissaecia* in the Aporoptycheae. In his supplement, Simon (1903a) recognized the synonymy and, presumably because *Fufius* has a recurved fovea and lacks a rastellum, he continued to maintain it in the Diplurinae despite his earlier remarks concerning the broad maxillae and long labium (Simon, 1892a, p. 97): "Les espèces de ce groupe diffèrent de celles des précédents [Ctenizeae] par leur pièce labiale plus longue . . . , par leur hanches des pattes-mâchoires plus courtes, beaucoup plus larges et presque carrées, . . . ; caractères qui rapellent ceux des Actinopodinae." The inclusion of *Fufius* in the Aporoptychini is unequivocal because of the unique, characteristically shaped maxillae, the low eye tubercle, diagonal fang, short fang groove, arched caput, and short broad tarsi; although no rastellum is present, the conspicuous mound between the fangs is readily evident.

SYNONYMY: *Hermorhachias* has the long labium of the Aporoptychinae and the recurved fovea of *Fufius*; no other characters given by Mello-Leitão (1941b) distinguish it from *Fufius*.

MISPLACED SPECIES: *Hapalothele* (*Fufius*) *garleppi* Simon (1892c) (type in MNHP, examined) is a diplurid with a lyra, sparse tarsal scopulae, long, slender paraxial fangs, and



FIGS. 229–234. *Bolostromus fauna* (Simon), male syntype. 229. Cephalothorax and abdomen, dorsal view. 230. Palpal tibia, cymbium, and bulb, prolateral view. 231. Cephalothorax, lateral view. 232. Posterior median spinnerets and basal segment of posterior laterals. 233. Posterior lateral spinneret, lateral view. 234. Sternum, maxillae, and labium.

long PLS; it is transferred to *Diplura* (new combination). From my examination of the type of *Brachythele antillensis* F. O. P.-Cambridge (1898), I find that the species belongs to *Fufius* (new combination), not *Tryssothele,* as listed by Roewer (1942), or *Brachythele,* as listed by Bonnet (1955).

BOLOSTROMUS AUSSERER
Figures 229–239

Bolostromus Ausserer, 1875, p. 149 (type species by monotypy *Bolostromus venustus* Ausserer; female holotype in BMNH, examined).

Phaeoclita Simon, 1889d, p. 184 (type species by monotypy *Phaeoclita fauna* Simon; male and female syntypes in MNHP, examined). NEW SYNONYMY.

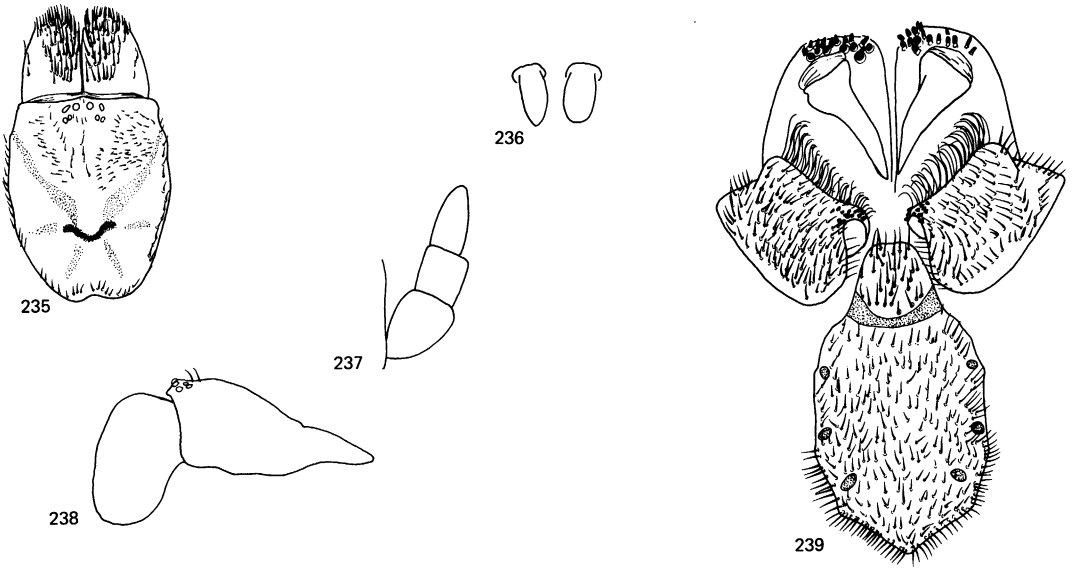
Celidotopus Simon, 1889d, p. 185 (type species by monotypy *Celidotopus pulchripes* Simon; female holotype in MNHP, examined). First synonymized by Simon, 1903a, p. 894.

Phaenothele Simon, 1889f, p. 399 (type species by monotypy *Phaenothele gaujoni* Simon; female holotype in MNHP, examined). First synonymized by Simon, 1903a, p. 894.

Ctenochelus Mello-Leitão, 1923, p. 61 (type species by original designation *Ctenochelus maculatus* Mello-Leitão; female holotype lost). NEW SYNONYMY.

DIAGNOSIS: Differs from *Acontius* in possessing a serrula, and from *Fufius* in the procurved fovea.

DESCRIPTION: Carapace glabrous, narrow; caput arched; fovea broad, transverse, procurved; clypeus absent. Eye group rectangular, about twice as wide as long; tubercle a low mound. Chelicerae small; rastellum consisting of several short, slender spines on low mound on inner distal surface; teeth only on promargin of furrow; fangs short with noticeably diagonal orientation. Labium subquadrate but longer than wide, without cuspules. Maxillae broad, almost square; anterior lobe indistinct; serrula present on anterior face; about 10 cuspules on inner angle of females. Sternum posteriorly broad; posterior sigilla small, oval, submarginal. Females with teeth on promargin of palpal claw; STC of both sexes with two rows of teeth on legs I and II, one tooth on outer faces and several on inner faces of legs III and IV; ITC curved, bare. Males with strong sessile spines on tibia I; spines present on cymbium; bulb pyriform with elongate embolus. Leg tarsi of females short; legs I and II noticeably more slender than legs III and IV; trochanter I noticeably



FIGS. 235–239. *Bolostromus fauna* (Simon), female syntype. 235. Cephalothorax, dorsal view. 236. Posterior median spinnerets, ventral view. 237. Posterior lateral spinneret, lateral view. 238. Cephalothorax, lateral view. 239. Chelicerae, sternum, maxillae, and labium.

elongate. Scopulae entirely absent in females; scopulae in males entire on tarsi I and II, distal on metatarsi I and II, elsewhere absent. Spines slender, few present on all leg tarsi. Tarsal organ low, indistinct. Preening combs absent. PMS at most one diameter apart; PLS short, apical segment short but digitiform. Two bilobate spermathecal receptacula.

DISTRIBUTION: Central and northern South America.

MISPLACED SPECIES: From an examination of the holotype of *Ancylotrypa panamana* Petrunkevitch (1925) I have ascertained that it is correctly placed in *Bolostromus*, New Combination. The description of *Ctenochelus* does not allow the genus to be distinguished from *Bolostromus*.

EUCTENIZINAE, NEW SUBFAMILY

TYPE GENUS: *Eucteniza* Ausserer.

DIAGNOSIS: Differs from other cyrtaucheniids by the male palpal bulb having a flattened spheroidal portion with a tapering but not filiform embolus (save in some *Myrmekiaphila*), and by females having one continuous sigmoid row of teeth or a basal bifid tooth.

GENERA INCLUDED: *Eucteniza* Ausserer (1875), *Aptostichus* Simon (1891a), *Myrmekiaphila* Atkinson (1886), *Promyrmekiaphila* Schenkel (1950).

SYNONYMY: A number of American genera—*Actinoxia, Astrosoga, Nemesioides, Enrico*—will be placed in the synonymy of the above valid genera upon the pending revision of the American ctenizoids by Gertsch and Platnick. Accordingly, diagnoses of American cyrtaucheniids are not provided.

IDIOPIDAE SIMON

Idiopeae Simon, 1889d, p. 178.

DIAGNOSIS: Differs from the Ctenizidae by males having a distal haematodocha extending down almost to the embolus, thus transforming the distal sclerite into an open scoop rather than a cone; by the bilobed palpal tarsus with one blunt and one acutely pointed lobe; and from the Cyrtaucheniidae by the domed apical segment of PLS.

Outer surface of cheliceral fang smooth. Females with teeth of paired claws similar in size and number. Labiosternal suture a shallow groove. Serrula absent. Anterior lobe of maxillae small.

SUBFAMILIES INCLUDED: Idiopinae, Arbanitinae, Genysinae.

DISTRIBUTION: India, Africa, Madagascar, Australia, New Zealand, and South and Central America.

KEY TO GENERA OF THE IDIOPIDAE

1. ALE set far in advance of others making eye group much longer than wide (Idiopinae) 2
   ALE not as above; eye group as wide as or wider than long 7
2. Chelicerae medially produced 3
   Chelicerae medially normal 4
3. Tibia III dorsally excavate .. *Heligmomerus*
   Tibia III dorsally convex .... *Gorgyrella*
4. Dorsal abdomen with a chitinized shield .... *Galeosoma*
   Dorsal abdomen soft 5
5. One row of cheliceral teeth ... *Ctenolophus*
   Two rows of cheliceral teeth 6
6. Posterior sternal sigilla absent ...... *Idiops*
   Posterior sternal sigilla present ... *Segregara*
7. Fovea strongly recurved in males and females (figs. 240, 250; Genysinae) 17
   Fovea more or less straight or procurved (Arbanitinae) 8
8. Labium about twice as wide as long; eye group clearly wider behind than in front 9
   Labium little wider than long; eye group wider in front than or as wide as long 12
9. Dorsal abdominal sigilla present 10
   Dorsal abdominal sigilla absent 11
10. Dorsal abdomen with coriaceous corrugations .... *Idiosoma*
    Dorsal abdomen not as above ... *Aganippe*
11. Carapace much longer than wide; caput low .... *Anidiops*
    Carapace little longer than wide; caput steeply arched .... *Eucyrtops*
12. Females with true scopulae entirely absent from anterior tarsi and numerous strong lateral spines on distal segments of legs I and II 13
    Females with true scopulae present on tarsi I and II; spines on distal segments of legs I and II ventral, not lateral 14
13. Fovea of females hardly curved; PLE clearly smaller than ALE; eye group wider in front than behind .... *Cataxia*
    Fovea of females deep, U-shaped; PLE as large as or larger than ALE; eye group as wide in front as or narrower than behind .... *Arbanitis*, part
14. Eye group clearly less than twice as wide as long 15
    Eye group about twice as wide as long or wider 16
15. Eye group clearly wider than long 19
    Eye group about as long as wide .... *Blakistonia*
16. Eye group occupies about half of head width .... *Neocteniza*
    Eye group occupies about one-third of head width 17
17. Spur on tibia I of male absent ..... *Hiboka*
    Spur on tibia I of male present 18
18. Tibial spur with two hooked processes .... *Genysa*
    Tibial spur if present not hooked .... *Scalidognathus*
19. Carapace broad, glabrous; females with strongly procurved fovea ... *Arbanitis*, part
    Carapace narrow and hirsute; females with more or less straight fovea .... *Hermeas*

IDIOPINAE SIMON

Idiopeae Simon, 1889d, p. 178.

DIAGNOSIS: Differs from all other idiopids by the anterior lateral eyes being set far in advance of other eyes.

Caput arched; fovea strongly procurved. Distal segments of anterior legs with numerous lateral spines. Scopulae absent on female tarsi. STC of females with one long and up to two smaller teeth. Male palpal tibia with crescentic cluster of spines on distal retromargin; tibia I with single, distal spur or with compound spur of two distally incrassate processes.

DESCRIPTION: Chelicerae with rastellum on distinct process; one (*Ctenolophus*) or two rows of strong teeth on furrow. Males with scopulae on tarsi I–IV. Posterior sternal sigilla absent or present (*Segregara, Gorgyrella*). Anterior lateral eyes close, set on clypeus margin, sessile or raised on two tubercles. Remaining eyes on low tubercle. Carapace glabrous with broad procurved fovea; caput arched, depressed behind eyes. Labium wider than long, with few cuspules. Maxillae rectangular with numerous cuspules usually spread along entire front margin. Sternum converging from opposite coxae III. Strong rows of spines on lateral tibiae, metatarsi, and tarsi I and II. Males with one straight row of long teeth on claws.

GENERA INCLUDED: *Ctenolophus* Purcell (1904), *Galeosoma* Purcell (1903), *Gorgyrella* Purcell (1902b), *Heligmomerus* Simon (1892a), *Idiops* Perty (1833), *Segregara* Tucker (1917).

DISTRIBUTION: South and Central America (*Idiops*), Africa, India, western Asia (*Ctenolophus, Heligmomerus, Gorgyrella, Galeosoma, Segregara, Idiops*).

SYNONYMY: *Titanidiops* and *Pachyidiops* are very similar to *Idiops* in all respects and it seems that the characters used by Simon upon which to base the genera are little more than species group autapomorphies.

REMARKS: The disproportionate diversity of idiopine genera in southern Africa may reduce when the group is revised. At present, the characters used by the authors of each genus and in the above key seem apomorphic and sufficiently distinct to warrant the recognition of most genera.

ARBANITINAE SIMON

Arbaniteae Simon, 1903a, pp. 885, 903.
Aganippeae Simon, 1903a, pp. 884, 901. NEW SYNONYMY.
Homogoneae Rainbow, 1914, p. 188. NEW SYNONYMY.
Euoploeae Rainbow, 1914, p. 217. NEW SYNONYMY.
Cataxeae Rainbow, 1914, p. 222. NEW SYNONYMY.

