

THE SPIDER FAMILY LEPTONETIDAE IN NORTH AMERICA

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ABSTRACT

A systematic review of spiders of the family Leptonetidae in North America is presented with analyses of their characters and relationships. Reasons are given for using only two generic names for the 44 taxa of this fauna, most of which are described as new. The subfamily Leptonetinae includes all representatives of the world fauna in which the posterior median eyes are situated far back of the posterior lateral eyes. The genus *Leptoneta*, which is the basic standard of the family and occurs widely in Palearctica, is considered to include all but three of the American species. Its disjunct distribution in North America makes possible treatment of different faunas of four quite discrete centers of distribution. The largest fauna of 15 species occurs in the southern Appalachian Mountains, includes six epigeal species and nine cavernicoles; of the latter one from Georgia is an eyeless troglobite and others have eyes in various stages of reduction. A dozen species from the Edwards Plateau Region of middle Texas and some outlying districts are related to those of Appalachia; one of the nine cavernicoles is eyeless and others have rudimentary eyes. Nine species from eastern Mexico show more morphological variability but differ little in basic features from those from the south-eastern United States; two of them are blind troglobites. The five Californian representatives of *Leptoneta* are all big-eyed epigeal types notable for remarkable, derivative modifications of the male palpi of some. A new genus *Archoleptoneta* is given subfamily status for various unusual features. The posterior median eyes form a transverse row with the posterior lateral eyes in an eye formula probably reminiscent of the ancestral stock of the family. The male palpus presents generalized features of the bulb and especially of the tarsus which lacks a transverse groove present in various degrees of development in the Leptonetinae. *Archoleptoneta* is an exclusively American group so far known from three species in California, Texas and Chiapas, México.

INTRODUCTION

This family of minute spiders is identified with cave habitats more than any other and most of the species have been described from caves. The typical cave leptonetid is white or yellowish with scarcely any dark pattern, a sedentary aerial spider that hangs from a small tangle or sheet web on long thin legs. Its eyes are normally of small size, may be reduced to vestiges or may be completely obsolete. The eyeless ones are obligative cavernicoles but it is also likely that others with reduced or rudimentary eyes may deserve such a classification. Several species of Europe, where few are completely blind, are regarded as being troglobites. The eyeless species so far noted from the Americas are the following: *Leptoneta isolata* Gertsch and *L. capilla* Gertsch from México and *Leptoneta*

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anopica Gertsch and *L. georgia* Gertsch described in this paper from Texas and Georgia in the United States. Other suggested species with reduced eyes noted in the descriptions may eventually prove to be troglobites. Leptonetids from epigeal situations are lucifugous types with shorter legs and evidence of dusky pattern of carapace and abdomen. They live deep in ground detritus and under imbedded rocks in mesic situations of forests and mountains. Some of these differ very little from their cave relatives.

The present revision, based on much recently collected material in the American Museum of Natural History in New York, represents a preliminary report on the family Leptonetidae in North America. To a considerable extent it has been prompted by need for specific names by colleagues doing geographical studies of caves and faunas. Several more species have been added to the Mexican fauna considered by me (Gertsch, 1971) on the basis of various cave representatives. Up to the present time only six leptonetids have been reported from the United States where the family has been considered to be a rare one. One of these species came from a Texas cave, three were taken in the Appalachian Mountains, and two came from California and Oregon. The American fauna is herein very substantially enlarged to 44 species, and it is obvious that eventually this fauna will be found far richer even than shown by the presently available material. Of outstanding interest is discovery of a new genus, *Archoleptoneta*, which presents what may well have been the original eye pattern of the family.

North American leptonetids have so far been taken only in four, quite discretely separated centers as follows: the southern Appalachian Mountains of our southeast; the Edwards Plateau and adjacent areas of Texas; the mountains of eastern México; and the Californian region of our northwest. Most material has come from students of cave faunas who have emphasized cavernicolous habitats, thus accounting for 26 of the known species. The epigeal species number 18 from the four centers and include the six so far known from the Californian region. The Mexican fauna is less well known than the others and its taxa likely will be found to have wider ranges. The distribution pattern for the leptonetids is found repeated in other groups of generalized spiders, notably the Nesticidae, which for the most part presents nuclei of species groups in each of the mentioned centers. The following systematic considerations of the American Leptonetidae treats the taxa of each center as a separate entity.

FAMILY LEPTONETIDAE

Simon, 1893, pp. 279-285 (Part). Fage, 1913, pp. 481-577. Bonnet, 1957, p. 2395.

