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Mecicobothriidae (Araneae, Mygalomorphae)

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A Revision of the Spider Family Mecicobothriidae (Araneae, Mygalomorphae)

WILLIS J. GERTSCH¹ AND NORMAN I. PLATNICK²

ABSTRACT

The Argentinean spider *Mecicobothrium thorelli* Holmberg is redescribed on the basis of the first specimens to be discovered since the long lost holotype was collected in 1881; the female is described for the first time. The female of the Californian species *Megahexura fulva* (Chamberlin) is redescribed and the male described for the first time. *Hexura picea* Simon from Washington and Oregon is redescribed and a new species, *Hexura rothi*, is described from Oregon. A new genus, *Hexurella*, is established for four new species: *H. pinea* and *H.*

apachea from Arizona, *H. rupicola* from California, and *H. encina* from Baja California. The presence of an elongated, cymbium-shaped tarsus surrounding the male palpal bulb is suggested to be synapomorphic for the family. Evidence from the structure of the tarsal organ is used to support the previous rejection of a hypothesized sister-group relationship between the Mecicobothriidae and Antrodiaetidae in favor of one between the Mecicobothriidae and Dipluridae.

INTRODUCTION

On May 8, 1881, in the small town of Tandil, Argentina, Eduardo Holmberg discovered a curious mygalomorph spider. It was living in a small web consisting of a 2 cm. long silk tube, bowed at the middle, with one of the openings ending on a 2 cm. square mat. The single male, only 6.2 mm. long, was named *Mecicobothrium thorelli* and considered by Holmberg (1882) to be the most unusual mygalomorph representative of the Argentine fauna. Because of its shallow, longitudinal thoracic groove and elongated, cymbium-shaped palpal tarsus (features otherwise unknown among mygalomorphs), and because of

the great similarity between its web and that of the sympatrically occurring araneomorph spider *Tegenaria*, Holmberg felt obliged to place *Mecicobothrium* in a family of its own. His verbal description was long, detailed, and supplemented by a full plate of 12 figures.

Two years later, Simon (1884) reviewed the genus on the basis of Holmberg's description and described a related genus, *Hexura*, from Washington. Since that time, *Mecicobothrium* has remained enigmatic, and the association with it of North American forms tentative, because as Gertsch (1979, p. 120) recently indicated, Holmberg's single male specimen "has

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long been lost and . . . no [additional] specimens have been taken since or are known to be deposited in any world museum."

Through the courtesy of Dr. Emilio A. Matury of the Museo Argentino de Ciencias Naturales, we have been privileged to examine a series of *Mecicobothrium* recently collected in the vicinity of the Sierra de la Ventana of southeastern Argentina. These specimens, together with much North American material accumulated over the past four decades, have allowed us to present below a revision of the entire family and a reconsideration of its relationships.

RELATIONSHIPS

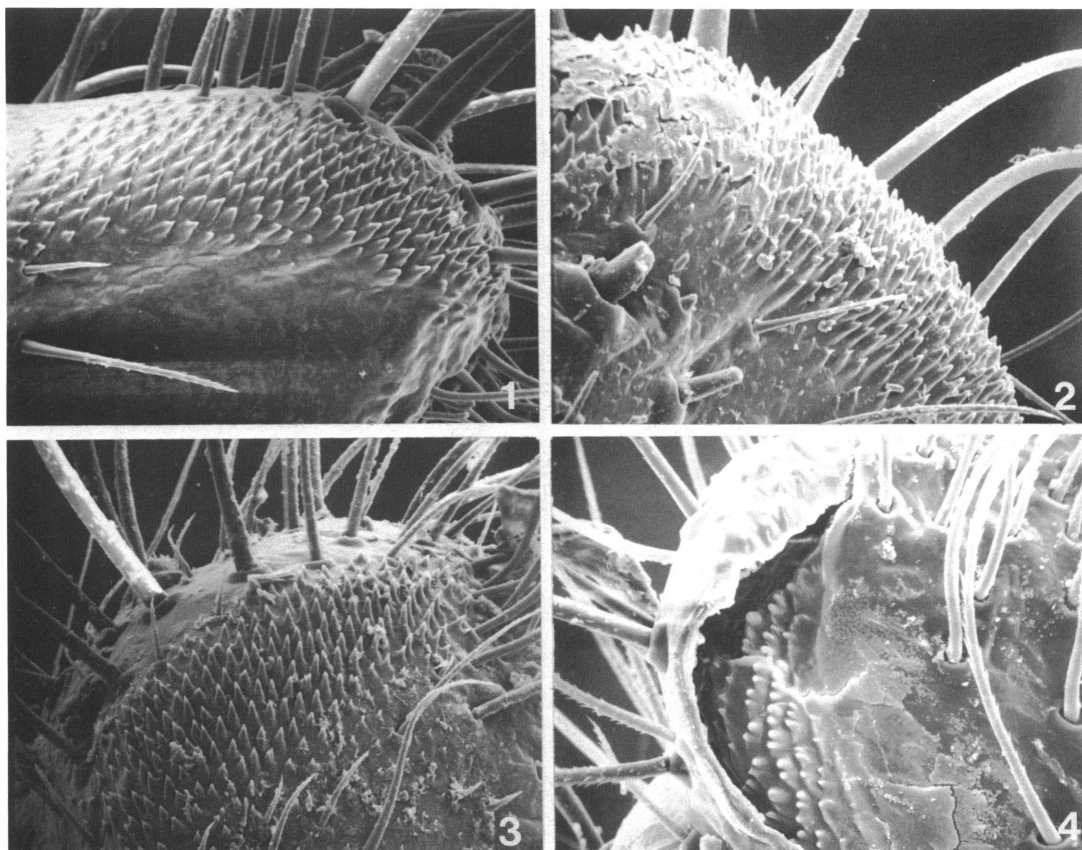
Three questions will be considered here: first, whether the mecicobothriids represent a natural (i.e., putatively monophyletic) group; second, the identity of their closest relatives; and third, how the various mecicobothriid species are interrelated. The first of these questions is relatively unproblematic; as Holmberg (1882) noted, the male palpi of *Mecicobothrium* (figs. 44-50) bear a striking resemblance to those of araneomorph spiders and differ from those of all other mygalomorphs in having the tarsus prolonged far beyond the tip of the palpal bulb, forming a structure (analogous to the cymbium of araneomorph spiders) into the recesses of which the elongated embolus and conductor fit. Similar (although not so pronounced) elongations of the palpal tarsus occur in the other mecicobothriid genera treated below. Since in both families (the Antrodiaetidae and Dipluridae) which have been considered closest relatives of the Mecicobothriidae the palpal tarsus either does not extend beyond the palpal bulb or, if it does (as in *Ischnothele*), does not enclose the palpal bulb, the elongated tarsus enclosing the bulb is regarded as synapomorphic for the family. One other character noted by Holmberg may also be a defining character of the Mecicobothriidae: the thoracic groove, usually transverse in mygalomorphs, is shallow and longitudinal. A longitudinal thoracic groove also occurs in two of the three genera of Antrodiaetidae (*Antrodiaetus* and *Atypoides*), but in those genera the groove is deep and

greatly depressed at each end; a similar groove in *Microhexura* (Dipluridae) is also somewhat deepened and expanded anteriorly. Hence the shallow longitudinal groove may well be unique among mygalomorphs (although similar grooves are common in the Araneomorphae); studies of endosternite morphology in these genera might help resolve the question.

As indicated above, two alternate hypotheses of relationship have been put forward regarding the Mecicobothriidae, and they have a curious history. Simon (1884), on the basis of the thoracic groove and five other cited characters (none of which is unique to the groups concerned), proposed that the mecicobothriids are close relatives of the Antrodiaetidae. Indeed, he subsequently (1889, 1891, 1892) placed the two groups, together with *Atypus* and *Calommata*, in a family (Atypidae) separate from all the other mygalomorphs (placed in the Aviculariidae), although he later (1903) restricted the Atypidae by transferring the mecicobothriids and antrodiaetids to the Aviculariidae. Simon's initial hypothesis of a close mecicobothriid-antrodiaetid relationship was accepted without question by his contemporaries (Banks, 1892; Pocock, 1903; Comstock, 1903; Smith, 1908) in spite of the fact that the mecicobothriids share with the Dipluridae highly elongated lateral spinnerets with pseudosegmented terminal segments which are used to construct funnel-webs and which are not found in other mygalomorphs.

Petrunkévitch (1923, 1928, 1939) pointed out this discrepancy regarding the posterior lateral spinnerets and placed the mecicobothriids as a subfamily of the Dipluridae. Although Petrunkévitch made this transfer without presenting any detailed argumentation, his views were accepted by workers of the following two decades (Berland, 1932; Gertsch, 1936; Caporiacco, 1938; Gerhardt and Kästner, 1938; Roewer, 1942) with as much unanimity of opinion as had been those of Simon.

Opinion shifted again, however, when Chamberlin and Ivie (1945, p. 549) presented a list of five characters differentiating the Atypidae, Antrodiaetidae, and Mecicobothriidae (the "Atypoidea") from all other mygalomorphs (the "Ctenizoidea") and concluded



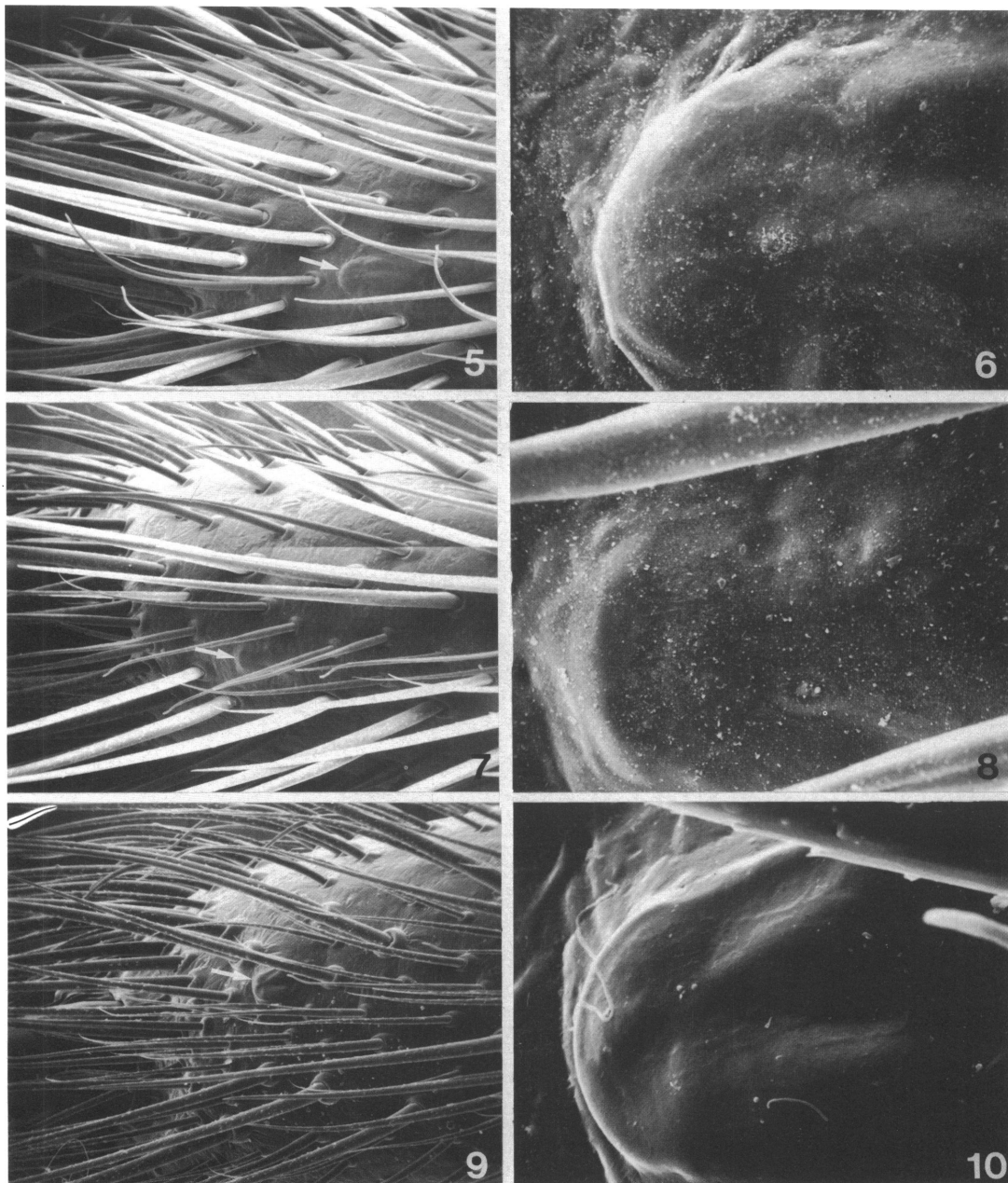
FIGS. 1-4. Serrula of female, scanning electron micrographs, 500 \times (figs. 1-3), 950 \times (fig. 4). 1. *Mecicobothrium thorelli* Holmberg. 2. *Megahexura fulva* (Chamberlin). 3. *Hexura picea* Simon. 4. *Hexurella rupicola*, new species.

that "There is a convergence in general structure and habit between the Hexuridae [=Mecicobothriidae] and the Dipluridae, . . . Hexuridae closely resembles Dipluridae and makes similar loose sheet webs under stones and trash; both have elongate spinnerets." The view that the similarities between the spinnerets and webs of diplurids and mecicobothriids are due to convergence was accepted by such authors as Archer (1948), Coyle (1971, 1975), Kaston (1972, 1978), and Gertsch (1949, p. 130), who stated that

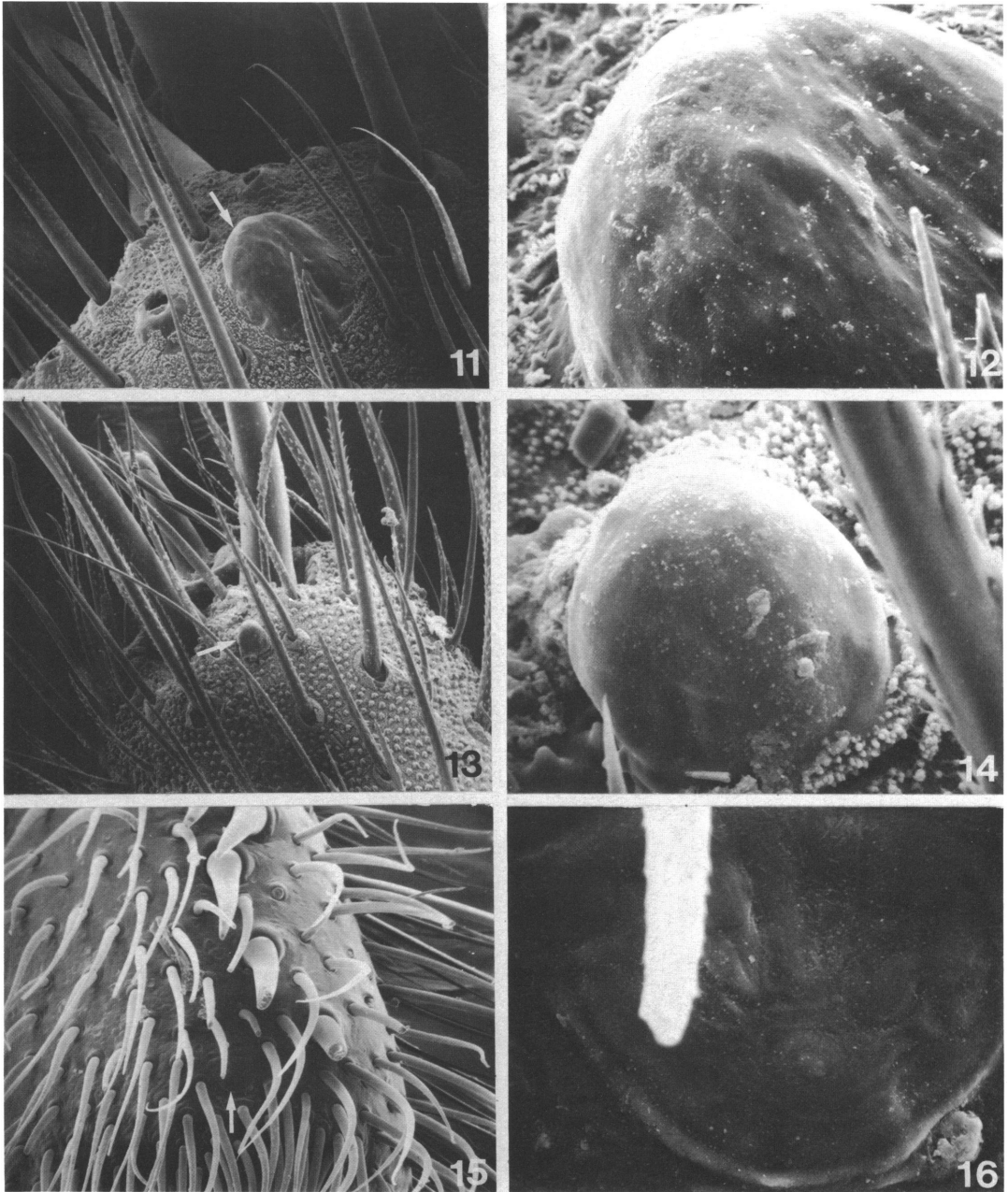
It is of particular interest that among the atypical tarantulas we should find a group that parallels very closely the sheet-web tarantulas of the fam-

ily Dipluridae. The hind spinnerets of these spiders are greatly elongated (particularly the terminal segment, which is flexible) and rather widely spaced; this is probably an adaptation for spinning the sheet web, and it illustrates how in widely unrelated creatures similar activities often lead to the production of similar morphological features. The resemblance between *Hexura* and the diplurids is an amazing one. We find it running over a silken sheet web as do its distant relatives. Were we not deterred by what appear to be more fundamental features, we would ordinarily place them close together, perhaps deriving one directly from the other.