DIAGNOSIS: Differs from the Idiopinae by the wider eye group and from the Genysinae by the straight or procurved fovea.

Eyes in compact group. Males with one or two curved cuticular processes on distal prolateral palpal tibia and usually with twin coupling spurs on distal prolateral tibia I.

DESCRIPTION: Eye tubercle low or absent. Eyes in two or three rows (*Aganippe, Blakistonia, Anidiops*) in group about twice as wide as long (*Arbanitis,* some *Hermeas*), wider (*Aganippe*), or longer (*Blakistonia, Cataxia*). Fovea more or less straight (*Hermeas, Cataxia*), or procurved (*Arbanitis, Idiosoma, Anidiops, Eucyrtops*). Caput arched and glabrous, or low and hirsute (*Hermeas*). Labium wider than long, with or without cuspules. Chelicerae with rastellum on distinct mound, reduced to few spines (*Hermeas,* some *Cataxia*), or absent (some *Cataxia*). Cheliceral furrow with teeth only on promargin (some *Hermeas*), usually also with row of smaller teeth on retromargin. Intercheliceral tumescence distinct (*Cataxia*), reduced, or absent. Sternal sigilla small, oval, subcentral to marginal. Legs I and II of females lightly scopulate with few tarsal spines (*Aganippe, Arbanitis, Hermeas, Idiosoma*) or ascopulate with numerous lateral spines on distal segments (some *Arbanitis, Cataxia*). STC of females with one or few long teeth; STC of males with numerous teeth in one S-shaped row.

TRIBES INCLUDED: Arbanitini, Aganippini.

GENERA INCLUDED: *Aganippe* O. P.-Cambridge (1877), *Anidiops* Pocock (1897a), *Arbanitis* L. Koch (1874), *Blakistonia* Hogg (1902), *Cataxia* Rainbow (1914), *Eucyrtops* Pocock (1897a), *Hermeas* Karsch (1878), *Idiosoma* Ausserer (1871).

DISTRIBUTION: Australia (all genera) and New Zealand (*Hermeas*).

SYNONYMY: None of Rainbow's tribes serve any grouping function—each is monogeneric. However, I retain the Aganippini as a tribal grouping of *Aganippe, Idiosoma, Anidiops,* and *Eucyrtops.*

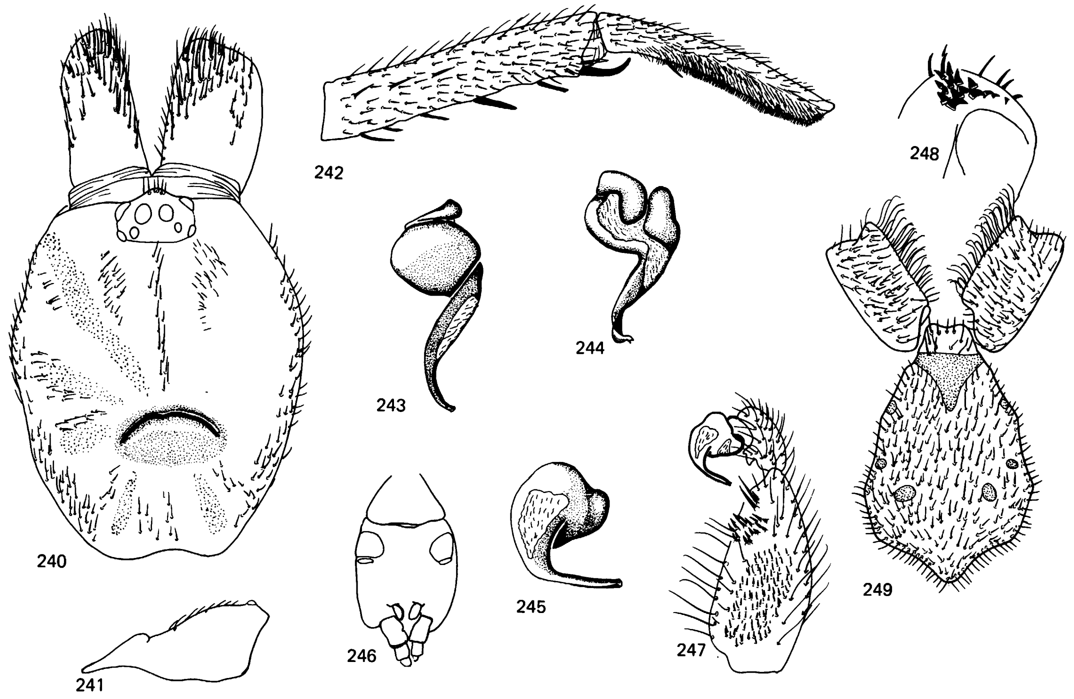
GENYSINAE SIMON
Figures 240–253

Genyseae Simon, 1903a, pp. 885, 904.

DIAGNOSIS: Differs from the Arbanitinae by the broad recurved fovea and eye group being wider than twice its length or occupying about half of the head width.

Eyes in wide group. Males with one or two curved cuticular processes on distal prolateral palpal tibia and usually with twin coupling spurs on distal prolateral tibia I.

DESCRIPTION: Eye tubercle low or absent. Eyes in two rows in group about three times wider than long (*Scalidognathus, Hiboka, Genysa*); group occupies about half (*Neocteniza*) or one-third (all other genera) of head width. Fovea broad and recurved. Caput arched and glabrous. Labium wider than long, with or without cuspules. Chelicerae with rastellum on distinct mound. Cheliceral furrow with teeth on promargin, usually also with row of smaller teeth on retromargin. Intercheliceral tumescence absent. Sternal sigilla small, oval, subcentral to marginal (most genera) or large and subcentral (*Neocteniza*). Legs I and II of females lightly scopulate with few tarsal spines (*Scalidognathus, Hiboka, Genysa*) or ascopulate with numerous lateral spines on distal segments (*Neocteniza*). STC of females with one or few long teeth; STC



FIGS. 240–249. *Scalidognathus radialis* (O. P.-Cambridge), male. 240, 241. Cephalothorax. 240. Dorsal view. 241. Lateral view. 242. Tibia and metatarsus I, prolateral view. 243–245. Palpal bulb. 246. Abdomen, ventral view. 247. Palpal tibia, cymbium, and bulb, retrolateral view. 248. Chelicera, ventral view of right, showing rastellum. 249. Sternum, maxillae, and labium.

of males with numerous teeth in one S-shaped row.

GENERA INCLUDED: *Genysa* Simon (1889b), *Hiboka* Fage (1922), *Neocteniza* Pocock (1895d), *Scalidognathus* Karsch (1891).

DISTRIBUTION: India and Ceylon (*Scalidognathus*), Madagascar (*Hiboka, Genysa*), South America (*Neocteniza*).

SYNONYMY: *Genysochoera* and *Nemesiellus* were each erected for the male and female of their sister genera, *Genysa* and *Scalidognathus,* respectively. Simon and Pocock were seemingly unaware of the sexually dimorphic nature of the characters they used. *Hiboka* is tentatively considered valid although it differs from *Genysa* only in lacking a male tibial spur. *Diadocyrtus* was placed by Simon in a different tribe because the posterior sternal sigilla were smaller and marginal rather than submarginal to subcentral. I here consider that distinction only of specific significance in this group, and place that genus in the synonymy of *Genysa.*

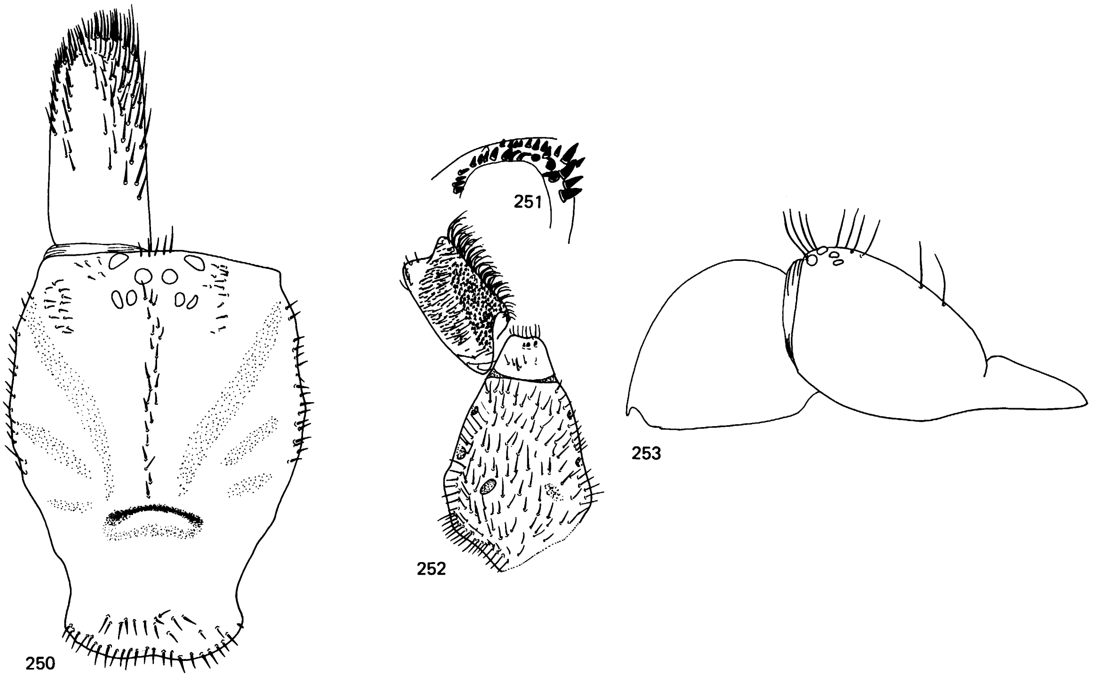
CTENIZIDAE THORELL

Ctenizoidae Thorell, 1887, p. 19.
Halonoproctidae Pocock, 1901a, pp. 207, 209.
Cyclocosmieae Simon 1903a, p. 884.

DIAGNOSIS: Differs from the Idiopidae by the short eye group or the absence of tarsal scopulae, and by the small haematodocha on the male palpal bulb, and from the Cyrtaucheniidae by the strongly spinose distal segments of legs I and II and the biserially dentate chelicerae.

Distal segments of legs I and II with lateral bands of short thornlike spines in females. Outer surface of cheliceral fang smooth. Three claws; STC with few or one tooth. Male palpal bulb simple, with pyriform conical distal sclerite; second haematodocha small. Two rows of strong teeth on cheliceral furrows. Apical segment of PLS domed. Fovea strongly procurved.

DESCRIPTION: Carapace arched, glabrous. Eyes in two or three (*Latouchia,* some *Cte-*



FIGS. 250–253. 250. *Scalidognathus montanus* (Pocock), female holotype, cephalothorax, dorsal view. 251–253. *Scalidognathus seticeps* Karsch, female holotype. 251. Chelicera, anterior showing rastellum. 252. Sternum, maxilla, and labium. 253. Cephalothorax, lateral view.

niza, Aepycephalus) rows, front row strongly procurved; group trapezoidal (*Cteniza, Aepycephalus, Stasimopus*). Eye tubercle absent (*Cteniza*), AME on low tubercle (*Cyclocosmia, Latouchia*), or all eyes on low tubercle (Pachylomerinae). Cheliceral rastellum with large spines on distinct process or on low mound (*Latouchia, Cyrtocarenum*); intercheliceral tumescence present (*Cyclocosmia*) or absent. Labium wider than long with few cuspules. Maxillae rectangular or with pronounced lobe (*Cteniza, Aepycephalus, Stasimopus*), few or numerous cuspules present; serrula absent. Posterior sternal sigilla large and deep, central but indistinct, or shallow (*Cyclocosmia, Stasimopus, Latouchia*). Trichobothria present on tibiae, metatarsi, and tarsi. Tarsal organ low. STC of females with one long and sometimes two smaller teeth; ITC curved, bare. Scopulae absent in females; in males present on all tarsi (*Cyclocosmia*), on tarsi I and II (*Conothele, Ummidia, Latouchia*), or on tarsi II–IV (*Hebestatis, Bothriocyrtum*). Abdomen soft or posteriorly hard, canaliculate (*Cyclocosmia*). Male tarsi cylindrical or distally enlarged (*Conothele*). Tibia III cylindrical or with dorsal glabrous saddle-shaped depression (Pachylomerinae).

SUBFAMILIES INCLUDED: Ctenizinae, Pachylomerinae.

