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STUDIES IN THE ORBWEAVING SPIDERS (ARGIOPIDAE). 1

BY ALLAN F. ARCHER¹

INTRODUCTION

The present paper is one of a series in which the orbweaving spiders of the family Argiopidae will be discussed. During the past 10 years a vast amount of new material has been accumulated in the collection of the American Museum of Natural History and in that of the author at present housed in the Alabama Museum of Natural History. Of very great importance is the portion taken by men who were in overseas service during the last decade and who, in addition to fulfilling their duties in the war service, were able to bring together representative collections from many regions of the world. A large part of the material upon which this report is being made was collected by Dr. W. J. Gertsch and by the author, both long interested in this group of spiders, during field trips within the borders of the United States. Unless otherwise indicated, all the types and most of the paratypes of the new species are deposited in the American Museum of Natural History.

During three summer months in 1949 the author was able to study the American Museum collections at first hand, thanks to a grant from the Council Fund of the Scientific Staff. This study was sponsored by the Department of Insects and Spiders, which is under the leadership of Dr. Mont A. Cazier, and to all members of which I am indebted for aid and advice. At this time I also acknowledge with thanks the courtesies accorded me by Dr.

¹ Curator of Arachnida of the Alabama Museum of Natural History, University, Alabama.

Joseph Bequaert and Miss E. B. Bryant during a trip to the Museum of Comparative Zoölogy in Cambridge, Massachusetts, and much aid from Dr. Walter B. Jones, Director of the Alabama Museum of Natural History.

Especial acknowledgment is due to Dr. Willis J. Gertsch for his constant help and his collaboration with the author in many of the problems presented by this study. In addition to placing at my disposal the large argiopod collections under his care and to outlining some of the studies to be made, he has allowed me to use 15 figures prepared by Mr. Wilton Ivie (see figs. 48-62) for this paper. All the other figures were drawn by the author.

The present contribution is concerned with the subfamilies Metinae and Araneinae, which are considered from the viewpoint of their natural limits and to which are added a number of new genera and species. An innovation is the incorporation of the Gasteracanthinae in the subfamily Araneinae as merely a subdivision.

SYSTEMATIC SECTION

The position of the typical orbweavers in relation to other argiopoid families (superfamily Argiopoidea) can be clearly defined on the basis of the male palpus. There are two principal groups. In the first the male palpus lacks the paracymbium, while in the second it is present. It is supposed that the paracymbium is a more advanced character, whereas the lack of this structure is regarded as the more primitive condition. Certain apophyses on the cymbium in *Hypochilus* and other genera have been designated in the literature under this term, but there is little evidence to support its valid occurrence except in the more derivative families of the Argiopoidea. A study of the penultimate molt in *Conarana excelsa* Banks indicates that the paracymbium, visible through the transparent cuticle, is formed by a vertical splitting off of the lower portion of the margin of the cymbium on its ectal (prolateral) side. The vertical structure thus derived is similar to that found in primitive genera such as *Nephila*. The particular angle at which the paracymbium lies is not a criterion of the family to which a given spider belongs, but the relationship of the paracymbium to neighboring structures, the cymbium, and the tibia is all important. Of importance also are the attachment of the genital bulb to the cymbium and the relative proportions of the tegulum and subtegulum.

The following families have no paracymbium, although cymbial apophyses may in some instances be mistaken for it:

THERIDIDAE: Genital bulb of the male palpus attached to the base of the cymbium. Tegulum very reduced in proportion to the subtegulum which is large. Cymbium along with the genital bulb not folded down on the tibia.

ARCHAEIDAE: Genital bulb attached to the base of the cymbium. Tegulum and subtegulum nearly equal. Base of the genital bulb sagging down on the slightly flattened ventral face of the tibia.

SYMPHYTOGNATHIDAE: Attachment of the genital bulb to the cymbium median. Apical structures, including the tegulum, predominating over the reduced subtegulum. Cymbium and genital bulb sagging down on the ventral face of the tibia, thus assuming the uncate position of *Pholcus* and *Filistata*.

The following families have a paracymbium:

MIMETIDAE: Paracymbium a short lobe projecting diagonally from the margin of the cymbium a considerable distance above the apical face of the tibia. Attachment of genital bulb eccentric median. Tegulum predominant over subtegulum. Position of cymbium and genital bulb normal, not uncate.

LINYPHIIDAE: Paracymbium separate from, or fused with, the margin of the cymbium, extended or horseshoe shaped, and with basal face very close to, or resting directly on, the apical face of the tibia. Attachment of the genital bulb to the cymbium median. Tegulum and subtegulum relatively equal. Position of cymbium and genital bulb normal. The genitalia do not warrant the separation of Nesticidae and Micryphantidae from this family.

ARGIOPIDAE: Paracymbium vertical or divergent from the axis of the cymbium, but its basal face not resting on the apical face of the tibia, instead usually being separated from it by a distinct gap. Attachment of the genital bulb to the cymbium ranging from universal-median and then by all degrees of migration to frankly basal (as in the Theridiidae). Tegulum greatly overbalancing the subtegulum, the latter ranging from ring-like to a vestigial knob. Position of cymbium and genital bulb normal. The genitalia do not warrant the separation of the Tetragnathidae and Theridiosomatidae from this family.

SUBFAMILY METINAE

It is evident that the character and position of this subfamily

have not been properly evaluated. Simon (1892-1895, *Histoire naturelle des araignées*, vol. 1, pp. 726-742) maintained the present components as tribes under the Tetragnathinae. Others since then have placed certain genera under the last-named subfamily, at the same time holding the remaining metines under the Metinae. Recently Harriet Exline (1948, *Ann. Ent. Soc. Amer.* no. 3, pp. 309-325) assigned the genus *Allepeira* to a new subfamily, the Allepeirinae, basing her conclusions not only on the remarkable web made by at least one of the species but also on the superficial resemblance to the Linyphiidae and on structural relationships with the argiopid subfamily Argiopinae. The presence of a median apophysis of the tegulum was demonstrated and was furthermore regarded as a feature otherwise lacking in members of the Metinae. Whereas the writer agrees that the median apophysis is a very important structure in differentiating genera as well as species, it cannot be regarded as excluding a genus from a position beside genera lacking this structure. The reason for this is that it is at the level of the Metinae that the median apophysis first appears, and in one genus, *Plesiometa*, we find its true beginnings as a wall-like extension of the apical margin of the tegulum close to the base of the conductor, a condition, however, which is not much more advanced in *Allepeira* than in certain other genera where it has been overlooked. It is suggestive that in the Argiopidae and other families the median apophysis serves as a retaining structure for certain apical elements of the genital bulb. At any rate the need in the Argiopidae is not for an increase in subfamily categories but for a simplification, the basis of which can best be demonstrated by a study of the genera of the world.

The Metinae constitute a link between the ancient and primitive Nephilinae and the more advanced Argiopinae which in turn link directly with the very large subfamily, the Araneinae, the remaining subfamilies being apparent side branches of the two most primitive argiopid subfamilies. The series is so complete as to leave no doubt of the real existence of living intermediates. Taken with other external structures the most outstanding genitalic features of the subfamilies under immediate consideration are:

NEPHILINAE: Median apophysis lacking and general structure of the genital bulb primitive, with attachment to the cymbium universal. Paracymbium relatively small and suberect.

METINAE: Median apophysis either lacking or else in a more than incipient development (found in one tribe), and other apophy-

ses besides this one present. Genital bulb more complex, with attachment to cymbium universal. Paracymbium divergent, small to large.

ARGIOPINAE: Median apophysis present, a serrate or denticulate-aculeate blade. Genital bulb otherwise not much more complicated than in the previous subfamily, and with attachment to cymbium subbasal and more extensive than the next one. Paracymbium stout, cornified, divergent. Characters of the eyes and legs also used by many as distinguishing characteristics.

ARANEINAE: Median apophysis present, and, if blade-like, not serrate; generally extremely varied. Genital bulb quite simple to very complex, with numerous apophyses, and its attachment basal and more or less restricted. Paracymbium various, divergent. Eye characters duplicating previous ones (*Cyrtophora citricola*) in rare cases only, but legs quite different in relative proportions of distal segments.

TRIBE METINI

The tribe Metini is constituted essentially as indicated by Simon (1895, *Histoire naturelle des araignées*, vol. 1, p. 726) after the removal of elements, partly comprising entirely sound, old genera described by O. P. Cambridge (and since sunk under *Meta* or *Leucauge*), and partly constituting new genera. *Metabus* O. P. Cambridge, 1899 (genotype: *M. gravidus* O. P. Cambridge), is close to *Metargyra* and *Leucauge* and not to *Meta* under which it is included. It resembles the former two in the genital bulb, and is distinct in having a subbasal apophysis on the cymbium at the same time lacking one on the paracymbium. *Leucauge* White, 1841, (genotype: *L. argyrobapta* White), has a wide distribution in both hemispheres and is divisible into two subgenera, *Leucauge* and *Argyropeira* Emerton (type: *L. venusta* Walckenaer), the latter apparently confined to the Western Hemisphere. In *Leucauge* the palpal tibia is relatively short, while the apical patellar spine of the male palpus is not always present. Examples of this subgenus other than the type are *L. granulata* (Walckenaer), *L. argentata* O. P. Cambridge, *L. hebridisia* Berland, *L. decorata* (Blackwall), *L. celebesiana* (Walckenaer), and *L. retracta* Chamberlin. Besides the type species, examples of *Argyropeira* are *L. longipes* F. O. P. Cambridge, *L. mandibulata* F. O. P. Cambridge, *L. aurulenta* C. Koch, and *L. mabelae*, new species.

All records cited in the coming pages will be assumed to be

based on the collections in the American Museum of Natural History (A.M.N.H.) whether or not they are so indicated. All locality records from other collections will be specifically identified as to their location, virtually all cited being from the Museum of Comparative Zoölogy (M.C.Z.).

***Leucauge (Argyropeira) mabelae*, new species**

Figures 1 and 2

MALE: Total length, 3.8 mm. Color of male similar to that of the female. First leg: femur, 4.5 mm.; patella, 0.6 mm.; tibia, 4.7 mm.; metatarsus, 4.5 mm.; tarsus, 1.3 mm. Palpus as illustrated in figure 1.

FEMALE: Total length, 6.0 mm. This species is fully the stature of *L. venusta* (Walckenaer) and much like it in coloration and appearance, having green legs. Abdomen silvery, ebony, and with green and gold markings; orange coloration on the sides and venter of *venusta* replaced by coral red; two apical caudal red spots present; ventral red spot large.

Epigynum as illustrated in figure 2.

For contrast with this species, and to show differences in the genitalia, the epigynum and male palpus of *L. venusta* (from Rock Mountain, Tuscaloosa, Tuscaloosa County, Alabama) are illustrated in figures 3 and 4. *L. mabelae* occurs in Florida and adjacent localities of contiguous states.

TYPE LOCALITY: Male holotype, female allotype, and female paratypes from Sarasota, Sarasota County, Florida, December 26, 1940 (A. F. Archer).

OTHER LOCALITIES: Florida: Male and female paratypes from Royal Palm State Park, Dade County, December 27–28, 1940 (A. F. Archer); female paratypes, Orlando, Orange County, November 11–14, 1946 (Mableann Archer and A. F. Archer); female paratypes, Silver Springs, Marion County, November 11, 1946 (Mableann Archer and A. F. Archer). Alabama: Male and female paratypes, Chattahoochee State Park, Houston County, October 18, 1939 (A. F. Archer).

***Leucauge (Argyropeira) aurulenta* (C. Koch)**

Figures 5 and 6

Linyphia aurulenta C. KOCH, 1845, Die Arachniden, vol. 12, p. 127, pl. 424, fig. 1049.

Leucauge venusta F. O. P. CAMBRIDGE, 1908, Biologia Centrali-Americana, Arachnida, vol. 2, p. 441, pl. 42, figs. 1-2.

This species was placed by Cambridge under *L. venusta*, but is very distinct as to the male palpus and the epigynum. It is very close to it in appearance, but replaces it in Middle America.

ORSINOME SIMON

Orsinome Simon should be mentioned in passing as nearly transitional to the next group. The cymbium of the male palpus is oblong, with a median dorsal spur, and the embolus and conductor are long and coiled. The male chelicerae are divergent laterally, and the femora lack trichobothria. The tribe *Opadini*, new, is proposed here to cover a group of genera all of which possess a rudimentary or primitive median apophysis of the tegulum of the male palpus.

PLESIOMETA F. O. P. CAMBRIDGE, 1903

Rudimentary median apophysis of male palpus present as a thin, slight, lunate extension of the apical margin of the tegulum. Embolus curved, tapering, included in curved tapering conductor. Cymbium spinose, with a procurved, hook-like spur from near the base. Paracymbium narrow. One apical spine on palpal patella. Chelicerae having anterior upper surface closely pilose, a sub-basal patch of bristly spines, and at least one median, prolateral seta. Epigynum presenting a fleshy erect scape over small atriolar opening. Numerous small cusps on tibiae and metatarsi I and II. Femur IV with two rows of trichobothria.

GENOTYPE: *Plesiometa argyra* (Walckenaer), figure 7.

ANOPAS, NEW GENUS

Median apophysis of male palpus present as a strongly lunate blade. Embolus and conductor together forming a short curve, more or less prone on apex of stout genital bulb. Cymbium weakly spinose; a fenestrated area over zone of attachment of bulb (as in *Meta*); a spur-like apophysis projecting diagonally from near the base. An apical patellar spine present. Epigynum a depressed pair of atriolar spaces separated by a weak septum less prominent than upper margin of atriolum. Abdomen tending to have a caudal projection, high above spinnerets. Legs with long, scattered spines. Femur IV lacking trichobothria.