Small haplogyne spiders of suborder Araneomorphae. Respiratory system consisting of pair of book lungs at base of abdomen and double system of tracheal tubes within abdomen opening through single spiracle in front of spinnerets. Spinnerets six; colulus small, flat lobe bearing few setae. Eyes nocturnal; anterior median eyes obsolete; anterior lateral eyes contiguous in front as first row; four posterior eyes in transverse row (*Archoleptoneta*) or in strongly procurved row, with median eyes placed far back from recurved row of four in front (*Leptoneta*, etc.). Chelicerae without lateral condyle, elongated, free at base, with long thin fang; promargin armed with row of small teeth and thin carina in basal half; retromargin with few trivial denticles. Labium immobile, little wider than long, with transverse groove. Endite longer than broad, narrowly to broadly rounded at apex, moderately convergent, with apical scopula and thin serrula on outer corner. Legs long, thin, with weak spines or none; three tarsal claws usually on onychium; trichobothrial

pattern: one on metatarsi and single row of one to four on tibiae. Female palpus with long claw. Epigynum internal, with atrio-bursal orifices below lip of genital groove leading to voluminous pouch and single tube on each side. Male palpus generalized; tarsus leg-like segment, little modified, with weakly developed alveolus to hold bulb.

Discussion—The family Leptonetidae was characterized by Fage (1913) in an excellent paper describing the European fauna. The stem genus *Leptoneta* was represented by a series of closely allied species in which the transversely grooved tarsus of the male palpus was produced in front into a prominent retrolateral lobe bearing a conspicuous modified seta. Two species lacking such modifications on the tarsi and having slightly different dentition on the chelicerae were given generic rank as *Paraleptoneta*. The several genera established since that time for Palearctic leptonetids were based on such features as shape of the endites, presence or absence of an apical serrula on the endites, shape of the sternum, on the number and arrangement of teeth on the promargin of the chelicerae, and especially on the interesting specializations of the palpi of males. Most of these characters are integradient and fragment the basic pattern of *Leptoneta* in directions even within what are obviously closely allied series. Only after a world revision of these difficult spiders, certain to be far more numerous than so far known, becomes available can the generic limits be adequately defined. To my mind the genera so far proposed mostly represent species groups so it is a matter of taste whether one or many generic names be used. The American species differ in insignificant features from those of Europe so I have decided to use only the generic name *Leptoneta* for the many species of the United States and México. This keeps *Leptoneta* in line with similar generalized genera, such as *Nesticus*, with clusters of species groups in various world centers all retained within a single generic unit.

SUBFAMILY LEPTONETINAE

Diagnosis—Diad of posterior median eyes remote from posterior lateral eyes. Tarsus of male palpus with transverse groove.

Genus *Leptoneta* Simon

Leptoneta Simon, 1872, p. 477; 1893, p. 283. Fage, 1913, p. 132. Gertsch, 1971, p. 50.
Paraleptoneta Fage, 1913, p. 551. *Neoleptoneta* Brignoli, 1972, p. 134.

Types of genera—Of *Leptoneta*, *L. convexa* Simon of Europe; of *Paraleptoneta*, *L. spinimana* Simon of Algeria; of *Neoleptoneta*, *L. capilla* Gertsch of México.

Diagnosis—Characters of family as given above or as modified below shared by all or most American species, making repetition of them in descriptions unnecessary.

Small spiders, 1 to 3 mm long, typically whitish without darker pattern, more rarely with dusky shadings of spots or bands on carapace and abdomen. Carapace longer than broad, suboval to moderately elongated, convex, rounded in front and on sides, subtruncated behind, highest behind eyes at midpoint of carapace, smooth and shiny with short bristles in row from cervical area to eyes and one of few on clypeus, all usually rubbed off. Pars cephalica subtriangular, with cephalic grooves scarcely evident and median groove trivial linear depression. Clypeus prominent, declining forward, usually as high as eye group. Eyes typically six; in epigeal forms larger and subequal in size, in cavernicoles variable and sometimes completely obsolete; front four eyes usually subequal