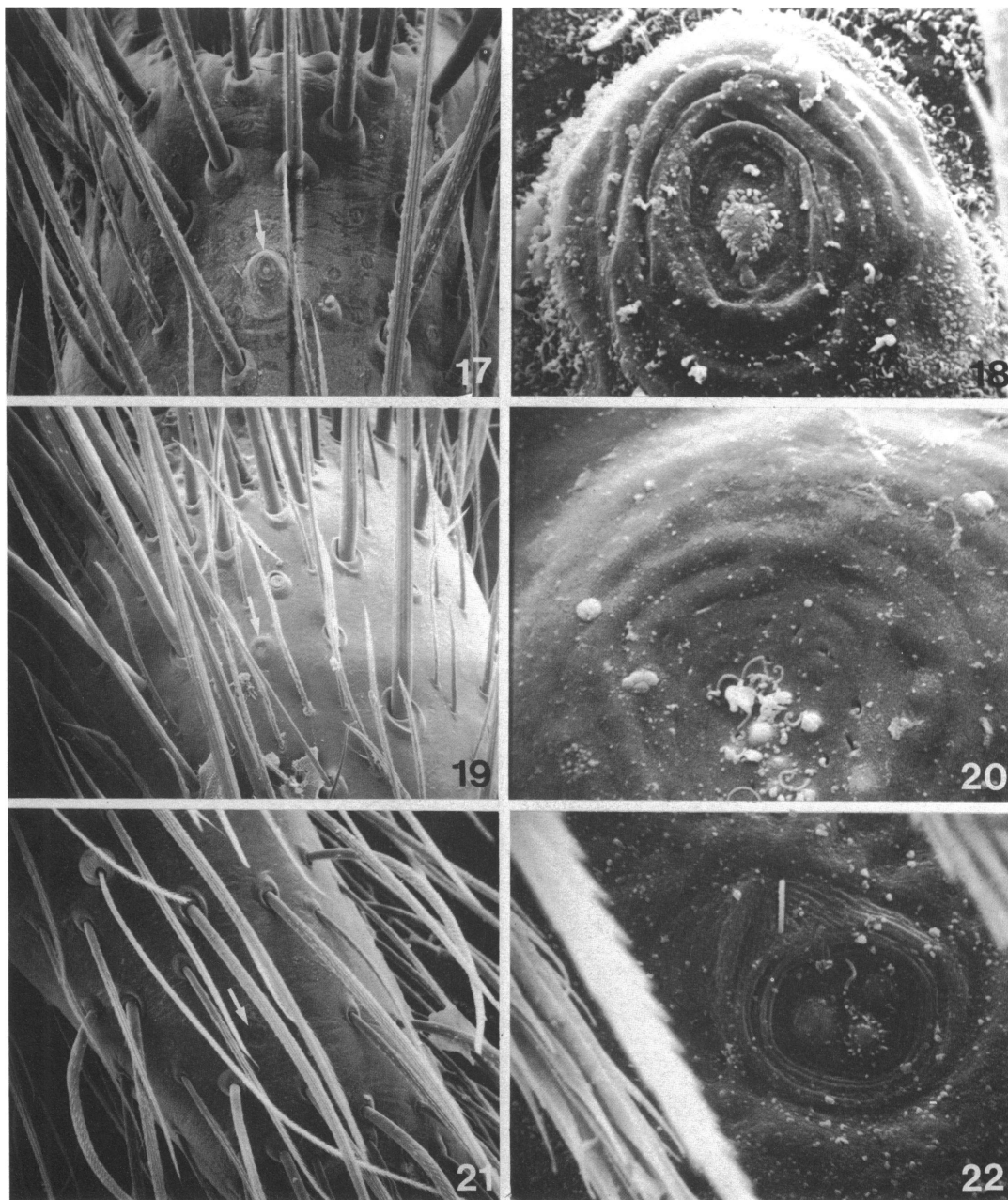
However, Platnick (1977, pp. 14-15) reexamined the characters that had been used to



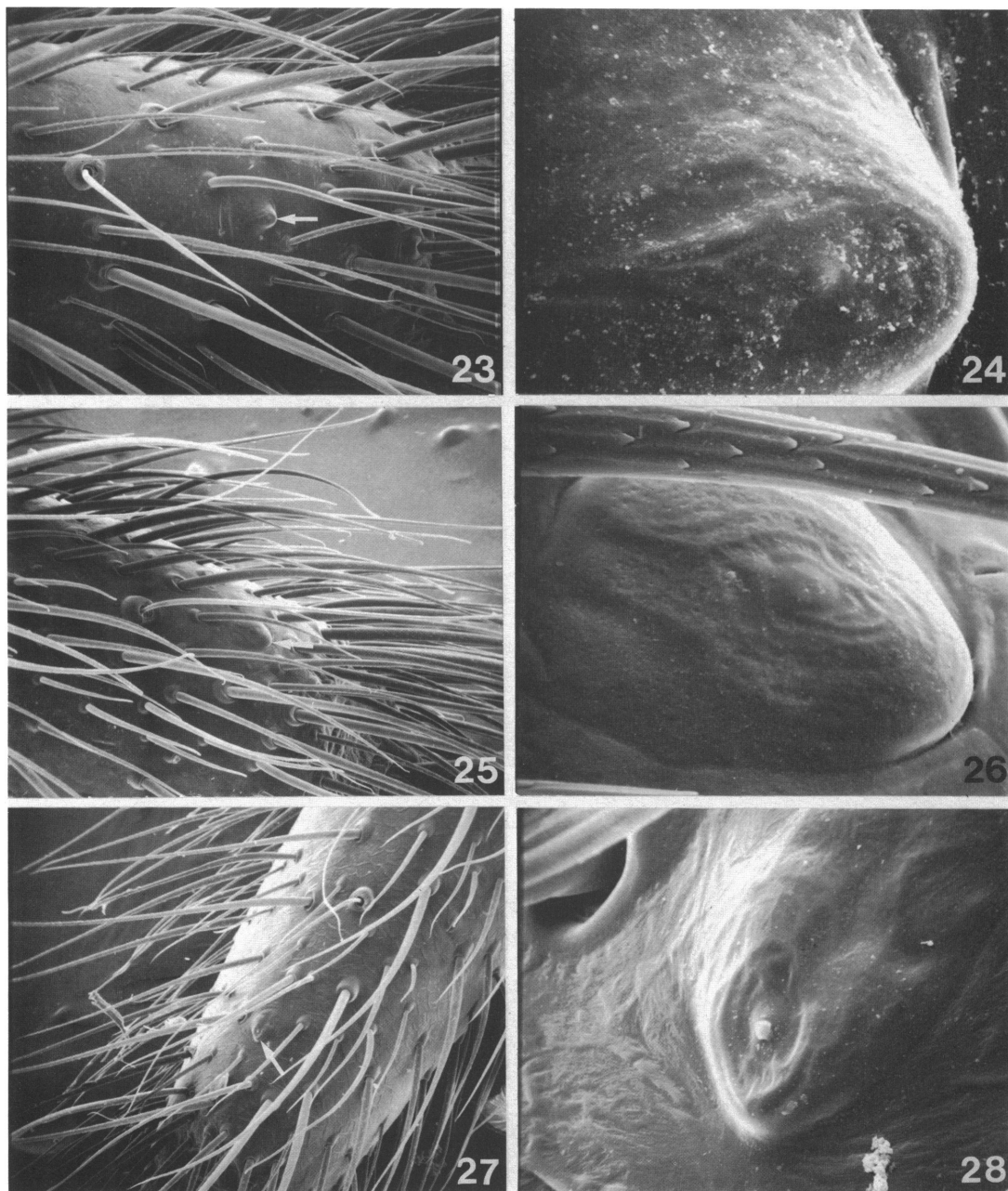
FIGS. 5-10. Distal end of tarsus I (left, 190 \times) and tarsal organ (right, 1900 \times) of female, scanning electron micrographs. 5, 6. *Antrodiaetus unicolor* (Hentz). 7, 8. *Atypoides riversi* O. P.-Cambridge. 9, 10. *Aliatypus californicus* (Banks).



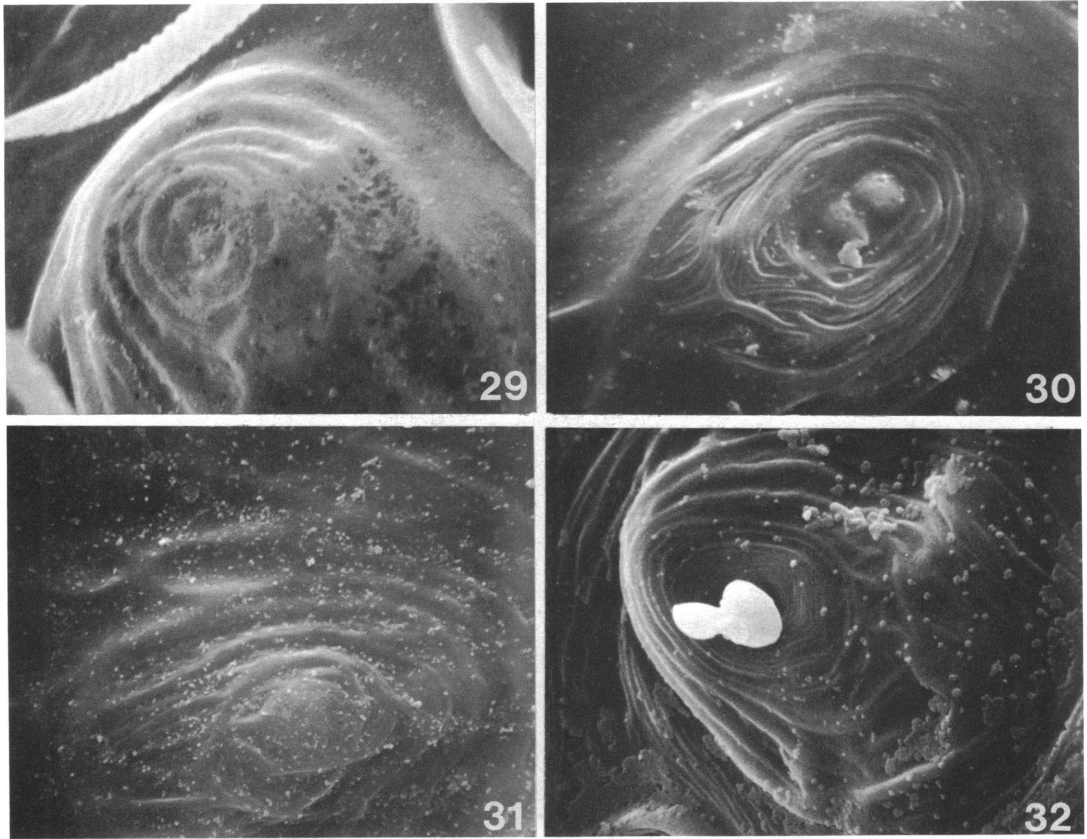
FIGS. 11-16. Distal end of tarsus (left, 190 \times) and tarsal organ (right, 950 \times , fig. 12; 1900 \times , figs. 14, 16) of female, scanning electron micrographs. 11, 12. *Liphistius desultor* Schiödte. 13, 14. *Heptathela kimurai* (Kishida). 15, 16. *Atypus piceus* (Sulzer).



FIGS. 17-22. Distal end of tarsus I (left, 500 \times , figs. 17, 21; 200 \times , fig. 19) and tarsal organ (right, 5000 \times) of female, scanning electron micrographs. 17, 18. *Euagrus* sp. 19, 20. *Diplura* sp. 21, 22. *Accola* sp.



FIGS. 23-28. Distal end of tarsus I (left, 190 \times) and tarsal organ (right, 3000 \times , fig. 24; 2000 \times , figs. 26, 28) of female, scanning electron micrographs. 23, 24. *Hexathele hochstetteri* Ausserer. 25, 26. *Plesiothele fentoni* (Hickman). 27, 28. *Scotinoecus cinereopilosus* (Simon).



FIGS. 29-32. Tarsal organ of female, 5000 \times , scanning electron micrographs. 29. *Mecicobothrium thorelli* Holmberg. 30. *Megahexura fulva* (Chamberlin). 31. *Hexura picea* Simon. 32. *Hexurella rupicola*, new species.

support the concept of these two major groups of mygalomorphs ("Atypoidea" and "Ctenizoidea") and showed that outgroup comparison with the Mesothelae (Liphistiidae) indicates that each of the character states previously used to define the Atypoidea is plesiomorphic; the characters involved can thus be used at best only to support the monophyly of the Ctenizoidea. He further showed that of the mygalomorph genera surveyed, only those belonging to the Mecicobothriidae and Dipluridae possess a serrula on the palpal endites, and that outgroup comparison with the Mesothelae indicates the presence of a serrula to be the derived condition. He therefore concluded, on the basis of

two putative synapomorphies (the serrula and the modified posterior lateral spinnerets), that the Mecicobothriidae are more closely related to the Dipluridae than to the Antrodiaetidae. Subsequent investigation has shown that a serrula is indeed found in all four genera of the Mecicobothriidae, although it is somewhat reduced in *Hexurella* (figs. 1-4).

We are able to report here on an additional character that supports the rejection of a mecicobothriid-antrodiaetid sister-group relationship. A preliminary survey of the tarsal organ of spiders by Dr. R. R. Forster (in prep.) has shown that the surface structure of these sensory organs, as revealed by scanning elec-

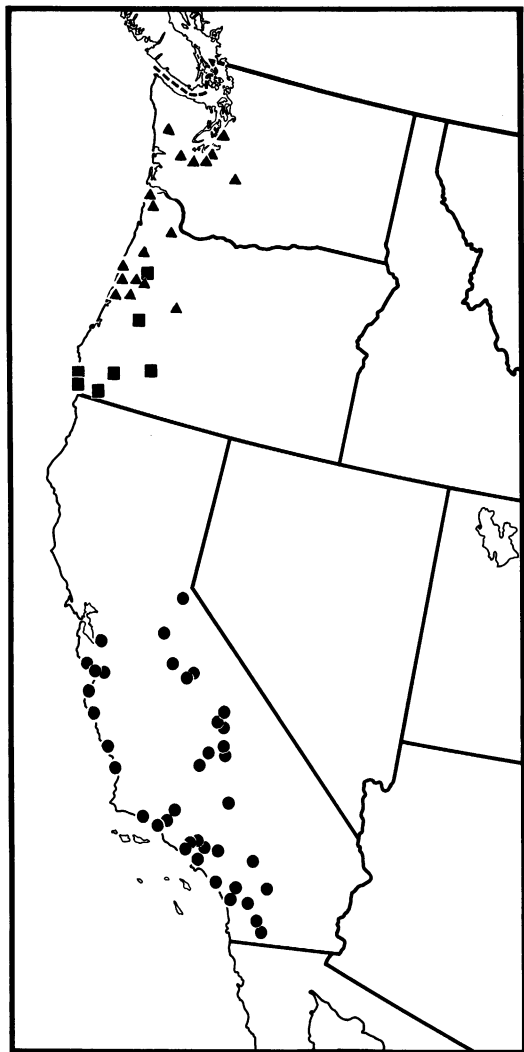


FIG. 33. Map of western United States, showing distributions of *Megahexura fulva* (circles), *Hexura picea* (triangles), and *Hexura rothi* (squares).

tron microscopy, varies (often dramatically) among different groups of spiders, and hence may prove to be an extremely valuable character for phylogenetic analysis. The tarsal organ, situated dorsally and usually near the distal tip of the tarsus, is easy to locate and photograph under the scanning scope. In the Antrodiaetidae, the tarsal organ forms a rounded protrusion with no obvious surface

sculpturing (figs. 5-10). This would appear to be the plesiomorphic form of the tarsal organ for spiders, as it is also found in the Liphistiidae and Atypidae (figs. 11-16). In the Dipluridae, however, the tarsal organ bears a series of concentric ridges forming an oval or spoon-shaped pattern; this is evident in such typical diplurid genera as *Euagrus*, *Diplura*, and *Accola* (figs. 17-22) and also in the group usually considered to contain the most primitive of the diplurids, the Hexathelinae (figs. 23-28). Examination of representatives of the four mecicobothriid genera indicates that the concentric ridge pattern is found in each (figs. 29-32). It is not claimed here that this type of tarsal organ is a synapomorphy unique to the Mecicobothriidae plus Dipluridae, as we have not surveyed the other ctenizoid mygalomorphs in detail and Forster's preliminary results indicate that the ridged pattern may be widespread among them, but the tarsal organ data does argue against a sister-group relationship between the Mecicobothriidae and Antrodiaetidae.