GENOTYPE: *Anopas ventralis* (Thorell), figures 8 and 9.

This genus from the Indo-Pacific region is represented also by *A. cultus* (O. P. Cambridge). The males are not much smaller than the females, and the individual spiders are dusky, resembling species of *Orsinome*.

OPAS O. P. CAMBRIDGE, 1896

Median apophysis of male palpus a lunate wall much as in *Allepeira*. Embolus a short, acute flagellum. Conductor erect and with an apophysis. Cymbium and paracymbium much as in *Leucauge*. Tibia very short. Patella lacking apical spine. Epigynum provided with a wide septum separating atriolar openings; anterior atriolar rim forming a hood. Abdomen either produced caudally or else overhanging the carapace. Legs lacking a brush, but femur IV with trichobothria.

GENOTYPE: *Opas lugens* O. P. Cambridge.

In this tropical American genus is also included the species *O. moerens* O. P. Cambridge. The males are at least three-fourths the stature of the females. There is quite a close superficial resemblance between *Opas* and the next genus.

OPADOMETA, NEW GENUS

Median apophysis of the male palpus present as a lunate wall, higher than wide. Embolus enveloped in the erect, fleshy conductor; tip of latter constricted. Lateral subterminal apophysis widely separated from base of conductor. Tip of cymbium tapering; a talon-like apophysis projecting from near the base. Paracymbium having a blunt basal lobe. Chelicerae long, geniculated at base (but not so much so as in *Atimiosa*), with concave face; a row of stout curved spines on retrolateral margin, and a prolateral row of curved sinuous spines. Basally geniculate fang folded behind projection from promargin of paturon. Tibia short, cylindrical. Patella lacking a distal spine. Two rows of stiff, spine-like, ventral hairs on tibiae and metatarsi of legs of male, and abdomen very pubescent. Epigynum sunken inside of atriolar margins; septum narrow. Female chelicerae stout, geniculate at the base. Abdomen colorful, often silvery, smooth; base prominent, sometimes so much so as to overlap the carapace completely. Legs finely spinose. Femur IV with two rows of trichobothria. A prominent distal brush on tibia IV, resembling the type of brush found in some species of *Nephila*.

GENOTYPE: *Opadometa grata* (Guerin), figures 10, 13, and 14.

The type species superficially resembles a small, colorful *Nephila*, because of the brush and because of the general shape of the abdomen. Both this and the next species, *O. fastigiata* (Simon), belong to an East Indian genus. The latter occurring, for example, in the Philippine Islands bears quite a resemblance to *Opas moerens* of South America in that the silvery abdomen overhangs the carapace, but the genus *Opas* lacks the brush, certain palpal apophyses, and the modified chelicera of the male. In *Opadometa* the male is extremely diminutive.

PICKARDINELLA, NEW GENUS

Median apophysis of male palpus a lunate projection. Embolus and conductor overlapping each other, and lying across the apex of the bulb. Cymbium and paracymbium similar to those of *Leucauge*. Tibia short. Patella having a distal spine. Chelicera geniculate at base and attenuate towards apex; a group of stout setae on prolateral side and curved setae in a row on retrolateral side.

GENOTYPE: *Pickardinella setigera* (F. O. P. Cambridge), figures 11 and 12.

This Neotropical genus resembles *Opadometa* (q. v.) in a number of respects. The female is unknown. The male is minute (total length, 2.0 mm.).

SUBFAMILY ARANEINAE

The removal of *Gasteracantha*, *Micrathena*, and allied genera from the status of a distinct subfamily is a departure from the present-day procedure. The only tangible features distinguishing them from the Araneinae are the cornification of the abdomen and the presence of a tube or ring around the spinnerets. The last feature is not present in some genera that are structurally allied to *Gasteracantha* nor is it always unmistakably detectable in that genus itself. In the genera grouped around *Micrathena* the tarsal comb of the type found in the Theridiosomatinae is present but, as will be shown in a subsequent paper, the tarsal comb or vestiges of it are much more widely spread among subfamilies that are forerunners of the Araneinae than has been demonstrated in the literature. As for the *Gasteracantha* group, it stands midway between two groups of genera (supertribes) that are commonly regarded as true Araneinae, on the one hand a group with minute males and rather simple genitalia in both sexes, and on the other

hand a group with relatively large males and with more or less complex genitalia. This placing of the group in question is justified from the morphological standpoint, for the genitalia are midway in complexity between the other two groups, closely resembling both, and the males range from minute to a more considerable stature. This question will be considered in detail in a forthcoming paper on the genus *Gasteracantha*.

GROUP GASTERACANTHIDI

***Micrathena comstocki*, new species**

Figures 15, 16, and 17

MALE: Median apophysis of male palpus as shown in figure 17. The stature and appearance of the male are much the same as those of *M. sagittata* (Walckenaer), but for contrast in genitalia see figure 20 showing the median apophysis of the male palpus.

FEMALE: Total length, 11.0 mm. The holotype is not so large as specimens from St. Cloud, Osceola County, Florida. The abdomen has the caudal horns long and less diverging than those of *M. sagittata*, the horns being black throughout nearly their whole length and red at the base. The anterior abdominal horns are slenderer and more diverging than those of *M. sagittata* (fig. 15).

Epigynum as illustrated in figure 16.

This species was figured by J. H. Comstock in the "Spider book" under the name *sagittata*.

TYPE LOCALITY: Female holotype and paratypes from Royal Palm State Park, Dade County, Florida, December 27-28, 1940 (A. F. Archer).

OTHER LOCALITIES: Florida: Male allotype, Homestead, Dade County, July 12 (A.M.N.H.); female paratype, Murdock, Charlotte County, December 26, 1940 (A. F. Archer); female paratypes, St. Cloud, Osceola County, November 14, 1946 (Mabelann Archer and A. F. Archer); male paratypes, Gainesville, Alachua County, June 12, 1935 (W. J. Gertsch).

***Micrathena sagittata emertoni*, new subspecies**

Figures 18, 22

MALE: Median apophysis of male palpus as shown in figure 22. Figure 20 of *M. sagittata* was drawn from a specimen taken at Palatka, Florida (A.M.N.H.).

FEMALE: Total length, 9.5 mm. The caudal region of the abdomen is wider proportionately than that of *M. sagittata*, more convex behind, and with the caudal horns shorter and more diverging. The epigynum shows no differences from that of *M. sagittata*.

This subspecies was figured under the name of *Acrosoma spinea* (*M. sagittata*) by Emerton in his New England Epeiridae (1889, Trans. Connecticut Acad. Sci., vol. 6, pl. 38, figs. 5-8). For contrast with this subspecies and with *M. comstocki*, new species, *M. sagittata* (Walckenaer) is illustrated in figures 19 to 21. It is not known where the two geographical races meet and intergrade, for records are largely lacking from the upper South. It is certain that *emertoni* extends into that region, and there is also abundant material to prove that typical *sagittata* is a southeastern race, occupying the area as far south as upper peninsular Florida.

TYPE LOCALITY: Female holotype and paratypes, Norwell, Plymouth County, Massachusetts, August 28-September 3, 1941 (A. F. Archer).

OTHER LOCALITIES: New Jersey: Male allotype, Lakehurst, Ocean County, August, 1923 (A.M.N.H.). Illinois: Female paratype, Alpine Park, Rockford, Winnebago County, August, 1942 (A. F. Archer). West Virginia: Female paratypes, Wheeling, Ohio County, August, 1947 (Karl W. Haller).

GROUP ARANEIDI

Eight of the new genera described in this and a succeeding paper are contained in the third group of tribes (starting with the Dolophonini and ending with the Cyphalonotini) of the subfamily Araneinae. As it has been understood up until now, the genus *Aranea* contains seven of these genera. Three of them are North American, while one of them, *Lariniacantha*, is Neotropical; *Gibbaranea* is Eurasian; *Simonarachne* is Indo-Pacific, and *Afraranea* is African and Indo-Pacific. *Conaranea*, one of the genera described from western North America, is also Eurasian. F. O. P. Cambridge early recognized that species pertaining to what we now know as the above genus constitute a peculiar group, as pointed out under *Aranea anguinifera* (1902, Biologia Centrali-Americana, Arachnida, vol. 2, p. 514). *Amamrotypus* is a new North American genus of very distinct aspect. The break-down of the North American members of *Aranea* was really started by F. O. P. Cambridge when he proposed *Neosconella* in 1904.

However, two American species, *N. pegnica* (Walckenaer) and *N. thaddeus* (Hentz), have long been omitted from this genus, even though they belong to it. The basis of the present classification proposed here lies in the genitalia, which present characters much more important than other structures usually relied upon. Chamberlin and Ivie (1942, Bull. Univ. Utah, vol. 32, no. 13) proposed the genera *Aculepeira* and *Araniella*, taking them out of *Aranea*. In the "Spiders of Alaska" (1947, Bull. Univ. Utah, vol. 37, no. 10) these same authors recognize the distinctness of the old genus *Epeira* but without explanation. Of the genera taken out of *Aranea* all, new and old, will be described in this and succeeding papers, with the exception of *Aculepeira* Chamberlin and Ivie, which has been adequately covered by the authors. In the latter the only additional features that deserve mention are that the spur on coxa I of the male is ventral, and that there is a row of ventral femoral spines (a second row is sometimes present on femora I and II) in the male only.

ALCIMOSPHEMUS SIMON, 1895

Median apophysis of male palpus a thick, erect plate, wider than high, and with a pair or so of apical denticles; the entire structure somewhat lenticular. Embolus, a short, fleshy loop closely appressed to the low apex; conductor weakly differentiated; lateral subterminal apophysis an irregular lobe. Cymbium and paracymbium as usual. Patella with a single apical spine. No basal cone on the palpal femur. Coxa I with a hook. Tibiae I and II having two rows of stout, prolateral spines. Epigynum lacking a scape, but having a wide septum between atriolar openings. Abdomen having one or more caudal prolongations. Eyes in a straight line, reminiscent of *Gasteracantha*. Legs rather short. Stout ventral femoral hairs in two rows; delicate spines on tibiae and metatarsi. Femur IV having two rows of trichobothria as in some genera of Metinae.

GENOTYPE: *Alcimospheenus licinus* Simon.

The tribe Arachnurini includes the genus *Arachnura* of the Eastern Hemisphere as well as the Neotropical *Alcimospheenus*.

BERTRANA KEYSERLING, 1884

Median apophysis of male palpus a thick, lenticular plate. Embolus fine, hair-like. Conductor pad-like under an overhanging, lobate, terminal apophysis. Cymbium as usual. Para-

cymbium short, projecting with erect terminal hook. One apical patellar spine. No basal cone on palpal femur. Coxa I with a hook. Tibiae unmodified. Carapace rather wide and abdomen rounded. Epigynum with a strong atriolear margin and a projecting, narrow-tipped scape.

GENOTYPE: *Bertrana striolata* Keyserling.

This Neotropical genus is a member of the tribe Bertranini. Allied to it is *Spintharidius* in which the abdomen is more rhomboid and the male palpus resembles that described above except that the tip of the cymbium is subacute.

The tribe Mangorini is closely allied to the Bertranini and should comprise the genera listed by Simon (1894-1895, *Histoire naturelle des araignées*, vol. 1, pp. 785-795) under Mangoreae, except for the following which should be removed and placed in the tribe Araneini: *Acacesia*, *Eustala*, and *Larinia*. These genera differ from the Mangorini in not having the median apophysis of the male palpus lenticular or subtriangular and in having tibia II of the male incrassate or, if not incrassate, then in having a pair of apical patellar spines (*Larinia*) on the male palpus. The first two genera in question resemble those in the Mangorini in possessing a single apical patellar spine, a feature widespread in the genera that follow, including part of the members of the tribe Araneini. In further reference to the genus *Bertrana* we find that in addition to the single apical patellar spine there is, beside it, a stout hair. This combination occurs very usually in *Nephila* and is probably a trait typical of the ancestors of the Argiopidae. In passing it should also be mentioned that the prolateral basal trichobothria found on tibia III is a striking feature in *Mangora*, for usually tibial trichobothria, when present, are not confined to this particular leg.

***Mangora spiculata* (Hentz)**

Figures 27 and 28

Epeira spiculata HENTZ, 1847, Jour. Boston Soc. Nat. Hist., vol. 5, p. 475, pl. 31, fig. 13.

This species is almost exactly like *M. floridana*, new species, in size and coloration, but the genitalia are distinct. This species has long been kept in the synonymy of *M. placida*, but it is very distinct from it. On the dorsum of the abdomen the herringbone pattern is usually not bounded on either side by a longitudinal line. A few of the larger specimens rather resemble *M. placida*.

Median apophysis of the male palpus as shown in figure 28. This is one of the species of *Mangora* in which there is but a single apical spur on the median apophysis. For comparison with this species the median apophysis of *M. maculata* (Keyserling) is shown in figure 32 (Fort Mitchell, Russell County, Alabama). Epigynum as shown in figure 27. In this species the caudal border of the atriolar plate is nearly straight instead of slanting as in *M. placida*.

LOCALITIES: Alabama: Male, female, Pea River Project, Dale County, 1940 (A. F. Archer); female, Panther Creek State Park, Geneva County, October 18, 1939 (A. F. Archer); male, Dyas Creek, Baldwin County, June 25, 1940 (A. F. Archer); female, Dauphin Island, Mobile County, June 26, 1940 (A. F. Archer). Louisiana: Male, females, Kisatchie National Forest, Grant Parish, June, 1941 (A. F. Archer). Mississippi: Males, females, Centreville, Wilkinson County, 1944 (A. F. Archer).

***Mangora floridana*, new species**

Figures 31, 56, and 60

MALE: Total length, 2.1 mm. Coloration similar to that of the female, but paler.