in size and contiguous, in strongly recurved row on quite prominently elevated tubercles; posterior pair of eyes on very low tubercles well removed behind front eyes and often smaller in size. Chelicerae robust, evenly narrowed to apex; promargin with row of seven to 13 closely spaced or separated teeth; retromargin with two to six minute denticles. Labium transversely suboval sclerite closely joined to sternum; anterior margin with four barbed hairs or spines and several simple hairs. Endites subparallel, about twice as long as broad, narrowed and convergent apically; apical serrula distinct, continuous, minutely toothed band on outer side at apex. Sternum subcordate, narrowed between and separating posterior coxae by width of coxa. Abdomen suboval, as high as broad, clothed with simple hairs. In mature females area in front of genital groove convex, sometimes protruding to show internal features; atriobursal orifices voluminous pouches funnelling embolus and bulb of palpus to tubular seminal receptacle on each side. Male palpus generalized; tarsus leg-like segment little modified, with weakly developed alveolus to hold bulb; tarsus with transverse groove near middle, sometimes armed with retrolateral lobes and modified setae of various kinds; other segments variously provided or not with spurs and modified setae; bulb suboval, attached to tarsus near middle; embolus typically little sclerotized, indistinct projection at apex.

THE APPALACHIAN FAUNA

This fauna, seemingly the richest of our country, ranges from West Virginia and Tennessee south into Georgia and Alabama mainly in mountainous or deeply wooded situations. The first species, *silvicultrix*, an epigean type well befitting its name, years ago was sifted from rich ground litter in mesic woods of North Carolina. Five additional epigean species are reported here from woodland stations in the southern Appalachians. These are mostly small, averaging about 1.5 mm, dusky species with legs of medium length. Their fairly large eyes are well pigmented. Nine cavernicolous species are described in this paper for the first time; one from Arkansas is arbitrarily included in this fauna, to which it is closely related, as a practical expedient. The cave species feature small size and pale coloration and their legs are considerably longer. Their small eyes vary from medium size to obsolescence. Only one species, *georgia*, is completely eyeless.

Males of only seven of the 15 species of the *silvicultrix* group are presently known. Such species as *silvicultrix*, *coma* and *gertschi* appear to be close relatives of the cave species of Europe with which they share similar features of body morphology and genitalia. The male palpi have exactly the same basic elements: deeply grooved tarsi with prominent subapical retrolateral lobes set with distinctive setae; suboval bulbs with bluntly rounded, variously spined embolar parts; similar binding junctures of bulbs with weakly developed cymbia and prolateral paracymbial lobes. Along with these quite standard species are some with more weakly grooved tarsi and usual lack of retrolateral lobes, as exemplified by *sandra*, *alabama* and others. Some of these have retrolateral apophyses on the tibiae set with distinctive setae but in others this segment is unmodified. This group corresponds in a general way with the genus *Paraleptoneta* of Fage, but in this paper such species are considered merely to represent taxa of a wider genus *Leptoneta*. The chelicerae of the group exhibit modest variability and differ little from those of European representatives. The seven to 11 teeth on the promargin may be closely or more loosely spaced but they differ little in size. The epigyna of the females are of quite stereotyped design with lightly sclerotized atrial chambers and a coiled tube on each side. The artificial keys offered below are based on various morphological features but mostly on those of the genitalia.

KEY TO THE FEMALES

- 1a. Eyeless species (Fig. 5) from Byers Cave, Dade County, Georgia *georgia*, new species
- 1b. Eyes present 2
- 2a(1a). Epigynum with tightly coiled tubular receptacles 3
- 2b. Epigynum with heavier S, C, or otherwise shaped receptacles 10
- 3a(2a). Legs short, first leg at most 4.5 times, first femur at most 1.2 times as long as carapace; epigean species 4
- 3b. Legs longer, first leg at least 5.6, first femur at least 1.5 times as long as carapace; cavernicolous species 6
- 4a(3a). Promargin of chelicera with eight teeth; epigynum (Fig. 43) *silvicultrix* Crosby & Bishop
- 4b. Promargin with seven teeth 5
- 5a(4a). Epigynum (Fig. 44) *coma* Barrows
- 5b. Epigynum (Fig. 45) *gertschi* Barrows
- 6a(3b). Epigynum with shallow, semilunar bursae 7
- 6b. Epigynum of different pattern 8
- 7a(6a). Promargin of chelicera with 10 teeth; epigynum (Fig. 46); Bangor Cave, Blount County, Alabama *barrowsi*, new species
- 7b. Promargin with eight to 11 teeth; epigynum (Fig. 39); Crystal Caverns, Jefferson County, Alabama *jonesi*, new species
- 8a(6b). Legs shorter, first femur 1.2 times as long as carapace; Bat Cave, Lauderdale County, Alabama *credula*, new species
- 8b. Legs longer, first femur at least 1.5 times as long as carapace 9
- 9a(8b). Posterior eyes small, widely separated from lateral eyes (Fig. 8); epigynum (Figs. 37-38); Ingram Cave, Blount County, Alabama *blanda*, new species
- 9b. Eyes larger, epigynum (Fig. 40); caves of northern Georgia *fiskei*, new species
- 10a(2b). Epigean species 13
- 10b. Cavernicolous species 11
- 11a(10b). S shaped receptacles of epigynum widely separated (Fig. 36); all eyes separated (Fig. 7); Blanchard Springs Caverns, Stone County, Arkansas *arkansa*, new species
- 11b. S shaped receptacles closer together; eyes subcontiguous 12
- 12a(11b). Promargin with eight to 11 teeth; epigynum (Fig. 33); caves of Marshall and deKalb Counties, Alabama *alabama*, new species
- 12b. Promargin with seven teeth; epigynum (Fig. 35); Collier Cave, Lauderdale County, Alabama *serena*, new species
- 13a(10a). Legs shorter, first femur 1.2 times as long as carapace; epigynum (Fig. 41); Georgia *iviei*, new species
- 13b. Legs longer, first femur 1.6 times as long as carapace; epigynum (Fig. 47); West Virginia, Virginia *sandra*, new species