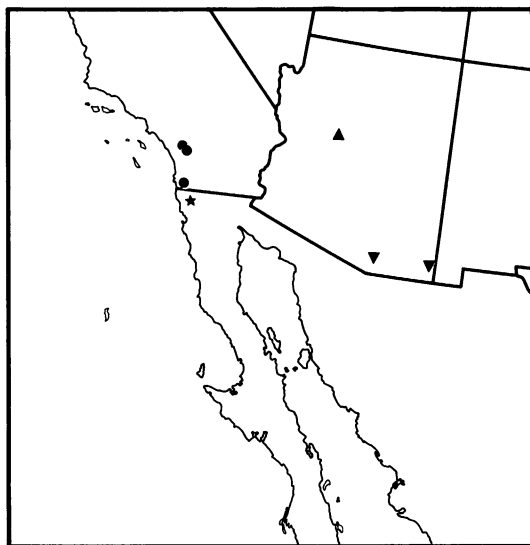
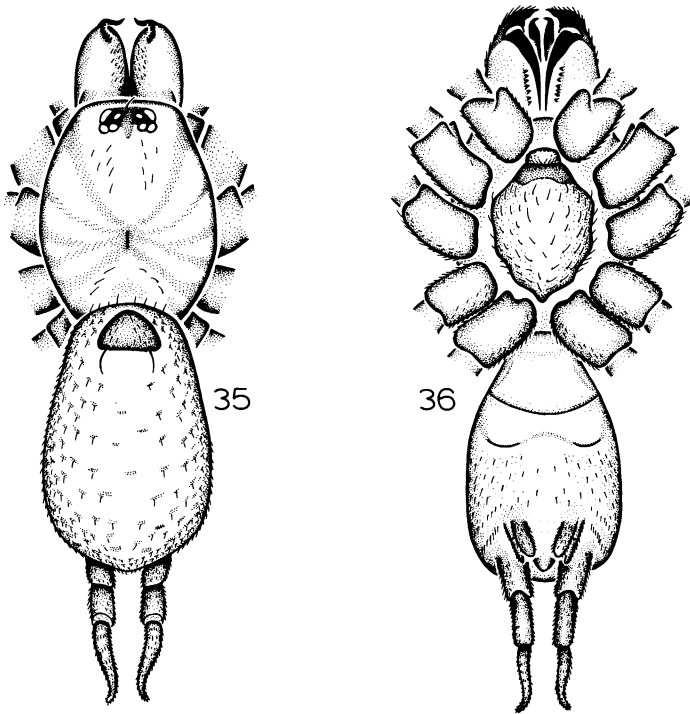


FIG. 34. Map of southwestern North America, showing distributions of *Hexurella pinea* (upright triangle), *H. apachea* (inverted triangles), *H. encina* (star), and *H. rupicola* (circles).



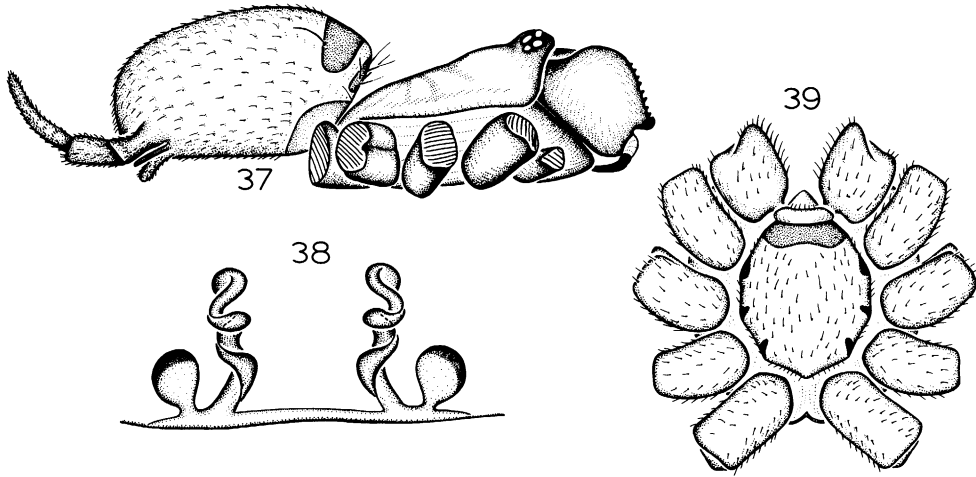
FIGS. 35, 36. *Mecicobothrium thorelli* Holmberg, male. 35. Dorsal view. 36. Ventral view.

Finally, there is the question of the interrelationships of the eight known mecicobothriid species. Each of the four genera recognized below has characters unique to it: the male cheliceral apophyses (figs. 40-42) and the pro-lateral apophysis on the male palpal tarsus of *Mecicobothrium* (figs. 44, 47), the expanded pleurites at the posterolateral corners of the cephalothorax of *Megahexura* (figs. 51, 53), the fused abdominal tergal plates of *Hexura*, and the four-segmented posterior lateral spinnerets of *Hexurella* (figs. 70-73). The last of these characters is also found in some species of *Atypus* but has apparently been independently derived in that group. With regard to the interrelationships of the genera, we have found few relevant characters. Males of all the genera except *Hexurella* have pseudosegmented tarsi (fig. 43), a character not found in at least the hexatheline diplurids but which does occur sporadically in other groups. The extremely long embolus of the genera other than *Hexurella* may also be a derived condition. If *Hexurella*

is the sister group of the other genera, the only documented sympatry among the species would be between members of the two basic branches of the family (*Hexurella rupicola* and *Megahexura fulva* at Murrieta, California, figs. 33, 34) rather than within either branch. The development of strong spine rows on the inner dorsal surface of the male chelicerae may be a character linking *Megahexura* and *Hexura*, but only if the peculiar cheliceral modifications of *Mecicobothrium* do not represent a further stage of this transformation.

NATURAL HISTORY

Very little has been published on the biology of the mecicobothriids. They are mostly small spiders that live close to the soil in crevices, under rocks, pieces of wood, or other ground objects, and are often found quite deep in organic ground litter. Although they are active animals they spend most of their lives within the confines of a sheet web. From their retreat



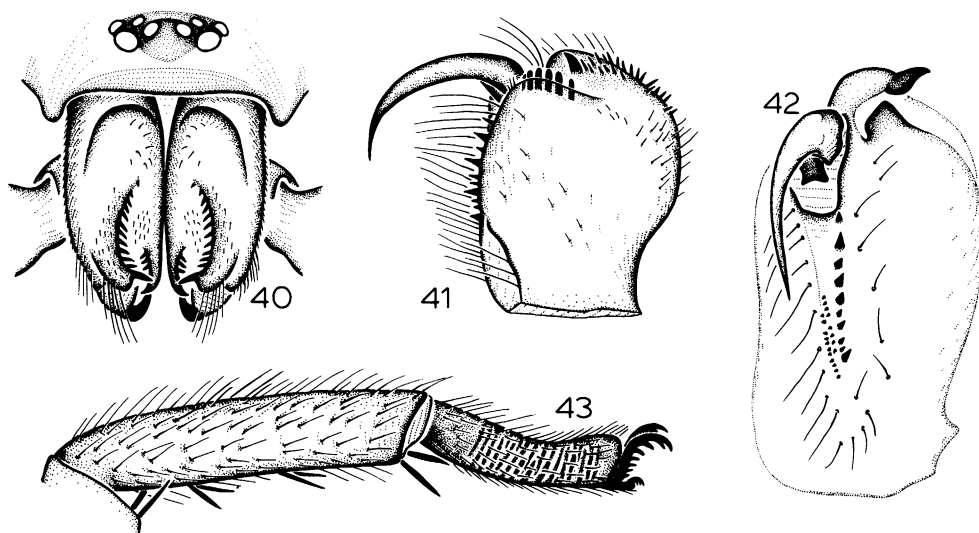
FIGS. 37-39. *Mecicobothrium thorelli* Holmberg. 37. Lateral view of male. 38. Epigynum, dorsal view. 39. Sternum and coxae of female, ventral view.

funnel they spin out a flat sheet a few inches wide and run upright over the surface. Older webs soon become a complex of tubes and supporting sheets of white silk laid down in available spaces beside, above, or beneath the principal sheet. Typically, the webs are mostly hidden from view by covering objects or detritus. *Hexura picea* lives in wooded areas of Oregon and Washington under the usually abundant pine or coniferous duff. The webs of the larger, widespread *Megahexura fulva* of California to some extent resemble the webs of agelenids and occur in holes and crevices in the banks of ravines, usually under the shade of oak or conifer trees. The web of *Mecicobothrium thorelli* was likened to those of *Tegenaria* by Holmberg (1882). In Arizona and southern California the minute species of *Hexurella* spin webs under objects on the ground or hide them deep in pine needles or under oak leaves. The capturing techniques of the mecicobothriids are likely to be the same as those of diplurids. The long, widely spaced, flexible spinnerets of both are ideal organs for laying down sheet webs.

Most mygalomorph spiders are known to be perennial, living more than one year, and this is probably true for the mecicobothriids. Some evidence of this is offered by the fact that immature specimens of various sizes can be found during most months of the year. Mature

females, usually accompanied by nearby immature stages, occur during almost all months of the year but are most abundant in summer and fall. Males of *Hexura* and *Megahexura* are first seen in the penultimate stadium during July and August and as sexual adults from then through November and even into the beginning of the next year. Little is known about the egg sacs of these species. An egg sac of a female *Hexura rothi*, collected on July 22, is a flat lenticular object about 11 mm. in diameter containing about 80 opaque whitish eggs. This number would seem to be about average for spiders of this size.

The small size of the species of *Hexurella* makes them of special interest but questions of their longevity and biology remain for future investigation. All presently known specimens were collected from March to May at one of seven well separated stations. Mature males and females and immatures were found together at these times. Egg sacs were produced by two females of *Hexurella apachea* from Madera County, Arizona, on May 25, and each sac, a small round bag about 2 mm. in diameter, contained seven eggs. Egg sacs were produced, also in the laboratory, by four females of *Hexurella rupicola* from Johnson Canyon, California, on May 6, 25, and 26, and June 2. These varied in size from 1.7 to 2.2 mm. in diameter and contained four, six, seven, and seven eggs,



FIGS. 40-43. *Mecicobothrium thorelli* Holmberg, male. 40. Chelicerae, anterior view. 41. Right chelicera, prolateral view. 42. Right chelicera, ventral view. 43. Metatarsus and tarsus I, lateral view.

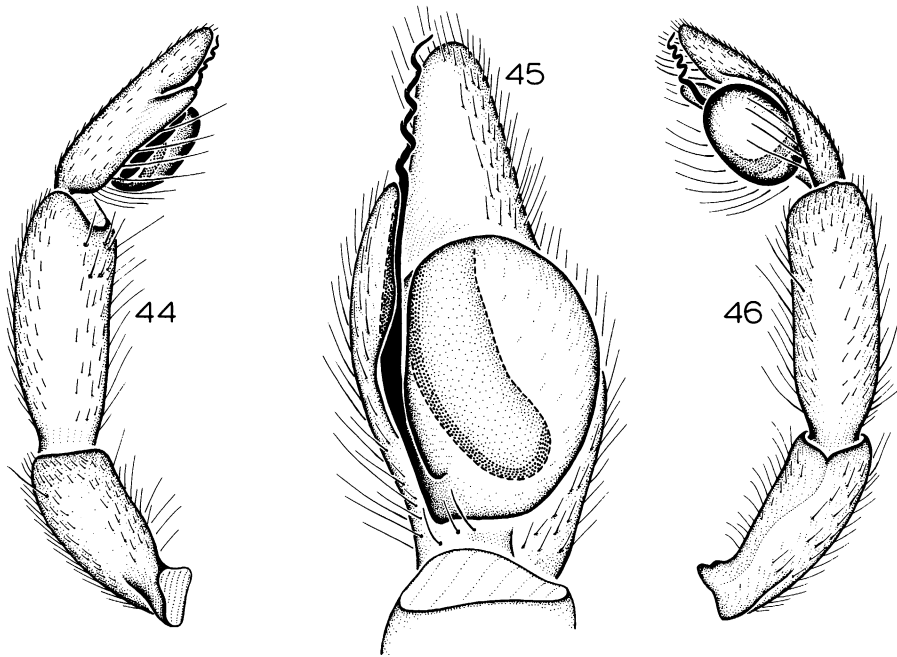
respectively. This small count is in keeping with the small size of the females, inasmuch as their abdomens cannot accommodate additional eggs, and is again about average for spiders of this size. This information was supplied by Mr. Wendell Icenogle, who is continuing his study of these spiders to discover whether multiple egg sacs are ever produced by females.

ACKNOWLEDGMENTS

We are indebted to many colleagues for their assistance with various aspects of this project. Dr. Emilio A. Maury of the Museo Argentino de Ciencias Naturales, Buenos Aires (MACN), kindly allowed us access to his *Mecicobothrium* specimens and permitted us to retain a pair for the collection of the American Museum of Natural History (AMNH; unless otherwise indicated, all specimens listed below are in the AMNH collection). Dr. R. R. Forster of the Otago Museum, Dunedin, New Zealand, shared with us his findings on spider tarsal organs and other characters. Dr. Frederick A. Coyle of Western Carolina University, Cullowhee, North Carolina, and Mr. Robert J. Raven of the Queensland Museum, Brisbane,

Australia, donated specimens and/or reviewed a draft of the manuscript. The discovery of the genus *Hexurella* in our fauna brought about a campaign by various students and friends to secure adequate material of each species and data on their natural history. Special mention and gratitude is offered the following: Mr. Vincent D. Roth of the Southwestern Research Station, Portal, Arizona, who discovered the first species, *H. pinea*, and later two additional ones; Dr. B. J. Kaston of San Diego State University, San Diego, California, and his student Mr. Steve Johnson, who donated many specimens and photographs of *H. rupicola*; and Mr. Wendell R. Icenogle of Winchester, California, who donated many specimens of *H. apachea* and *H. rupicola*, as well as other mecicobothriids, and supplied us with his valuable field notes. Dr. H. W. Levi lent the mecicobothriids of the Museum of Comparative Zoology, Harvard University (MCZ). At the American Museum of Natural History, Dr. M. U. Shadab provided his assistance with illustrations, and Mr. R. J. Koestler his skill with the scanning electron microscope.

All measurements cited below are in millimeters.



FIGS. 44-46. *Mecicobothrium thorelli* Holmberg, left male palp. 44. Prolateral view. 45. Ventral view. 46. Retrolateral view.

MECICOBOTHRIIDAE HOLMBERG

Mecicobothrioidea Holmberg, 1882, p. 160.

Hexurinae Simon, 1889, p. 173.

Mecicobothriidae: Pocock, 1903, p. 346.