Median apophysis of male palpus as illustrated in figure 31. In this species there are two spurs on the median apophysis, but they are erect, while those of *M. placida* (Hentz) are slanting as shown in figure 30 (Tuscaloosa, Alabama). Male palpus as shown in figure 60.

FEMALE: Total length, 2.5 mm. This species is like *M. spiculata* (Hentz), and is smaller in stature than *M. placida*. The folium is dusky rather than black or chocolate as in *M. placida*, and lacks the longitudinal line on either side of the folium.

Epigynum as illustrated in figure 56. The atriolar plates are different in shape from those of *M. placida*, figure 29 (Hatchet Creek, Coosa County, Alabama).

TYPE LOCALITY: Male holotype and female allotype, and paratypes from Peace River, west of Arcadia, DeSoto County, Florida, March 30, 1939 (W. J. Gertsch).

OTHER LOCALITY: Florida: Female paratypes, Murdock, Charlotte County, December 26, 1940 (A. F. Archer).

It is to be noted that in this species the double spur on the median apophysis of the male palpus is of the same type as that found

in *Mangora ornata* (Walckenaer), which is shown in figure 26 for comparative purposes. It appears from Abbot's drawing, no. 475 (type), that Walckenaer's species is in reality the same as *M. gibberosa* (Hentz), and not *M. maculata* (Keyserling).

LARINIACANTHA, NEW GENUS

Median apophysis of male palpus a stout, transverse plate, wider than high; ectal lobe on upper corner short to long and projecting. Embolus and conductor short and flattened. Terminal apophysis stout, suberect. Cymbium spinose. Paracymbium stout, corneous, subterminally constricted. Base of palpal femur without a cone. Legs with scattered spines; short, stout, ventral, femoral spines in a row (lacking in femur I). Epigynum with a corneous scape projecting caudad from a hood. Abdomen elongated, cylindrical, much like that of *Larinia*, with or without an anteriorly projecting horn from each shoulder.

GENOTYPE: *Lariniacantha grayi* (Blackwall), figures 38, 39, and 40.

The spiders of this genus possess brightly colored abdomens ornamented with stripes of black, red, yellow, and other colors. Other members of this genus are *L. veniliae* (Keyserling) and *L. latro* (Fabricius).

WIXIA O. P. CAMBRIDGE, 1882

In this genus the median apophysis of the male palpus is a projecting plate, wider than high, lobate at one or at both ends, but not so elongated or prone as in the allied genus *Parawixia*. The paracymbium differs from that of the latter in that the tip is differentiated, often hook-like beyond the subterminal process. It is interesting and important to note that Keyserling in "Die Arachniden Australiens" (1881-1883) in plate 6, figure 5, shows the male palpus of *Epeira tenella* L. Koch, and that this is a perfectly typical *Wixia*. The existence of this genus in the Eastern Hemisphere as well as that of other genera supposedly confined to the Neotropical region (plus North America to a limited extent) demonstrates the geological antiquity of the genera in question, and also has a bearing on the Antarctic distribution of many tropical genera.

GENOTYPE: *Wixia abdominalis* O. P. Cambridge.

Wixia bryanti, new species

Figure 33

FEMALE: Total length, 5.2 mm. Carapace, 1.7 mm. long, 1.7 mm. wide. Abdomen, 4.2 mm. long, 4.0 mm. wide, 3.0 mm. high.

A dark brownish species with a pale patch on the mid dorsum of the abdomen and a ladder-like foliate pattern. Characters as usual in *Wixia*, much resembling a small *W. anaglyphe* (Walckenaer) in appearance. Dorsal elevation of abdomen ridge-like, bifid, high. Short, black spines on mid region of dorsum.

Epigynum as illustrated in figure 33, shiny brown.

TYPE LOCALITY: Female holotype from White House Canyon, Santa Rita Mountains, Arizona, October 15, 1935 (O. Bryant).

Wixia hentziana, new species

Figures 48 and 52

FEMALE: Total length, 9.0 mm. Carapace, 3.8 mm. long, 3.3 mm. wide. Abdomen, 7.4 mm. long, 5.7 mm. wide, 6.5 mm. high.

Carapace ruddy brown with margins dusky; cephalic region dusky; a transverse, dark stripe in front of median groove. Dorsum of abdomen deep gray, dusky on anterior face of shoulders; a brown spot on each hump; caudal face of the humps presenting a creamy dorsal shield marked with two pairs of muscle scars; a broad, irregularly quadrangular, black folium may be present on caudal half.

Structure very close in most respects to that of *W. anaglyphe*, but shoulder humps steeper and more elevated than in the latter. Anterior face of shoulders, cleft between the humps, and caudal face provided with numerous short, black spines. Legs not quite so stout as those of *W. anaglyphe*. First leg: femur, 3.5 mm.; patella, 1.8 mm.; tibia, 2.6 mm.; metatarsus, 2.6 mm.; tarsus, 1.0 mm. Fourth leg: femur, 2.6 mm.; patella, 1.8 mm.; tibia, 2.0 mm.; metatarsus, 2.6 mm.; tarsus, 0.9 mm.

Epigynum as illustrated in figure 52.

TYPE LOCALITY: Female holotype from Florida, November, 1939 (A. F. Carr, Jr.).

OTHER LOCALITIES: Florida: Female paratype, Marianna, Jackson County, December 31, 1939 (A. F. Archer). Alabama: Female paratype, penultimate molt, Omussee Creek, Houston County, September 1-2, 1940 (A. F. Archer).

For the sake of contrast between this species and *W. anaglyphe* (*W. ectypa*) the epigynum of the latter is illustrated in figure 54 (Skaggsville, Maryland, which is also the locality from which was figured the gravid female, fig. 49). In most specimens of *W. anaglyphe* the ridge on the shoulders is more marked than in the illustration.

AMAMROTYPUS, NEW GENUS

Epigynum with a long scape, folded over anteriorly and then caudally, with the cochlear a wide spatula. Atrium a rather simple, single plate, with each wing thickened anteriorly and slanting from the base anterolaterally; anterior border neither notched nor indented nor having a sinus; commissure between the wings a wide groove. Carapace pilose. Eyes procurved; median eyes on a blunt elevation, very widely separated from lateral eyes; lateral eyes under cones on the corner of the cephalic region. Abdomen rounded or globose and with rounded humps, one on each shoulder; surface not pilose. Legs stout, rather pilose. No ventral femoral spines; one or two rows of erect ventral hairs on legs I and II; dorsal femoral spines present, as many as two; retrolateral spines present. Tibiae provided with spines on all sides, three or four in a row.

GENOTYPE: *Amamrotypus mammatus*, new species.

Amamrotypus mammatus, new species

Figures 23 and 24

FEMALE: Total length, 7.3 mm. Carapace, 3.3 mm. long, 2.7 mm. wide. Abdomen, 5.0 mm. long, 4.4 mm. wide.

Carapace dusky brown. Dorsum of abdomen dusky except for cones on shoulders; C-shaped, black and white bordered lines, and folium bordered with black and white, but light inside. Venter dusky, with white borders and two caudal white spots. Legs dusky brown and with blackish rings.

Carapace widely cordate behind, with cephalic region stout; a lateral angle on each side just anterior to cervical groove; ridges overhanging anterior eyes; PME on each side of ocular prominence barely visible from above. Formula of legs 1243; moderately long.

Epigynum as illustrated in figure 23.

TYPE LOCALITY: Female holotype, White House Canyon, Santa Rita Mountains, Arizona, October 15, 1936 (O. Bryant).

Amamrotypus miniatus, new species

Figure 25

FEMALE: Total length 4.1 mm. Carapace, 1.8 mm. long, 1.2 mm. wide. Abdomen, 3.0 mm. long, 2.7 mm. wide.

Carapace and legs dusky, the latter with dark rings. Anterior part of dorsum of abdomen sepia, with light patches before and between shoulder cones, the cones themselves white; a wide folium with nearly straight white borders. Formula of legs 1243, rather short, especially the last two.

Epigynum (with scape broken off) as illustrated in figure 25.

TYPE LOCALITY: Female holotype from White House Canyon, Santa Rita Mountains, Arizona, October 15, 1936 (O. Bryant).

ERIOVIXIA, NEW GENUS

Epigynum composed of a stout scape with recurved tip, flatter than that of *Neoscona*. Atriolar openings anterior to a pair of curved sclerites almost completely incorporated in main body of scape, and visible only on the caudal face of the latter. Carapace pilose, especially on the cephalon. Anterior row of eyes more nearly straight than posterior row. Posterior median eyes (at least in the African species) slightly larger than the anterior ones, but this relation may not be constant. Abdomen subtriangular and with or without a caudal appendage. Spinal arrangement about as usual on the legs. Tibia I longer than the very short, wide carapace.

GENOTYPE: *Eriovixia rhinurus* Pocock.

The typical species was described by Pocock in 1899 (Proc. Zool. Soc. London, p. 852, pl. 56, fig. 9). This and other species are covered by de Lessert in 1930 (Rev. Suisse Zool., vol. 37, pp. 655-658). This genus comprises species with a facies resembling that of *Eustala*, having a caudal elevation or even an appendage above and beyond the spinnerets. A Philippine species, apparently *E. porcula* (Simon), agrees perfectly with the generic characters of the African species but has relatively large posterior median eyes. The other known species are *E. turbinata* (Thorell) and *E. napiformis* (Thorell).

Zygiella carpenteri, new species

Figure 34

FEMALE: Total length, 6.7 mm. Carapace, 3.4 mm. long, 2.5 mm. wide. Abdomen, 4.7 mm. long, 3.7 mm. wide.

Carapace ruddy. Abdomen with a dusky pattern and the longitudinal folium characteristic of *Zygiella*; some red spots on anterior margin as well as behind; red lines and white patches on either side.

Abdomen elliptical. Femora without dorsal spines above, and also lacking ventral spines. Stout spines few in a row on tibiae and metatarsi.

Epigynum as illustrated in figure 34.

TYPE LOCALITY: Female holotype from Del Monte Forest, Pacific Grove, Monterey County, California, October 8, 1945 (A. F. Archer).

This species differs markedly from other species of *Zygiella*, including *Z. californica* (Banks), the epigynum of which has a caudad projecting process. This species is dedicated to Stanley J. Carpenter, at one time Chief of Entomology, Fourth Service Command Laboratory, Fort McPherson, Georgia, who accompanied the author on field trips in California in 1945.

***Eustala arkansana*, new species**

Figures 44 and 47

MALE: Total length, 4.7 mm. Carapace, 2.5 mm. long, 1.9 mm. wide. Abdomen, 2.2 mm. long, 1.9 mm. wide.

Median apophysis of the male palpus as illustrated in figure 44.

FEMALE: Total length, 5.8 mm. Carapace, 2.5 mm. long, 1.8 mm. wide. Abdomen, 4.0 mm. long, 4.8 mm. wide.

Coloration very variable, with patterns as in *Eustala triflex* (Walckenaer). Size and form similar to those of *E. triflex*. Abdomen subtriangular, each shoulder having a round margin, and caudal region convex, but blunt and without cones.

Epigynum as illustrated in figure 47.

TYPE LOCALITY: Male holotype and female allotype and paratypes from Berryville, Carroll County, Arkansas, June to September (Miss O. C. Wilton).

This species is distinct from *E. anastera* (Walckenaer) as well as *E. triflex* (*E. anastera emertoni*) in the genitalia. Chamberlin and Ivie, moreover, regard *E. triflex* as distinct from *E. anastera*, and not as being merely a race of the latter (1944, Bull. Univ. Utah, vol. 35, no. 9, p. 103). The facts certainly warrant this conclusion. In *E. anastera* the epigynum possesses an anterior notch in the lobed portion of the atrium lying between the hook-shaped lateral rims. In *E. triflex* there is no such notch, and besides this

the base of the scape is not provided with a narrow longitudinal ridge as found in the former species. The median apophysis of the male palpus of *E. anastera* is illustrated in figure 46 (male from Hatchet Creek, Coosa County, Alabama). The median apophysis of *E. triflex* is illustrated in figure 45 (male from Decatur, Morgan County, Alabama).

VERRUCOSA MCCOOK, 1888

Median apophysis of the male palpus very elongated, transverse, rod-like; projecting tip usually bifid or incised. Cymbium with a subacute tip. Paracymbium elongated, hook-like. Palpal patella with a single apical spine. A cone at the base of the palpal femur. Epigynum with an extremely long scape directed backward.

GENOTYPE: *Verrucosa arenata* (Walckenaer).

This genus is of great interest in other respects than in the fact that the type species occurs in North and Middle America. It is closely related to *Eriophora*, even in the details of genitalic structure, but contrasts with the latter in certain features. Tibia II is not only incrassate, but possesses on the prolateral side a subdistal hook. The spiders of this genus make no nest and have the remarkable peculiarity of standing in the center of the large web head upward, quite the opposite of the head-downward position of other makers of vertical webs. Although these spiders are more colorful than species of *Eriophora*, and although the warty abdomen is usually subtriangular, there are exceptions to both of these features. Not only do we have the genus *Mahadeva* regarded as synonymous with *Verrucosa*, but we also have as synonyms *Pickardiana* (type: *P. truncata* Keyserling) and *Paraverrucosa* (type: *P. uropygialis* Mello-Leitao) proposed in recent years by Mello-Leitao. Although *Verrucosa* is not known from so wide a range as is *Eriophora*, it certainly occurs in the Eastern Hemisphere. Keyserling described *Epeira furcifera* in the second part of "Die Arachniden Australiens," 1884-1889, plate 12, figure 1, and this is most clearly a member of this genus.