CTENIZINAE THORELL

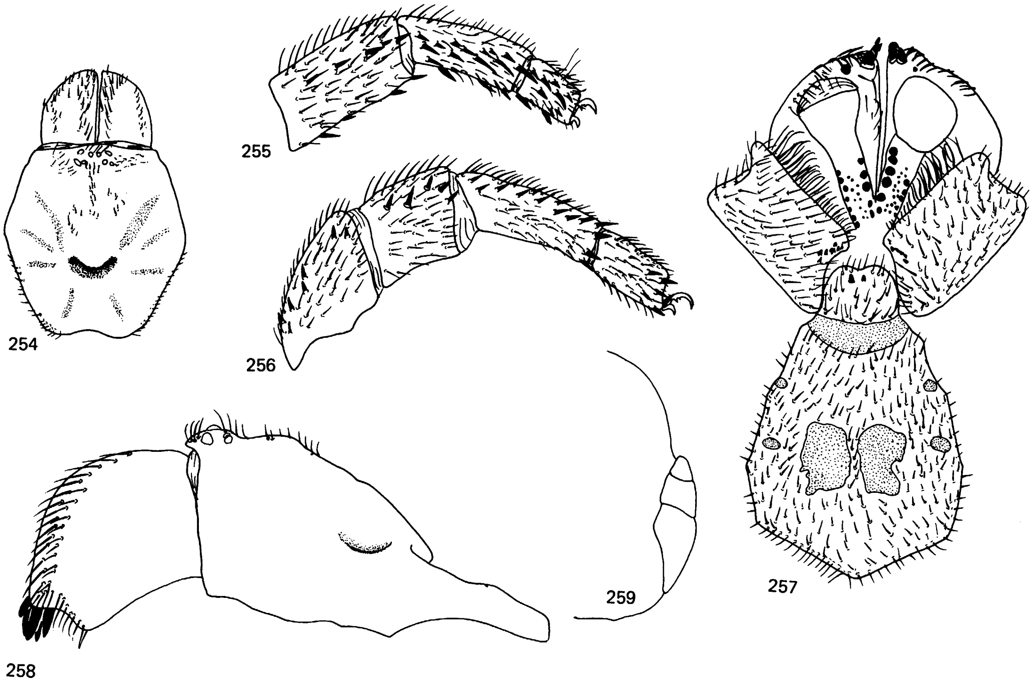
Figures 254–259

Ctenizoidae Thorell, 1887, p. 19.
Halonoproctidae Pocock, 1901a, pp. 207, 209.
Cyclocosmieae Simon, 1903a, p. 884.

DIAGNOSIS: Differs from Pachylomerinae by tibia III lacking a dorsal saddle-shaped depression.

GENERA INCLUDED: *Aepycephalus* Ausserer (1871), *Bothriocyrtum* Simon (1891a), *Cteniza* Latreille (1829), *Cyclocosmia* Ausserer (1871), *Cyrtocarenum* Ausserer (1871), *Latouchia* Pocock (1901a), *Stasimopus* Simon (1892a).

DISTRIBUTION: Africa (*Stasimopus*), North America (*Bothriocyrtum, Cyclocosmia*), Oriental region (*Cyclocosmia, Latouchia*),



FIGS. 254–259. *Cteniza* sp., female. 254. Cephalothorax, dorsal view. 255, 256. Tibia, metatarsus, and tarsus, prolateral view. 255. Leg I. 256. Leg III, with patella. 257. Chelicerae, sternum, maxillae, and labium. 258. Cephalothorax, lateral view. 259. Posterior abdomen and lateral spinneret, lateral view.

southern Europe and Eurasia (*Cteniza, Cyrtocarenum, Aepycephalus*).

REMARKS: As the above "diagnosis" indicates, the Ctenizinae lack a synapomorphy. Equally, a number of the above genera, although here recognized, seem no more than small species groups that have lost a diagnostic character or have acquired some autapomorphy. It is only the poor availability of material of those genera that restricts me from proposing the synonymy of *Cyrtocarenum* and *Aepycephalus* with *Cteniza.*

PACHYLOMERINAE SIMON

Pachylomereae Simon, 1889d, p. 178.

DIAGNOSIS: Differs from the Ctenizinae by the presence of a distinct dorsal excavation on tibia III of males and females.

GENERA INCLUDED: *Conothele* Thorell (1878), *Hebestatis* Simon (1903c), *Ummidia* Thorell (1875).

DISTRIBUTION: North and Central America (*Ummidia, Hebestatis*), India, Australia, and western Pacific islands (*Conothele*).

MISPLACED SPECIES: *Ummidia gressitti* Roewer (type in USNM, examined) is transferred to *Conothele,* New Combination, with which it shares the characteristic three spines transversely arranged on the distal third metatarsus.

KEY TO GENERA OF THE CTENIZIDAE

1. Posterior abdomen strongly canaliculate .... *Cyclocosmia*
   Posterior abdomen normal and soft 2
2. Tibia III dorsally excavate 3
   Tibia III not excavate 5
3. Trochanters I and II not notched 4
   Trochanters I and II distinctly notched .... *Ummidia*
4. Paired claws of legs I–III with one short tooth; Indo-Pacific region .... *Conothele*
   Paired claws of legs I–III with two large sharp and several smaller teeth; South and Central America .... *Hebestatis*

5. Eye group clearly less than twice as wide as long 6
Eye group at least twice as wide as long ... 7
6. Anterior median eyes very tiny .... *Aepycephalus*
Eyes of front row about equal in size .... *Cteniza*
7. Front eye row lightly procurved or straight 8
Front eye row strongly procurved 9
8. Eye group clearly wider behind than in front; anterior lobe of maxillae produced into a long cone .... *Stasimopus*
Eye group about as wide in front as behind; maxillary lobe short or indistinct .... *Latouchia*
9. Rastellum on a process; tibia IV bowed outward prolaterally and strongly spinose .... *Bothriocyrtum*
Rastellar process absent, spines sessile; tibia IV not as above .... *Cyrtocarenum*

ACTINOPODIDAE SIMON

Eriodontinae Ausserer, 1871, p. 134.
Pachyloscelini Simon, 1889d, p. 173
Actinopodinae Simon, 1892a, p. 66.

DIAGNOSIS: Differs from the Migidae and *Neocteniza* by the presence of a strongly procurved fovea, short square maxillae, and an elongate labium.

Apical segment of PLS domed. Eyes widely spaced, occupying at least half of head width. Rastellum present. Caput arched. Chelicerae with two rows of teeth; outer fang smooth or with low lateral flanges. Maxillae short, wider than long; labium much longer than wide. Cuspules present on labium and maxillae of females; serrula absent. Labiosternal suture indistinct or represented by two small sigilla. Distal segments of anterior legs with short strong lateral spines.

DESCRIPTION: Carapace steeply arched, glabrous, with strongly procurved fovea. Eye tubercle absent, clypeus wide. Eyes set on sloping face; group wider in front than behind, at least three times wider than long; eyes widely spaced, occupying at least half of head width. Chelicerae broad, geniculate, with teeth on both edges of cheliceral furrow; rastellum on distinct process (*Actinopus*) or low mound (*Missulena*); intercheliceral tumescence absent; fangs noticeably diagonal, outer surface smooth with basomedial tooth (*Actinopus, Missulena*), outer edges smoothly rounded (*Missulena*) or extended laterally (*Actinopus*). Maxillae broad, subquadrate, cuspules present along maxilla length or absent (male *Actinopus*); ventral face strongly sloping, posterior face of males rotated forward noticeably. Labium much longer than wide, with numerous apical cuspules or bare (male *Actinopus*). Labiosternal suture a shallow groove, associated sigilla small, oval (*Missulena*) or medially confluent in deep depression in anterior sternum (*Actinopus*). Sternal sigilla: posterior pair large, distinct, subcentral depressions, others smaller, more marginal (*Missulena*) or all medially confluent or almost so in moderately deep multiramous area (*Actinopus*). Sternum of males rebordered (*Missulena*) or not (*Actinopus*). Sternum cordate to oval. Male palpal tarsi aspinose, short, similarly (*Actinopus*) or dissimilarly (*Missulena*) incised. Legs of females stout with ascopulate tarsi; tibiae, metatarsi, and tarsi I and II with stout thornlike spines (*Actinopus*) or longer spines (*Missulena*); tarsi III and IV more spinose than I and II. Legs I and II more slender than legs III and IV. Preening combs absent. All tarsi integral. Males with scopulae on tarsi III and IV. Palpal bulb pyriform with small second haematodocha (*Missulena*), or with small paraembolic apophysis and twisted keels on embolus (*Actinopus*). Paired claws and palpal claw of females with long single tooth (*Missulena, Actinopus*), of males similar (*Actinopus*), or with several teeth on common process on legs I and II, legs III and IV with bifid basal tooth (male *Missulena*). Unpaired claws bare (*Actinopus,* female, *Missulena*) or with two long teeth (male, *Missulena*). Filiform trichobothria in two rows for half length of tibiae, more or less straight row on metatarsi and tarsi. Four spinnerets; all with raised bases giving appearance of two basal segments; PLS very short with domed distal segment. Spermathecae entire.

DISTRIBUTION: Australia and possibly Chile (*Missulena*), Central and South America (*Actinopus*).

INCLUDED GENERA: *Missulena* Walckenaer (1805), *Actinopus* Perty (1833).

REMARKS: For reasons similar to those used by Coyle (1971) in the Antrodiaetidae, I have no hesitation in using the only name that has applied to the Actinopodidae since 1892. The affinities of *Heteromigas bonneti* Zapfe (1961) are presently uncertain. *Heteromigas bonneti* appears to be an actinopodid in the disposition of the anterior sternal sigilla and the procurved fovea (see Raven [1984c] for further discussion). Calderon (1983) obtained the types and also found that the male has a dentate third claw, steeply arched caput, long labium, subquadrate maxillae, and wide eye group—a character combination known otherwise only in the actinopodid genus *Missulena*. Thus, *Heteromigas bonneti* belongs either to *Missulena* or is a new actinopodid genus; I tentatively include it in *Missulena*.

MIGIDAE SIMON

Migeae Simon, 1889d, p. 178.

Diagnosis: Differs from *Neocteniza* and the Actinopodidae by the longitudinal keels on cheliceral fangs, and the absence of a cheliceral rastellum.

Outer surface of fang with two distinct longitudinal keels. Chelicerae with two rows of teeth; rastellum entirely absent. Fovea straight, recurved, or tripartite T-shaped. Eyes in two rows, occupying at least half of head width; not on tubercle. Most distal haematodocha of bulb small; distal sclerite conical. Paired claws of males and females with reduced number of teeth. Third claw present, bare. At least tibia and metatarsi of legs I and II with strong lateral spines. Caput glabrous, arched; thoracic region behind fovea as high as or lower than fovea. Four spinnerets; apical segment of PLS domed. Maxillae without serrula.

Remarks: Because the Migidae are such a homogeneous group, easily recognized by the keeled fangs, I have expanded the diagnosis to include several descriptive characters.

KEY TO GENERA OF THE MIGIDAE

1. Tibia III distinctly excavate 2
   Tibia III not or weakly excavate 4
2. At least some cuspules on retroventral coxae I–III .... *Micromesomma*
   No cuspules on any of coxae I–III 3
3. Posterior sigilla entally very deep and lunate .... *Thyropoeus*
   Posterior sigilla shallow .... *Paramigas*
4. Thoracic region lower than caput 5
   Thoracic region as high behind fovea as in front 6
5. Eyes very wide, occupying about two-thirds or more of head width; preening comb present on metatarsus IV .... *Calathotarsus*
   Eyes occupying about half of head width; preening combs absent ...... *Heteromigas*
6. Basal fang with small outer tooth 7
   Basal fang without tooth .... *Moggridgea*
7. Caput distinctly demarcated; tibiae and metatarsi I and II without long ventral hairs between spines .... *Migas*
   Caput indistinctly demarcated; tibiae and metatarsi I and II with thick covering of long, thin hairs between spines; Africa .... *Poecilomigas*

MIGINAE SIMON

Diagnosis: Differs from Paramiginae by the presence of a small medial tooth on the outer fang.

Included Genera: *Migas* L. Koch (1873), *Poecilomigas* Simon (1903c).

Distribution: South Africa (*Poecilomigas*), Australia, New Zealand, New Caledonia, and Chile (*Migas*).

PARAMIGINAE PETRUNKEVITCH

Myrtaleae Simon, 1892a, p. 84 (unavailable through homonymy of type genus).

Paramiginae Petrunkevitch, 1939b, p. 154 (*nomen novum*).

Diagnosis: Differs from the Miginae by the presence of some excavation dorsally on tibia III.

Included Genera: *Micromesomma* Pocock (1895d), *Moggridgea* O. P.-Cambridge (1877), *Paramigas* Pocock (1895d), *Thyropoeus* Pocock (1895d).

Distribution: Madagascar (*Paramigas, Thyropoeus, Micromesomma*), South Africa (*Moggridgea*).

Synonymy: *Heteromigella* Strand (1908) and *Legendrella* Dresco and Canard (1975) are placed in the synonymies of *Thyropoeus* and *Paramigas*, respectively. *Heteromigella* shares the deep crescentic posterior sternal sigilla of *Thyropoeus* although the eyes are not quite as widely spread. Dresco and Canard (1975) separated *Legendrella* from *Paramigas* on minor differences in the size and spacing of the anterior median eyes. Without the correlation of a second character of more significance, there is no basis for retaining the genus.

A revision of the Paramiginae may further reduce the number of genera. In some species of *Moggridgea* I have examined the setae of the metatarsal preening comb were very thin and indistinct or absent (although the coxal cuspules were present), indicating that the present diagnosis of the genus is artificial.

CALATHOTARSINAE SIMON

Calathotarseae Simon, 1903a, p. 878.

DIAGNOSIS: Differs from other migids by the arched caput and absence of an excavation on tibia III.

INCLUDED GENERA: *Calathotarsus* Simon (1903c), *Heteromigas* Hogg (1902).

DISTRIBUTION: Australia (*Heteromigas*), Chile and Argentina (*Calathotarsus*).

MISPLACED SPECIES: *Heteromigas bonneti* Zapfe is tentatively transferred to *Missulena* (where further discussion is given).