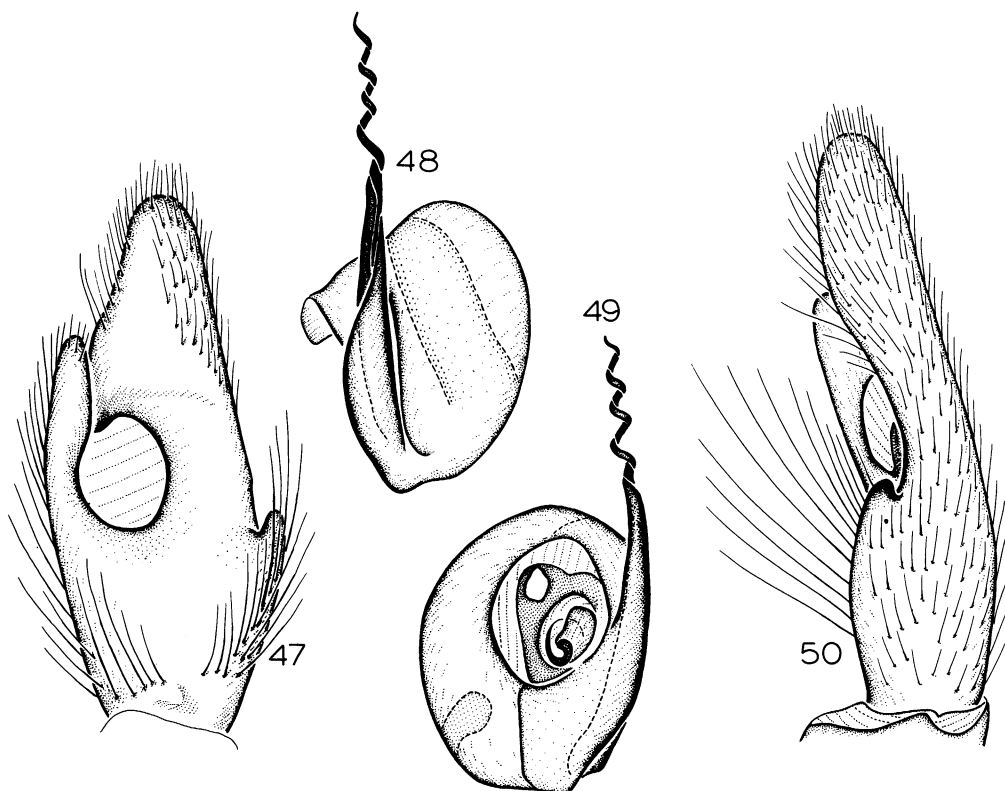
Hexuridae: Bristowe, 1938, p. 298.

Mecicobothriinae: Roewer, 1942, p. 210.

DIAGNOSIS: The combined presence of abdominal tergal plates and an elongated, pseudosegmented distal segment of the posterior lateral spinnerets will distinguish mecicobothriids from all other spiders.

DESCRIPTION: Carapace smooth, suboval, low, with moderately elevated pars cephalica and slightly convex pars thoracica; thoracic groove a short longitudinal fissure. Eye tubercle low, about one-third width of head and twice as wide as long, with eyes subcontiguous; clypeus relatively narrow. Anterior eye row straight or procurved, posterior row straight, slightly procurved, or slightly recurved; anterior median eyes round, dark; other eyes oval, light. Anterior lateral eyes roughly twice the

diameter of anterior medians; posterior eyes roughly subequal in diameter. Sternum with enlarged anterior pair of sigilla covering width of sternum behind labium; three smaller round posterior pairs of sigilla situated near edge opposite coxae usually evident at least in females. Labium free, separated from sternum by transverse groove, usually much wider than long, truncated distally, without spinules. Endites well developed, produced, stout rounded lobes with fine setae and anterior serrula, without spinules. Chelicerae of moderate size, porrect, laterally compressed, armed in some males with apophyses or dorsal brush of spines along midline; fang long, evenly curved at base; promargin with single row of unequal teeth, retromargin usually with denticles. Legs moderately long, with numerous paired and single spines on posterior legs, fewer spines on anterior legs, without claw tufts or scopulae, with three claws; paired tarsal claws and female palpal claw with single row of long, fine teeth; unpaired tarsal claws smooth or with few teeth;



FIGS. 47-50. *Mecicobothrium thorelli* Holmberg, left male palp. 47. Tarsus (bulb omitted), ventral view. 48. Bulb, prolateral view. 49. Bulb, dorsal view. 50. Tarsus (bulb omitted), retrolateral view.

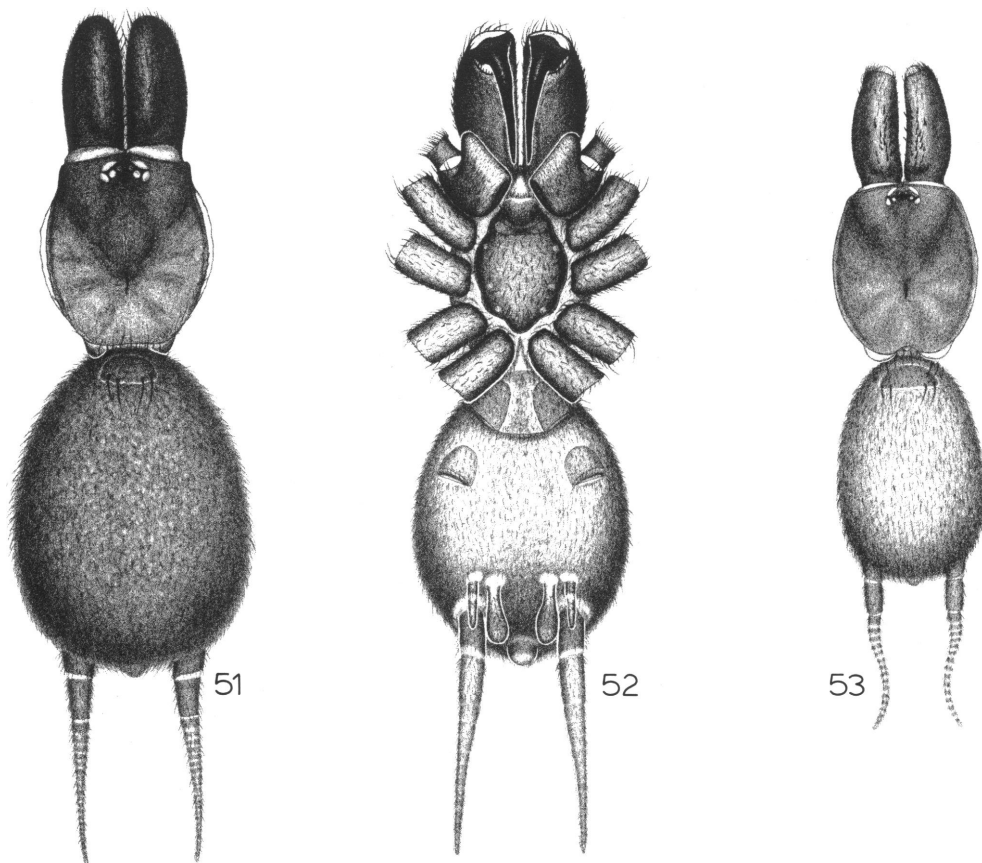
trichobothria in two distally converging dorsal rows on tibiae, in single dorsal row on metatarsi and tarsi; femur or tibia I of some males incrassate and with brush of heavy spines; tarsi of males pseudosegmented (except in *Hexurella*). Abdomen suboval, dorsum with two tergal plates (fused into single scutum in *Hexura*). Spinnerets six (four in *Hexura rothi*); anterior lateral pair functional, two-segmented (one-segmented in *Hexura picea*, absent in *Hexura rothi*); posterior median (middle) pair functional, thicker, one-segmented; posterior lateral pair functional, three-segmented (four-segmented in *Hexurella*), with apical segment (apical two segments in *Hexurella*) elongated, pointed, bearing many false sutures. Epigynum with doubled glandular pouches and receptacles on each side. Tarsus of male palp inflated in penultimate stadium or stadia (at least in *Megahexura* and *Hexura*), elongated beyond distal

tip of palpal bulb in adults; bulb with embolus and conductor closely joined while in resting position.

MISPLACED TAXON: The genus *Microhexura* Crosby and Bishop, considered a mecicobothriid by Roewer (1942) and, apparently, Kaston (1972, 1978), is a typical diplurid, as was demonstrated by Chamberlin and Ivie (1945); see *Hexurella* below for a comparative diagnosis.

KEY TO GENERA OF MECICOBOTHRIIDAE

1. Abdomen with separate anterior and dorsal tergal plates (as in fig. 37); anterior lateral spinnerets two-segmented (as in fig. 52) 2
- Abdomen with anterior and dorsal tergal plates fused into single scutum; anterior lateral spinnerets one-segmented (fig. 59) or absent (fig. 68); Oregon and Washington *Hexura*



FIGS. 51-53. *Megahexura fulva* (Chamberlin). 51. Female, dorsal view. 52. Female, ventral view. 53. Male, dorsal view.

2. Posterior lateral spinnerets three-segmented (as in fig. 36) 3
- Posterior lateral spinnerets four-segmented (fig. 71); Arizona, California, and Baja California *Hexurella*
3. Cephalothorax with pronounced pleurital extensions at posterolateral corners (figs. 51, 53); California *Megahexura*
- Cephalothorax without pronounced pleurital extensions at posterolateral corners (fig. 35); Argentina *Mecicobothrium*

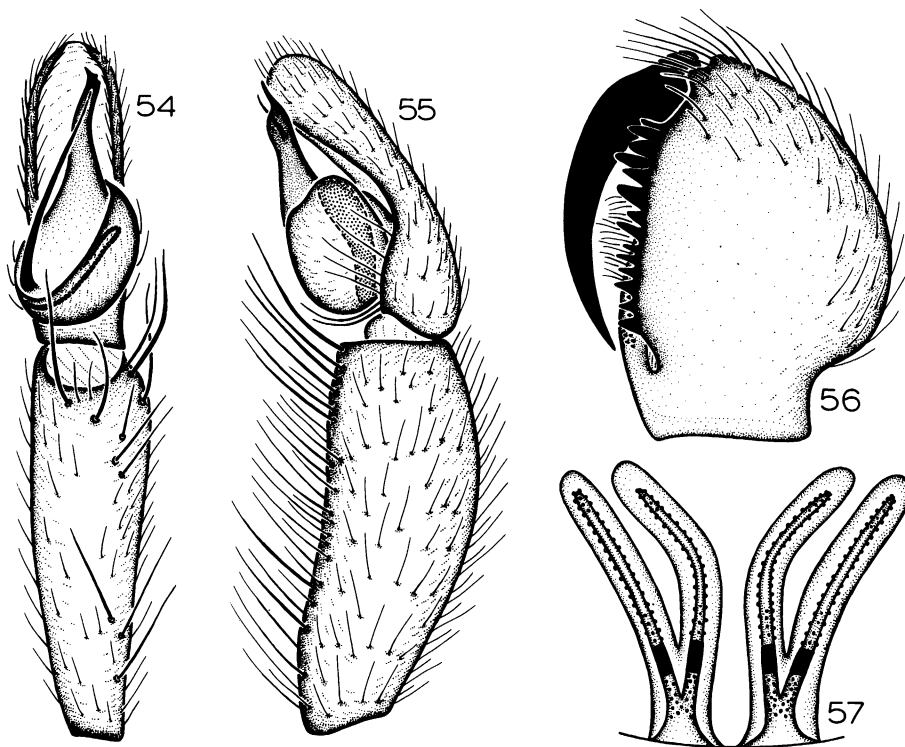
MECICOBOTHRIMUM HOLMBERG

Mecicobothrium Holmberg, 1882, p. 160 (type species by original designation *Mecicobothrium thorelli* Holmberg).

DIAGNOSIS: Specimens of *Mecicobothrium* may be distinguished from other mecicoboth-

riids by the combined presence of three-segmented posterior lateral spinnerets, two-segmented anterior lateral spinnerets, and unexpanded pleurites at the posterolateral corners of the carapace.

DESCRIPTION: Medium-sized spiders (length 6-8). Anterior eye row straight, with lateral eyes almost twice the diameter of medians; posterior row slightly recurved, with lateral eyes largest. Clypeus narrow, equal at middle to anterior median eye diameter. Sternum with four pairs of sigilla, but only anterior pair conspicuous in males. Chelicerae large, projecting forward one-half length of carapace, armed with apophyses in males; promargin with single row of unequal teeth, retromargin with clump of denticles. Leg I of males unmodified. Two tergal plates of abdomen well separated. Six



FIGS. 54-57. *Megahexura fulva* (Chamberlin). 54. Left male palp, ventral view. 55. Left male palp, retrolateral view. 56. Right female chelicera, prolateral view. 57. Epigynum, dorsal view.

spinnerets, anterior lateral pair two-segmented, posterior lateral pair three-segmented, terminal segment flexible, with false sutures. Epigynum with four receptacles of which outer pair is shortened, rounded. Tibia of male palp not incrassate, tarsus with distinct prolateral lobe and retrolateral invagination, elongate, forming cymbium distally; conductor shielding corkscrew-shaped embolus basally.

Mecicobothrium thorelli Holmberg

Figures 35-50

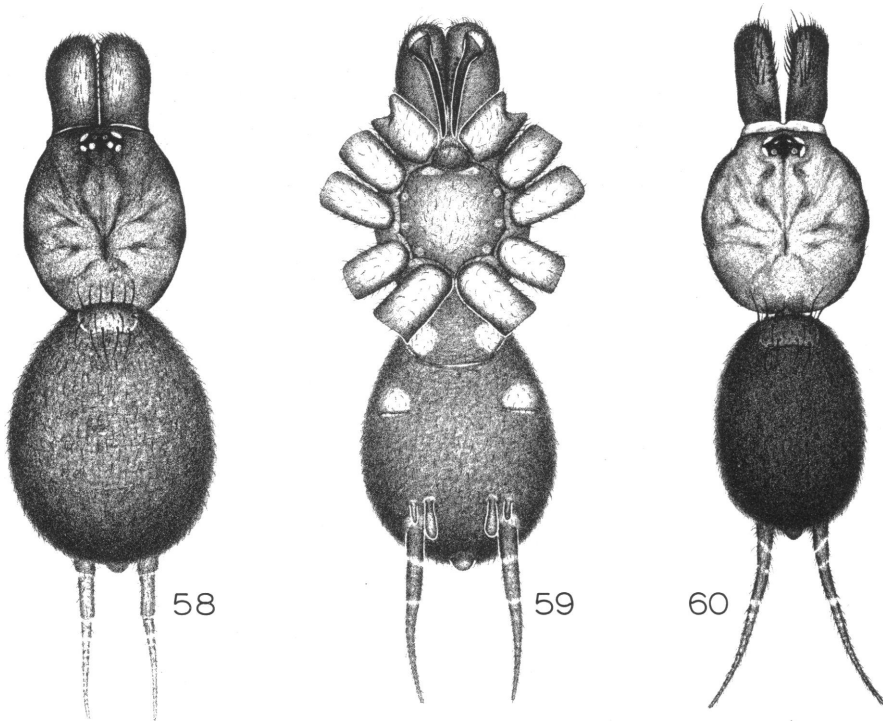
Mecicobothrium thorelli Holmberg, 1882, p. 163, figs. 1-12 (male holotype from Tandil, Buenos Aires, Argentina, lost). Roewer, 1942, p. 210.
Mecicobothrium thorelli: Bonnet, 1957, p. 2742.

DIAGNOSIS: The corkscrew-shaped embolus of the male (fig. 45) and short round lateral receptacles of the female (fig. 38) are diagnostic of the species.

FEMALE (Sierra de la Ventana): Total length,

including chelicerae, 6.9. Carapace light brown, darkest anteriorly; eye tubercle black; conjunctival membranes white, marginating anterior border only. Chelicerae brown; fangs light brown proximally, darker distally. Underside of cephalothorax pale yellow, with sclerotized elements set in white conjunctival membranes. Legs light brown. Abdomen light brown with dark brown tergal plates anteriorly and scattered dark markings in procurved transverse bands posteriorly; venter and spinnerets pale yellow.

Carapace 2.2 long, 1.8 wide, with weak dark setae in two longitudinal rows behind lateral eyes and strong dark setae on ocular tubercle and posterior half of pars thoracica, transverse in front, narrowly rounded at sides, slightly invaginated toward middle behind; pars cephalica highest at ocular tubercle, slightly depressed behind tubercle; thoracic groove one-ninth of carapace length, situated back about four-sevenths of carapace length.