KEY TO THE MALES

- 1a. Tarsus of male palpus with retrolateral lobe 2
 1b. Tarsus without such lobe 5
- 2a(1a). Bulb of palpus bifid at apex 3
 2b. Bulb not bifid at apex 4
- 3a(2a). Base of tarsus with modified setae on retrolateral margin (Fig. 32)
 *gertschi* Barrows
 3b. Base of tarsus without such setae (Fig. 24) *silvicultrix* Crosby & Bishop
- 4a(2b). Femur of palpus with series of heavy spines at apex on retrolateral side (Fig. 28); bulb with long wisp of fused setae (Fig. 29) *coma* Barrows
 4b. Femur without such spines (Fig. 93) *jonesi*, new species
- 5a(1b). Tibia of palpus with trivial apophysis (Fig. 220) and femur with subventral row of heavy spines *sandra*, new species
 5b. Tibia of palpus without retrolateral apophysis; femur without heavy spines . 6
- 6a(5b). Palpal segments short (Fig. 19) *archeri*, new species
 6b. Palpal segments elongate (Fig. 16) *alabama*, new species

Leptoneta silvicultrix Crosby & Bishop

Leptoneta silvicultrix Crosby & Bishop, 1925, p. 142, Fig. 1. Bishop & Crosby, 1926, p. 174. Roewer, 1942, p. 313. Bonnet, 1957, p. 2394.

Diagnosis—Small, dark, short-legged epigeal species with eyes of medium size, first leg of female 3.8 times, first leg of male 4.5 times as long as carapace; male palpus short, stocky, with prominent rounded lobe on tarsus armed with short spine; epigynum (Fig. 43).

Etymology—Specific name from Latin *silvicultrix*, inhabiting woods.

Female—Total length 1.4 mm. Carapace 0.64 mm long, 0.51 mm wide. Abdomen 0.86 mm long, 0.63 mm wide.

Carapace brown with dusky radiating shadings and lateral dark seam on pars thoracica and dark linear median groove; front eyes enclosing black field and posterior eyes narrowly ringed with black; sternum flecked with brown and margined by narrow brown band; labium, endites and chelicerae dull brown; legs dull yellowish brown. Abdomen brown to purplish in base color; dorsum paler at center but sides and venter more purplish, broken with numerous pale spots.

Carapace (Fig. 1) broadly oval; clypeus 0.13 mm high, longer than width of front eyes and about equal to length of eye group. Eyes of medium size (Fig. 2); front eyes subequal in size and subcontiguous; posterior eyes slightly smaller, separated from front lateral eyes by less than diameter of former. Sternum 0.42 mm long, 0.39 mm wide. Chelicera (Fig. 15) prominent; promargin with eight teeth, basal one forming part of keel; retro-margin with two small denticles.

Leg formula 4123. First leg 3.8 times, first femur 1.1 times as long as carapace.

Epigynum as shown in Fig. 43.

	I	II	III	IV	Palpus
Femur	0.70	0.61	0.52	0.71	0.27
Patella	0.18	0.17	0.16	0.18	0.27
Tibia	0.68	0.54	0.44	0.71	0.20
Metatarsus	0.52	0.45	0.41	0.56	—
Tarsus	<u>0.42</u>	<u>0.38</u>	<u>0.35</u>	<u>0.42</u>	<u>0.27</u>
Total	2.50	2.15	1.88	2.58	0.84

Male holotype—Total length 1.2 mm. Carapace 0.6 mm long, 0.52 mm wide. Abdomen 0.6 mm long, 0.4 mm wide.