ERIPHORA SIMON, 1864

Median apophysis of male palpus transverse, more or less elongated, tip projecting, with acute or subacute spurs, blades, or lobes; endal portion somewhat differentiated from rest of structure, irregular, plate-like, or serrate. Radix unusually large

and embolus, conductor, and other apophyses of great length. Apical portion of subacute cymbium emarginate. Paracymbium long and stout. Basal cone on palpal femur. Patella of palpus with one apical spine, one spine and a companion hair, or rarely two spines. Epigynum similar to that in *Verrucosa* with scape very long, but in a few instances decidedly shortened.

GENOTYPE: *Eriophora ravilla* (C. L. Koch).

In this genus as well as in the previous one the epigynum may lose the scape, leaving behind the scleritic plates of the atriolar structure. In some species the abdomen of the female resembles that of *Neoscona*, but in others there are anything from a pair of cones, one on each shoulder, to a great many all over the margin. As in the previous genus there is not only a retrolateral hook on coxa I in the male but also a tendency towards a basal cone. Basal spurs may be found on coxa IV in the male as in *Neoscona*, a condition suggesting that found in the very remotely related *Anepsia wichmanni* Kuclynski of New Guinea. A very large number of species, now ascribed to *Aranea*, occurring both in the American tropics and in the Eastern Hemisphere belong to this genus. In the latter region it includes species ranging through Australasia into the Oriental region and tropical Africa. Among a few species that can be assigned to *Eriophora* are *E. nephiloides* (O. P. Cambridge) of Middle America, *E. flavicoma* (Simon), *E. producta* (L. Koch), *E. transmarina* (L. Koch), *E. collina* (L. Koch), all of Australasia, *E. striata* (Bosenberg and Lenz), and *E. neufvilleorum* (de Lessert) of Africa. Synonymous with this genus is *Molinaranea* Mello-Leitao (type: *M. setosa* Mello-Leitao).

AFRRARANEA, NEW GENUS

Median apophysis of the male palpus suberect, elongated lenticular, arising from a broad lobate base; apical spur somewhat curved ectally. Radix unusually large as in *Eriophora*. Terminal apophysis stout, erect. Embolus slender, and conductor wide and leaf-like. Basal spur present on the femur of the male palpus; a pair of distal patellar spines present. Tibia II incrassate; a distal spur-like spine present; small, stout, prolateral spines subproximally located and in a horizontal row; prolateral serrate spines present. Patella II with a prolateral, spur-like, distal spine. Tibia I with a prolateral, spur-like spine. Coxa I with a spur. A single row of ventral femoral spines, legs I and II. Epigynum with a cornified scape or a soft, flexible one with a

spatulate tip; atriolar structure fused with the scape, very prominent, with openings far forward under the scape, the margins of the openings wide and flaring. Abdomen of both sexes rounded as in *Eriophora*; muscle scars comprising three pairs of cornified indentations resembling sigilla.

GENOTYPE: *Afraranea sanguipes* (Thorell), figure 43.

R. de Lessert gives a good account of species assigned to this genus (1930, Rev. Suisse Zool., vol. 37, pp. 644-655). This genus appears to be strongly represented in Africa, and the analysis of it was made after a study of material in the American Museum of Natural History that had previously been examined by de Lessert. Among the African species are *A. rufipalpis* (Lucas), *A. cereolellus* (Strand), *A. bucheti* (de Lessert), and *A. stanleyi* (de Lessert). Since the genus also has Indo-Pacific representatives, it should be pointed out that *Epeira maculaticeps* L. Koch and *Araneus cheesmanae* Berland belong here (these can be located easily in Roewer, 1942, Katalog der Araneae, vol. 1).

NEOSCONA SIMON, 1864

This well-known genus has among other peculiar features an anatoid (duck-like) median apophysis of the male palpus. The apophysis in question closely resembles that found in the related genus *Aranea* in the case of those species in which the main spur occupies a mid apical position, for example, *A. cavatica* (Keyserling) and *A. gemmoides* (Chamberlin and Ivie). However, the main body of the piece is mounted on a slanting stalk, quite unlike the wide base found in *Aranea*, and the base of the spur is more differentiated than is the case in the latter genus.

Neoscona jonesi, new species

Figures 35, 50, and 58

MALE: Total length, 5.4 mm. Carapace, 2.5 mm. long, 2.0 mm. wide. Abdomen, 3.0 mm. long, 2.0 mm. wide.

A species very much like *N. eximia* Gertsch and Mulaik in pattern and coloration, differing in palpal features. First leg: femur, 3.0 mm.; patella, 1.3 mm.; tibia, 2.4 mm.; metatarsus, 2.9 mm.; tarsus, 1.0 mm. Left tibia II, see figure 50.

Male palpus as illustrated in figure 58. Median apophysis of male palpus as illustrated in figure 35.

TYPE LOCALITY: Male holotype from Kisatchie National

Forest, Grant Parish, Louisiana, June, 1941 (W. B. Jones and A. F. Archer).

This species is dedicated to Dr. Walter B. Jones who took it in company with the author.

ARANEA LINNAEUS, 1758

Median apophysis of the male palpus transverse, wider than high, sometimes very wide, resting flat on its base; a large spur on the endal corner (i.e., nearest the radix), or located apically as in *Neoscona*; a lesser spur absent or present on the ectal corner, sometimes bifid, sometimes a mere apophysis or serrated margin; radix long. A tubular or flattened, tapering terminal apophysis above an attached median subterminal apophysis, overhanging a thick, tube-like embolus. Conductor a wall-like mass. Cymbium not spinose, and paracymbium simple and regular. A basal spur on the femur of the male palpus; a pair of stout, distal patellar spines present. Legs heavily spinose, and tibia I or II either incrassate with special clasping spines on prolateral face or practically undifferentiated. Prolateral spur on apical margin of coxa I of male present or represented by a thickening; coxa II sometimes having a basal cone. Epigynum with the scape soft or chitinized, the tip usually extending beyond the caudal margin, slender or stout; cochlear rarely as wide as the base, the spoon-shaped concavity large; wings of the atrium of varied shapes, extending laterally, or anterolaterally, sometimes longitudinally grooved or having a circular depression, and with or without accessory posterolateral sclerites; commissure between the wings slightly depressed, weakly developed, unchitinized. Carapace more or less densely pilose; a pair or more of spines on the cephalon of some males. Abdomen oval, widely ovate, or else subtriangular, and, if so, with a cone on each shoulder; surface of dorsum quite smooth and hairless, but the base having a long fine pile. Ventral femoral spines in two rows, especially in the male; dorsal femoral spines in a row in the male, and prolateral spines present. Male tibiae and metatarsi having very numerous spines on all sides, as many as seven in a row. Legs dissimilar.

GENOTYPE: *Aranea diademata* (Clerck), figure 80.

There is some irregularity in the matter of the incrassate tibiae in this genus and in some other genera within the tribe Araneini, but the absence of the incrassate feature in certain species is not so absolute as may appear to be the case at first sight.

In the cases in which this feature is very much reduced, tibia II still is a little thicker than tibia I and thickest at the junction with the patella, while in the incrassate species the thickening is very marked in the distal portion, thus contrasting with the metatarsus, and the spines may even be mounted on tubes (*A. circe* Audouin). In those species in which the tibia is not incrassate, the spur on coxa I of the male is absent except for a trace, and this lack of a spur extends even to certain round-shouldered species that do possess the incrassate tibia (except for *A. marmorea* Clerck, *A. pinguis* Karsch, and *A. rufofemorata* Simon of southern Asia). The species that are to be discussed will be assigned to two subgenera which are here erected for convenience. The subgenus *Euaranea* is proposed as new, and the typical species is *A. cavatica* (Keyserling). It includes those species in which tibia II of the male is not incrassate, and as far as known comprehends a species group peculiar to the Western Hemisphere, not being known from Eurasia. Besides the assigned typical species the following species belong here: *A. gemma* (McCook), *A. gemmoides* (Chamberlin and Ivie), *A. pirus* (Chamberlin and Ivie), *A. illaudata* (Gertsch and Mulaik), *A. trifolium* (Hentz). All other species belong to the subgenus *Aranea*, including species such as *A. quadrata* (Clerck) in which there is by way of exception no spur on coxa I of the male.

Species of *Aranea* make a large, vertical, formal web, but the nest or lack of nest depends on the type of station which each species prefers. Those species that utilize trees, shrubs, and ground plants make a tent-like nest of leaves at an upper angle of the web, but those that use tree trunks, large limbs, or rock overhangs have virtually no nest at all. Generally the spider faces the web at the end of the trap line, but a species in south Europe is said to block the entrance of the nest with the dorsum of the abdomen. None of our species can be correctly regarded as occurring throughout the United States as has been recorded for some of them. This genus, when properly limited, is confined to North and Middle America and Eurasia as far south as northern India and north Africa. Elsewhere, especially in southern latitudes, it is replaced by other similar genera.

***Aranea santarita*, new species**

Figure 65

FEMALE: Total length, 17.6 mm. Carapace, 6.5 mm. long, 6.0 mm. wide. Abdomen, 12.0 mm. long, 12.0 mm. wide.

Carapace brown except for dark brown on the margin and in the cephalic region. Dorsum of abdomen brown, with white-tipped hairs scattered all over. Patches on either side of the dark brown venter pale and speckled with red. Legs reddish brown and ringed.

Epigynum as illustrated in figure 65. The epigynum of this species, although very distinct, is of the same type as that of *A. diademata*.

TYPE LOCALITY: Female holotype from Madera Canyon, Santa Rita Mountains, Santa Cruz County, Arizona, August 16, 1942 (C. M. Bogert).

***Aranea darlingtoni*, new species**

Figures 71 and 75

MALE: Total length, 10.6 mm. Carapace, 6.2 mm. long, 4.0 mm. wide. Abdomen, 6.8 mm. long, 4.6 mm. wide.

Colors similar to those of the female.

Abdomen subovate; shoulder humps conical. General form similar to that of *A. nordmanni* (Clerck). Spur on coxa I. Basal cone on coxa II, a feature lacking in *nordmanni*. Tibia II strongly incrassate; stout prolateral subdistal spines and setae; scattered dorsal and ventral spines. Legs I, II, and III with one row of ventral femoral spines; leg IV with two rows of ventral femoral spines.

First leg: femur, 6.5 mm.; patella, 2.5 mm.; tibia, 6.4 mm.; metatarsus, 5.0 mm.; tarsus, 2.0 mm.

Median apophysis of the male palpus as illustrated in figure 75. On the endal side below the spur is a rounded angle, a feature entirely missing in *A. nordmanni*.

FEMALE: Total length, 10.8 mm. Carapace, 4.7 mm. long, 3.7 mm. wide. Abdomen, 7.8 mm. long, 6.4 mm. wide.

Carapace and abdomen very dusky. Dusky legs with femora I and II darkly annulate; tibiae, metatarsi, and tarsi I and II paler above.

Epigynum as shown in figure 71.

TYPE LOCALITY: Female holotype from Durbin, Cheat Range, West Virginia, August 1, 1948 (V. Shelford), in the American Museum of Natural History.

OTHER LOCALITIES: West Virginia: Female paratype from Minnehaha Springs, Pocahontas County, July, 1948 (Karl W. Haller), (A.M.N.H.). Tennessee: Male allotype and female

paratypes from New Found Gap Road, elevation 3500 feet, Sevier County, 1930 (P. H. Darlington), (M.C.Z.); female paratype, New Found Gap, North Carolina line, August 31, 1930 (N. Banks), (M.C.Z.). North Carolina: Female paratype, Mount Mitchell, Yancey County, June 10, 1930 (N. Banks), (M.C.Z.).

***Aranea silvatica* (Emerton)**

Epeira silvatica EMERTON, 1884, Trans. Connecticut Acad. Sci., vol. 6, p. 300, pl. 35, figs. 4-6.

An examination of the types of this species in the Museum of Comparative Zoölogy shows that Emerton was sound in recognizing its distinctness, even though he later reversed himself on this and other angulate species. It is remarkable that only the type specimens have come to light so far in spite of an extensive examination of large collections. Kaston (1948, Connecticut State Geol. Nat. Hist. Surv., bull. 70, pp. 250-251) regards this as identical with *A. nordmanni* (Clerck) and also in part with *A. solitaria* (Emerton). It is closest to the former but differs in that the median apophysis of the male palpus is more elongate, with the ectal end more elevated and the whole structure more dusky than in *A. nordmanni*, while the endal margin beneath the spur is more convex. In the female the scape is more elongate than that of *A. nordmanni*, and the atrial plates are rounded, much as in *A. bicentenaria* (McCook).

***Aranea pseudomelaena*, new species**

Figures 70 and 79

MALE: Total length, 11.0 mm. Carapace, 6.0 mm. long, 5.2 mm. wide. Abdomen, 5.2 mm. long, 4.2 mm. wide.

Carapace brownish. Abdomen dusky. Legs brownish, with paler longitudinal dorsal and lateral patches on femora, tibiae, metatarsi, and tarsi.

Abdomen subovate-triangular; shoulder cones present; bristles on anterior face. Coxa I with a stout spur. Coxa II with a low cone. Tibia II heavily incrassate, with prolateral, spur-like spines; ventral spines present. Femora with two rows of spines.

FEMALE: Total length, 14.8 mm. Abdomen, 10.0 mm. long, 8.3 mm. wide.

Carapace chestnut brown, with dusky margins. Abdomen with the dorsum black except for a hastate white patch between

the shoulders; venter dusky, with a pair of oblique white dots anterior to the spinnerets; sides sometimes gray. Femora and patellae chestnut brown; other segments paler and annulate.

Abdomen subtriangular; a pair of heavy, stout cones, one on each shoulder; anterior face shaggy, hirsute,

TYPE LOCALITY: Male holotype from east slope of Long's Peak, Rocky Mountain National Park, Colorado, summer, 1931 (Walter Kiener).