TAXONOMIC AND NOMENCLATURAL PROBLEMS

Adelonychia Walsch (1891, p. 269) (type not located) has been all but completely forgotten. Neither Simon (1892a, 1903a) nor Pocock (1900c) seemed to know of the name. Gravely (1915b) considered *Adelonychia nigrostriata* Walsch (1891) and *Diplothele walschi* O. P.-Cambridge (1890) (both the type species of the respective genera) as synonymous, and judged by the fact that Walsch's description was read to the Zoological Society 13 days before that of O. P.-Cambridge, concluded also that it was published sooner. Presumably, Gravely considered them synonymous because the types (all lost) of the type species of both genera were collected by Walsch from the same locality (Bengal: Orissa). Bonnet (1955) listed the genus, whereas it was placed by Roewer (1942) in his "der Namen der nicht zu deutenden Arten" in the synonymy of *Diplothele* O. P.-Cambridge (1890). Walsch's description of *Adelonychia* is inadequate to establish its relationships but he did mention (p. 269) "two pairs of whitish spinnerets" thus excluding the genus from the synonymy of *Diplothele* unless that was a *lapsus calami* instead of "one pair" or "two whitish." Of the other barychelid genera known from India, only *Sason* is known to occur so far north. However, the burrow described by Walsch is not that of *Sason* (see Pocock, 1900c, p. 173). Therefore, unable to determine the identity of the genus, I am forced to conclude that the names *Adelonychia* and *Adelonychia nigrostriata* are *nomina dubia.*

Bistrigus Franganillo (1930) (type lost) is represented only by a poor description, sufficient to recognize it only as a barychelid. I have no alternative but to regard the names *Bistrigus* and *Bistrigus muticus* Franganillo (1930) as *nomina dubia.*

Dimazion Franganillo (1926) (type lost), as in *Bistrigus,* is represented only by a poor description that if true in the presence of only two spinnerets, six teeth on the paired claws, and eyes that form a rectangular group with a recurved front row separated from the carapace margin by a distinct clypeus may be the nemesiid *Neodiplothele* or a valid genus. However, Franganillo (1926) is far too brief to allow any further comment and confirm the nemesiid or other affinities of the genus. Thus, *Dimazion* and *Dimazion fulvus* Franganillo are also considered *nomina dubia.*

Closterochilus Ausserer (1871) originally included the type species, *C. nigripes* (Lucas, 1834), from Brazil and *C. gracilis* (Hentz, 1841), but Ausserer was doubtful about the inclusion of the latter from the southern U.S.A. Since then the genus has been synonymized with *Sphodros* Walckenaer (1833), *Actinopus* Perty (1833), and finally the Australian genus *Missulena* Walckenaer (1805). Through a complex series of doubtful and confused synonymies, *Pachyloscelis rufipes* Lucas (1834) (=*Closterochilus gracilis*) was transferred to *Missulena* (first by Simon, 1892a). Thus, Bonnet (1957) lists *Closterochilus* as a synonym of *Missulena.* Apart from that, *Missulena* has been reported only from Australia and possibly from Chile. From the description and Lucas's figures (Lucas, 1837, pl. 7c, d), it is clear that the taxon to which both Lucas (1834) and Ausserer (1871) referred (*Pachyloscelis nigripes* Lucas) is an actinopodid—the combination of the wide eye group and long labium occur in no other mygalomorphs. Thus, *Closterochilus* is synonymized with *Actinopus,* into which *C. rufipes* is also transferred.

Eurypelma C. L. Koch, 1851, p. 73 (type species by original designation *Aranea avicularia* Linnaeus [1758]; types lost). The characters of the genus *Eurypelma* have been in a constant state of confusion since it was first described; part of that was through the erroneous nomination of *E. rubropilosum* Ausserer (1871) (type not located) as the type species by Simon (1892a). The genus description seemed so diffuse that many species, either for which males were not known or which were lacking unusual characters, were "dumped" in *Eurypelma.* I will only briefly summarize the problems.

C. L. Koch (1851) included 33 species in *Eurypelma.* No type species was designated but the first listed (that then usually taken as the type species) was *Aranea avicularia* Linnaeus, the type species of *Avicularia* Lamarck (1818). The specimens (one male and one female) upon which Koch based his description of *Eurypelma* are not the types of *Aranea avicularia* and are presumed lost.

Subsequently, Ausserer (1871) assigned four subgenera to *Eurypelma.* In the nominate subgenus, Ausserer included only nine species—four were new and only two of the remaining five were included by C. L. Koch (1851) in *Eurypelma.* However, Ausserer (1871) considered Koch's identification of *Mygale* (=*Aranea*) *avicularia* incorrect and described a new species, *Eurypelma rubropilosum,* apparently based upon Koch's description. Simon (1892a) recognized Ausserer's synonymy and designated *Eurypelma rubropilosum* as the type species.

Mello-Leitão (1923) placed a specimen from Brazil that he concluded was *E. rubropilosum* in the genus *Pterinopelma* Pocock (1901b). Petrunkevitch (1939a) believed that the Rules of Zoological Nomenclature compelled him to accept Simon's designation of the type species.

Koch's male of *Aranea avicularia* had "a thick inwardly curved setose spur and a filiform bulb." Both are characters of *Avicularia* (Pocock, 1901b; and see Systematics, Theraphosidae: Aviculariinae). On the other hand, *Eurypelma rubropilosum* was described from only a female (which cannot be located); Koch had both a male and a female. Also, Ausserer's diagnosis of *Eurypelma* stated that the first tibia of the male had two spurs, not one as Koch described. Therefore, Ausserer was incorrect in concluding that Koch's identification of his material as *Aranea avicularia* was erroneous.

However, the nomenclaturally decisive point is that the type species of a genus must be one of the species listed when the genus was first named; that is not true of *Eurypelma rubropilosum.* Therefore, *Eurypelma avicularia* L. Koch is the type species of *Avicularia* and is considered that also of *Eurypelma,* and thus *Eurypelma* is an objective synonym of *Avicularia* (see Addendum).

Hapalothele Lenz (1886, p. 396; type species by monotypy *Hapalothele reuteri* Lenz; type destroyed).

DESCRIPTION (from Lenz): Apical segment of PLS short, less than half abdomen length. Rastellum absent; one row of teeth on the cheliceral furrow. Fovea transverse, slightly curved. Maxillae with a double row of teeth. Labium half as long as wide. STC narrow with one curving row of teeth; ITC present. Leg scopulae absent.

DISTRIBUTION: Madagascar.

REMARKS: The above description relates *Hapalothele* to a number of genera with the reservation that it differs from all in an unusual combination of characters, as indicated by Lenz (1886). Specimens in Simon's collection in MNHP belong to the genus *Entypesa,* which differs from *Hapalothele* in the presence of two rows of teeth on the paired claws, a character about which Lenz's description was quite explicit. *Hapalothele* differs from the cyrtaucheniid *Homostola* in having only one row of teeth on the cheliceral furrow, no rastellum, and no scopulae, and from the Ischnothelinae by the shorter spinnerets and again having only one row of cheliceral teeth. I include the description here in the hope that new material from Madagascar may validate the genus. Until that time, I must conclude in the absence of close relatives, that *Hapalothele* and *Hapalothele reuteri* should be left as *nomina dubia.*

Pachypelma Karsch (1880, p. 389; type species by original designation *Mygale oculata* Nicolet [1849]; types presumed lost).

Karsch (1880) gave several characters in his diagnosis of *Pachypelma*: front eye row procurved, anterior lateral eyes larger than anterior median eyes, claws edentate, short undivided scopula on metatarsus IV, femur IV lacking scopula, metatarsus longer than tibia IV, and sternum nearly round. Nicolet (1849) mentions none of those characters. Because the type (now lost or represented only by a group of broken legs, according to Simon, 1892a) was a juvenile (carapace length about 4 mm, and Nicolet's observation), Karsch's description is most likely based upon further and therefore doubtfully congeneric material. Nicolet's description is too inadequate to allow the confident recognition of the species. Possibly matching the abdominal pattern of juvenile theraphosids from Chile to that described by Nicolet—two eye-shaped spots, dark brown in color above the abdomen; the flanks, toward the middle of the circumference, with a narrow round brown band over which there is a paler spot, another long band of similar color marks the sides of the abdomen—will result in the assignment of *Pachypelma* to a known species. The general pilosity of the spider eliminates all but the theraphosids as the possible family of the genus; and all known Chilean theraphosid genera are junior to *Pachypelma.* At present, I can only consider *Pachypelma,* and its type species, *Mygale oculata* Nicolet, as *nomina dubia.*

Theragretes Ausserer (1871) (type species by monotypy *Actinopus walckenaerii* Lucas [1837]; type lost) was based upon the Brazilian male associated with the female (now lost) from Georgia, U.S.A., and considered the holotype of *Sphodros abotti* (Walckenaer, 1835) by Gertsch and Platnick (1980) and is also the type species of *Sphodros.* For the male, Lucas (1837) gave a new species name, *walckenaerii,* and placed it in *Actinopus* Perty (1833). However, Walckenaer (1842) then replaced that species and *Actinopus audouinii* (Lucas) in *Sphodros.* Ausserer (1871) then newly proposed *Theragretes* for *Sphodros walckenaerii* (Lucas) and correctly placed *A. audouinii* in *Pachylomerus* (=*Ummidia*). Nevertheless, Simon (1892a) placed *Theragretes* (and *Closterochilus*) in the synonymy of *Eriodon* (a *nomen nudum* replaced by *Missulena* Walckenaer, 1833). Because Ausserer (1871) named *Actinopus walckenaerii* (and not *Sphodros abotti*) as the type species of *Theragretes* no confusion need now arise with *Sphodros abotti.* Therefore, as with *Closterochilus, Theragretes* is considered an actinopodid and presumed to be *Actinopus,* as first indicated by Lucas (1837).

NEW GENERIC SYNONYMIES

In this study I have made synonymies for two main reasons: the junior synonym does not differ significantly from the senior; or the characters of the junior synonym do not define a monophyletic group of species either because the "definitive" characters are plesiomorphic or because they are only considered species autapomorphies. When the data are complete (both sexes of both type species are known), the synonymy is unequivocal, but as fewer data are available the decision becomes less certain. However, often a genus is represented only by the types (as is the case with a number of genera named by Mello-Leitão, Franganillo, and Strand) and they are lost or unavailable. In such cases, I have tried, wherever possible, to use the original description (such as it is) and establish the sister group of the genus. Often the descriptions are too incomplete to allow the genus to be distinguished from related genera; in such cases, I have assumed that no other characters were worthy of mention and placed the genus in the synonymy of the genus with which it shares the most apomorphic characters.

NOMENCLATURAL CONSIDERATIONS: In this study, all described mygalomorph genera are accounted for in keys, synonymies, or as *nomina dubia.* As a result and inevitably, a number of nomenclatural changes occur. Those changes arise either through corrections in generic diagnoses (e.g., *Diplura, Pisenor*) or through long used names being newly synonymized with those long ignored. In certain cases, the International Code of Zoological Nomenclature provides for the suppression of the senior synonym. It is my firm belief that suppressions shelter incomplete taxonomic revisions and should be kept to a minimum. However, in a few cases involving very widespread use ("universality," e.g., the Australian funnel web spider genus *Atrax* and its senior synonym *Hadronyche*; see Raven, 1980b), such exceptions appear justified. Because many of the groups recognized here have been "revised" only twice and both times by the same author (Simon, 1892a, 1903a) operating under the same misapprehensions, universality and nomenclatural stability can hardly be invoked as reasons for not making changes, and indeed they are not under threat. (Perhaps one notable exception to that is the use of the name *Eurypelma* for generalized North American theraphosids. However, as I have indicated, *Eurypelma* is a junior objective synonym of *Avicularia.*) Consequently, with the exception of *Atrax,* the priority of the senior synonym is accepted throughout this study.

NEW SYNONYMIES AND STATUS CHANGES SINCE BRIGNOLI (1983)

Brignoli (1983) followed the synonymies of Roewer (1942) (with reservations concerning Roewer's "der Namen der nicht zu deutenden Arten"), of which some were new to that catalog and have never been justified. Although I recognize the action of Roewer's synonymies, I have sought to justify any names considered valid by Bonnet (1945–1959). Following the International Code of Zoological Nomenclature, I have recorded synonymies only if they were published in works clearly intended for serious scientific work, i.e., not in popular publications.

Throughout this section the terms "type" and "types" refer to the type specimen or specimens of the type species of the genus. The expression "characters of generic significance" or a similar phrase refers to the characters given in the diagnoses of genera, or those used in my keys.

Achetopus Tullgren (1905) (type in RMS, examined) is considered a junior synonym of *Diplura* C. L. Koch (see Systematics).

Acropholius Simon (1902a) (type in MNHP, examined) was considered valid because *Tigidia* Simon (1892c) was incorrectly diagnosed as having four spinnerets. In fact, *Tigidia* (type in MNHP, examined) lacks the posterior median pair of spinnerets and, as in *Acropholius,* the paired claws of legs I and II are much smaller than those of legs III and IV. Thus, *Acropholius* is placed in the synonymy of *Tigidia.*

Actinoxia Simon (1891b) (types not examined) will be placed in the synonymy of one of the valid euctenizinid genera by Gertsch and Platnick in their revision of North American ctenizoids.

Adelonychia Walsch (1891) (type not located) and its type species *Adelonychia nigrostriata* Walsch (1891) are considered *nomina dubia* (see Taxonomic and Nomenclatural Problems).

Adranochelia Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Cyclosternum* Ausserer (1871) (congeners in AMNH, examined), with which it shares the short rounded sternum and has no other characters that warrant its retention as a genus.

Afghanothele Roewer (1960) (types in GNM and SMF, examined) was compared to *Ischnothele,* presumably because of the long pseudosegmented apical segment of the posterior lateral spinnerets. However, in lacking cuspules and any of the ischnothelinid autapomorphies its affinities lie clearly with the Euagrinae. It is placed in the synonymy of *Phyxioschema* Simon (1889h) (type in MNHP, examined; Raven, 1981a) with which it shares the form of the spinnerets and differs in no other character worthy of generic status.