FIGS. 58-60. *Hexura picea* Simon. 58. Female, dorsal view. 59. Female, ventral view. 60. Male, dorsal view.

Eyes set on low tubercle about one-half width of head at that point. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 9:5:6:4. Posterior eye row slightly recurved, slightly wider than straight anterior row. Anterior median eyes separated by slightly more than their diameter, by one-fifth their diameter from anterior laterals. Posterior median eyes separated by almost three times their diameter, by one-fourth their diameter from posterior laterals. Anterior laterals separated from posterior laterals by one-third the diameter of the latter. Median ocular quadrangle wider than long (24/13), narrowed in front (24/15).

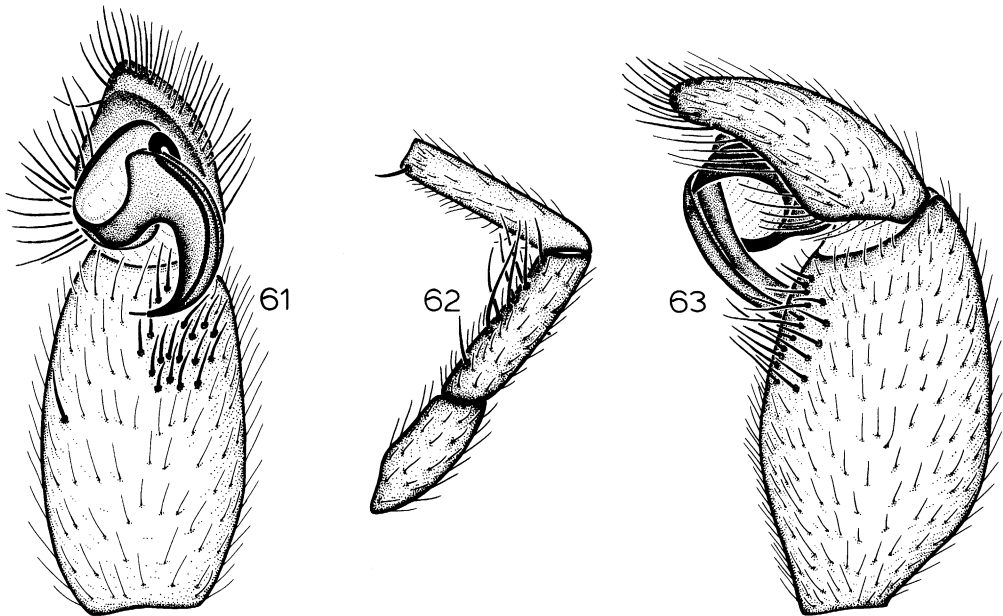
Sternum 1.4 long, 1.2 wide, smooth, shining, with dark setae scattered over surface except for large anterior sigillar depression; four pairs of sigilla conspicuous (fig. 39). Labium 0.1 long, 0.5 wide, with weak dark setae at apex, almost perpendicular to sternum. Endites 0.9 long, 0.8 wide, with weak scopula and wide anterior serrula, covered below with long

setae. Chelicerae large, porrect, with stiff setae dorsally; promargin with 10 or 11 teeth of which about half are reduced in size, retro-margin with about 14 denticles.

Leg formula 4132. Legs narrowed, clothed with short dark setae and long dark lateral and ventral spines most numerous on legs III and IV. Palpal claw with series of about nine, paired tarsal claws with series of about six teeth; unpaired tarsal claws with two or three teeth; claws of leg IV elongated. Measurements:

	I	II	III	IV	Palp
Femur	1.7	1.5	1.4	1.8	1.2
Patella	1.0	0.8	0.8	0.8	0.6
Tibia	1.1	0.9	0.9	1.4	0.8
Metatarsus	1.0	0.9	1.2	1.6	—
Tarsus	0.6	0.6	0.8	0.9	0.8
Total	5.4	4.7	5.1	6.5	3.4

Abdomen 4.0 long, 2.7 wide, with large triangular tergal plate on anterior surface bearing one median and eight marginal long dark



FIGS. 61-63. *Hexura picea* Simon, male. 61. Left palp, ventral view. 62. Middle segments of leg I, retrolateral view. 63. Left palp, retrolateral view.

spines and smaller triangular tergal plate at front of dorsum bearing two long dark spines on posterior margin. Posterior median spinnerets longer and stouter than anterior laterals; posterior lateral spinnerets with three segments 0.5, 0.6, and 0.9 long.

Epigynum (fig. 38) with long twisted inner and short rounded outer pairs of receptacles.

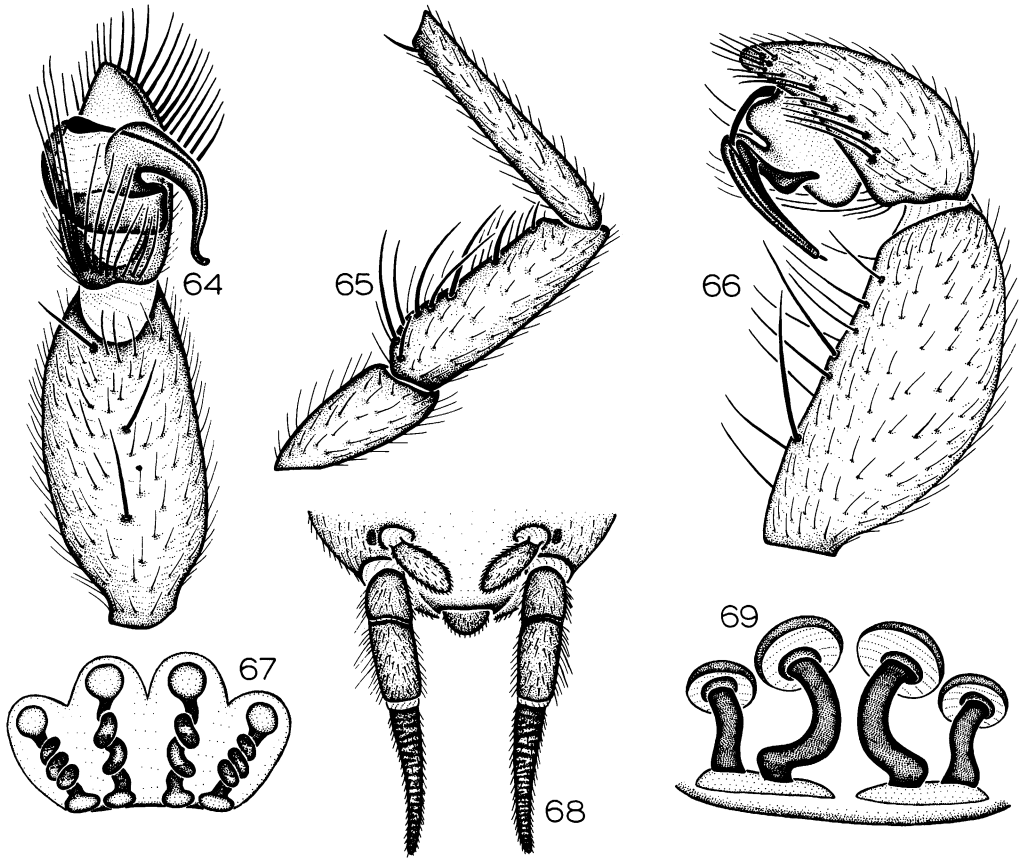
MALE (Sierra de la Ventana): Total length, including chelicerae, 6.6; body as in figures 35-37. Coloration and structure essentially as in female except as noted; lengths and widths of: carapace 2.6, 2.0; sternum 1.6, 1.3; labium 0.1, 0.5; endites 0.9, 0.8; abdomen 3.0, 1.8. Only anterior pair of sigilla conspicuous, fused into single transverse depression. Chelicerae (figs. 40-42) with large anterior knobs bearing stiff dark setae proximally and two complex apophyses distally; more anterior apophysis long, invaginated medially, bearing two irregular rows of about 12 stiff black cusps becoming longer distally, terminating in two elongate spurs; more posterior apophysis situated medially, narrow, bearing V-shaped row of eight stiff black cusps of which those along median

prong of row are elongate and club-shaped; retromargin of fang furrow with about 20 thin denticles. All tarsi pseudosegmented (fig. 43). Leg I not thickened or elongated, without clasping spines or spurs. Measurements:

	I	II	III	IV	Palp
Femur	2.1	1.9	1.7	2.0	1.6
Patella	1.2	1.0	0.9	1.1	1.0
Tibia	1.4	1.2	1.1	1.6	1.2
Metatarsus	1.4	1.2	1.6	2.1	—
Tarsus	0.8	0.8	1.2	1.3	1.0
Total	6.9	6.1	6.5	8.1	4.8

Palp (figs. 44-50) clothed sparsely with long dark setae; femur about six times as long as wide; patella and tibia not incrassate; tarsus greatly elongated, forming cymbium, bearing prolateral paracymbium-like lobe and retrolateral invagination; bulb about half as long as cymbium, with flattened conductor originating proximally on dorsal side and surrounding basal two-thirds of embolus; apical third of embolus corkscrew-shaped.

MATERIAL EXAMINED: **Argentina:** *Buenos Aires:* Balcarce, May 20, 1973 (C. Césari,



FIGS. 64-69. 64-66, 68, 69. *Hexura rothi*, new species. 67. *H. picea* Simon. 64. Left male palp, ventral view. 65. Middle segments of male leg I, retrolateral view. 66. Left male palp, retrolateral view. 67, 69. Epigynum, dorsal view. 68. Spinnerets, ventral view.

MACN), ♂. Cerro Negro, Sierra de la Ventana, May 26, 1972 (C. Césari, MACN), ♀♀. "Las Espandafías," Sierra de la Ventana, Oct., 1973 (E. Maury, C. Césari), ♂, ♀. Tornquist, Sierra de la Ventana, Mar., 1974 (C. Césari, MACN), ♂♂.

DISTRIBUTION: Known only from Buenos Aires Province, Argentina.

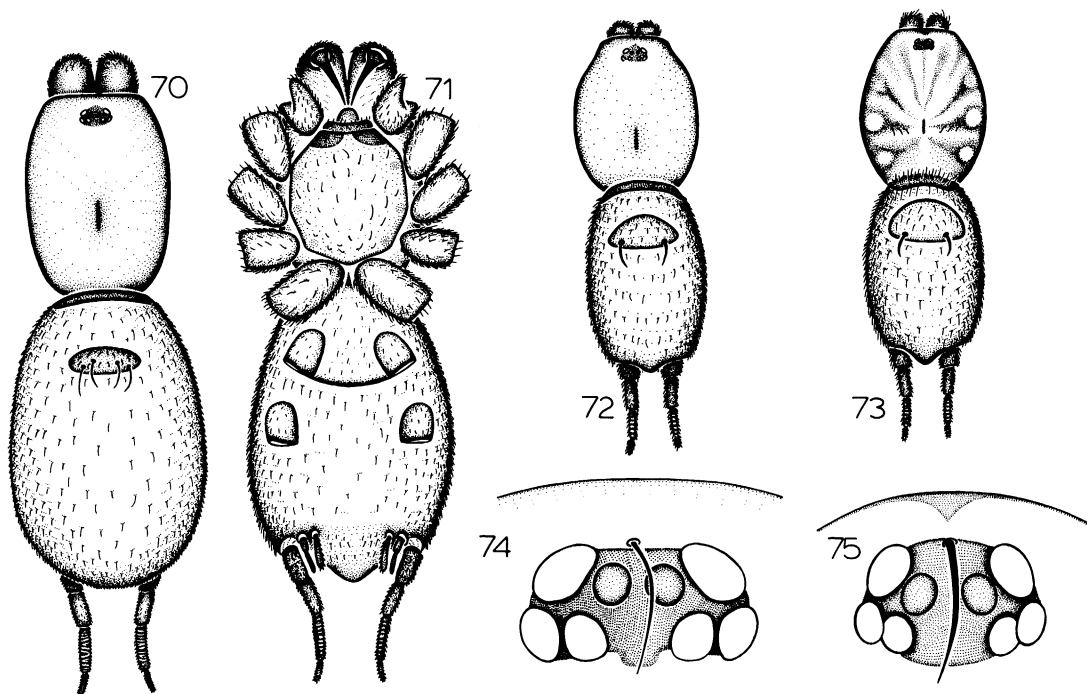
MEGAHEXURA KASTON

Megahexura Kaston, 1972, p. 60 (type species by monotypy *Hexura fulva* Chamberlin).

DIAGNOSIS: Specimens of *Megahexura* may be easily distinguished from other

mecicobothriids by the expanded pleurites at the posterolateral corners of the carapace (figs. 51, 53).

DESCRIPTION: Medium-sized spiders (length up to 18) similar in appearance and structure to *Mecicobothrium* but differing as follows: Carapace with expanded pleurites at posterolateral corners. Anterior eye row procurved. Clypeus short, less than anterior median eye diameter. Chelicerae without apophyses, armed above with series of short spines in males. Metatarsi with distal preening comb on ventral surface. Epigynum with elongate receptacles. Tibia of male palp moderately incrassate, armed below with several heavy spines; tarsus without dis-



FIGS. 70-75. 70-72, 74. *Hexurella pinea*, new species. 73, 75. *H. encina*, new species. 70. Female, dorsal view. 71. Female, ventral view. 72, 73. Male, dorsal view. 74, 75. Eyes, dorsal view.

tinct prolateral lobe but with shallow retro-lateral invagination; conductor recessed behind embolus.

Megahexura fulva (Chamberlin)

Figures 51-57

Hexura fulva Chamberlin, 1919, p. 1 (female holotype from Claremont, Los Angeles County, California, in MCZ, examined). Roewer, 1942, p. 210. Bonnet, 1957, p. 2207.

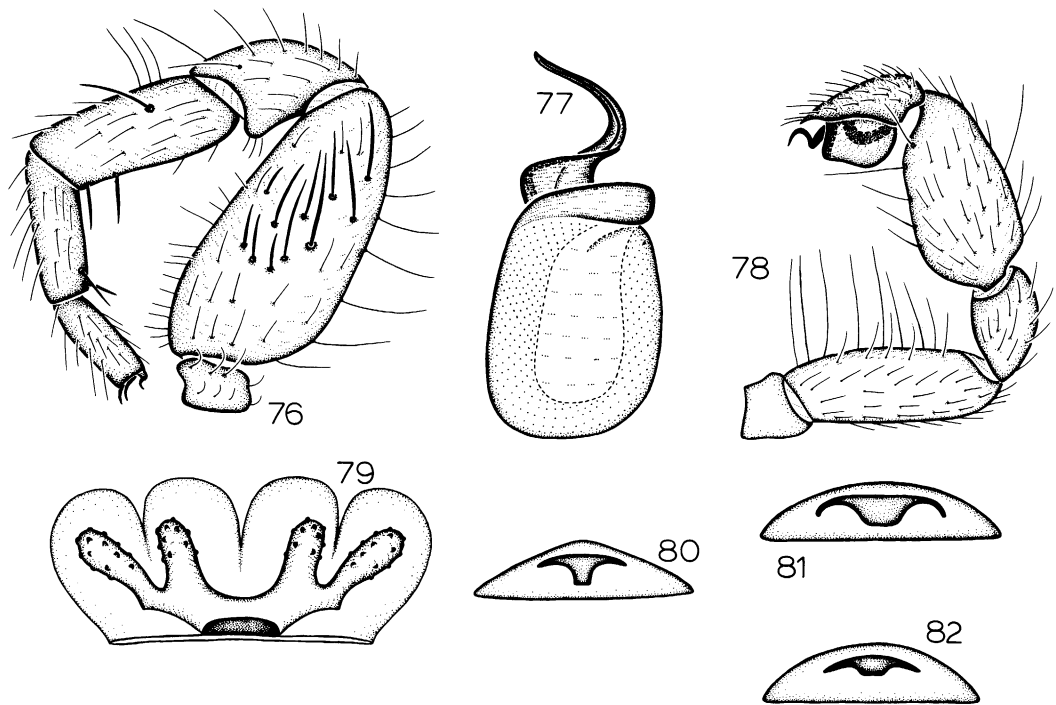
Megahexura fulva: Kaston, 1972, p. 60, figs. 140, 141; 1978, p. 64, figs. 157, 158. Gertsch, 1979, p. 120, fig. 5c.

DIAGNOSIS: The long straight embolus of the male (fig. 54) and extremely long receptacles of the female (fig. 57) are diagnostic of the species.