OTHER LOCALITIES: Arizona: Female allotype, Graham Mountain, 8000 feet elevation, September 5, 1937 (O. Bryant); two female paratypes, Chiricahua Mountains, October 4, 1937 (O. Bryant). California: Female paratype, Ponderosa, Siskiyou County, July 21, 1941 (W. M. Pearce); female paratype, 4 miles from No Chance, Chilcoot (W. M. Pearce).

This species bears a close superficial resemblance to *A. nigra* (Emerton), and in the female the epigynum has a quite similar long scape, but the structure of the atriolar plates is closest to that of *A. santarita*, new species. However, the posterior margin of the atriolar openings of *A. santarita*, which can be seen by lifting the scape, is quadrilobate instead of being non-lobate as in *pseudomelaena*. The epigynum also bears a marked superficial resemblance to that of *A. illaudata* Gertsch and Mulaik, and yet these two appear not to belong to the same subgenus. In the male palpus the median apophysis is something like that of *A. tusigia* Chamberlin, another western species, but the apical spur is shorter and ribbed, the endal and basal angles are less convex, and the upper ectal corner is more crested. The median apophysis of the latter species can be seen in figure 73. In this same species the scape of the epigynum is short and wide, as wide at the base as at the tip.

***Aranea kisatchia*, new species**

Figure 69

FEMALE: Total length, 24.0 mm. Carapace, 11.0 mm. long, 7.8 mm. wide. Abdomen, 15.0 mm. long, 14.5 mm. wide.

Carapace dark reddish brown, with a very dusky border. Anterior face of abdomen very dusky or ebony, this background being interrupted by anterior-dorsal light markings, the largest of them having branches; abdominal shield almost identical with that of some specimens of *A. solitaria* (Emerton), consisting of a

black-bordered folium set in olivaceous or green; caudal faces of shoulder cones white, with anterior faces black.

Epigynum as shown in figure 69.

This giant species appears to be one of the largest members of the genus. The plates of the epigynum are button-like, as is the case in *A. bicentenaria* (McCook), the European *A. circe* (Savigny), and the east Asiatic *A. ventricosa* (L. Koch), but differs from these in the details of the sclerites and in the character of the scape. Unfortunately the male of this apparently rare species is unknown. In the region of the southern United States south of the Appalachian Mountains species of *Aranea* are few, and with the exception of the ubiquitous *A. marmorea* (Clerck) (= *A. raji* Scopoli), individuals are decidedly uncommon. In referring to the rather similar *A. ventricosa* it should be pointed out that the median apophysis of the male palpus is the most unusual so far encountered in the genus. In Japanese specimens recently examined the median apophysis proves to be a very naviculate structure like that of *A. andrewsi*, new species, but the spur is less clearly differentiated than that of the latter, and is a low, prow-like, irregular cone. Opposite to it is the blunt ectal angle, whose inner crest is not visible unless the palpus is tilted.

Aranea kisatchia was erroneously referred to *A. solitaria* by the writer in a paper on Alabama Argiopidae (1941, Alabama Mus. Nat. Hist. Paper, no. 18, pp. 19-20, pl. 3, fig. 2).

TYPE LOCALITY: Female holotype from Grant Parish, Louisiana, in the collection of the American Museum of Natural History.

OTHER LOCALITIES: Louisiana: Female paratype, Kisatchie National Forest, Grant Parish, June, 1941 (A. F. Archer). Alabama: Female paratype, May's Gulf, Cherokee County, September 14, 1940 (A. F. Archer). South Carolina: Female paratype, cypress swamp, 14 miles northeast of Charleston, June 25, 1948 (Koopman); this and following records in the American Museum of Natural History. Florida: Immature female paratype, 10 miles east of Silver Springs, Marion County, June 25, 1934. Texas: Female paratype, College Station, (M. A. Cazier). New York: Female paratype, Hempstead, Long Island, June 2, 1948 (Lyn Cazier).

***Aranea nigra* (Emerton)**

Figure 77

Epeira nigra EMERTON, 1894, Trans. Connecticut Acad. Sci., vol. 9, p. 402, pl. 1, fig. 1.

The median apophysis of the male palpus of this species is shown in figure 77. Coxa I of the male has the apical spur, while there is a short basal cone in coxa II. In the epigynum the atriolar mass is curved on each side of the very long scape, and the atriolar plates are on each side longitudinally cleft inside of the margin as is the case in *A. marmorea* (Clerck). In addition to the type locality, Laggan, Canada, the following records have been found in the American Museum of Natural History collection.

LOCALITY RECORDS: Colorado: Male, Frazer, July 27, 1940 (O. Bryant). Montana: Female, Skalkaho Canyon, Ravalli County, July 25, 1939 (Jellison). New Jersey: Male, Ramsey, Bergen County, September 8, 1933 (W. J. Gertsch).

***Aranea solitaria* (Emerton)**

Figure 72

Epeira solitaria EMERTON, 1884, Trans. Connecticut Acad. Sci., vol. 6, p. 299, pl. 33, fig. 11, pl. 35, fig. 3.

Aranea solitaria KASTON, 1948, Connecticut State Geol. Nat. Hist. Surv., bull. 70, pp. 250-251, pl. 37, figs. 785-786, pl. 38, figs. 796-797.

In this species the median apophysis of the male palpus (fig. 72) is of a different shape than that of *A. nigra* (Emerton), its ectal end being less projecting. The epigyna are similar, but in *solitaria* the atriolar margins are subangular and the cleft in the atriolar plates is much more gaping. None of the New England records will be cited here, but records from other regions will be of interest.

LOCALITY RECORDS: New York: Male, Lake Cayuga, August 26, 1930 (A. G. Richards); male, Copake Falls, Taconic State Park, September 21, 1945 (Alice Bell); female, Listening Mountain, Stony Point, October 20, 1940 (H. N. Damon). Quebec: Female, Matapedia, August 19, 1938. Ontario: Male, Smoky Falls, Mattagami River, August 28, 1938. Montana: Male, Gird Point Lookout, Ravalli County, July 23, 1934 (W. L. Jellison). Wyoming: Male, females, Yellowstone National Park, August, 1930 (W. J. Gertsch). Utah: Female, Salt Lake City, October, 1933 (W. J. Gertsch). Alberta: Two females, Medicine

Hat, September 8, 1924 (F. S. Carr). British Columbia: Female, Salmon Arm, October 1940 (O. R. Leech).

***Aranea corticaria* (Emerton)**

Figure 76

Epeira corticaria EMERTON, 1884, Trans. Connecticut Acad. Sci., vol. 6, p. 300, pl. 33, fig. 14, pl. 35, fig. 9.

Aranea corticaria KASTON, 1948, Connecticut State Geol. Nat. Hist. Surv., bull. 70, p. 252, pl. 38, figs. 800-802.

The median apophysis of the male palpus (fig. 76) shows that this species is not only related to some extent to the previous two species, but is very close to the next species, *A. denningi*, new species. In addition to the marked peculiarities of the median apophysis that set it off from *A. nigra* and *A. solitaria* it totally lacks the cone on coxa II of the male.

LOCALITY RECORD: New York: Male, females, Essex County.

***Aranea denningi*, new species**

Figure 81

MALE: Total length, 4.7 mm. Carapace, 2.6 mm. long, 2.3 mm. wide. Abdomen, 2.3 mm. long, 2.3 mm. wide.

Anterior face of abdomen reticulate brown except for central clover-leaf pattern; posterior faces of shoulder cones white; dorsal shield finely reticulate white, with plainly marked folium. Legs orange from distal halves of femora to tips; annulate.

Abdomen subtriangular; a pronounced cone on each shoulder. Usual spur on coxa I only. Tibia II incrassate, with spur-like ventral spines especially long. One row of ventral femoral spines, legs I to III; two rows of ventral femoral spines, leg IV. A spine behind the posterior lateral eyes.

First leg: femur, 2.5 mm.; patella, 1.2 mm.; tibia, 2.5 mm.; metatarsus, 2.0 mm.; tarsus, 0.9 mm.

Median apophysis of the male palpus as illustrated in figure 81. It is similar to that of *A. corticaria* (Emerton), but the ectal portion of the main piece is less steeply ascending than in the case of the latter, while the margin next to the radix is more lobate. The conductor is a very stout, low blade extending across the apical portion of the genital bulb.

TYPE LOCALITY: Male holotype, The Pas, Manitoba, August 11, 1937 (Denning).

***Aranea bicentenaria* (McCook)**

Figures 68 and 78

Epeira bicentenaria McCook, 1889, Proc. Acad. Nat. Sci. Philadelphia, p. 195.

MALE: Total length, 10.0 mm. Carapace, 6.1 mm. long, 4.1 mm. wide. First leg: femur, 5.0 mm.; patella, 2.6 mm.; tibia, 4.9 mm.; metatarsus, 1.2 mm. Median apophysis of palpus as illustrated in figure 78 (male from Chocorua, New Hampshire).

FEMALE: Total length, 16.5 mm. The only females seen by the writer are very dark. They may possess a transverse yellow patch midway between the shoulder cones. Epigynum as illustrated in figure 68 (female from Oakland, New Jersey).

***Aranea andrewsi*, new species**

Figures 63, 64, and 82

MALE: Total length, 10.0 mm. Carapace, 5.5 mm. long, 4.4 mm. wide. Colors similar to those of the female.

A pair of bristle-like hairs on median ocular quadrangle. Abdomen irregularly subovate and having long, scattered hairs; shoulder humps conical. Spur on coxa I large as in *A. bicentenaria*.

Median apophysis of male palpus as illustrated in figure 82.

FEMALE: Total length, 15.9 mm. Carapace, 6.0 mm. long, 5.0 mm. wide. Abdomen, 10.1 mm. long, 9.8 mm. wide.

Carapace dark reddish brown. Abdomen dusky brown, with typical folium. Legs brown, ringed.

Characters as usual in large species of the genus. Abdomen subtriangular, each shoulder bearing a stout, blunt, angular cone.

Epigynum as illustrated in figure 63. The atriole region of the epigynum with the scape broken off is shown (fig. 64) from a paratype taken in West Los Angeles, California. For contrast with this species the epigynum of *A. angulata* (Clerck), Pland, Sweden, is illustrated in figure 66.

TYPE LOCALITY: Male holotype and immature paratypes from Claremont, Los Angeles County, California (H. W. Andrews).

OTHER LOCALITIES: California: Female allotype, Green Valley Falls, Solano County, April 27, 1941 (W. M. Pearce);

Monterey County, August–November, 1945 (A. F. Archer); female paratypes, Cypress Point, Monterey County, September 23, 1945 (A. F. Archer); female paratype, Pacific Grove, September, 1945 (A. F. Archer); female paratypes, Carmel, Monterey County, September 23, 1945 (A. F. Archer); female paratype, La Honda, San Mateo County.

This species is undoubtedly the one that Emerton called *A. angulata* when he decided that most of his angulate species belonged under that name (1909, Trans. Connecticut Acad. Sci., vol. 14, p. 199). As can be readily seen, this species differs from the European *angulata* in its genitalia, and is a strictly western North American species, being common in California and Oregon. In *A. andrewsi* it is interesting to note the color patterns that occur on varied backgrounds: 1. Blackish, with a light spot between the shoulders. This occurs on pines, and on hedges and walls in towns. 2. Lichen colored, with greenish gray on the sides of the abdomen. This is found on branches and trunks of oaks (*Quercus agrifolia*). 3. Chamois colored. This is found on branches of Monterey cypress. 4. Brown. This occurs on pine branches and telephone poles. The range of size in females is 13.7 to 17.6 mm. in total length.

The second group in the subgenus *Aranea* comprises species such as *marmorea* (Clerck) in which the abdomen is oval and lacks the cones on the shoulders. In this group as well as in the next one the spiders often possess striking colors. In addition to the typical species the writer has had the opportunity of examining *A. pinguis* (Karsch) from Japan. In both of these species coxa I of the male has the characteristic spur, and coxa II possesses a very pronounced cone. In both species the epigynum has the same general characteristics. In *A. pinguis* the median apophysis of the male palpus has a more deeply angular base than does *A. marmorea* in which the base is only slightly curved, and there is an endal lobe next to the radix, a feature not found in the latter. In fact its appearance is suggestive of that of *A. tusigia* Chamberlin (fig. 73).

We now pass to a small series related to *Aranea quadrata* (Clerck) in which this typical species is the only common member. The abdomen has the same appearance and shape as that of the previous group. Although tibia I or II of the male is incrassate, there are no modifications of the coxae other than a rudiment of the spur on coxa I. In the median apophysis of the palpus there is a

spur above the ectal corner as well as an endal spur projecting above the radix. In the two species now to be described only the male of the related European species *A. alsine* Walckenaer is known.

***Aranea iviei*, new species**

Figure 53

FEMALE: Total length, 12.0 mm. Carapace, 5.5 mm. long, 4.0 mm. wide. Abdomen, 8.6 mm. long, 8.6 mm. wide.

A species very much like *A. alsine* (Walckenaer) of Europe in appearance. Carapace and legs orange. Abdomen with an orange background and brilliantly marked with crimson rings on the dorsum; sides and base brownish.

Epigynum as illustrated in figure 53. In this species the wings of the atrium are thicker than those of *A. alsine*.

TYPE LOCALITY: Female holotype from Keene Valley, Essex County, New York, August 10, 1917 (Notman).

OTHER LOCALITIES: New York: Female paratypes, Ohio, August 17–20, 1912 (H. Bragg). New Jersey: Female paratype, Ramsey, Bergen County, September 1, 1946 (W. Ivie and W. J. Gertsch). Alberta: Female, Cypress Hill, Canada, August 21, 1930 (Carr).

***Aranea sachimau*, new species**

Figure 55

FEMALE: Total length, 10.2 mm. Carapace, 5.0 mm. long, 3.5 mm. wide. Abdomen, 8.0 mm. long, 7.0 mm. wide.