Albaniana Rainbow and Pulleine (1918) (type in AMS, examined) has a subquadrate labium and is thus excluded from the Aganippini; the eye group is not subquadrate as in *Blakistonia* or *Cataxia*; the fovea of the female is procurved like *Arbanitis,* and not straight as in *Hermeas*; and the leg scopulae are reduced, as in *Euoplos* (=*Arbanitis*). No other character warrants the recognition of the genus; thus, the name is placed in the synonymy of *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined).

Ancylochiros Mello-Leitão (1920b) (type in ZMSP, examined) is a penultimate male aviculariine (thus the modified male tarsus) in which, contrary to the description, the scopula of tarsus IV is entire, and is indifferentiable from *Avicularia* (congeners in AMNH and BMNH, examined), into the synonymy of which it is placed.

Anemesia Pocock (1895d) (type in BMNH, examined) was erected because, unlike *Nemesia* Audouin (1827) (congeners in RMS, examined), it lacks a door to the burrow. However, the posterior portion of the spider and the spinnerets were lost, presumably during capture (Pocock neither mentions nor figures them). Only two morphological differences are known that distinguish *Anemesia* from *Nemesia*: the posterior sternal sigilla are elongate and separated from the margin and the clypeus is slightly produced medially. Without a revision of *Nemesia* I cannot assign generic significance to those characters and thus until then *Anemesia* is placed in its synonymy.

Anoploscelus Pocock (1897b) (type not located in BMNH) resembles *Phoneyusa* Karsch (1884) (congeners in BMNH, examined) in all characters of generic significance.

Aparua Todd (1945) (type in Otago Museum; congeners in AMNH, examined) was placed in the synonymy of *Stanwellia* Rainbow and Pulleine (1918) by Main (1983b). That decision is followed here; however, a phylogeny of the species of *Stanwellia* (*sensu stricto*) and of the type species of *Aparua* is required to substantiate that.

Aphantopelma Simon (1903b) (type in MNHP, examined) shares with *Thalerommata* Ausserer (1875) (type in BMNH, examined) the spinose and dissimilarly shaped lobes of the cymbium, and the short posterior lateral spinnerets—both indicative of barychelid affinities. No other differences are considered sufficient to warrant its continued separation from *Thalerommata.*

Aphonopelma Pocock (1901b) (type in BMNH, examined) is placed in the synonymy of *Rhechostica* Simon (1892a) (male type in USNM collection at AMNH, examined), which was originally placed in the Homoeommeae because of the narrowly divided tarsal scopulae (which alone is insufficient reason for any placement). The types of both genera share the strong setae on the prolateral coxae and, as in *Aphonopelma,* males of *Rhechostica* have a double spur and the palpal bulbs are similar.

Aporoptychus Simon (1886) (types in MNHP, examined) is placed in the synonymy of *Acontius* Karsch (1879a) (type in ZMB, examined) and the action is explained in the systematic treatment of that genus.

Armadalia Rainbow and Pulleine (1918) (type in AMS, examined) differs from *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined) only in the presence of weak scopulae on tarsi I and II. Because no other apomorphic characters are congruent with the weak scopulation it is considered of significance only at the species level and thus *Armadalia* is placed in the synonymy of *Arbanitis.*

Ashantia Strand (1908a) (type in SMF, examined) shares with *Harpactirella* Purcell (1902a) (congeners in SAMC, examined) the absence of cheliceral scopula and lyra, the reduced number of labial cuspules, and the wide clypeus. However, the holotype is a larger spider and (presumably correlated with that) the scopulae on tarsi II are undivided. Those characters are, in themselves, considered insufficient to warrant generic recognition, and the genus name is placed in the synonymy of *Harpactirella.*

Astrosoga Chamberlin (1940b) (type in AMNH, examined) will be placed in the synonymy of a valid euctenizid genus in the pending revision of that group by Gertsch and Platnick.

Atrophonysia Benoit and Legendre (1968) (types in MRAC, examined) shares with *Idioctis* L. Koch (1874) (types in ZMH and BMNH, examined) the uniquely narrow sternum, the weak rastellum, and the broad fovea. Simon (1892a, 1903a) was confused about certain characters of *Idioctis* (further discussion will be given in my pending revision of the genus). No other characters warrant the continued separation of the genus.

Avicuscodra Strand (1908a) (type in SMF, examined) is placed in the synonymy of *Chaetopelma* Ausserer (1871) (type species in MNHP, examined), with which it shares the recurved fovea and divided scopulae of tarsi IV; none of the other characters warrant recognition of the genus.

Bancroftiana Rainbow and Pulleine (1918) (type in AMS, examined) shares the distinctive abdominal pattern with *Armadalia ornata* Rainbow and Pulleine (1918) (type in AMS, examined), and also the serrate lower edge of the fang with *Euoplos* Rainbow (1914) (type in AMS, examined), here placed in the synonymy of *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined). Contrary to the original description, it does not have the character warranting generic status—biserially dentate paired claws; the claw dentition is typical of other male Arbanitinae. Thus, *Bancroftiana* is placed in the synonymy of *Arbanitis.*

Barropelma Chamberlin (1940a) (type not examined) is placed in the synonymy of *Crypsidromus* Ausserer (1871) (congeners in AMNH, examined), with which it shares the divided scopulae of the tarsi, and was described seemingly because it was compared erroneously with *Aphonopelma* (type in BMNH, examined). No other characters warrant generic recognition.

Batesiella Pocock (1903b) (type in BMNH, examined) is placed in the synonymy of *Encyocrates* Simon (1892c) (type in MNHP, examined), with which it shares all characters of generic significance.

Bemmeris Simon (1903b) (type in MNHP, examined) was placed in the synonymy of *Spiroctenus* Simon (1889g) by Purcell (1904) although his statement was insufficiently clear and the genus was retained by Roewer (1942). Purcell (1904) was correct.

Bessia Pocock (1900b) (type in BMNH, examined) is placed in the synonymy of *Spiroctenus* Simon (1889g) (type in MNHP, examined), with which it shares the short, domed apical segment of the PLS, biserially dentate paired claws in females (males have not been described), and tarsi I and II are not or weakly scopulate.

Bistrigus Franganillo (1930) and its type species *Bistrigus fulvus* Franganillo are considered *nomina dubia* (see Taxonomic Problems).

Brachypelma Simon (1891a) (congeners in AMNH, examined) is placed in the synonymy of *Euathlus* Ausserer (1875) (type in BMNH, examined), with which it shares all characters of generic significance.

Brachytheliscus Pocock (1902b) (type in BMNH, examined) was placed in the synonymy of *Hermacha* Simon (1889g) (congeners in AMNH and SAMC, examined) by Hewitt (1915a) but restored without explanation by Petrunkevitch (1928); Hewitt was correct.

Butantania Mello-Leitão (1935) (type male not examined) is placed in the synonymy of *Dryptopelma* Simon (1889f) (type in MNHP, examined), with which it shares the form of the apophysis on tibia I and the structure of the palpal bulb.

Caedmon O. P.-Cambridge (1903) was considered valid by Roewer (1942) and Brignoli (1983); however, Bonnet (1956, p. 919) pointed out that because *Poecilomigas* Simon (1903c) was published earlier it has priority. Thus, *Caedmon* is the junior synonym.

Cantuaria Hogg (1902) (type in BMNH, examined) was presumably named because the description of *Hermeas* Karsch (1878) (type in ZMB, examined), from which it differs in no generic characters, was inadequate to place that taxon correctly; therefore, I place *Cantuaria* in the synonymy of *Hermeas.*

Cantuarides Strand (1907c) (type lost) is placed in the synonymy of *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined), with which it shares the subquadrate labium, procurved fovea, and trapezoidal eye group; no other characters in the description warrant recognition of the genus.

Cenobiopelma Mello-Leitão and Arlé (1934) (congeners in AMNH, examined) is placed in the synonymy of *Oligoxystre* Vellard (1924) (type male lost), with which it shares the weak second (lateral) tibial apophysis, pyriform bulb with long, tapering embolus, and reduced number of cuspules on the maxillae and labium (see Gerschman and Schiapelli, 1973b).

Cestotrema Simon (1902a) (type in MNHP, examined) is placed in the synonymy of *Tigidia* Simon (1892c) (type in MNHP, examined), which had been misdiagnosed as having four spinnerets instead of only two and with which it shares the reduced size of the paired claws of legs I and II and differs only in the slightly longer eye group.

Chaetorhombus Ausserer (1871) (type not located) is placed in the synonymy of *Cyclosternum* Ausserer (1871) (congeners in AMNH, examined), from which it differs insufficiently and with which it shares the short, rounded sternum.

Chaunopelma Chamberlin (1940a) (type not examined) was originally placed in *Eurypelma* C. L. Koch (1851) as a subgenus characterized by an artificial difference in the number of spines on the palpal tibia of males but is placed in the synonymy of *Rhechostica* Simon (1892a) (type in USNM collection at AMNH, examined) because its affinities with *Eurypelma*, a junior synonym of *Avicularia* Lamarck (1818) (see Taxonomic and Nomenclatural Problems), are illusory below the family level.

Chrysopelma Roewer (1963) (types in USNM and SMF, examined) is placed in the synonymy of *Sason* Simon (1887a) (types in HMO, examined), with which it shares the linear arrangement of the cuspules on the labium, the reduced rastellum, reduced eye tubercle, and the eye configuration; any differences are of significance only at the species level.

Clavopelma Chamberlin (1940a) (type in MCZ, examined), for reasons similar to those for *Chaunopelma*, is placed in the synonymy of *Rhechostica* Simon (1892a) (type in USNM collection at AMNH, examined).

Clitotrema Simon (1904) (type in MNHP, examined) is placed in the synonymy of *Ancylotrypa* Simon (1889g) (type in MNHP, examined), with which it shares all the apomorphic characters and differs in no character of generic significance.

Closterochilus Ausserer (1871) is placed in the synonymy of *Actinopus* Perty (1833); see Taxonomic and Nomenclatural Problems for explanation.

Cronebergella Charotinov (1946) (type not located; congeners provided by Mr. S. L. Zonshtein, Academy of Science, Kirghiz, Frounze, U.S.S.R., examined) is placed in the synonymy of *Latouchia* Pocock (1901a) (type in BMNH, examined), with which it shares the presence of an eye tubercle, medially confluent posterior sternal sigilla, and the form of the rastellum and differs in no characters of generic significance.

Ctenochelus Mello-Leitão (1923) (type not located) was placed in the Pselligmeae by Mello-Leitão (1923) who stated that it differs from *Pselligmus* Simon (1892c) (type in USNM collection at AMNH, examined) in the eye group being wider. His inadequate description is sufficient only to place it in the synonymy of the Aporoptychini, where it is tentatively placed in the synonymy of *Bolostromus* Ausserer (1875) (type in BMNH, examined) because of the taxa known from the same area, it has the widest eye group. Material in MRJ labeled "*Ctenochelus* sp. nov." (apparently by Mello-Leitão) is congeneric with the nemesiid *Prorachias* and has none of the characters mentioned in his description of *Ctenochelus*; thus, the identification is considered erroneous.

Ctenonemus Simon (1903b) (type in MNHP, examined) is replaced in the synonymy of *Spiroctenus* in agreement with the synonymy of Purcell (1904).

Cyclopelma Benoit (1965c) (type in MRAC, examined) is placed in the synonymy of *Sipalolasma* Simon (1892a) (type in MNHP, examined), with which it shares all characters of generic significance; the type specimen is a juvenile and the characters used to establish the genus are thus simply ontogenetically undeveloped. The name *Cyclopelma* is also preoccupied by an unplaced fossil insect, *Cyclopelma* Busch, 1851.

Cyclothoracoides Strand (1929) (type not located) is placed in the synonymy of *Hapalotremus* Simon (1903a) (type not examined), with which it shares the bent metatarsus I and the conformation of the male palpal bulb and differs in no characters of generic significance.

Damarchodes Simon (1903b) (type in MNHP, examined) was compared with *Damarchus* but is here placed in the synonymy of *Hermacha* Simon (1889g) (congeners in AMNH, examined), with which it shares the presence of scopulae on tarsi III, the marginal sternal sigilla, and the relatively straight fovea.

Davus O. P.-Cambridge (1892) was placed in the synonymy of *Cyclosternum* Ausserer (1871) by Valerio (1982).

Delopelma Petrunkevitch (1939a) (type not examined) is placed in the synonymy of *Rhe-*

chostica Simon (1892a) (type in USNM collection at AMNH, examined), with which it shares all characters of generic significance.

Diadocyrtus Simon (1902a) (type in MNHP, examined) is placed in the synonymy of *Genysa* Simon (1889b) (type in MNHP, examined), from which it differs only in the posterior sternal sigilla being in a slightly different position.

Dimazion Franganillo (1926) and *Dimazion fulvus* Franganillo are considered *nomina dubia* (see Taxonomic and Nomenclatural Problems).

Dolichothele Mello-Leitão (1923) (types in MRJ, examined) is placed in the synonymy of *Hapalotremus* Simon (1903a) (type not examined), with which it shares the reduced number of cuspules on the labium and maxillae and differs in no characters of generic significance.

Dryptopelmides Strand (1907c) (type lost) is placed in the synonymy of *Holothele* Karsch (1879b) (type in ZMB, examined), with which it shares the division of all tarsal scopulae, and the absence of any characters indicating affinities with other genera. However, *Dryptopelmides rondoni* Lucas and Bücherl (1972) is transferred to *Dryptopelma.*

Dugesiella Pocock (1901b) (types in BMNH, examined) is placed in the synonymy of *Rhechostica* Simon (1892a) (type in USNM collection in AMNH, examined), with which it shares the form of the double tibial spur and the thornlike setae on the prolateral coxae; no other characters meriting the continued separation of *Dugesiella* are known.