FEMALE (Chatsworth): Total length, including chelicerae, 18.0; body as in figures 51, 52. Carapace with pars cephalica light reddish brown, with darker streaks running from side

margins back to thoracic groove; pars thoracica dusky yellow, with brown streaks radiating from thoracic groove; eye tubercle black; conjunctival membranes white, bordering all margins. Chelicerae dark reddish brown, shining; fang black. Sternum brown around margins, yellowish in center; labium and endites mostly brown, whitish at apex. Legs dull yellow to pale brown, without contrasting markings. Base color of abdomen white to yellow; venter unmarked; sides and dorsum evenly speckled with fine purplish spots; tergal plates yellowish brown.

Carapace 5.6 long, 4.7 wide, suboval, smooth, bare except for few short hairs in ocular region and others margining edges of pars thoracica; pars cephalica subtriangular, moderately elevated, highest in ocular area; thoracic groove a short, deep, longitudinal fissure 0.5 long, situated back nearly two-thirds distance to straight posterior margin. Pleurites strongly developed posteriorly, bearing dorsal ridges.



FIGS. 76-82. 76-80. *Hexurella pinea*, new species. 81. *H. apachea*, new species. 82. *H. rupicola*, new species. 76. Male leg I, prolateral view. 77. Left male palpal bulb, ventral view. 78. Left male palp, retrolateral view. 79. Epigynum, ventral view. 80-82. Epigyna, posterior views.

Eyes set on small tubercle about one-third width of head at that point. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 20:9:14:11. Anterior eye row slightly narrower than posterior row, procurved; median eyes separated by two-thirds their diameter, somewhat nearer laterals. Posterior eye row slightly recurved; median eyes separated by slightly more than twice their diameter, almost touching laterals. Lateral eyes of each side nearly contiguous. Median ocular quadrangle wider than long (2/1), narrowed in front (8/5).

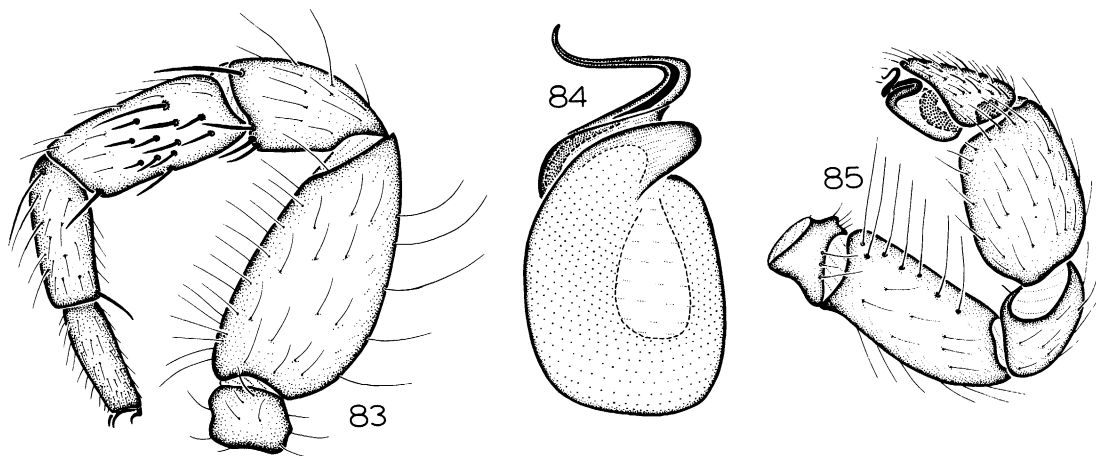
Sternum 3.3 long, 2.7 wide, covered sparsely with black setae; four pairs of sigilla present (fig. 52), front pair greatly enlarged, nearly touching below labium. Labium 1.1 long, 0.7 wide, rounded at apex, set with few black setae. Endites 2.1 long, 1.7 wide, clothed with black setae scattered mostly along inner margins. Chelicerae 5.0 long, 1.6 wide at base,

with thin row of black bristles above along inner margin; promargin with 14 stout teeth in single row, retromargin with small cluster of about 14 tiny denticles opposite most proximal promarginal tooth (fig. 56).

Leg formula 4123. Legs of moderate length, rather thin, clothed with fine black setae and paired or single thin ventral spines. Palpal claw with series of about eight, paired tarsal claws with single row of about nine teeth; unpaired tarsal claws smooth or with one tooth. Measurements:

	I	II	III	IV	Palp
Femur	4.2	4.0	3.3	4.4	3.1
Patella	2.5	2.4	2.3	2.6	1.8
Tibia	3.1	2.7	2.3	3.5	2.0
Metatarsus	3.1	3.0	3.7	5.0	—
Tarsus	1.7	1.6	1.8	2.1	2.0
Total	14.6	13.7	13.4	17.6	8.9

Abdomen 9.0 long, 6.5 wide, suboval, cov-



FIGS. 83-85. *Hexurella apachea*, new species, male. 83. Leg I, prolateral view. 84. Left palpal bulb, ventral view. 85. Left palp, retrolateral view.

ered evenly with fine black setae; dorsum with narrow tergal plate situated above pedicel bearing six long posterior setae and small tergal plate situated well above base bearing four long posterior setae. Posterior lateral spinnerets with three segments 1.0, 1.3, and 4.0 long.

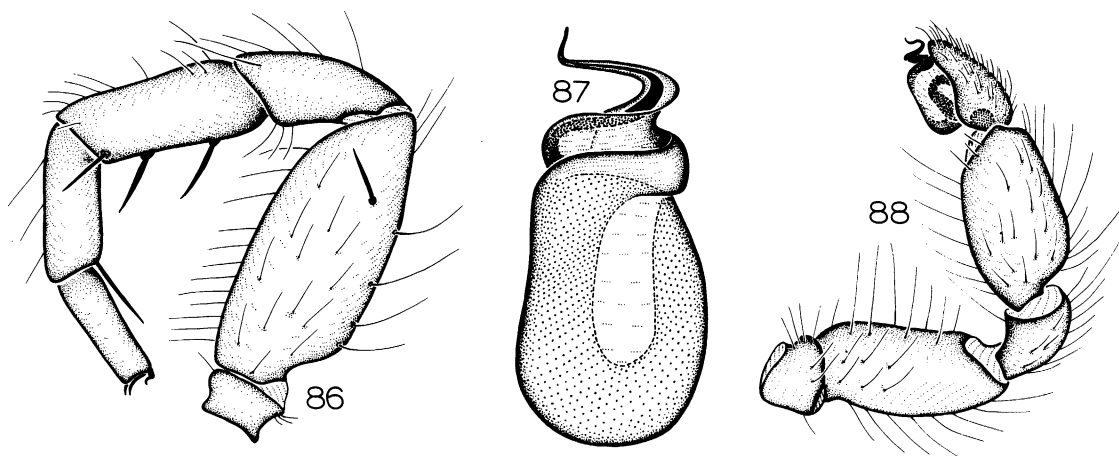
Epigynum (fig. 57) with pair of long thin receptacles on each side.

MALE (Chatsworth): Total length, including chelicerae, 13.0; body as in figure 53. Coloration and structure essentially as in female except as noted; lengths and widths of: carapace 4.7, 4.0; sternum 2.8, 2.1; labium 0.8, 0.6; endites 1.8, 1.3; abdomen 6.0, 3.8. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 16:9:11:9. Median ocular quadrangle wider than long (17/8), narrowed in front (34/21). Anterior pair of sigilla very large, fused at center. Chelicerae with dorsal series of short, stout spines along inner margins; promargin with 18 black teeth of variable size, with largest near base of fang. Leg formula 4132. Legs proportionally longer than those of female, with only legs III and IV provided with series of ventral spines; leg I bare except for weak spines at apex of metatarsus; leg II with weak spine pair at apex of tibia and one unpaired and two apical spine pairs at end of metatarsus. All tarsi pseudosegmented. Measurements:

	I	II	III	IV	Palp
Femur	4.2	3.7	3.5	4.3	2.8
Patella	2.2	2.1	1.9	2.2	1.4
Tibia	3.2	2.7	2.3	3.3	2.0
Metatarsus	3.6	3.3	3.7	4.8	—
Tarsus	2.0	2.0	2.5	2.8	1.7
Total	15.2	13.8	13.9	17.4	7.9

Palp (figs. 54, 55) with long straight conductor and thin embolus lying in groove at apex; tibia with four enlarged ventral spines at apex.

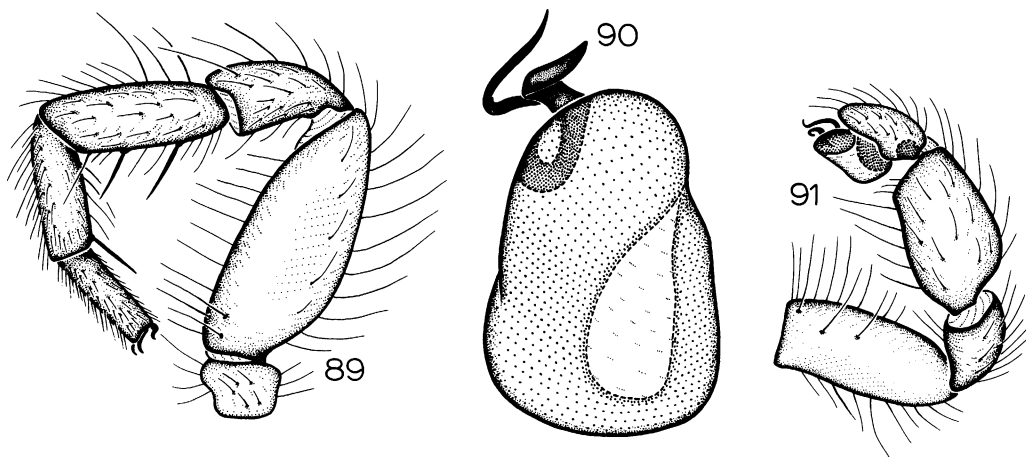
MATERIAL EXAMINED: **California:** *Alameda Co.:* Canyon off Niles Canyon, Jan. 1, 1964 (V. Roth), ♀. *El Dorado Co.:* 4 mi. W. Kyburz, Sept. 15, 1959 (W. J. Gertsch, V. Roth), ♀♀. *Fresno Co.:* Wilsonia, Kings Canyon National Park, Sept. 13, 1959 (W. J. Gertsch), ♀. *Kern Co.:* 4 mi. E Glenville, Mar. 19, 1941 (S. and D. Mulaik), ♀; Water Canyon, Tehachapi Mountains, June 10-Sept. 7, 1959-1967, in webs under rocks (W. R. Icenogle), juv. ♂, ♀♀. *Los Angeles Co.:* Chatsworth, Apr. 4-Oct. 23, 1966, in webs in crevice of ravine bank (W. R. Icenogle), ♂♂, ♀♀; Claremont (MCZ), ♀ (holotype); Eaton Canyon, Mar., 1913 (R. V. Chamberlin), ♀; Eaton Canyon Park, Nov. 28-Dec. 8, 1967 (M. Thompson), ♂♂; Glendora, July 15, 1944, golden oaks, ♀; Gold Canyon, San Gabriel Mountains, Jan.-May 7, 1952-1955, under



FIGS. 86-88. *Hexurella encina*, new species, male. 86. Leg I, prolateral view. 87. Left palpal bulb, ventral view. 88. Left palp, retrolateral view.

rocks (R. X. Schick), ♀♀; Limekiln Canyon, 2 mi. NW Granada Hills, Jan. 17, 1971, elevation 1000 ft., ravine bank (W. R. Icenogle), ♀; Los Angeles, Nov.-Dec., 1975, around house (G. Chang, MCZ), ♂; Santa Monica Mountains, Jan.-Feb., 1953 (R. X. Schick), ♀; Sunland, May 19, 1951 (T. Tice), ♀; Tanbark Flats, San Gabriel Mountains, June 20, 1952 (W. J. Gertsch), ♀♀; Topanga Canyon, Santa Monica Mountains, Apr., 1952 (R. X. Schick), ♀. *Madera Co.*: Bass Lake, July 9, 1958 (W. J. Gertsch, V. Roth), ♀♀; 5 mi. N North Fork, July 9, 1958 (W. J. Gertsch, V. Roth), juv. ♂, ♀♀. *Mariposa Co.*: 0.5 mi. NW Mariposa, Oct. 14-15, 1969, elevation 2000 ft., in duff (W. R. Icenogle), ♀♀; 3 mi. SW Mariposa, Oct. 14, 1970, elevation 2000 ft., in crevice of bank (W. R. Icenogle), ♀; Wawona Camp, Yosemite National Park, Sept. 17, 1941 (W. Ivie), ♀. *Monterey Co.*: 14 mi. S Big Sur, Dec. 22, 1953 (V. Roth), ♀♀; Carmel, Feb. 9, 1967 (V. Roth), ♀; 1 mi. N Carmel, Dec. 21, 1953 (V. Roth), ♂, ♀♀; Carmel Hill Gate, Feb. 10, 1967 (V. Roth), ♀; Cypress Point, 17 Mile Drive, Oct. 1, 1938 (W. Pearce), ♀; Hastings Natural History Reserve (Linsdale), ♀; Pacific Grove, Apr., 1909 (R. V. Chamberlin), juv. ♂, ♀♀; Redwood Canyon, 4 mi. S Gorda, Apr. 2, 1960 (W. J. Gertsch, W. Ivie, R. Schrammel), ♀. *Orange Co.*: Laguna

Beach, July, 1931 (R. V. Chamberlin, W. Ivie), juv. ♂♂, ♀♀; Salt Creek, 1.5 mi. N Dana Point, Nov. 12-Dec. 6, 1968-1969, elevation 1000 ft., in crevice in bank (W. R. Icenogle), ♀♀. *Riverside Co.*: Idyllwild, San Jacinto Mountains, June 17-18, 1952 (W. J. Gertsch), juv. ♂; June 18, 1952 (R. X. Schick), ♀; 3 mi. N Idyllwild, July 1, 1956 (W. J. Gertsch, V. Roth), juv. ♂; 2.5 mi. S Murrieta, Apr. 11-May 10, 1977, elevation 1200 ft., under rocks below chaparral on canyon side (W. R. Icenogle), juv. ♂, ♀. *San Bernardino Co.*: Mill Creek Canyon, San Bernardino Mountains, May 21-June 18, 1969-1970, elevation 6000 ft., under rocks (W. R. Icenogle), ♀♀; Mountain Home Creek, Aug. 13, 1959 (W. J. Gertsch, V. Roth), juv. ♂. *San Diego Co.*: 4 mi. E Fallbrook, Sep. 20, 1971, in web in hole in ravine bank (W. R. Icenogle), ♀; 2.5 mi. NE Julian, Nov. 8, 1971, elevation 4000 ft., in web in crevice of bank (W. R. Icenogle), ♀; Mt. Palomar, July 26, 1931 (R. V. Chamberlin, W. Ivie), juv. ♂♂, ♀; June 30, 1956, elevation 3000-5000 ft. (W. J. Gertsch, V. Roth), ♀; July 15, 1970, elevation 4000 ft., in crevice in bank (W. R. Icenogle), ♀; May 16-Dec. 21, 1970-1971 (B. Azevedo), ♂♂, ♀♀; Pine Valley, Mar. 29, 1960 (W. J. Gertsch, W. Ivie, R. Schrammel), ♀. *San Luis Obispo Co.*: Cambria, Nov. 16, 1937 (O.



FIGS. 89-91. *Hexurella rupicola*, new species, male. 89. Leg I, prolateral view. 90. Left palpal bulb, ventral view. 91. Left palp, retrolateral view.