Clypeus 0.14 mm long, longer than width of front eye row, about as long as eye group. Sternum 0.35 mm long and wide.

Leg formula 1423. First leg 4.5 times, first femur 1.2 times as long as carapace.

Male palpus (Figs. 24-26) with short segments and oval bulb; femur with cluster of short spines in distal half on prolateral side; tarsus deeply grooved beyond middle, with rounded lobe armed with short spine; bulb bifid at apex.

	I	II	III	IV	Palpus
Femur	0.72	0.62	0.50	0.70	0.21
Patella	0.20	0.19	0.15	0.15	0.10
Tibia	0.70	0.55	0.47	0.72	0.12
Metatarsus	0.66	0.47	0.44	0.60	—
Tarsus	<u>0.43</u>	<u>0.35</u>	<u>0.30</u>	<u>0.42</u>	<u>0.21</u>
Total	2.71	2.18	1.86	2.59	0.64

Type Data—Male holotype, male and three females from Oteen, North Carolina, 15 October 1923 (C. Crosby, S. Bishop), in Cornell University collection.

Distribution—Virginia to North Carolina.

Records—*Virginia*: Lee County: Cumberland Gap National Park, trail to Skylight Cave, 10 June 1971 (W. A. Shear), three males, females from dry and wet litter. *North Carolina*: Blowing Rock, 10 October 1923, two males, female. Montreat, 16 October 1923, male. Minehole Gap, Buncombe County, 17 October 1923, female. Four miles N Oteen, 16 October 1965 (J. & W. Ivie), two males, five females. North of Ashville, 7 July 1933 (W. Ivie), penultimate male probably this species. Junction Rt. 441, Tuskee Gap Trail, Swain County, 24 October 1969 (W. A. Shear, F. Coyle), two females.

Leptoneta coma Barrows

Leptoneta coma Barrows, 1940, p. 131, Fig. 3. Vogel, 1967, p. 88. Brignoli, 1972, p. 135.

Diagnosis—Dusky, stocky, short-legged epigeal species with eyes of medium size; first leg of female 4.5 times, first leg of male 4.8 times as long as carapace; male palpus of medium length, with prominent rounded lobe on tarsus armed with long, thin spine; epigynum (Fig. 44).

Etymology—Specific name of Latin *coma*, in reference to wisp of long hairs on bulb of male palpus.

Female paratype—Total length 1.7 mm. Carapace 0.7 mm long, 0.57 mm wide. Abdomen 1 mm long, 0.8 mm wide.

Coloration and structure like those of *silvicultrix* unless otherwise noted. Clypeus 0.16 mm high, much broader than width of front eyes, about equal to length of eye group. Eyes of medium size (Fig. 10); front eyes subequal; posterior eyes suboval, slightly smaller than front eyes and separated by full diameter. Sternum 0.42 mm long, 0.4 mm wide. Promargin of chelicera with seven subequal teeth but apical three more widely spaced.

Leg formula 4123. First leg 4.5 times, first femur 1.2 times as long as carapace.

Epigynum as shown in Fig. 44.

	I	II	III	IV	Palpus
Femur	0.87	0.76	0.60	0.87	0.35
Patella	0.21	0.20	0.20	0.21	0.15
Tibia	0.93	0.74	0.60	0.93	0.23
Metatarsus	0.65	0.60	0.52	0.76	—
Tarsus	<u>0.50</u>	—	<u>0.42</u>	<u>0.50</u>	<u>0.40</u>
Total	3.16	—	2.34	3.27	1.13

Male paratype—Total length 1.5 mm. Carapace 0.73 mm long, 0.61 mm wide. Abdomen 0.72 mm long, 0.56 mm wide.

Coloration and structure like those of female except as noted; front edge of pars cephalica more narrowed; clypeus 0.17 mm high. Sternum 0.45 mm long, 0.38 mm wide at front, abnormal, triangular. Fang of chelicera strongly bent at middle.

First leg 4.8 times, first femur 1.3 times as long as carapace.

Male palpus (Figs. 27-29) of medium length; femur with cluster of short spines in apical half on retrolateral side; tarsus deeply grooved at middle, with prominent rounded lobe armed with principal long, thin spine; bulb with wisp of long setae below.