Dyarcyops Hogg (1902) (type in BMNH, examined) is placed in the synonymy of *Hermeas* Karsch (1878) (type in ZMB, examined), with which it shares the weakly spinose but scopulate tarsi I and II, the straight fovea, subquadrate labium, and similar eye group configuration. No other character of the taxon warrants the continued separation of the two genera (see Addendum).

Encyocratella Strand (1907a) (types lost) is placed in the synonymy of *Chaetopelma* Ausserer (1871) (congeners in MNHP, examined), with which it shares all characters of generic significance.

Encyocrypta Simon (1889c) (type in MNHP, examined) was placed in the synonymy of *Idiommata* Ausserer (1871) (type in BMNH, examined) by Simon (1892a). However, *Encyocrypta* differs from *Idiommata* in the presence of preening combs and a number of other characters that will be discussed in my pending review of Australian barychelids.

Enrico O. P.-Cambridge (1895) (type in BMNH, examined) will be placed presumably in the synonymy of *Eucteniza* Ausserer (1875) (type in BMNH, examined) by Gertsch and Platnick in their pending revision of North American ctenizoids. The only difference between the type species of the two genera is that the teeth in the retrolateral row of the cheliceral furrow are noticeably smaller than those in the prolateral row. Through the kind cooperation of Dr. W. J. Gertsch in loaning the material of his revision, I have ascertained that intermediate states of the tooth strength and size exist. Thus, the smaller teeth alone are insufficient to warrant the recognition of two genera.

Entychides Simon (1888) (types not examined): as with *Actinoxia.*

Epipedesis Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Psalistops* Simon (1889d), with which it shares the eye group configuration, the produced maxillary heel, the shape and dentition of the labium, and the absence of scopulae on tarsi III and IV.

Erythropoicila Fischel (1927) (type male lost) is placed in the synonymy of *Cyriocosmus* Simon (1903a) (congeners in AMNH, examined), with which it shares the divided scopulae of the tarsi and the characteristic elongate paraembolic apophysis (see Schiapelli and Gerschman, 1973a).

Eudiplura Simon (1892a) (type in NHMV, examined) was incorrectly diagnosed by Simon as having only few clavate setae in the maxillary lyra, whereas in fact it has about 60 forming a black shield, as in *Trechona* C. L. Koch (1851) (congeners in BMNH and MNHP, examined) with which it is synonymized.

Euharmonicon Mello-Leitão (1920a) (type not located) is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined), from which it differs only in the artificial and minor difference in the number of clavate setae in the maxillary lyra.

Euoplos Rainbow (1914) (type in AMS, examined) shares with *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined) the reduced size of the mating spur on tibia I of the male (as in *Bancroftiana*) and the procurved fovea of females; the only difference possibly warranting recognition of the genus is the weak scopulae on the legs. However, as with the reduced rastellum of *Cataxia*, the distinction is unconvincing and unsupported by other characters. Thus, *Euoplos* is placed in the synonymy of *Arbanitis*.

Eurypelma C. L. Koch (1851) is placed in the synonymy of *Avicularia* Lamarck (1818); see discussion of Taxonomic and Nomenclatural Problems.

Eurypelmella Strand (1907c) (type male lost) is placed in the synonymy of *Schizopelma* F. O. P.-Cambridge (1897) (type in BMNH, examined), which it resembles in all the characters of generic significance given in the description.

Euthycaelus Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Holothele* Karsch (1879b) (type in ZMB, examined), with which it shares the thin and divided tarsal scopulae and the characteristic crack on the fourth tarsus. No other characters warrant recognition of the genus, which seems to have been perpetuated through Simon's (1892a) diagnosis and key being based upon a species other than the type species.

Evagrella Mello-Leitão (1923) (type in MZSP, examined), incorrectly described as having only one row of teeth on the paired claws and no maxillary lyra, is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined), with which it shares two rows of teeth on the paired claws and a lyra.

Forsythula Pocock (1903a) (type in BMNH, examined) is placed in the synonymy of *Tigidia* Simon (1889c) (type in MNHP, examined), with which it shares all characters of generic significance.

Gaius Rainbow (1914) (type in AMS, examined) was placed in the synonymy of *Anidiops* Pocock (1897a) (type in BMNH, examined) by Main (1957) but was not so recorded by Brignoli (1983).

Genysochoera Simon (1902a) (type in MNHP, examined) is placed in the synonymy of *Genysa* Simon (1889b) (type in MNHP, examined), from which it was originally distinguished by a difference in leg lengths that is attributable to sexual dimorphism; no other characters of generic significance warrant the continued separation of the two genera.

Goniodontium Mello-Leitão (1923) (type in MZSP, examined) was erroneously included in the Barychelidae. Because it has digitiform apical segments of the PLS and well-developed maxillary lobes it is transferred to the Theraphosidae where is placed in the synonymy of *Hapalotremus* Simon (1903a) (type not examined), with which it shares the characteristically reduced number of cuspules on the labium and maxillae.

Gosipelma Chamberlin (1940a) (types not examined) is based upon the artificial difference of the number of spines on the male palpal tibia and as with *Chaunopelma* (which see also for further explanation) is placed in the synonymy of *Rhechostica* Simon (1892a) (type in USNM collection at AMNH, examined).

Hapalopinus Simon (1903a) (type in MNHP, examined) was placed by Simon in the Theraphosidae, where Gerschman and Schiapelli (1973a) included it in the Ischnocolinae. However, the apical segments of the PLS are short and domed, the cymbium is divided into two dissimilar lobes, and the anterior lobe of the maxillae is hardly differentiated. Therefore, it is transferred to the Barychelidae, where it is placed in the synonymy of *Trichopelma* Simon (1888) (type in MNHP, examined), from which it does not differ in any generic characters.

Hapalothele Lenz (1886): see Taxonomic and Nomenclatural Problems.

Harmonicon F. O. P.-Cambridge (1896) (type in BMNH, examined) is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined), with which it shares all characters of generic significance.

Harpaxictis Simon (1892a) (type in NHMV, examined) is placed in the synonymy of *Mygalarachne* Ausserer (1871) (type in NHMV, examined), from which it does not differ in any characters of generic significance.

Hemiercus Simon (1903a) (type in MNHP, examined) is placed in the synonymy of *Holothele* Karsch (1879b) (type in ZMB, examined), with which it shares the characteristically cracked fourth tarsi.

Hermachastes Pocock (1900a) (type in BMNH, examined), following Purcell (1904), is replaced in the synonymy of *Spiroctenus* Simon (1889g) (type in MNHP, examined).

Hermachola Hewitt (1915b) (type not located; specimen conspecific with type in CAS, examined) is placed in the synonymy of *Hermacha* Simon (1889g) (congeners in AMNH, examined), with which it shares all characters of generic significance and differs only in the spiralled form of the embolus which, in the absence of other evidence, I consider to be a species autapomorphy.

Hermorhachias Mello-Leitão (1941b) (type not located) is placed in the synonymy of *Fufius* Simon (1888) (type in MNHP, examined), with which it shares the long labium and recurved fovea; no other characters warrant the continued separation of the genera.

Hesperopholis Chamberlin and Ivie (1939) (type in AMNH, examined) was originally placed in the Theraphosidae but has three claws, no claw tufts, and is placed in the synonymy of *Calisoga* Chamberlin (1937) (type in AMNH, examined), which was placed in the Ctenizidae and from which it does not differ significantly.

Heteromigella Strand (1908b) (type in RMS, examined) is placed in the synonymy of *Thyropoeus* Pocock (1895d) (type in BMNH, examined), with which it shares the characteristically deep crescent-shaped posterior sternal sigilla and the excavate third tibia, and differs only in a minor difference of the eye group proportions.

Heterophrictus Pocock (1900c) (type in BMNH, examined) is placed in the synonymy of *Plesiophrictus* Pocock (1899b) (type in BMNH, examined), with which it shares all characters of generic significance and differs only in that the scopulae of tarsi of legs I and II are narrowly divided rather than entire. Gravely (1915b) concluded similarly but placed the senior synonym in synonymy.

Homoeoplacis Simon (1892c) (type in MNHP, examined) is placed in the synonymy of *Strophaeus* Ausserer (1875) (type not located), with which it shares the form of the palpal bulb, tibial spur on the first leg of males, and the eye group conformation.

Homogona Rainbow (1914) (types in AMS, examined), according to Main (1983a) differs from *Cataxia* Rainbow (1914) (congeners in QMB and AMS, examined) in the presence of a rastellum—a plesiomorphic character—and an elusive difference in the structure of the spermathecae. However, the types of *Cataxia spinipectoris* Main (1970) (in QMB, examined) and specimens of a new species (from Wolfram, north Queensland; in AMS) are either entirely arastellate or the rastellum spines are so weak and slender (see Main, 1970, figs. 3, 4, 8, 16, 18) that the rastellum must be considered very weak; thus those species are more closely related to *Cataxia maculata* Rainbow (1914) than to *Homogona pulleinei* Rainbow (1914) (both the type species of their respective genera). Other similarities—the absence of leg scopulae, the presence of strong lateral spines on the distal segments of legs I and II, the configuration of the eye group, and the recurved fovea—all support the monophyly of the two "genera." The minor difference of the spermathecae is unconvincing in the absence of a comprehensive study of the spermathecae of *Cataxia*. In fact, Forster and Wilton (1968, figs. 31, 54) placed species with both "types" of spermathecae in *Cantuaria*. Thus, even the spermathecal difference does not warrant the recognition of two genera. The final possible reason for maintaining the two genera as distinct is the "half moon"-shaped trapdoor constructed by *Cataxia* (see Main, 1970). From my observations of *Homogona*, the burrow lacks a door (*H. cunicularia* Main) or has a thin door or collapsed burrow entrance (*H. pulleinei*). Thus, burrow construction is too variable to warrant the separation of the genera. *Cataxia* and *Homogona* were described in the same paper and *Cataxia* includes more species. As first reviser considering which of the two genera should be senior, I place *Homogona* in the synonymy of *Cataxia* and thereby minimize the nomenclatural changes.

Idiothele Hewitt (1919) (type not examined) is placed in the synonymy of *Pterinochilus* Pocock (1897b) (type in BMNH, examined) because it was incorrectly placed in the Barychelidae on the grounds that the spinnerets were slightly shorter than those of most theraphosids; the form of the bulb in association with the scopula on the outer chelicerae allies it with the Harpactirinae and the shorter spinnerets are considered species autapomorphies in *Pterinochilus.*

Ischnocolella Strand (1907c) (types lost; further material in AMNH, examined) was originally compared to *Ischnocolus* Ausserer (1871) (type in BMNH, examined). However, it is placed in the synonymy of *Plesiophrictus* Pocock (1899d) (type in BMNH, examined), with which it shares all characters of generic significance.

Lampropodus Rainbow and Pulleine (1918) (type in AMS, examined) was incorrectly diagnosed as having two spinnerets; however, the posterior median pair was present in life (as evidenced by two large traumatized scars). In other characters of generic significance it resembles *Idiommata* Ausserer (1871) (type in BMNH, examined), into the synonymy of which it is placed.

Lasiopelma Simon (1892a) (type in NHMV, examined) is placed in the synonymy of *Tapinauchenius* Ausserer (1871) (type in ZMB, being too fragile to loan, was kindly examined for me by Dr. M. Moritz), with which it shares the bipartite tibial spur and the pyriform bulb; with other Aviculariinae it shares the characteristic spinose mound on the cymbium.

Lechrictenus Chamberlin (1917) (type in MCZ, examined), of unknown type locality, is presumably from the Indo-West Pacific region because it is placed in the synonymy of *Conothele* Thorell (1878), with which it shares all characters of generic significance.

Legendrella Dresco and Canard (1975) (type not examined) is placed in the synonymy of *Paramigas* Pocock (1895d) (type in BMNH, examined) because they are separated only by a minor difference in the relative spacing of the anterior median eyes that is considered insufficient for generic recognition.

Leptofischelia Strand (1929) (type male lost) is placed in the synonymy of *Trichopelma* Simon (1888) (type in MNHP, examined), with which it shares the similar palpal bulb and tibial apophysis evident in its junior synonym, *Hapalopinus* Simon (1903a) (type in MNHP, examined).

Leptopelma Ausserer (1871) (type on loan to Brignoli from NHMV, not available) is placed in the synonymy of *Ischnocolus* Ausserer (1871) (type in BMNH, examined) because it apparently differs only in possessing a rastellum, which is here presumed to be a species autapomorphy (see Barychelidae, "Leptopelmatinae"). To minimize changes I have retained the historically theraphosid of the two possible names.

Loxophobema Simon (1907) (type in CMG, not examined) is left in the synonymy of *Phoneyusa.*

Loxoptygus Simon (1903a) (type in MNHP, examined) was placed in synonymy by Laurent (1946) without checking the types and on the grounds that the characters that Simon (1892a, 1903a) had used in his key were not significant; however, Simon did not mention the distinct generic autapomorphies given in my key. Consequently, *Loxoptygus* is restored.

Loxoptygella Strand (1906) (type in MNHP, examined) is indifferentiable from *Loxoptygus* Simon (1903a) and is thus placed in synonymy.

Lycinus Thorell (1894) (type in RMS, examined) has the rounded sternum (fig. 97) and abdomen, the wide triangular labium with a deep labiosternal suture, a distinct eye tubercle, and, most significantly, the minute posterior median eyes (see Schiapelli and Gerschman, 1967, figs. 19, 21), all mentioned by Nicolet (1849) in his description of *Mygaloides* Nicolet (1849). No other genus known from Chile has that character combination; therefore, *Lycinus* is placed in the synonymy of *Mygaloides.* Further discussion is given with the diagnosis of that genus.