Bryant), ♀; Feb. 7, 1967, pine duff (V. Roth), ♂; Reservoir Canyon, San Luis Obispo, Aug. 15, 1959 (W. J. Gertsch, V. Roth), ♀; San Luis Obispo, Aug. 3, 1931 (R. V. Chamberlin), juv. ♂. *Santa Barbara Co.*: Santa Barbara, Mar., 1931 (R. V. Chamberlin), juv. ♂, ♀♀. *Santa Clara Co.*: San Juan Hot Springs, July 30, 1931 (R. V. Chamberlin, W. Ivie), juv. ♂. *Santa Cruz Co.*: Ben Lomond, July 6, 1956 (W. J. Gertsch, V. Roth), ♀; Boulder Creek, Dec. 23, 1953 (V. Roth), ♀♀; Felton, Apr. 3, 1960 (W. J. Gertsch, W. Ivie, R. Schrammel), ♀♀; Mt. Madonna, E Watsonville, July 4, 1958 (W. J. Gertsch, V. Roth), juv. ♂. *Tulare Co.*: near Ash Mountain, Sequoia National Park, July 5-19, 1956-1958, elevation 3700 ft. (W. J. Gertsch, V. Roth), ♂, ♀; near Giant Forest, Sequoia National Park, Apr. 2, 1955 (J. MacSwain, M. Wasbauer, P. Hurd), ♀; Johnsondale, Kern River, July 4, 1956 (W. J. Gertsch, V. Roth), juv. ♂, ♀♀; 6 mi. W Johnsondale, Sept. 15, 1959 (W. J. Gertsch, V. Roth), ♀♀; near Main Camp, Sequoia National Park, July 5, 1956, elevation 5500 ft. (W. J. Gertsch, V. Roth), juv. ♂♂, ♀♀; Quaking Aspen Camp, Sept. 9, 1959 (W. J. Gertsch, V. Roth), ♀♀; Soda Creek, near Nelson Camp, Sept. 14, 1959 (W. J. Gertsch, V. Roth), ♀. *Tuolumne Co.*: Tuttletown, July 8, 1958 (W. J. Gertsch, V. Roth), ♀♀. *Ventura Co.*: 7 mi. SE Carpinteria, July 2, 1958 (W. J. Gertsch,

V. Roth), juv. ♂, ♀♀; Mt. Pinos, July 31, 1961 (V. and B. Roth), juv. ♂; Wheeler Springs, July 2, 1958 (W. J. Gertsch, V. Roth), juv. ♂.

DISTRIBUTION: Coast ranges and Sierras of southern California (fig. 33).

HEXURA SIMON

Hexura Simon, 1884, p. 315 (type species by monotypy *Hexura picea* Simon).

DIAGNOSIS: Specimens of *Hexura* may be easily distinguished from other mecicobothriids by the fusion of the two abdominal tergal plates into a single scutum (figs. 58, 60). The anterior lateral spinnerets being only one-segmented (fig. 59) or absent (fig. 68) is also diagnostic of the genus.

DESCRIPTION: Medium-sized spiders (length 4-10) similar in appearance and structure to *Mecicobothrium* but differing as follows: Anterior eye row procurved. Clypeus short, less than anterior median eye diameter. Sternum with four pairs of sigilla apparent, anterior pair nearly touching at midline. Chelicerae without apophyses, armed above on distal half with series of stiff spines in both sexes; retromargin with series of tiny denticular setae. Metatarsi with distal preening comb on ventral surface; tibia I of males moderately incrassate, with patch of clasping spines below or on retro-

lateral surface; metatarsi I of males unspined or nearly so. Tergal plates of abdomen fused into single anterodorsal scutum. Spinnerets six or four; anterior lateral spinnerets, if present, one-segmented, slender. Epigynum with tubular receptacles. Male palp with moderately incrassate tibia; tarsus forming shallow cup, without pro-lateral lobe, with shallow retrolateral invagination; bulb attached to base of tarsus, with stout conductor sheathing thin embolus, curved to point posteriorly.

Hexura picea Simon

Figures 58-63, 67

Hexura picea Simon, 1884, p. 316 (male and female syntypes from "Washington-Territory," should be in Muséum National d'Histoire Naturelle, not examined). Roewer, 1942, p. 210. Chamberlin and Ivie, 1945, p. 550, figs. 3-5. Bonnet, 1957, p. 2207. Gertsch, 1979, p. 120, figs. 5A, 5B.

DIAGNOSIS: This dark species differs from *H. rothi* in still retaining three pairs of spinnerets, although the anterior lateral pair is thin and much smaller than the posterior median pair (fig. 59). The tubular receptacles of the epigynum are coiled and terminate in short, oval bulbs (fig. 67); the clasping spines on the first leg of the male are largely retrolateral in position (fig. 62).

FEMALE (Grande Ronde): Total length, including chelicerae, 8.5; body as in figures 58, 59. Carapace yellow to orange brown; pars cephalica dusky, with dark streaks from side margins and eyes running back to thoracic groove; pars thoracica concolorous, with dusky streaks radiating from thoracic groove to sides; eye tubercle black. Chelicerae orange brown; fang black. Sternum dusky over yellow; labium, endites, and coxae yellowish. Legs dusky yellowish brown, paler below; basal scutum on dorsum brown; spinnerets and lung patches yellowish.

Carapace 3.1 long, 2.6 wide, bare except for short black hairs in ocular area and inconspicuous black setae around margin of pars thoracica; pars cephalica triangular, convex, moderately elevated, highest in ocular area; thoracic groove a short, deep, longitudinal fissure 0.25 long, situated back two-thirds distance to straight posterior margin.

Eyes set on small tubercle slightly less than one-third width of head at that point. Clypeus short, less than radius of anterior median eyes. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 22:11:19:18. Anterior eye row slightly narrower than posterior row, procurved; median eyes separated by their radius, somewhat nearer laterals. Posterior eye row gently recurved; median eyes separated by slightly more than their long diameter, touching laterals. Median ocular quadrangle wider than long (5/3), narrowed in front (50/23).

Sternum 1.8 long, 1.6 wide, covered sparsely with black setae; four pairs of sigilla evident, front pair enlarged. Labium 0.3 long, 0.6 wide, broadly rounded at apex, with apical and median rows of black hairs. Endites 1.1 long, 0.8 wide, clothed with fine black setae. Chelicerae 1.5 long, 0.75 wide at base, provided with fine setae and few suberect black setae along inner margin; promargin with about 13 black teeth and denticles in single row, of which some near base of fang are enlarged.

Leg formula 41=32. Legs of moderate length and thickness, all with pairs or single ventral spines. Palpal claw and paired tarsal claws with about seven fine teeth in single row; unpaired tarsal claws with single fine tooth near base. Measurements:

	I	II	III	IV	Palp
Femur	2.3	2.1	2.2	2.5	1.7
Patella	1.3	1.2	1.2	1.3	0.9
Tibia	1.7	1.4	1.5	1.9	1.2
Metatarsus	1.7	1.7	2.1	2.7	—
Tarsus	1.2	1.3	1.3	1.5	1.2
Total	8.2	7.7	8.3	9.9	5.0

Abdomen 4.5 long, 3.0 wide, suboval, covered evenly with fine black setae; dorsum with basal scutum of two coalesced tergal plates, each marked with row of four principal setae set in small alveoli. Anterior lateral spinnerets small, cylindrical, one-segmented; posterior lateral spinnerets with three segments 0.6, 0.8, and 2.3 long.

Epigynum (fig. 67) consisting of pair of thin, tightly coiled tubes on each side.

MALE (Grand Ronde): Total length, including chelicerae, 8.0; body as in figure 60. Coloration and structure essentially as in female

except as noted; lengths and widths of: carapace 3.2, 2.6; sternum 1.8, 1.5; labium 0.25, 0.45; endites 1.0, 0.7; abdomen 3.5, 2.7. Pars cephalica much narrowed in front. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 22:11:19:17. Median ocular quadrangle wider than long (42/29), narrowed in front (42/23). Chelicerae longer, narrower, with patch of stout, erect setae on distal half; promargin with single row of 12 or 13 black teeth and denticles, with enlarged teeth at both ends of series. Leg formula 4213. Legs proportionally longer, thinner, with fewer spines on legs I and II; tibia I with double series of six stout spines on retrolateral side of distal half (fig. 62). Measurements:

	I	II	III	IV	Palp
Femur	2.6	2.5	2.4	3.0	1.8
Patella	1.4	1.3	1.3	1.4	0.9
Tibia	1.8	1.8	1.7	2.2	1.7
Metatarsus	2.1	2.3	2.7	3.4	—
Tarsus	1.8	2.0	1.9	2.2	1.0
Total	9.7	9.9	10.0	12.2	5.4

Palp (figs. 61, 63) with heavy, curved conductor and fine embolus lying in groove along retrolateral side; tibia with cluster of small spines beneath at apex.

MATERIAL EXAMINED: **Oregon:** *Benton Co.:* Corvallis, May 12, 1953 (V. Roth), ♀; Mary's Peak, Apr. 8, 1951 (V. Roth), ♂; Mary's Peak Road, Sept. 11-15, 1964 (F. Beer), ♂♂, ♀♀, June 7, 1965 (F. Beer), ♀; 5 mi. W Philomath, Sept. 21, 1963 (F. Beer), ♂♂, ♀♀; 7 mi. W Philomath, May 21, 1949 (V. Roth), ♀♀; 7.5 mi. N Philomath, May 26, 1965 (F. Beer), ♂♂; 9 mi. W Philomath, July 29, 1953 (W. J. and J. W. Gertsch), juv. ♂♂, ♀♀. *Clatsop Co.:* 5 mi. N, 7 mi. W Elsie, Mar. 15, 1972, elevation 700 ft. (E. M. Benedict, MCZ), ♀; 3 mi. SE Olney, Nov. 27, 1971, elevation 400 ft. (E. M. Benedict, MCZ), ♀. *Lane Co.:* 3 mi. E. Blue River, May 3, 1947, leaf litter (I. Newell), ♀; Glenada, May 18, 1957 (B. Malkin), ♀; 3 mi. E Tiernan, Sept. 30, 1959 (V. Roth), ♀; Triangle Lake, May 19-June 9, 1957, bait trap (B. Malkin), ♀, Sept. 30, 1959 (V. Roth), ♀. *Lincoln Co.:* Nelscott Beach, Apr. 10, 1949, funnel webs over moss (V. Roth),

♀♀; Tidewater, Sept. 19, 1946 (J. C. Chamberlin), ♂♂; 4.7 mi. E. Tidewater, Oct. 16, 1965 (F. Beer), ♀; Yaquina River, 6 mi. E Newport, Sept. 4-6, 1946 (J. C. Chamberlin), juv. ♂. *Polk Co.:* 4-8 mi. W Grande Ronde, Nov. 27, 1940 (W. Ivie), ♂, ♀♀. *Washington Co.:* Forest Grove, juv. ♂♂. **Washington:** *Grays Harbor Co.:* Graves Creek near Quinault, Olympic National Park, July 12, 1951, rain forest (H. W. Levi, MCZ), juv. ♂, ♀; 5 mi. E McCleary, Aug. 26, 1959 (W. J. Gertsch, V. Roth), ♀; Quinault, Sept. 5, 1936 (L. C. Lloyd), ♀; July 21, 1952 (J. and V. Roth), juv. ♂, ♀♀; Quinault Lake, July 12, 1945, cedar-hemlock, ♀. *King Co.:* Renton, Apr. 30, 1936 (H. Exline), ♀♀; Seattle (Kincaid), ♀, Nov., 1930 (H. Exline), ♂. *Pierce Co.:* Carbon River, Mt. Rainier National Park, July 15, 1956 (B. Malkin, R. Kottke), juv. ♂, ♀; Fort Lewis, June 10, 1965, crawling on ground (W. R. Icenogle), ♀; near Kautz Creek, Mt. Rainier, July 20, 1935, elevation 2400 ft. (M. Hatch), juv. ♂; Paradise Park, Mt. Rainier, July 20, 1905 (J. H. Emerton, MCZ), ♀; Puyallup (T. H. Scheffer, MCZ), ♀♀. *Thurston Co.:* Olympia, Mar. 26-Dec. 27, 1928-1944 (H. Exline), juv. ♂, ♀♀, Mar. 19-27, 1937 (W. Lloyd), ♂, ♀, Oct. 10, 1943 (D. Frizell), ♂, Aug. 22, 1955 (V. Roth), juv. ♂♂, ♀, Aug. 26, 1959 (W. J. Gertsch, V. Roth), juv. ♂♂, ♀♀.

DISTRIBUTION: Western Oregon and Washington (fig. 33). The record from Montana noted by Gertsch and Jellison (1939) is a misidentification.

Hexura rothi, new species

Figures 64-66, 68, 69

TYPES: Male holotype and female paratype from McDonald Forest, north of Corvallis, Benton County, Oregon (September 29, 1959; V. Roth), deposited in AMNH.

ETYMOLOGY: Named for Mr. Vincent Roth, collector of many meicobothriids.

DIAGNOSIS: This somewhat larger and more robust species is readily distinguished from *Hexura picea* by the presence of only four spinnerets, the anterior lateral pair being completely absent (fig. 68). The tubular receptacles

of the epigynum are short, uncoiled, and terminate in transparent, suboval pouches (fig. 69); the series of clasping spines on the first leg of the male are clustered near the base on the ventral tibial surface (fig. 65).

FEMALE (Sunny Valley): Total length, including chelicerae, 11.0. Coloration and structure like that of *H. picea* except as noted; lengths and widths of: carapace 4.3, 3.3; sternum 2.3, 1.9; labium 0.35, 0.70; endites 1.5, 1.0; abdomen 5.0, 3.5. Carapace duller, more dusky, with narrow marginal dark seam and thin radiating streaks from thoracic groove; chelicerae dark brown. Pars cephalica somewhat broader in front, with ocular tubercle equalling one-third width at that point. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 30:15:20:18. Median ocular quadrangle wider than long (11/6), narrowed in front (11/7). Chelicerae longer, wider, more robust. Leg formula 4132. Palpal claw with about eight fine teeth; paired tarsal claws with eight to 10 similar teeth; unpaired tarsal claws smooth. Measurements:

	I	II	III	IV	Palp
Femur	3.0	2.6	2.7	3.3	2.3
Patella	1.6	1.3	1.6	1.7	1.2
Tibia	2.0	1.7	1.8	2.4	1.5
Metatarsus	2.2	2.0	2.6	3.5	—
Tarsus	1.4	1.4	1.7	1.8	1.7
Total	10.2	9.0	10.4	12.7	6.7

Anterior lateral spinnerets absent, with small scars showing former locations (fig. 68); posterior lateral spinnerets with three segments 0.7, 1.1, and 2.3 long. Epigynum (fig. 69) presenting on each side two short, curved, black tubes with transparent oval bulbs at apex.

MALE (Corvallis): Total length, including chelicerae, 9.3. Coloration and structure like that of *H. picea* except as noted; lengths and widths of: carapace 3.6, 3.0; sternum 2.1, 1.8; labium 0.3, 0.6; endites 1.2, 0.8; abdomen 4.8, 2.8. Chelicerae not elongated; promargin with 13 black teeth and denticles, with enlarged teeth scattered along row. Leg formula 4=132. Tibia I somewhat incrassate, with cluster of six long spines below near base (fig. 65). Measurements:

	I	II	III	IV	Palp
Femur	2.8	2.8	2.7	3.1	2.9
Patella	1.5	1.3	1.3	1.4	1.1
Tibia	2.2	1.8	1.8	2.3	1.7
Metatarsus	2.4	2.5	2.7	3.4	—
Tarsus	1.4	1.8	1.8	2.2	1.2
Total	10.3	10.2	10.3	12.4	6.9

Palp (figs. 64, 66) with tarsus bearing series of coarse hairs along retrolateral margin; tibia with two single spines below on basal half but without patch of setae near apex; conductor of embolus longer and thin at apex.

OTHER MATERIAL EXAMINED: **Oregon:** *Curry Co.:* Carpenterville, Sept. 31, 1959 (V. Roth), ♀; Gold Beach, 2 mi. N of bridge, Oct. 13, 1954, myrtle duff (V. Roth), ♂; 13 mi. E Gold Beach on road to Agness, Mar. 10, 1972, elevation 600 ft. (E. M. Benedict, MCZ), ♀. *Douglas Co.:* 2 mi. SW Divide, Jan 5, 1963 (F. Beer), ♂, ♀. *Jackson Co.:* Union Creek, July 3, 1952 (W. J. Gertsch), ♀. *Josephine Co.:* Cave City, May 17, 1947 (B. Malkin), ♀; Grave Creek, 9 mi. W Sunny Valley, July 22, 1962 (V. Roth), ♀; 2 mi. W Placer, Aug. 3, 1959 (W. J. Gertsch, V. Roth), ♀; Sunny Valley, May 30, 1952 (B. Malkin), juv. ♂. *Lane Co.:* Constock, 9 mi. S Cottage Grove, July 24, 1962 (V. Roth), juv. ♂.

DISTRIBUTION: Southwestern Oregon (fig. 33).

HEXURELLA, NEW GENUS

Hexurella Gertsch, 1979, p. 120 (*nomen nudum*).