	I	II	III	IV	Palpus
Femur	0.95	0.80	0.60	0.90	0.35
Patella	0.22	0.21	0.20	0.21	0.15
Tibia	0.98	0.77	—	—	0.13
Metatarsus	0.82	0.64	—	—	—
Tarsus	<u>0.52</u>	<u>0.47</u>	—	—	<u>0.25</u>
Total	3.49	2.89	—	—	0.88

Type Data—Male holotype, and male and five female paratypes, from Gatlinburg, Tennessee, 21 June 1936 (W. M. Barrows), by sifting leaves near river, in Ohio State University. Male and two females of above (labelled cotypes) in American Museum of Natural History.

Leptoneta gertschi Barrows

Leptoneta gertschi Barrows, 1940, p. 131, Fig. 2. Vogel, 1967, p. 88. Brignoli, 1972, p. 135.

Diagnosis—Small, dark, short-legged epigean species with eyes of medium size; first leg of female 4.1 times as long as carapace; male palpus massive, with rounded lobe on tarsus armed with curved spine; epigynum (Fig. 45).

Female—Total length 1.35 mm. Carapace 0.64 mm long, 0.38 mm wide. Abdomen 0.8 mm long, 0.57 mm wide.

Coloration and structure like those of *silvicultrix*. Clypeus 0.14 mm high, longer than width of front eyes, about as long as ocular group. Eyes of medium size (Fig. 11); front eyes subequal, contiguous; posterior eyes smaller than and separated from front lateral eye by diameter of latter. Sternum 0.4 mm long, 0.36 mm wide, subtriangular, slightly deformed. Chelicera like that of *silvicultrix*, with seven teeth on promargin of which apical three larger and slightly separated.

Leg formula 1423, first and third legs subequal. First leg 4.1 times, first femur 1.2 times as long as carapace.

Epigynum as shown in Fig. 45.

	I	II	III	IV	Palpus
Femur	0.80	0.70	0.60	0.80	0.34
Patella	0.20	0.19	0.18	0.18	0.11
Tibia	0.80	0.65	0.54	0.80	0.22
Metatarsus	0.65	0.55	0.53	0.70	—
Tarsus	<u>0.48</u>	<u>0.42</u>	<u>0.35</u>	<u>0.43</u>	<u>0.32</u>
Total	2.93	2.51	2.20	2.91	0.99

Male paratype—Carapace 0.7 mm long, 0.57 mm wide.

Coloration and structure like those of female except as noted. Clypeus 0.16 mm high. Sternum 0.4 mm long, 0.38 mm side. Fang of chelicera strongly bent at middle.

First femur 1.3 times as long as carapace.

Male palpus (Figs. 30-32) of medium length; tarsus deeply grooved beyond middle, rounded on side and armed with curved spine; basal half of tarsus armed with four curved setae; massive bulb deeply incised in apical part.

	I	II	III	IV	Palpus
Femur	0.90	0.72	0.65	0.90	0.37
Patella	—	0.22	0.17	0.21	0.15
Tibia	—	0.73	0.58	0.91	0.20
Metatarsus	—	0.80	0.58	0.80	—
Tarsus	—	—	<u>0.37</u>	<u>0.52</u>	<u>0.28</u>
Total	—	—	2.35	3.34	1.00

Type Data—Male type and paratype from Greenbrier section of Great Smoky Mountains National Park, Tennessee, 14 June 1939 (W. M. Barrows), taken by sifting leaves, in Ohio State University collection; paratype in American Museum of Natural History.

Distribution—Tennessee to South Carolina.

Records—*Tennessee*: Kingston, 12 July 1933 (W. Ivie), female. *South Carolina*: Greenville, 11 March 1954 (W. Ivie), male, two females, two immature.

Leptoneta sandra, new species

Diagnosis—Dusky epigeal species with fairly long legs; first leg of female 6.7 times, first leg of male 7.3 times as long as carapace; tarsus of male palpus without lateral lobe and femur armed with eight stout spines on retrolateral side (Fig. 20); epigynum (Fig. 47).

Etymology—Named for Mrs. Sandra Bird Porterfield, who worked on the bionomics of this interesting spider.

Female—Total length 1.8 mm. Carapace 0.63 mm long, 0.57 mm wide. Abdomen 1.1 mm long, 0.7 mm wide.

Cephalothorax and appendages light dusky brown; carapace with dark shadings and faint marginal seam; front eyes enclosing black field and posterior eyes ringed with black; sternum with indistinct dark marginal seam. Abdomen purplish brown, with paler spotting on sides and venter.