Magulla Simon (1892c) (type in MNHP, examined) is placed in the synonymy of *Cyclosternum* Ausserer (1871) (congeners in AMNH, examined) because they are separated only by an artificial difference in the distribution of scopulae on metatarsi IV.

Megalosara Rainbow (1914) (type in AMS, examined) was placed in the synonymy of *Dyarcyops* Hogg (1902) (type in BMNH, examined) by Main (1977) but not so recorded by Brignoli (1983). Therefore, as with *Dyarcyops, Megalosara* is placed in the synonymy of *Hermeas* Karsch (1878) (type in ZMB, examined).

Melloa Schenkel (1954) (type in NHMB,

examined) is a junior homonym of the opilionid *Melloa* Roewer, 1930, and is replaced here by *Glabropelma,* new name.

Melloleitaoina Gerschman and Schiapelli (1960) (types in MACN, examined) is placed in the synonymy of *Dryptopelma* Simon (1889f) (type in MNHP, examined) (not included in the revision of "Ischnocolinae" by Gerschman and Schiapelli, 1973a), with which it shares the form of the palp, the tibial spur, and the incrassate third femur.

Melognathus Chamberlin (1917) (type in MCZ, examined) is placed in the synonymy of *Cyriopagopus* Simon (1887b) (type in MNHP, examined) because the only differences between them are considered species autapomorphies.

Melopoeus Pocock (1895b) (type in MNHP and congeners in BMNH, examined) is placed in the synonymy of *Haplopelma* Simon (1892a) (type in MCG, examined) because both share the characteristic high caput, short eye tubercle, and distinct clypeus. Nevertheless, Gravely (1915b) may have been correct in considering *Melopoeus* (and therefore also *Haplopelma*) synonymous with *Cyriopagopus* Simon (1887b).

Merothele Petrunkevitch (1925) (type in PMY, examined) is placed in the synonymy of *Trichopelma* Simon (1888) (type in MNHP, examined), with which it shares the characteristically cracked fourth tarsi and does not differ in any character of generic significance.

Metriopelma Becker (1878) (type in IRSN, examined) was first placed in the synonymy of *Crypsidromus* Ausserer (1871) (congeners in AMNH, examined) by Simon (1892a) but restored by Valerio (1983). However, it is diagnosed by a character found only in females—the spermathecae are entire, rather than divided as in *Crypsidromus sensu stricto*)—that is doubtfully apomorphic. But if it is so then the genus *Crypsidromus* would lack an autapomorphy. Until that problem is solved, I replace *Metriopelma* in the synonymy of *Crypsidromus.*

Misgolas Karsch (1878) (type in ZMB, examined) is generically indistinguishable from *Hermeas* Karsch (1878) (type in ZMB, examined) and appeared in the same paper. As the first reviser, I place *Misgolas* in the synonymy of *Hermeas* (see Addendum).

Monocentropella Strand (1907b) (type lost) is placed in the synonymy of *Citharischius* Pocock (1900b) (type in BMNH, examined), with which it shares the unusually long labium; no other characters warrant the continued separation of the genera.

Myostola Simon (1903a) (type in MNHP, examined) is restored from synonymy for the same reason as for *Loxoptygus* Simon (1903a).

Neischnocolus Petrunkevitch (1925) (type in PMY, examined) is placed in the synonymy of *Crypsidromus* Ausserer (1871) (congeners in AMNH, examined), with which it shares the division of the scopulae of the third tarsi and has the unilobular spermathecae of *Metriopelma* Becker (1878), here also synonymized with *Crypsidromus.*

Nemesiellus Pocock (1900c) (type in BMNH, examined) is placed in the synonymy of *Scalidognathus* Karsch (1891) (type in ZMB, examined), from which it was distinguished only by characters that are sexually dimorphic.

Nemesioides Chamberlin (1919) (type in MCZ, examined): as with *Actinoxia.*

Nemesiothele Dalmas (1920) (type in MCG, examined) is placed in the synonymy of *Brachythele* Ausserer (1871) (congeners in BMNH, examined), with which it shares the serrations of the inner fang edge and the spur characteristic of the Nemesiini. However, as I have indicated above (see Systematics, *Nemesia*), the presence of a rastellum, albeit weak, would otherwise place this species in *Nemesia.* Thus, *Nemesia* may simply be a group of rastellate species lacking any other defining character.

Neochilobrachys Hirst (1909) (type in Zoological Survey of India collection, not available) is placed in the synonymy of *Phlogiellus* Pocock (1897c) (type in BMNH, examined), with which it shares the presence of a third claw on the fourth leg and the sparse lyra setae, and from which it differs in no other generic characters; as noted by Simon (1903a), the type species of both are synonymous.

Neostothis Vellard (1925) (types lost) is placed in the synonymy of *Chaco* Tullgren (1905) (type in RMS, examined), with which it shares the extent of the scopulae on the third and fourth tarsi, the wide labium, and the assumed absence of the third tarsal claw (*Neostothis* was originally included in the Barychelidae).

Nhandu Lucas (1981b) (type not examined) is placed in the synonymy of *Mygal-*

arachne Ausserer (1871) (type in NHMV, examined) because it differs insufficiently from *Sericopelma* (=*Mygalarachne*) in the conformation of the palpal bulb.

Nossibea Strand (1907a) (types lost) is placed in the synonymy of *Tigidia* Simon (1892c) (type in MNHP, examined), with which it shares the absence of the posterior median spinnerets.

Obaerarius Petrunkevitch (1926) (type not located) is placed in the synonymy of *Trichopelma* Simon (1888) (type in MNHP, examined), with which it shares a similar eye group configuration, the absence of the clypeus, the numerous labial cuspules, and the presence of scopulae on tarsi III and IV.

Pachyidiops Simon (1903a) (type in MNHP, examined), in agreement with Gravely (1915b) but not so recorded by Bonnet (1957), is placed in the synonymy of *Idiops* Perty (1833) (type lost; congeners in AMNH, examined), from which it does not differ in any character of generic significance.

Pachypelma Karsch (1880) and its type species *Mygale oculata* Nicolet (1849) are considered *nomina dubia* (see Taxonomic and Nomenclatural Problems).

Parapselligmus Toledo Piza (1939) (type not located) is placed in the synonymy of *Rachias* Simon (1892a), with which it shares the dense scopulae on tarsi III, and the densely grouped maxillary cuspules. No other characters given warrant the continued separation of the two genera.

Paromostola Purcell (1903) (type in SAMC, not located) is placed in the synonymy of *Homostola* Simon (1892c) (type in USNM collection at AMNH, examined) because the differences upon which the genus was based are insufficient to warrant its continued recognition.

Pelinobius Karsch (1885) (type in ZMB, examined) is placed in the synonymy of *Phoneyusa* Simon (1884) (congeners in BMNH, examined), as suggested by Pocock (1898), because the only significant difference between the two genera is that *Pelinobius* lacks a single ventral spine on tibia IV. Simon's (1892a, 1903a) concepts of *Pelinobius* were incorrect.

Pelmatorycter Pocock (1902a) (type in BMNH, examined) is placed in the synonymy of *Ancylotrypa* Simon (1889g) (type in MNHP, examined), from which it differs only in having a slightly more elevated eye tubercle which is here considered only a species autapomorphy.

Petropolisia Mello-Leitão (1920a) (type in MRJ, examined) is placed in the synonymy of *Pselligmus* Simon (1892c) (type in USNM collection at AMNH, examined), with which it shares the extent of the leg scopulae and the absence of a third claw on the first three pairs of legs and differs only in that *Petropolisia* has spinose leg tarsi that, alone, is considered insufficient to warrant the continued separation of the two genera.

Phaeoclita Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Bolostromus* Ausserer (1875) (type in BMNH, examined) which Simon (1892a, 1903a) seems to have misunderstood; none of the characters given for *Phaeoclita* distinguish it from *Bolostromus*.

Phlogiodes Pocock (1899b) (type in BMNH, examined) is placed in the synonymy of *Haploclastus* Simon (1892a) (type in CMG, examined), with which it shares the characteristic transversely oriented arrangement of spinules on the prolateral face of the maxillae and differs in no other generic characters.

Pisenorina Benoit (1966) (type in MRAC, examined) is placed in the synonymy of *Cyphonisia* Simon (1889g) (type in MNHP, examined), from which it differs only in the presence of cuspules on the first coxae. That alone is considered insufficient to warrant generic recognition and is presumed to be a species autapomorphy.

Pisenorodes Pocock (1898) (type in MNHP, examined) was incorrectly placed in the synonymy of *Pisenor* Simon (1889g) (type in MNHP, examined; see synonymy of *Urothele* for further discussion) and is placed in the synonymy of *Cyphonisia* Simon (1889g) (type in MNHP, examined), from which, contrary to Benoit (1966), neither the shape of the eye group nor the relative leg thicknesses are adequate to separate it.

Plesiopelma Pocock (1901b) (type in BMNH, examined) is placed in the synonymy of *Citharacanthus* Pocock (1901b) (type in BMNH, examined), from which it differs inadequately in the characters given by Pocock (1901b) and Valerio (1980).

Proshapalopus Mello-Leitão (1923) (type in MRJ, examined) is placed in the synonymy of *Stichoplastus* Simon (1889d) (congeners in

AMNH, examined), with which it shares the form of both the palpal bulb and tibial spur, and has similarly scopulate tarsi.

Prosharmonicon Mello-Leitão (1938) (type in IBB, examined) is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined), with which it shares all the characters of generic significance.

Proshermacha Simon (1908) (type in ZMH, examined) was placed in the synonymy of *Chenistonia* Hogg (1901) (type in BMNH, examined) by Main (1982a) which is here retained in the synonymy of *Aname* L. Koch (1873) (type in ZMH, examined).

Psalistopoides Mello-Leitão (1923) (type in IBB, examined) is placed in the synonymy of *Pselligmus* Simon (1892c) (type in USNM collection at AMNH, examined), with which it shares the absence of a third claw on tarsi I–III and the weak scopulae on the legs.

Pseudhapalopus Strand (1907a) (type lost) is placed in the synonymy of *Paraphysa* Simon (1892a) (type in MNHP, examined), with which it shares all characters of generic significance given in the original description.

Pseudidiops Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Idiops* Perty (1833) (congeners in AMNH, examined) because they differ in only the relative proportions of the sternum, the number of labial cuspules, and the extent of the cuspules along the maxillae—all characters that are not readily definable and questionably apomorphic.

Pseudohermacha Strand (1907a) (type lost) was distinguished from *Hermacha* Simon (1889g) (congeners in AMNH, examined) in the weak scopulae on the first metatarsi and tarsi. Those characters indicate that it is related to *Entypesa* Simon (1902a) (type in MNHP, examined) and because they differ in no character of generic significance, *Pseudohermacha* is placed in the synonymy of *Entypesa.*

Pterinochilides Strand (1920) (types in IRSN, examined) was placed in the synonymy of *Pterinochilus* Pocock (1897b) (type in BMNH, examined) by Laurent (1946) but not so noted by Brignoli (1983). I concur with Laurent's decision that none of the characters warrant generic status.

Pterinopelma Pocock (1901b) (congeners in AMNH, examined) is placed in the synonymy of *Rhechostica* Simon (1892a) (type in USNM collection at AMNH, examined), from which it differs only in the relative size of the anterior median eyes and the relative size of the spinules on the prolateral coxae (see Valerio, 1980).

Pycnothelopsis Schiapelli and Gerschman (1942) (types in MACN, examined) is placed in the synonymy of *Androthelopsis* Mello-Leitão (1934) (type in IBB, examined) for the reasons given in the systematic treatment of that genus.

Rhianus Thorell (1890) (type in CMG, examined) is preoccupied in the Coleoptera by *Rhianus* Pascoe, 1889, but no replacement name has been proposed previously. Simon (1892a) used *Rianus,* which is either an invalid emendation or a *lapsus calami*; to avoid confusion with that I here propose another name, *Rhianodes,* new name, to replace *Rhianus* Thorell.

Ryuthela Haupt (1983) (type in ZMH, not examined) is placed in the synonymy of *Heptathela* Kishida (1923) (congeners in AMNH, examined) and the action discussed in Male Palpal Bulb.

Schismatothele Karsch (1879b) (type in ZMB, examined) is placed in the synonymy of *Holothele* Karsch (1879b) (type in ZMB, examined), with which it shares the characteristic crack on the fourth tarsi and was described in the same work.

Scodra Becker (1879) (type lost?; congeners in IRSN, examined) is a junior homonym of *Scodra* Heinemann, 1959 and contrary to Bonnet (1958) requires replacement. However, as observed by Simon (1892a), it is synonymous with *Stromatopelma* Karsch (1881a) (type in ZMB, examined), which thus replaces *Scodra* Becker.

Scopelobates Simon (1903a) (type in MNHP, examined) is placed in the synonymy of *Holothele* Karsch (1879b) (type in ZMB, examined) for the same reasons as for *Hemiercus.*

Sericopelma Ausserer (1875) (congeners in AMNH, examined) is placed in the synonymy of *Mygalarachne* Ausserer (1871) (type in NHMV, examined), with which it shares all characters of generic significance with the exception that the scopula on femur IV is not well developed. However, because males with and without a well-developed scopula on femur IV are otherwise indistinguishable, the reduced scopula is considered a reversal rather than (less parsimoniously) as a plesiomorphic condition.

Sickius Soares and Camargo (1948) (types not located) is placed in the synonymy of *Hapalotremus* Simon (1903a) (type not examined), with which it shares the conformation of the tibial spur and the associated bent metatarsus (both of the first leg); no other difference given warrants generic separation.