TYPES SPECIES: *Hexurella pinea*, new species.

ETYMOLOGY: The generic name is from *Hexura* and the Latin suffix *ella* (little), referring to the small size.

DIAGNOSIS: Specimens of *Hexurella* may be easily distinguished from other mecicobothriids by the four-segmented posterior lateral spinnerets (fig. 71). The members of this genus are among the smallest of all mygalomorph spiders and in North America are rivalled only by the diplurids of the genus *Microhexura*. The two groups are much alike in superficial appearance but the presence of six spinnerets, tergal plates

on the abdomen, and a palpal conductor readily differentiate *Hexurella*.

DESCRIPTION: Small spiders (length 2.5-5.0) similar in appearance and structure to *Mecicobothrium* but differing as follows: Posterior eye row straight or slightly procurved. Clypeus sloping, equal in width to long diameter of anterior lateral eye. Posterior three pairs of sigilla inconspicuous or not evident; anterior pair broad. Chelicerae without apophyses, short, projecting ventrad; retromargin with band of hairs and one or two teeth near tip of fang. First leg of males moderately incrassate, with or without patch of clasping spines on femur or tibia; terminal segments with few spines. Posterior lateral spinnerets four-segmented, last two segments with false sutures. Four epigynal receptacles subequal in length. Tibia of male palp incrassate; tarsus without prolateral lobe, with shallow retrolateral invagination; conductor and embolus coiled.

KEY TO SPECIES OF *HEXURELLA*

1. Carapace pale yellow or white, without contrasting markings (fig. 72); posterior eye row usually straight (fig. 74); leg I of males with patch of clasping spines (figs. 76, 83); Arizona2
- Carapace reddish brown, with contrasting markings (fig. 73); posterior eye row usually slightly procurved (fig. 75); leg I of males without patch of clasping spines (figs. 86, 89); California and Baja California3
2. Femur I of male with, tibia I without, patch of spines on prolateral surface (fig. 76); bursa copulatrix of females relatively narrow (fig. 80); pine forest near Prescott, Arizona*pinea*
- Femur I of male without, tibia I with, patch of spines on prolateral surface (fig. 83); bursa copulatrix of females relatively wide (fig. 81); oak and ground litter on mountains of southeastern Arizona*apachea*
3. Conductor and embolus of male closely appressed (fig. 87); female unknown; oak litter of northern Baja California*encina*
- Conductor and embolus of male well separated (fig. 90); female with shallow bursa copulatrix (fig. 82); under rocks in ground litter on foothills of southern California*rupicola*

***Hexurella pinea*, new species**

Figures 70-72, 74, 76-80

TYPES: Male holotype and female paratype from small funnel webs in duff of *Pinus ponderosa* forest 5 mi. west of Prescott, Yavapai County, Arizona (May 5, 1956; V. Roth), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition from the Latin *pineus* (pine), referring to the pine duff habitat.

DIAGNOSIS: *Hexurella pinea* resembles *H. apachea* in lacking contrasting markings on the carapace (fig. 72), but may be distinguished by the patch of spines on the male femur I (fig. 76) and the narrow bursa copulatrix of females (fig. 80).

FEMALE (paratype): Total length, including chelicerae, 3.5; body as in figures 70, 71. Cephalothorax and appendages pale yellow; eye tubercle and thoracic groove black; fangs brown. Abdomen white, dorsum dusted with purple; tergal plates yellowish.

Carapace 1.50 long, 1.10 wide, suboval, smooth, bare except for few inconspicuous hairs in ocular region and few scattered erect hairs on sides of pars thoracica, gently rounded in front, slightly invaginated behind, low and convex, without evident cephalic grooves; thoracic groove shallow, linear, 0.15 long, situated back nearly two-thirds distance to posterior margin.

Eyes (fig. 74) set on low tubercle about one-third width of head at that point. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 10:7:7:7. Anterior eye row slightly narrower than posterior row, procurved, a line along posterior edges of eyes being nearly straight; median eyes separated by roughly their radius, almost touching laterals. Posterior eye row essentially straight; median eyes separated by one and one-half times their diameter, almost touching laterals. Lateral eyes of each side almost touching. Median ocular quadrangle wider than long (29/15), narrowed in front by same ratio.

Sternum 0.86 long, 0.70 wide, sparsely covered with long pale hairs; four pairs of sigilla present but only broad anterior pair conspic-

uous. Labium 0.10 long, 0.30 wide, gently rounded at apex, set with apical row of fine hairs, with few hairs posteriorly. Endites 0.40 long, 0.33 wide, with scattered pale hairs, without spinules. Chelicerae 0.30 long, 0.28 wide at base as seen from above, only one-fifth length of carapace, sparsely clothed with long pale hairs; promargin with eight brown teeth varying greatly in width, retromargin with single tooth near tip of fang.

Leg formula 4132. Legs of moderate length, clothed with long pale hairs and spines; legs I and II mostly without dorsal or lateral but with ventral spines on tibia and metatarsi; legs III and IV with more numerous spines on all surfaces. Palpal claw and paired tarsal claws with series of about seven fine teeth in single curved row; unpaired tarsal claws with about three fine teeth. Measurements:

	I	II	III	IV	Palp
Femur	0.98	0.88	0.80	0.95	0.60
Patella	0.60	0.50	0.50	0.63	0.40
Tibia	0.58	0.50	0.50	0.70	0.40
Metatarsus	0.50	0.47	0.55	0.75	—
Tarsus	0.33	0.30	0.50	0.55	0.40
Total	2.99	2.65	2.85	3.58	1.80

Abdomen 2.00 long, 1.50 wide, suboval, somewhat flattened, covered evenly with inconspicuous pale hairs; dorsum with conspicuous wide tergal plate at base and small suboval plate beyond base, both sparsely covered with long curved hairs. Posterior median spinnerets as long as anterior laterals; posterior lateral spinnerets with four segments 0.35, 0.35, 0.43, and 0.22 long.

Epigynum (fig. 79) with two thin receptacles on each side; outer pair slightly wider and longer than inner pair; bursa copulatrix relatively narrow (fig. 80).

MALE (holotype): Total length, including chelicerae, 2.5; body as in figure 72. Coloration and structure essentially as in female except for smaller abdomen; lengths and widths of: carapace 1.10, 0.90; sternum 0.70, 0.60; labium 0.08, 0.22; endites 0.30, 0.25; abdomen 1.40, 0.90. Chelicerae shorter than in female, about 0.1 long as projecting from above, less than one-tenth length of carapace. Leg I

thickened, with femur nearly half as deep as long, armed at center of prolateral surface with patch of about 12 spines, tibia and metatarsus with two or three weak ventral spines (fig. 76).

Measurements:

	I	II	III	IV	Palp
Femur	0.85	0.70	0.60	0.80	0.55
Patella	0.45	0.40	0.40	0.52	0.25
Tibia	0.45	0.40	0.40	0.70	0.25
Metatarsus	0.41	0.40	0.50	0.75	—
Tarsus	0.30	0.31	0.38	0.45	0.30
Total	2.46	2.21	2.28	3.22	1.35

Palp (figs. 77, 78) clothed with fine pale hairs and weak spines; femur thick, cylindrical, two and one-half times as long as deep; patella short; tibia thickened, scarcely twice as long as deep; tarsus twice as long as broad, excavated to form shallow cup; conductor and embolus forming thin curl.

MATERIAL EXAMINED: A male and females taken with the types.

DISTRIBUTION: Known only from the type locality in central Arizona (fig. 34).

***Hexurella apachea*, new species**

Figures 81, 83-85

TYPES: Male holotype and female paratype from detritus under oak trees at an elevation of 5400 ft. in a side canyon of the north fork of Cave Creek Canyon, near the Southwestern Research Station, Cochise County, Arizona (March 9, 1972; V. Roth), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition from the Apache Indians of southeastern Arizona.

DIAGNOSIS: *Hexurella apachea* resembles *H. pinea* but may be distinguished by the patch of spines on the male tibia I (fig. 83) and the wide bursa copulatrix of females (fig. 81).

FEMALE (paratype): Total length, including chelicerae, 3.25. Coloration and structure as in *H. pinea* except as noted. Cephalothorax and appendages whitish to dull yellow; carapace with faint narrow marginal dusky band. Abdomen whitish, without darker pattern. Lengths and widths of: carapace 1.10, 1.00; sternum

0.70, 0.62; labium 0.10, 0.25; endites 0.30, 0.25; abdomen 2.00, 1.20. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 11:6:8:8. Anterior eye row moderately procurved, with line along posterior edges being slightly procurved; median eyes separated by nearly their diameter. Cheliceral promargin with seven or eight teeth and denticles, first, third, and fifth or sixth of tooth size, retromargin with two proximal teeth. Measurements:

	I	II	III	IV	Palp
Femur	0.80	0.70	0.70	0.87	0.52
Patella	0.50	0.40	0.40	0.50	0.33
Tibia	0.50	0.40	0.40	0.62	0.38
Metatarsus	0.43	0.40	0.50	0.68	—
Tarsus	0.30	0.30	0.35	0.40	0.35
Total	2.53	2.20	2.35	2.97	1.58

Epigynum with inner pair of receptacles longer than outer pair; bursa copulatrix relatively wide (fig. 81).

MALE (holotype): Total length, including chelicerae, 3.3. Coloration slightly darker than that of female; abdomen lightly shaded with purple. Lengths and widths of: carapace 1.02, 0.81; sternum 0.62, 0.55; labium 0.10, 0.20; endites 0.27, 0.22; abdomen 1.30, 0.90. Eyes closer together than in female but proportions similar; anterior median eyes separated by their radius. Leg formula 41=32. First leg thickened (fig. 83); femur nearly half as deep as long, without prolateral or retrolateral spines; patella with prominent subdorsal spine at apex and three smaller subventral spines at apex; tibia with seven prolateral spines forming loose brush. Measurements:

	I	II	III	IV	Palp
Femur	0.70	0.65	0.60	0.80	0.57
Patella	0.40	0.40	0.36	0.46	0.22
Tibia	0.43	0.35	0.37	0.53	0.36
Metatarsus	0.36	0.39	0.43	0.58	—
Tarsus	0.25	0.28	0.38	0.42	0.24
Total	2.14	2.07	2.14	2.79	1.39

Palp similar to that of *H. pinea* but with embolus and conductor thicker at terminal bend (figs. 84, 85).

MATERIAL EXAMINED: A male and females

taken with the types, plus the following: **Arizona:** *Pima Co.:* Madera Canyon, picnic grounds near Santa Cruz County line, Santa Rita Mountains, April 30-May 3, 1972, under rocks in duff of ravine at elevation of 5000 ft. (W. Icenogle), ♂♂, ♀♀.

DISTRIBUTION: Chiricahua and Santa Rita Mountains of southeastern Arizona (fig. 34).

***Hexurella encina*, new species**

Figures 73, 75, 86-88

TYPE: Male holotype sifted from oak leaves 40 mi. south of Tecate, Baja California Norte, Mexico (April 29, 1961; W. J. Gertsch, V. Roth), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition from the Spanish *encina* (oak), referring to the oak leaf habitat.

DIAGNOSIS: *Hexurella encina* resembles *H. rupicola* in having contrasting markings on the carapace (fig. 73), but may be distinguished by the closely appressed palpal conductor and embolus (fig. 87).

FEMALE: Unknown.

MALE (holotype): Total length, including chelicerae, 2.25; body as in figure 73. Carapace dull orange, with reddish brown pattern of radiating streaks. Sternum, labium, endites, chelicerae, and coxae dull yellow. Legs yellow to dull orange, lightly suffused with reddish brown; femora with reddish brown bands on sides. Abdomen dark reddish brown; tergal plates nearly same color. Structure as in *H. pinea* except as noted; lengths and widths of: carapace 1.00, 0.82; sternum 0.60, 0.50; labium 0.07, 0.20; endites 0.25, 0.20; abdomen 1.25, 0.87. Carapace oval, broadly rounded in front, straight behind; thoracic groove 0.1 long. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 10:5:6:6. Anterior eye row moderately procurved (fig. 75), line along posterior edges slightly procurved; median eyes separated by two-thirds their diameter. Posterior eye row gently procurved. Median ocular quadrangle wider than long (11/5). Cheliceral retromargin with two denticles near tip of fang. Femur I without spines on prolateral surface, moderately thickened (fig. 86). Measurements:

	I	II	III	IV	Palp
Femur	0.69	0.60	0.53	0.70	0.45
Patella	0.37	0.33	0.33	0.42	0.26
Tibia	0.41	0.33	0.35	0.47	0.40
Metatarsus	0.37	0.35	0.45	0.60	—
Tarsus	0.28	0.25	0.32	0.40	0.27
Total	2.12	1.86	1.98	2.59	1.38

Palp (figs. 87, 88) with femur about twice as long as deep; tibia proportionately more incrasate than in *H. pinea*, embolus and conductor long, relatively wide at terminal bend.

MATERIAL EXAMINED: A juvenile taken with the holotype.

DISTRIBUTION: Known only from the type locality in Baja California (fig. 34).

Hexurella rupicola, new species

Figures 82, 89-91

TYPE: Male holotype from 1 mi. south of Temecula, Riverside County, California (March 6, 1971; J. M. Rowland), deposited in AMNH.

ETYMOLOGY: The specific name is from the Latin *rupes* (rock) and *incola* (inhabitant), referring to the habitat under rocks.

DIAGNOSIS: *Hexurella rupicola* resembles *H. encina* but may be distinguished by the widely separated embolus and conductor of the male palp (fig. 90). Females of *H. rupicola* have a distinctively shallow bursa copulatrix (fig. 82).

FEMALE (Johnson Canyon): Total length, including chelicerae, 4.5. Coloration as in *H. encina*, structure as in *H. pinea* except as noted; lengths and widths of: carapace 1.50, 1.20; sternum 0.90, 0.75; labium 0.15, 0.30; endites 0.40, 0.35; abdomen 3.00, 1.50. Clypeus equal in width to slightly more than long diameter of anterior lateral eye. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 4:2:3:3. Anterior eye row procurved as seen from front, but line along posterior edges nearly straight; median eyes separated by half their radius, as far from lateral eyes. Posterior eye row slightly procurved; median eyes separated by nearly twice their diameter. Chelicerae 0.50 long, 0.33 wide; promargin with nine teeth and denticles, retromargin with one tooth and two denticles near tip of fang. Measurements:

	I	II	III	IV	Palp
Femur	1.25	1.00	0.85	1.15	0.70
Patella	0.50	0.50	0.35	0.80	0.35
Tibia	0.70	0.50	0.50	0.80	0.40
Metatarsus	0.50	0.35	0.50	0.83	—
Tarsus	0.35	0.30	0.60	0.60	0.40
Total	3.30	2.65	2.80	4.18	1.85

Epigynum similar to *H. pinea* but with shallower bursa copulatrix (fig. 82).

MALE (holotype): Total length, including chelicerae, 2.30. Coloration and structure as in *H. encina* except as noted; lengths and widths of: carapace 1.00, 0.74; sternum 0.60, 0.46; labium 0.07, 0.20; endites 0.23, 0.21; abdomen 1.30, 0.75. Ratio of eyes, anterior lateral: anterior median: posterior lateral: posterior median, 10:5:6:6. Posterior median eyes separated by nearly twice their diameter. Cheliceral retromargin with one tooth near tip of fang. Depth of femur I less than half its length (fig. 89). Measurements:

	I	II	III	IV	Palp
Femur	0.66	0.60	0.52	0.65	0.43
Patella	0.37	0.33	0.32	0.41	0.21
Tibia	0.41	0.33	0.33	0.50	0.40
Metatarsus	0.39	0.33	0.40	0.55	—
Tarsus	0.29	0.27	0.36	0.40	0.23
Total	2.12	1.86	1.93	2.51	1.27

Palp (figs. 90, 91) with distinctly separated embolus and conductor.

OTHER MATERIAL EXAMINED: **California:** *Riverside Co.:* near De Luz road, 2.5 mi. S Murrieta, Apr. 9-28, 1977-1978, under rocks below chaparral on canyon side, elevation 1200 ft. (W. Icenogle), ♂, ♀♀. *San Diego Co.:* Johnson Canyon, N end of Harvest Road, 2 mi. SW Lower Otay Lake, Apr. 7-16, 1977-1978, under rocks on grassy canyon side, elevation 500 ft. (S. Johnson, W. Icenogle), ♂♂, ♀♀.

DISTRIBUTION: Southern counties of California (fig. 34).

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