Coloration and appearance like those of *A. iviei*, new species. Legs ringed. Abdomen possessing a series of deep, orange red, oval rings scattered over the base and forming caudally anastomosed chains behind.

First leg: femur, 3.2 mm.; patella, 1.0 mm.; tibia, 3.0 mm.; metatarsus, 2.5 mm.; tarsus, 1.2 mm.

Epigynum as illustrated in figure 55. This species is distinct from *A. iviei* in the thickness and anterior convexity of the atrial wings.

TYPE LOCALITY: Female holotype, Norwell, Plymouth County, Massachusetts, August 28–September 3, 1941 (A. F. Archer). Female paratype from the same locality in the collection of the writer.

The specific name is taken from the Algonquin word *sachimau*, the title of King Philip (Metacom), famous sachem of the Wampanoag Indians who occupied Plymouth County in the seventeenth century.

EURANEA, NEW SUBGENUS

Differing from the subgenus *Aranea* in that tibia II of the male is weakly, if at all, incrassate; differentiation detectable only in the proximal portion.

TYPE SPECIES: *Aranea cavatica* (Keyserling).

This subgenus is divisible into two sections contrasting somewhat with each other. The first group, that of *A. cavatica* (Keyserling), comprises those species in which the abdomen possesses a cone on each shoulder, while the median apophysis of the male palpus has the inner spur in an apical position or else it is located closer to the ectal corner than to the endal corner. The remaining group is that of *A. trifolium* (Hentz) and comprises species with a striking pattern on the abdomen whose shoulders lack any cones. In this group the characteristic spur is in the endal position. In all species of *Euaranea*, coxa I of the male possesses only the rudiment of the spur. It is evident that this subgenus is confined to the Western Hemisphere.

It is impossible to say for certain whether *Euaranea* is the result of progressive modification resulting in a regressive reduction of the clasping structures of the legs of the male or is more primitive, with *Aranea* being the derivative subgenus. If the latter situation is the case, then it would be better to place it in front of subgenus *Aranea*. However, for a number of reasons it is deemed better to make use of the opposite arrangement. In the first place the development of clasping and other secondary structures in the male is not necessarily linked with progressive modification and elaboration of the genital structures. For example, in more primitive genera all the way down the line we find some cases in which modified coxae and incrassate tibiae appear, especially the latter feature. In the case of the tibiae we have some extremely striking modifications in genera like *Acacesia* and *Verrucosa* which are lower down in the series than is *Aranea*. In the second place derivative genera, as contrasted with the primitive ones, are those in which there is the greatest departure from the *Nephila* type of arrangement of the patellar appendages in the male palpus, the single apical spine with or without a com-

panion hair. *Aranea* with two apical patellar spines falls well within this range, even in the case of the genera with the least modification of the legs. Another important point to be noted is the progressive modification of that most significant structure, the median apophysis of the male palpus. Starting with a mere extension of the apical margin of the tegulum in the Metinae there is a whole series of developments from the primitive condition in which the base of the median apophysis is wide to that in which it is narrow, especially in proportion to the width or height of the structure. In the most primitive of the Araneinae, for example, the Cyrtophorini and Mastophorini, the median apophysis consists of a narrow or linear spur resembling that in *Theridiosoma*, but the base is wide. In later genera transverseness is more or less characteristic, and only in cases like *Neoscona* is there a narrow stalk behind the base of the main piece. It is at the upper level of the transverse series that the palpal patella first exhibits a second apical patellar spine, and from then on is consistently present along with the more derivative type of median apophysis. It is an easy transition from the wider-based type of median apophysis to the narrower one, and we find exceedingly modified structures in *Epeira*, *Cercidia*, and *Cyphalonotus*. Finally, it should be stressed that *Euaranea* is American, and therefore its restricted range is another point in favor of the proposed arrangement.

In connection with the above it is proper to comment on the arrangement of genera that will follow the treatment of *Aranea*. By basing the arrangement upon the genitalia in an ascending order of derivation and upon other cumulative differences and resemblances, we arrive at a classification in which many subsequent genera appear to have less modification of the legs than is the case in *Neoscona*, *Aranea*, and related genera. However, as has been hinted, some features appear to be lost by regression, and this phenomenon not only affects the legs of the males but also appears in the loss of some apophyses of the genital bulb of the palpus. In one case at least *Singa* goes so far as to reduce one of the apical patellar spines of the male palp.

***Aranea gemmoides* (Chamberlin and Ivie)**

Araneus gemmoides CHAMBERLIN AND IVIE, 1935, Bull. Univ. Utah, vol. 26, no. 4, p. 22, pl. 10, fig. 80.

The male palpus of this species is unfigured, but the median apophysis has the main spur in the apical position and closer to the ectal corner than to the endal one. There is no other spur present.

The describers of this species cite no locality east of Minnesota, but the species occurs in Illinois and Wisconsin.

LOCALITY RECORD: Illinois: Females, Camp Grant near Rockford, Winnebago County, summer, 1942 (A. F. Archer).

***Aranea pirus* (Chamberlin and Ivie)**

Araneus pirus CHAMBERLIN AND IVIE, 1935, Bull. Univ. Utah, vol. 26, no. 4, p. 22, pl. 10, fig. 81.

The median apophysis of the male palpus has a stouter endal spur than is the case in *A. gemmoides*, and its tip is much more inclined endally. Separated from it by a rounded sinus is a stout, suberect, ectal spur.

LOCALITY RECORDS: California: Male, female, University of California campus, Alameda County, September 27, 1938 (W. M. Pearce); female, Big Trees Park, Santa Cruz, Santa Cruz County, October 14, 1945 (A. F. Archer).

***Aranea illaudata* Gertsch and Mulaik**

Figures 67 and 74

Aranea illaudata GERTSCH AND MULAİK, 1936, Amer. Mus. Novitates, no. 863, p. 19, figs. 36, 37.

Median apophysis of the male palpus as shown in figure 74. It is closest to that of *A. pirus*, but differs in that the endal spur is less inclined (as in *A. gemmoides*), while the ectal spur (lacking in *A. gemmoides*) is shorter, more attenuated and acute. The epigynum (fig. 67) which is quite different from that of other members of the *A. cavatica* group, bears quite a resemblance to that of *A. pseudomelaena*, new species.

***Aranea gemma* (McCook)**

Epeira gemma MCCOOK, 1888, Proc. Acad. Nat. Sci. Philadelphia, p. 193, figs. 1, 2.

Epeira gemma MCCOOK, 1893, American spiders, vol. 3, p. 182, pl. 9, figs. 1, 2.

Araneus gemmus CHAMBERLIN AND IVIE, 1935, Bull. Univ. Utah, vol. 26, no. 4, pp. 21–22, pl. 10, fig. 79.

The median apophysis of the male palpus is longer than in the related species. The main spur is very close to the ectal corner, separated by a notch from the blade-like, angular, ectal corner.

Chamberlin and Ivie cite localities in southern California for this species.

LOCALITY RECORD: Arizona: Male, females, Madera Canyon, Santa Rita Mountains, September 6, 1941 (H. Ellsworth).

***Aranea manitobae*, new species**

Figures 51, 59, and 62

MALE: Total length, 6.0 mm. Carapace, 3.5 mm. long, .30 mm. wide. Abdomen, 3.0 mm. long, 2.5 mm. wide.

Carapace orange. Dorsum of abdomen chalky white, faintly tinged with brownish on the caudal border. Spinnerets brown. Legs orange, but distal halves of femora orange yellow.

Carapace broadly cordate behind, cervical grooves and radial furrows weakly impressed; median longitudinal furrow very short. Cephalic region elevated, sloping gradually back to pedicel. Sternum small, truncated anteriorly, and narrowed to a point between coxae IV. Maxillae divergent, very bluntly angular. Legs having stout femora and rather stout tibiae. Patellae having at least three spines. Tibiae I and II having very stout spines on all sides, but tibiae III and IV having fewer and more scattered spines.

First leg: femur, 3.2 mm.; patella, 1.0 mm.; tibia, 3.0 mm.; metatarsus, 2.5 mm.; and tarsus, 1.2 mm. Fourth leg: femur, 2.5 mm.; patella, 1.0 mm.; tibia, 2.0 mm.; metatarsus, 1.8 mm.; and tarsus, 0.9 mm.

Male palpus as illustrated in figure 59. Median apophysis of male palpus as illustrated in figure 51.

TYPE LOCALITY: Male holotype from The Pas, Manitoba, Canada. Male paratype, August 11, 1937 (Denning).

This species belongs to the *A. trifolium* group. It differs from *A. trifolium* (Hentz) in that the median apophysis of the male palpus has the endal spur very close to the endal corner, and that there are a pair of stout ectal processes, more or less erect. In *A. trifolium*, the median apophysis of which has never been figured, there is only one process and that one is the main spur which is apical and is a short distance in from the rounded endal corner.

NEOSCONELLA F. O. P. CAMBRIDGE, 1904

Median apophysis of male palpus an erect plate, higher than wide; base relatively narrow; apex bearing a pair of equal or subequal spurs separated from each other by a sinus; sometimes a third ectal spur present, equal or subequal, and arising from ectal corner. Embolus situated in a ridge-like elevation. Conductor an erect, fleshy, cordate tag. Terminal apophysis erect, tapering to a subacute tip from a thick collared ring. Lateral subterminal apophysis rather subtriangular, erect. Cymbium not spinose. A basal cone on femur of male palpus; a pair of apical patellar spines present. Coxa I of male having the apical spur either pronounced or rudimentary. Tibia II incrassate and with marked clasping spines. Epigynum having a fleshy scape, long or short, slender or stout, and with cochlear concavity always small; atriolar rims bordering very wide atriolar openings into the vulvae; these rims very prominent and fused in the posterior margin to form a lobate or bilobate structure equally as prominent. Carapace moderately pilose. Abdomen rounded or widely rounded; a short, dense pile on the sides, but otherwise quite smooth. One or two rows of ventral femoral spines in the males, usually on all legs. Tibiae and metatarsi spinose on all sides in the males; generally a few spines in a row in the females, with few exceptions; ventral tibial spines lacking in females of some species. Legs similar or dissimilar in the females.

GENOTYPE: *Neosconella styligera* F. O. P. Cambridge.

The characteristic median apophysis of the male palpus is shown in figure 42, *N. pegnia* (Walckenaer), Dauphin Island, Mobile County, Alabama. The median apophysis of this species is very similar to that of *Neosconella arizonensis* (Banks), (1901, Proc. U. S. Natl. Mus., vol. 23, p. 585, pl. 22, fig. 5), but the spurs are proportionately shorter in the former than in the latter. In proposing the genus *Neosconella*, Cambridge referred to the paucity of spines on the legs of the females, and stated that the legs are similar in length. However, these characters do not hold up consistently, since in species like *N. pegnia* the spines are not scarce, and the legs are not too similar in length, a fact which suggests that the genus is divisible into two subgenera. Most typically similar to the genotype in respect to leg characters of the females is *N. thaddeus* (Hentz) from eastern North America. The latter is one of the species in which the median apophysis of the male palpus has a third and subequal spur.

Species of *Neosconella* make a vertical web, in an upper angle of which is a deep nest of opaque silk mottled with numerous transparent patches, in which the spider sits facing the web along the trap line. This genus is apparently confined to the Western Hemisphere, and there are numerous representative species in Tropical America. In North America the species *N. pegnina* is not so widely spread as is *N. thaddeus*, but is very abundant in all situations in the southern states, replacing the largely absent species of *Aranea* in that region as a house and garden spider. Along the Gulf Coast *Cambridgepeira detrimentosa* (O. P. Cambridge) has become so abundant in recent years as to compete with it for the more sunlit and cultural trapping sites.

***Neosconella montana*, new species**

Figure 41

MALE: Total length, 3.6 mm. Carapace, 1.8 mm. long, 1.5 mm. wide. Abdomen, 1.9 mm. long, 1.6 mm. wide.

Carapace and legs dusky brown. Abdomen brown; a dorsal foliate pattern like that of the male of *N. pegnina*. Abdomen ovate, and other characters as in the genus. Coxa I with the distal, retrolateral spur well developed. First leg: femur, 2.6 mm.; patella, 0.9 mm.; tibia, 1.2 mm.; metatarsus, 2.1 mm.; tarsus, 1.8 mm.

Median apophysis of male palpus as illustrated in figure 41.

TYPE LOCALITY: Male holotype from Santa Rita Mountains, Arizona (O. Bryant).

This species differs from *N. arizonensis* (Banks) in that the median apophysis has three apical spurs, not two of them, and from *N. thaddeus* (Hentz) in that the spurs are all equal.

EPEIRA WALCKENAER, 1805

Median apophysis of male palpus longer than wide, projecting, and arising from close to the base of the genital bulb, the tegulum being narrowed on its ventral face; the base narrow but stout; apex cleft, the endal portion usually narrower than the blade-like ectal portion and usually constituting a stout spur. Radix a stout rod. Embolus a short collared swelling with a narrowed tip. Conductor a suberect or projecting blade, expanded at the tip, sometimes subacute. Terminal apophysis more or less acute or blunt, filiform or lanceolate. Lateral subterminal apophysis a wall surmounted by one or more projections. Cymbium not

spinose. No basal spur on femur of male palpus; a pair of distal patellar spines present. Coxae of male without spurs. Tibia II not incrassate. Epigynum with the short, slender scape soft, or else fixed and chitinous, sometimes aborted; atrium composed of a broad, grooved, or lobate plate between curved rims on either side; rims simple or fringed. Carapace hirsute or closely pilose. Abdomen rounded or ovate, without angular shoulders; surface of dorsum quite smooth, sometimes shiny. Ventral femoral spines present in the males; dorsal and prolateral spines also present. Tibiae of females thickened at the distal ends. Legs dissimilar.