Structure like that of *silvicultrix* except as noted. Clypeus 0.14 mm high, equal to length of eye group. Eyes large, subequal in size; subround posterior eyes separated by their radius from front lateral eyes. Sternum 0.44 mm long and wide. Chelicera: pro-marginal with eight teeth, those at apex more widely separated; retromarginal with three denticles.

Leg formula 1423. First leg 6.7 times, first femur 1.6 times as long as carapace.

Epigynum as shown in Fig. 47.

	I	II	III	IV	Palpus
Femur	1.15	0.92	0.76	1.10	0.40
Patella	0.24	0.21	0.20	0.21	0.12
Tibia	1.27	0.90	0.70	1.15	0.30
Metatarsus	0.96	0.70	0.62	0.90	—
Tarsus	<u>0.64</u>	<u>0.55</u>	<u>0.47</u>	<u>0.55</u>	<u>0.37</u>
Total	4.26	3.28	2.75	3.91	1.19

Male—Total length 1.9 mm. Carapace 0.75 mm long, 0.64 mm wide. Abdomen 1 mm long, 0.78 mm wide.

Leg formula 1423. First leg 7.3 times, first femur 1.8 times as long as carapace.

Male palpus (Figs. 20-21) with elongate segments; femur with subventral series of eight stout spines along retrolateral side; tarsus elongate, moderately grooved at middle, lacking accessory lobes or modified spines; tibia rounded at apex and with two long spines on retrolateral side.

	I	II	III	IV	Palpus
Femur	1.40	1.10	0.85	1.27	0.53
Patella	0.26	0.24	0.20	0.20	0.21
Tibia	1.70	1.13	0.85	1.32	0.26
Metatarsus	1.33	0.90	0.76	1.04	—
Tarsus	<u>0.77</u>	<u>0.65</u>	<u>0.55</u>	<u>0.63</u>	<u>0.26</u>
Total	5.46	4.02	3.21	4.46	1.26

Type Data—Male holotype, male, female and immature from Camp Creek State Forest, Mercer County, West Virginia, 9 May 1967 (W. A. Shear), from rhododendron litter.

Distribution—West Virginia and adjacent Virginia.

Records—*West Virginia*: Mercer County: NW side of East River Mountain, 5 mi SE Bluefield, 3 June 1971 (W. A. Shear), berlese from mixed deciduous litter, two immature females. *Virginia*: Tazewell County: East River Mt., Bluefield-Cove Creek Road, 4 April 1971 (W. A. Shear), male, two females, immature from summit bog at about 3800 feet.

Leptoneta iviei, new species

Diagnosis—Pale epigeal species with small eyes and short legs; first leg 4.8 times as long as carapace; epigynum (Fig. 41).

Etymology—Named for the late Wilton Ivie.