Sorata Strand (1907a) (type lost) is placed in the synonymy of *Grammostola* Simon (1892a) (congeners in AMNH, examined), with which it shares the presence of plumose hairs on basal leg segments; the minor difference in the distribution of those hairs does not warrant generic recognition.

Stasimopella Roewer (1953) (type in MRAC, examined) is placed in the synonymy of *Ancylotrypa* Simon (1889g) (type in MNHP, examined), with which it shares all characters of generic significance; it was recognized only through an incorrect notion of the characters of *Ancylotrypa.*

Sterrhochrotus Simon (1892a) (type in Zoological Museum, Moscow State University, examined and description provided by S. L. Zohnstein, Academy of Sciences of Kirgiz, U.S.S.R.) is placed in the synonymy of *Cteniza* Latreille (1829), from which (contrary to Simon, 1892a) it does not differ in the eye group configuration or any other character of generic significance.

Stictogaster Purcell (1902b) (type in SAMC, examined) is placed in the synonymy of *Homostola* Simon (1892c) (type in USNM collection at AMNH, examined), from which it does not differ in any characters of generic significance.

Stothis Simon (1889d) (type in MNHP, examined) is placed in the synonymy of *Trichopelma* Simon (1888) (type in MNHP, examined) although it lacks the characteristic crack on tarsi IV. It may be better placed in the synonymy of *Psalistops* Simon (1889d); however, that genus lacks scopulae on tarsi III and IV, present in *Trichopelma* and *Stothis.* I doubt that even the crack of the fourth tarsi will warrant generic status but only a revision of those related taxa will resolve that question; until then I place *Stothis* in the synonymy of *Trichopelma* and retain *Psalistops* as distinct.

Tambouriniana Rainbow and Pulleine (1918) (type in AMS, examined) is placed in the synonymy of *Arbanitis* L. Koch (1874) (type lost; congeners in QMB, examined) in agreement with Main (1967) (not recorded by Brignoli, 1983).

Taunayella Mello-Leitão (1923) (type in MZSP, examined) is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined), with which it shares all characters of generic significance.

Terania Raven (1980b) is preoccupied by the hemipteran *Terania* Pirán, 1963, and is replaced by *Teranodes,* new name.

Thalerothele Bertkau (1880) (types lost) is placed in the synonymy of *Diplura* C. L. Koch (1851) (type in ZMB, examined) for reasons given in the systematic treatment of that genus.

Theragretes Ausserer (1871) is placed in the synonymy of *Actinopus* Perty (1833) for reasons given in Taxonomic and Nomenclatural Problems.

Titanidiops Simon (1903a) (type in MNHP, examined), in agreement with Gravely (1915b), is placed in the synonymy of *Idiops* Perty (1833) (congeners in AMNH, examined), from which it differs only in the presence of spinules on coxae III; that is not here considered sufficient to warrant generic recognition.

Tmesiphantes Simon (1892c) (type in MNHP, examined) is synonymized with *Dryptopelma* Simon (1889f) (type in MNHP, examined), from which it differs only in artificial characters (see Gerschman and Schiapelli, 1973a). The enlargement of the third femur is considered too indeterminate to warrant the recognition of "genera" in which it is less evident.

Trasyphoberus Simon (1903a) (type not examined), in agreement with Lucas (1981a), is placed in the synonymy of *Acanthoscurria* Ausserer (1871) (congeners in RMS and AMNH, examined) because they are separated only by an artificial difference in the relative extent of the scopulae on metatarsi of the fourth leg (see Schiapelli and Gerschman, 1979).

Tryssothele Simon (1902b) (congeners in AMNH and MNHP, examined) is placed in the synonymy of *Acanthogonatus* Karsch (1880), erroneously placed in the Barychelidae, and is explained in the systematic treatment of that genus.

Urothele Tullgren (1910) (congeners in MRAC, examined) was considered distinct because *Pisenor* Simon (1889g) (type in MNHP, examined) was incorrectly described as having four spinnerets. In fact, the type of *Pisenor* has only two spinnerets, with no sign of the posterior median spinnerets ever having been present. Thus, *Urothele* is placed in the synonymy of *Pisenor* because no characters of generic significance warrant its continued recognition.

Uruchus Simon (1889f) (type in MNHP, examined) is placed in the synonymy of *Linothele* Karsch (1879b) (type in ZMB, examined), from which it differs only in having slightly denser scopulae on tarsi I and II, insufficient in itself to warrant generic recognition. The previous synonymy of *Linothele* with *Diplura* by Raven (1980b) was based upon the assumption that the latter is alyrate, as indicated by Simon (1892a, 1903a).

"*Yamia*" Kishida (1928), although listed by Roewer (1942), is a *nomen nudum* (Bonnet, 1959).

Zophopelma Benoit (1965c) (types in MRAC, examined) is placed in the synonymy of *Euphrictus* Hirst (1908) (types in BMNH, examined), with which it shares the form of the palpal bulb, the presence of a cheliceral rastellum, and the similar scopulation of the legs.

Zygopelma Chamberlin and Ivie (1938) (type not located) is placed in the synonymy of *Thalerommata* Ausserer (1875) (type in BMNH, examined), with which it shares all characters of generic significance given in the description.

NEW COMBINATIONS
(Apart from Those Created Directly by the Synonymy of Genera)

Accola australis Mello-Leitão (1939) (type in NHMB, examined) is transferred to "*Euagrus*" because it lacks the autapomorphies of the Masteriinae.

Achetopus erlandi Tullgren (1905) and *A. parallelus* Mello-Leitão (1923) (types not examined) are transferred to *Diplura* (see Systematics).

Ancylotrypa panamana Petrunkevitch (1925) (type in PMY, examined) is transferred to *Bolostromus,* with which it shares the subquadrate maxillae, characteristic of the Aporoptychini.

Aporoptychus africanus Simon (1889g) (type in MNHP, examined), *A. decoratus* Lessert (1938) (type in MRAC, examined), and *A. machadoi* Lessert (1938) (type in MRAC, examined) are transferred to *Acontius* for the same reasons as the type species of *Aporoptychus.*

Brachythele antillensis F. O. P.-Cambridge (1898) (type in BMNH, examined) is transferred to *Fufius* because it has all the characteristics of that genus.

Brachythele incursa Chamberlin (1916) (type in MCZ, examined) is tentatively transferred to *Bolostromus* until a revision of the genus permits a better placement.

Brachythele theveneti Simon (1891a) (type in MNHP, examined) is transferred to *Calisoga,* with which it shares the characteristic clavate setae on the prolateral face of the chelicerae.

Cyrtauchenius maculata Bertkau (1880) (type lost) is transferred from *Rachias* (where it was placed by Mello-Leitão [1926]) to *Bolostromus,* with which it agrees with all characters of generic significance.

Cyrtauchenius simile Ausserer (1871) (type in BMNH, examined) is transferred from *Amblyocarenum* back to *Cyrtauchenius* (see Systematics).

Diplura brachythele Mello-Leitão (1937) (type in IBB, examined) is transferred to *Rachias,* with which it shares the unusual form of the palpal bulb.

Diplura dolichosterna Mello-Leitão (1938) (type in IBB, examined) is transferred to *Rachias,* as in *Diplura brachythele.*

Diplura longicauda Ausserer (1871) (type in NHMV, examined) is transferred to *Linothele* because it also lacks a maxillary lyra.

Dryptopelmides rondoni Lucas and Bücherl (1972) (type not examined) is transferred to *Dryptopelma,* with which it shares the form of the palpal bulb and tibial spur.

Eurypelma steindachneri Ausserer (1875) (type not examined) is transferred to *Rhe-*

chostica, with which it shares the presence of a double spur on the first tibia of males and the form of the bulb.

Eurypelma tripeppi Dresco (1984) (type not examined) is transferred to *Hapalopus* (congeners in AMNH, examined), with which it shares the unusual form of the palpal bulb and tibial apophysis.

Hapalothele (*Fufius*) *garleppi* (Simon, 1892c) (type in MNHP, examined) is transferred to *Diplura,* with which it shares the presence of a maxillary lyra and the other characters of the Diplurinae.

Hermacha purcelli Tucker (1917) is a secondary junior homonym and is replaced by *Hermacha tuckeri,* new name.

Homoeoplacis austeni F. O. P.-Cambridge (1896) (type in BMNH, examined) is transferred to *Strophaeus* for the same reasons as the type species of *Homoeoplacis.*

Idioctis palmarum Hogg (1902) (type in AMS, examined) lacks the very characteristic narrow sternum of *Idioctis* and, contrary to Hogg (1896), the eye group is subquadrate and not widely trapezoidal; it is transferred to *Idiommata,* with which it shares all characters of generic significance.

Idiommata schomburgki Karsch (1878) (type in ZMB, examined) lacks claw tufts, and possesses a third claw and distal haematodocha as in other idiopids; it is transferred to *Hermeas,* with which it shares all characters of generic significance.

Idiommata sordida Rainbow (1898) (type in QMB, examined), transferred by Main (1981b) to *Idioctis,* lacks the characteristic narrow sternum, wide fovea, and wide trapezoidal eye group of that genus; it is transferred to *Sipalolasma,* with which it shares the rectangular eye group, domed apical segment of the PLS, and cuspules on the labium.

Ischnothele (sp.) was considered by Schawaller (1982) to be the genus of a species he described (but did not name) from Dominican amber. Schawaller's figures show the compact eye group with the reduced AME and the unpaired claw with a number of teeth on a single process which are the diagnostic characters of the Masteriinae. Thus, the species is here considered a *Masteria.*

Mygale conspersa Walckenaer (1837) (probable type in BMNH, examined) is transferred to *Pselligmus,* with which it shares the extent of scopulae on the legs and the domed apical segment of the PLS.

Psalistops auripilus Mello-Leitão (1946) (type in IBCE, examined) is transferred from *Pycnothelopsis,* where it was transferred by Capocasale and Pérez-Miles (1979), to *Androthelopsis,* where it may be a junior synonym of *A. modestus* (Schiapelli and Gerschman) (see Systematics).

Psalistops corozali Petrunkevitch (1929) (type in AMNH, examined) is transferred to *Trichopelma,* with which it shares all characters of generic significance.

Pselligmus argentinensis Schiapelli and Gerschman (1958) (type in MACN, examined) is transferred to *Stenoterommata,* with which it shares the similar extent of leg scopulae and form of the palpal bulb, in association with the presence of a third claw.

Pycnothelopsis tacauriensis Pérez-Miles and Capocasale (1982) (type in IBCE, examined) is transferred to *Acanthogonatus,* with which it shares all characters of generic significance (see Systematics).

Rachias intermedia Soares (1944) (type not located) is transferred to *Androthelopsis,* with which it shares the pseudosegmented tarsi of the male.

Sasonichus arthrapophysis Gravely (1915b) (type not examined) is transferred to *Sipalolasma,* with which it shares the presence of a tibial spur and labial cuspules.

Scalidognathus seticeps Karsch (1891) (type in ZMB, examined) is removed from the synonymy of *Scalidognathus radialis* (O. P.-Cambridge, 1869) (type in HMO, examined).

Stenoterommata gounelli Simon (1886) and *S. segne* Simon (1886) (types of both in MNHP, examined) are transferred to *Acanthogonatus* with which they share the similarly extensive tarsal scopulae in association with the digitiform apical segment of the PLS.

Tmesiphantes elegans Gerschman and Schiapelli (1958) and *T. serratus* Gerschman and Schiapelli (1958) (types not examined) are left as synonyms of *Homoeomma,* as noted by Gerschman and Schiapelli (1973a), with which they share the similar basal process on metatarsus I of males (see Schiapelli and Gerschman, 1970, figs. 1–4; Schiapelli and Gerschman, 1958).

Trechona auronitens Keyserling (1891) (type in BMNH, examined) is transferred from *Pycnothelopsis,* where it is was placed by Capocasale and Pérez-Miles (1979) in *Pycnothele* (see Systematics).

Tryssothele fuegiana Simon (1902b) (types in ZMH, examined) is transferred to *Acanthogonatus* along with the type species of *Tryssothele.*

Ummidia gressitti Roewer (1963) (type in USNM, examined) is transferred to *Conothele,* with which it shares the three spines transversely on the distal third tibia.

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ADDENDUM

According to the third edition of the International Code of Zoological Nomenclature (Article 70(c)), the type species of *Eurypelma* (see Taxonomic and Nomenclatural Problems) is *Eurypelma avicularia* L. Koch (1851), a new nominal species.

Main (1985a) has chosen the name *Misgolas* Karsch (1878) as the senior synonym of (the more euphonious) *Hermeas,* published in the same paper and here selected as the senior. Because Main is the first reviser, her name is valid and all references to *Hermeas* as the senior synonym in this paper should be to *Misgolas.*

From the description, the characters of *Neohomogona* Main (1985a) (types not examined) indicate that is only the sister group of species within *Cataxia,* as herein defined. The characters of *Neohomogona* are either species group autapomorphies or too vague (more compact eye group) to give them generic significance. Hence, until then, I place *Neohomogona* into the synonymy of *Cataxia.* Main (1985a) gives no information that indicates decisions taken here should be otherwise revised.

Main (1985b) has used the name *Hadronyche* as a valid name for species previously included in *Atrax,* the medically infamous Australian funnel-web spider. No reason was given. Hence, despite the almost universal usage of the name *Atrax* in extensive literature, the suppression of the virtually unknown name will not be sought, as stated by Gray (personal commun.).

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(Valid generic names are printed in italics, suprageneric names in boldface, primary locations in boldface.)