GENOTYPE: *Epeira cornuta* (Clerck).

Not only are the genitalia a distinctive feature of this genus, but the tibiae of the females, thickened distally, constitute a feature not found in related genera. The species of *Epeira* construct a rather large, formal, vertical web with a nest at an upper corner consisting of a tube or silk open at both ends like that of *Singa*. This genus is composed of species that inhabit the cooler climates of the Holarctic region, not venturing too far into the Warm Temperate Zone. The species described below is rather exceptional in its location and distribution.

***Epeira carolinensis*, new species**

Figure 57

FEMALE: Total length, 9.8 mm. Carapace, 4.9 mm. long, 3.7 mm. wide. Abdomen, 5.8 mm. long, 4.1 mm. wide.

General morphology and color pattern like those of *E. reptilis* Keyserling. Carapace reddish brown, with dark lateral margins. Abdomen grayish brown, very dark on the base and caudal region; a scalloped folium margined with pale ivory, and four pairs of brown muscle scars within. Legs reddish brown except for yellow on ventral sides of femora III and IV. Abdomen dorso-ventrally compressed, ovate-elliptical.

First leg: femur, 4.0 mm.; patella, 1.9 mm.; tibia, 4.0 mm.; metatarsus, 3.5 mm.; tarsus, 2.0 mm. Fourth leg: femur, 3.5 mm.; patella, 1.2 mm.; tibia, 2.9 mm.; metatarsus, 2.9 mm.; tarsus, 1.3 mm.

Epigynum as illustrated in figure 57.

TYPE LOCALITY: Female holotype and paratypes from White Lake, Bladen County, North Carolina, September, 1929 (J. C. Beakley).

SINGA C. KOCH, 1837

Median apophysis of male palpus transverse, much longer than wide, arising from a narrow, somewhat elbowed base; no endal spur, although a vertical blade or lobe sometimes present; ectal spur present, more or less acute, horizontal to suberect. Radix much as in *Epeira*. Embolus elongated, lanceolate, gently curved, its base enlarged, and tip filiform, passing directly over the apex of the short, fleshy, obtuse conductor. Terminal apophysis as long as the embolus and with a flattened, blade-like tip. Lateral subterminal apophysis subtriangular, suberect. No basal cone on femur of male palpus; two, rarely one, distal patellar spines, in the latter case accompanied by a reduced, hair-like spine. No cones on the male coxae. Tibia II not incrassate; a thickened, apical, prolateral spine. Epigynum with or without a wide, thick scape; atriole structure composed of an ornate plate, with a shallow pit on each lateral half; a vertical septum present; lateral margins subcircular; posterior margin fused, entire. Carapace quite smooth. Abdomen elliptical, wider behind than in front; dorsum very smooth and shiny. Legs without ventral femoral spines. Legs dissimilar.

GENOTYPE: *Singa hamata* (Clerck).

***Singa orotes*, new species**

Figures 36, 37, and 61

MALE: Total length, 2.7 mm. Very closely resembling *Singa tusus* (Petrunkévitch). A pair of colorless hairs behind PLE. Dorsum of abdomen dusky on the sides; a chalky line within, running from anterior border to one-half of the way back; a black, central, longitudinal zone. Legs stout; formula 1243; moderately spinose.

Median apophysis of male palpus as illustrated in figure 36. The entire male palpus as shown in figure 61.

FEMALE: Total length, 3.1 mm.

Epigynum as shown in figure 37.

TYPE LOCALITY: Male holotype from Regnier, Colorado, June 6-9, 1919 (F. E. Lutz).

OTHER LOCALITIES: New York: Female allotype, Ceram, Suffolk County, May 30 (E. J. Bell).

In spite of the great distance between the above localities, the exact resemblance of the female to the male makes the association

of the two a reasonable matter. Both sexes resemble *S. tusus* Petrunkevitch, but differ in genitalia. The distal patellar spines of the male palpus are paired and equal, as is the case in related species. In *Singa calix* (Walckenaer) (= *S. maura* Hentz) only the inner spine is fully developed, the outer one being a mere seta or hair-like appendage, a situation found also in *Metepeira*, although this does not mean that the two genera are closely related.

CERCIDIA THORELL, 1869

Median apophysis of male palpus very prone, much longer than wide, arising from a narrow base; main piece (at least in the genotype) notched medially on apical margin, tapering at both ends as in *Cyphalonotus* (*q. v.*); an acute endal blade, free, extending outside of radix; a long, narrow, elbowed, suberect, ectal spur; median apophysis located well towards the base of the genital bulb. Embolus apparently concealed beneath overlapping, wide, terminal apophysis; the latter closely appressed to the apex of the genital bulb. Conductor an erect, obtuse, fleshy flap. Cymbium not spinose; paracymbium narrow, subacute, distally truncated. Femur of male palpus lacking the basal cone; a pair of distal patellar spines present, one of them stouter than the other and curved; tibia having a ventral cone suggesting that of *Gasteracantha*. Coxa I with a retrolateral apical spur. Tibia II slightly incrassate. Epigynum having a wide scape; atriolar rims around circular pits, one on each half of atriolum, and margins of rims more or less subcircular. Carapace having a longitudinal row of spines. Abdomen ovate and having an especially opaque thickening of the dorsal cuticle; a row of short spines on the anterolateral angles. No rows of ventral femoral spines.

GENOTYPE: *Cercidia prominens* Westring.

This genus probably has a very wide distribution, but it seems likely that some species credited to it do not belong here. There is certainly some question about the assignment of *C. funebris* Keyserling to such a position, and it may prove to be a *Singa*, for the two genera are very close in many respects, including the shiny dorsal cuticle. On the other hand *Epeira albostrata* Keyserling from South America should be added to *Cercidia*. Fine figures of the female of this species are shown by Tullgren (1905, *Arkiv för Zool.*, vol. 2, no. 19, p. 34, pl. 5, figs. 11-11a). The writer has examined specimens of the genotype from Switzerland and from North America. Reference is here made to the fine

description of the genotype given by Kaston (1948, Connecticut Geol. Nat. Hist. Surv., bull. 70, pp. 227-228, pl. 34, fig. 731).

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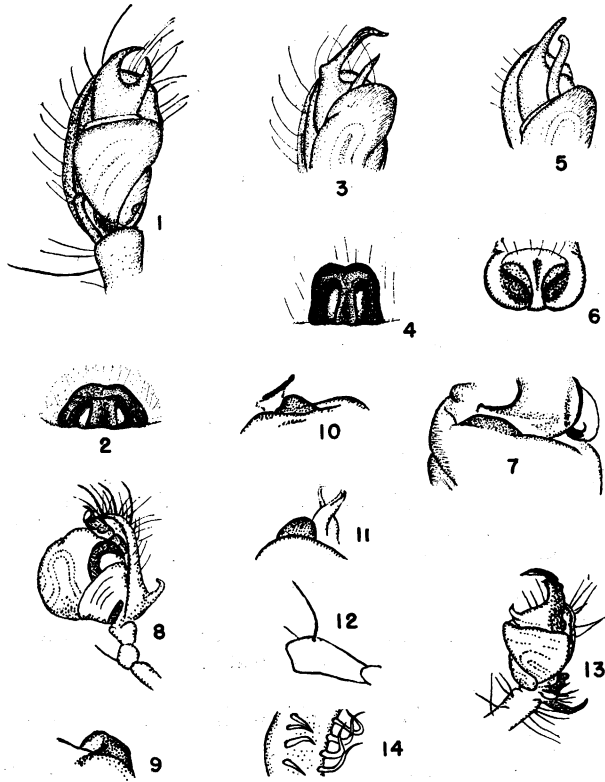
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FIGS. 1, 2. *Leucauge mabelae*, new species. 1. Palpus, ectal view. 2. Epigynum.

FIGS. 3, 4. *Leucauge venusta* (Walckenaer). 3. Terminal division of palpus. 4. Epigynum.

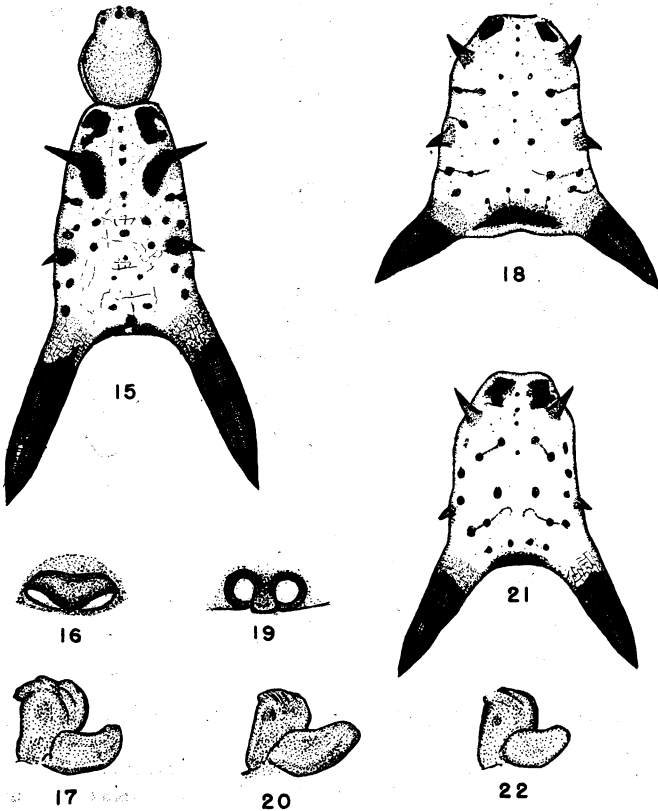
FIGS. 5, 6. *Leucauge aurulenta* C. Koch. 5. Terminal division of palpus. 6. Epigynum.

FIG. 7. *Plesiometes argyra* (Walckenaer), showing origin of median apophysis of palpus on margin of tegulum.

FIGS. 8, 9. *Anopas ventralis* (Thorell). 8. Male palpus. 9. Median apophysis.

FIGS. 10, 13, 14. *Opadometa grata* (Guerin). 10. Median apophysis of palpus next to base of embolus. 13. Male palpus. 14. Setae of chelicerae.

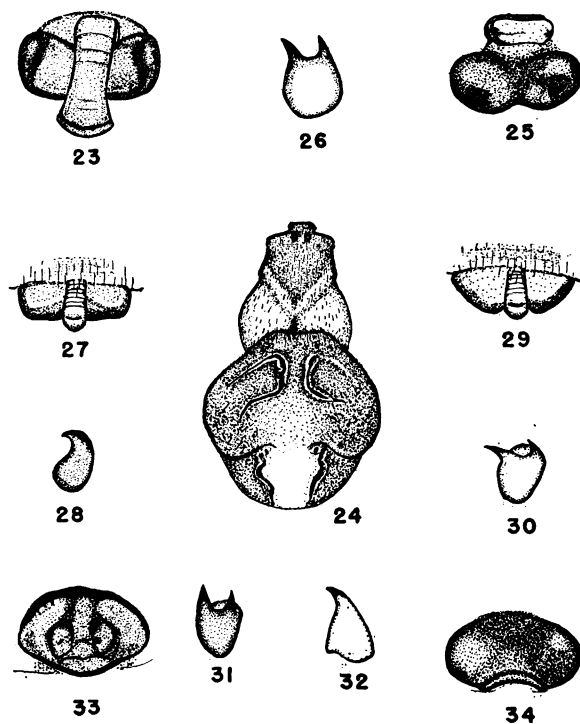
FIGS. 11, 12. *Pickardinella setigera* (F. Cambridge). 11. Rudimentary median apophysis, embolus, and conductor of palpus. 12. Palpal tibia.



FIGS. 15-17. *Micrathena comstocki*, new species. 15. Holotype. 16. Epigynum. 17. Median apophysis of palpus.

FIGS. 18, 22. *Micrathena sagittata emertoni*, new subspecies. 18. Abdomen of holotype. 22. Median apophysis of palpus.

FIGS. 19-21. *Micrathena sagittata* (Walckenaer). 19. Epigynum. 20. Median apophysis of palpus. 21. Abdomen.



FIGS. 23, 24. *Amamrotypus mammatus*, new species. 23. Epigynum. 24. Holotype.

FIG. 25. *Amamrotypus miniatus*, new species, epigynum.

FIG. 26. *Mangora ornata* (Walckenaer), median apophysis of palpus.

FIGS. 27, 28. *Mangora spiculata* (Hentz). 27. Epigynum. 28. Median apophysis of palpus.

FIGS. 29, 30. *Mangora placida* (Hentz). 29. Epigynum. 30. Median apophysis of palpus.

FIG. 31. *Mangora floridana*, new species, median apophysis of palpus.

FIG. 32. *Mangora maculata* (Keyserling), median apophysis of palpus.

FIG. 33. *Wixia bryanti*, new species, epigynum.

FIG. 34. *Zygiella carpenteri*, new species, epigynum.

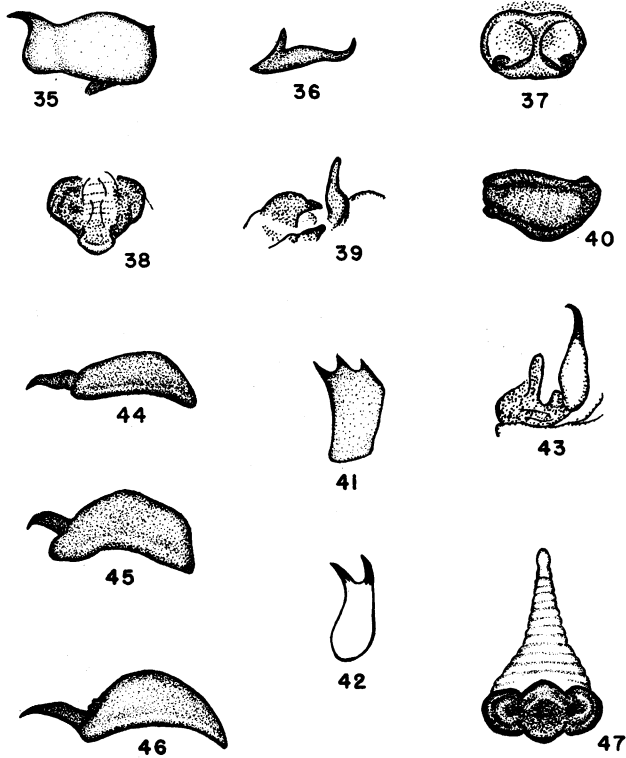


FIG. 35. *Neoscona jonesi*, new species, median apophysis of palpus.

FIGS. 36, 37. *Singa orotes*, new species. 36. Median apophysis of palpus 37. Epigynum.

FIGS. 38-40. *Lariniacantha grayi* (Blackwall). 38. Epigynum. 39. Terminal division of palp. 40. Median apophysis of palpus.

FIG. 41. *Neosconella montana*, new species, median apophysis of palpus.

FIG. 42. *Neosconella pegnia* (Walckenaer), median apophysis of palpus.

FIG. 43. *Afraranea sanguipes* (Thorell), median division of bulb of palpus (after R. de Lessert).

FIGS. 44, 47. *Eustala arkansana*, new species. 44. Median apophysis of palpus. 47. Epigynum.

FIG. 45. *Eustala triflex* (Walckenaer), median apophysis of palpus.

FIG. 46. *Eustala anastera* (Walckenaer), median apophysis of palpus.

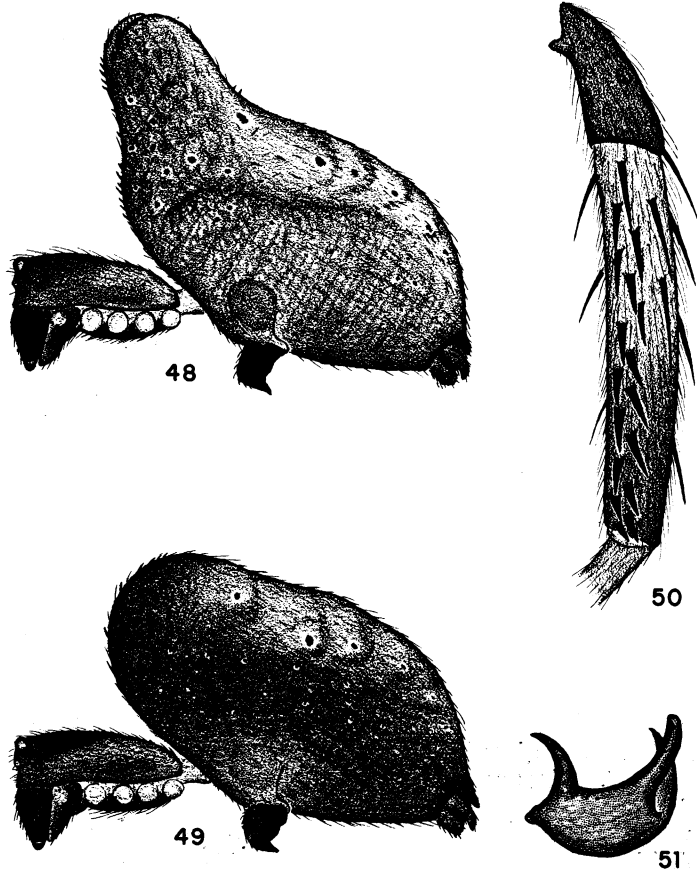
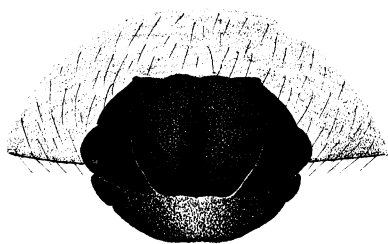


FIG. 48. *Wixia hentziana*, new species, female holotype.

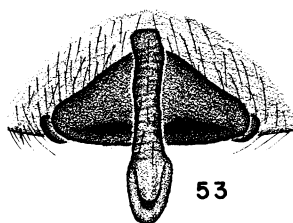
FIG. 49. *Wixia anaglyphe* (Walckenaer), female.

FIG. 50. *Neoscona jonesi*, new species, left tibia II of male, subanterior view.

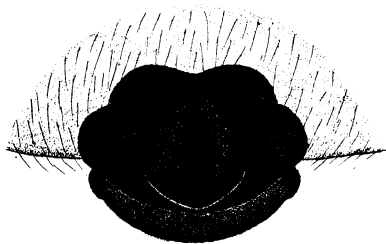
FIG. 51. *Aranea manitobae*, new species, median apophysis of palpus.



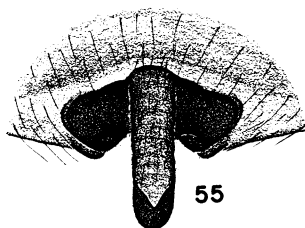
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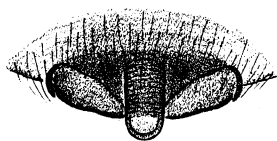
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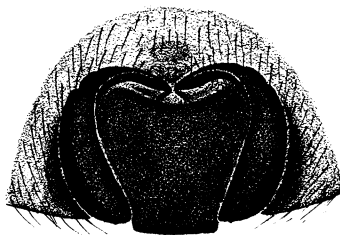
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- FIG. 52. *Wixia hentziana*, new species, epigynum.
FIG. 53. *Aranea iviei*, new species, epigynum.
FIG. 54. *Wixia anaglyphe* (Walckenaer), epigynum.
FIG. 55. *Aranea sachimau*, new species, epigynum.
FIG. 56. *Mangora floridana*, new species, epigynum.
FIG. 57. *Epeira carolinensis*, new species, epigynum.

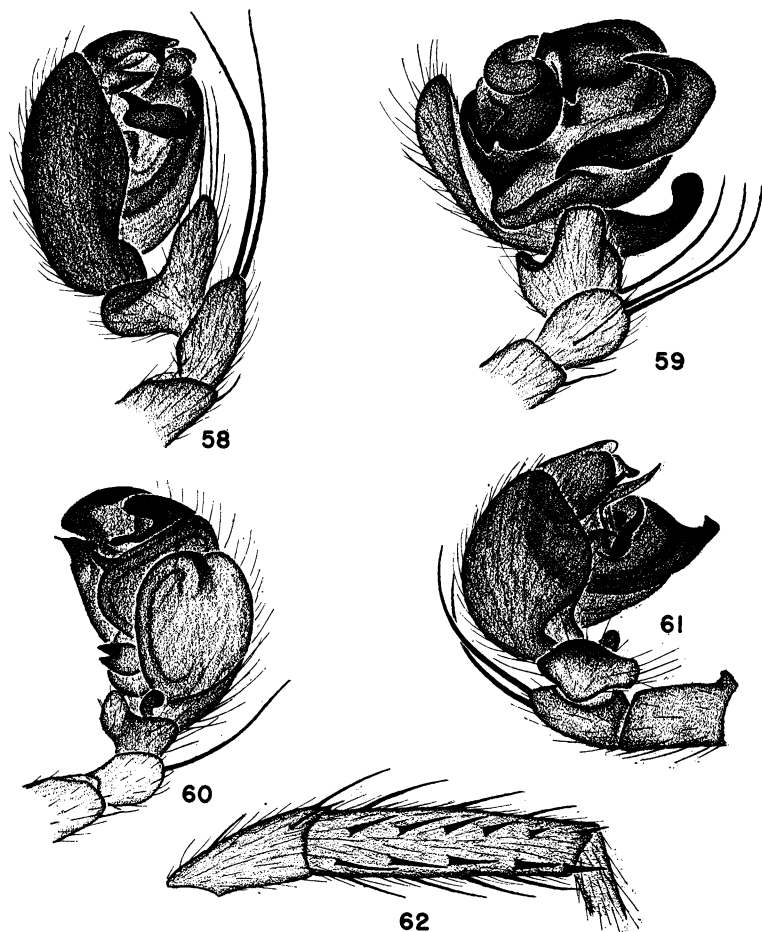
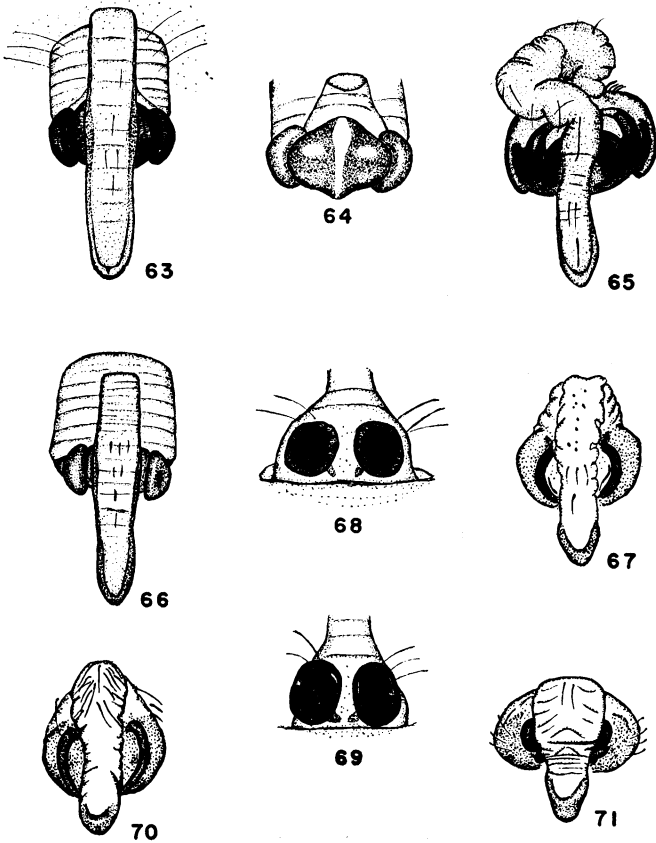


FIG. 58. *Neoscona jonesi*, new species, palpus.

FIGS. 59, 62. *Aranea manitobae*, new species. 59. Palpus. 62. Left tibia II of male, anterior view.

FIG. 60. *Mangora floridana*, new species, palpus, subectal view.

FIG. 61. *Singa orotes*, new species, palpus.



FIGS. 63, 64. *Aranea andrewsi*, new species. 63. Epigynum. 64. Epigynum of paratype.

FIG. 65. *Aranea santarita*, new species, epigynum.

FIG. 66. *Aranea angulata* (Clerck), epigynum.

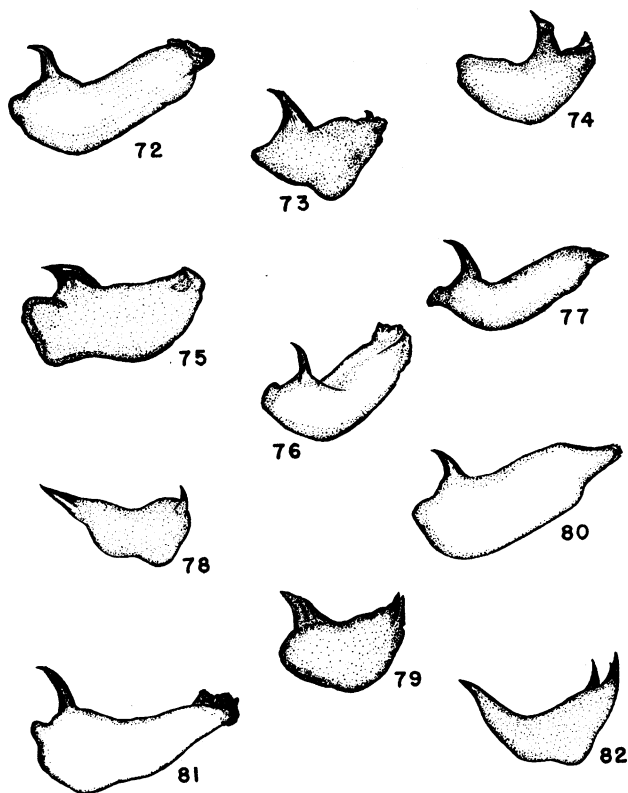
FIG. 67. *Aranea illaudata* Gertsch and Mulaik, epigynum.

FIG. 68. *Aranea bicentenaria* (McCook), epigynum.

FIG. 69. *Aranea kisatchia*, new species, epigynum.

FIG. 70. *Aranea pseudomelaena*, new species, epigynum.

FIG. 71. *Aranea darlingtoni*, new species, epigynum.



- FIG. 72. *Aranea solitaria* (Emerton), median apophysis of palpus.
 FIG. 73. *Aranea tusigia* Chamberlin, median apophysis of palpus.
 FIG. 74. *Aranea illaudata* Gertsch and Mulaik, median apophysis of palpus.
 FIG. 75. *Aranea darlingtoni*, new species, median apophysis of palpus.
 FIG. 76. *Aranea corticaria* (Emerton), median apophysis of palpus.
 FIG. 77. *Aranea nigra* (Emerton), median apophysis of palpus.
 FIG. 78. *Aranea bicentenaria* (McCook), median apophysis of palpus.
 FIG. 79. *Aranea pseudomelaena*, new species, median apophysis of palpus.
 FIG. 80. *Aranea diademata* (Clerck), median apophysis of palpus.
 FIG. 81. *Aranea denningi*, new species, median apophysis of palpus.
 FIG. 82. *Aranea andrewsi*, new species, median apophysis of palpus.