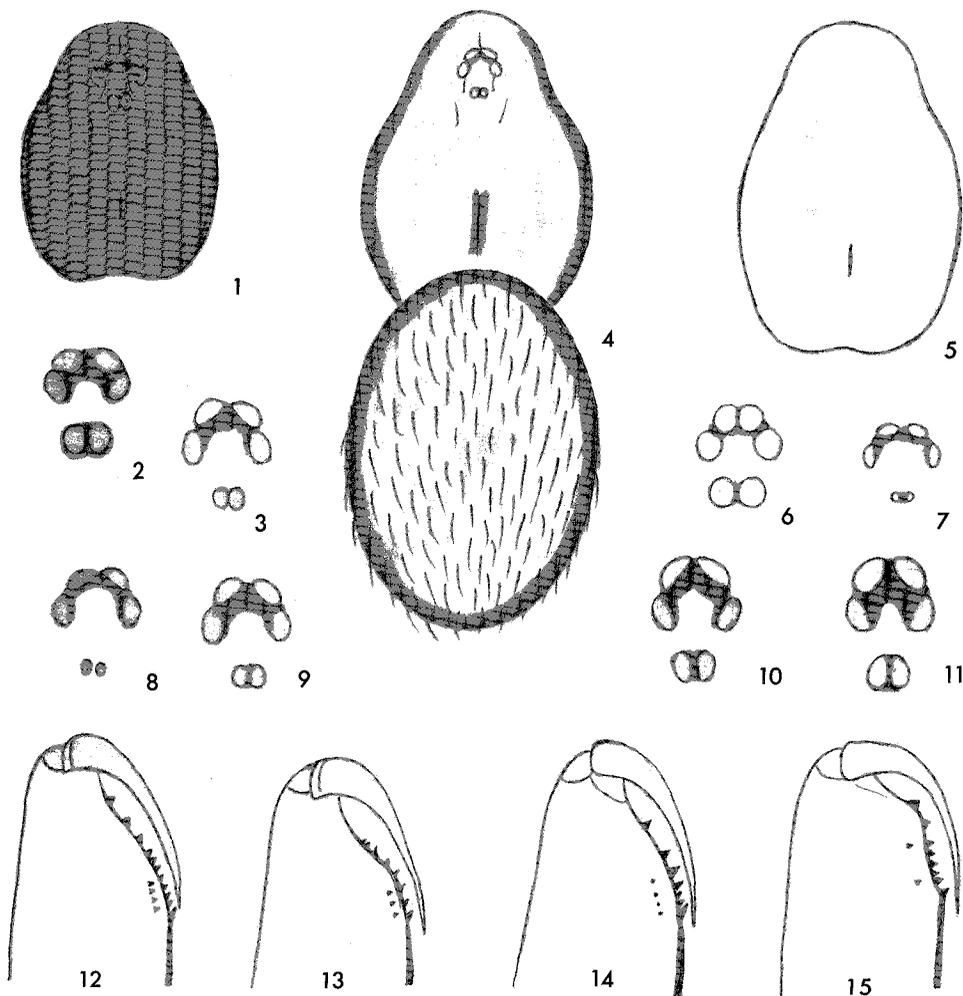
Female—Total length 1.5 mm. Carapace 0.58 mm long, 0.57 mm wide. Abdomen 1 mm long, 0.7 mm wide.

Cephalothorax and appendages pale yellow; front eyes enclosing black field; posterior eyes narrowly ringed with black; abdomen whitish.

Clypeus 0.1 mm high, equal in length to width of front eye group, shorter than length of eye group. Eyes small, subequal in size; oval posterior eyes separated from lateral front eyes by short diameter of first. Sternum 0.42 mm long and wide. Chelicera: promargin with eight teeth, apical two more widely spaced.

Leg formula 1423. First leg 4.8 times, first femur 1.2 times as long as carapace.

Epigynum (Fig. 41) with coiled tube on each side curved toward midline.



Figs. 1-15.—Species of *Leptoneta*: 1, *L. silvicultrix*, carapace of female, dorsal view; 2, *L. silvicultrix*, eyes of female; 3, *L. alabama*, eyes of female; 4, *L. alabama*, carapace and abdomen of female; 5, *L. georgia*, carapace of female; 6, *L. archeri*, eyes of male; 7, *L. arkansa*, eyes of female; 8, *L. blanda*, eyes of female; 9, *L. jonesi*, eyes of female; 10, *L. coma*, eyes of female; 11, *L. gertschi*, eyes of female; 12, *L. alabama*, chelicerae of female from Painted Bluff Cave, ventral view; 13, *L. alabama*, chelicerae of female from Weaver Cave, ventral view; 14, *L. credula*, chelicera of female, ventral view; 15, *L. silvicultrix*, chelicera of female, ventral view.

	I	II	III	IV	Palpus
Femur	0.70	0.61	0.53	0.72	0.25
Patella	0.19	0.17	0.16	0.17	0.10
Tibia	0.72	0.60	0.45	0.75	0.20
Metatarsus	0.80	0.47	0.44	0.60	—
Tarsus	<u>0.45</u>	<u>0.40</u>	<u>0.32</u>	<u>0.45</u>	<u>0.30</u>
Total	2.76	2.25	1.90	2.69	0.85

Type Data—Female holotype from NW of Clayton, Georgia, 28 April 1943 (W. Ivie).

Distribution—Georgia.

Record—*Georgia*: SE of Toccoa 29 April 1943 (W. Ivie), immature probably this species.

Leptoneta archeri, new species

Diagnosis—Small, yellowish epigeal species with legs of medium length and distinctive male palpus; eyes evanescent, of medium size; first leg 5.5 times as long as carapace; tibia of male palpus with retrolateral lobe bearing short spine.

Etymology—Named for Dr. Allan F. Archer of Tift College, Forsyth, Georgia.

Male—Total length 1.12 mm. Carapace 0.5 mm long, 0.44 mm wide. Abdomen 0.62 mm long, 0.45 mm wide.

Cephalothorax and appendages yellow; front eyes enclosing tiny dusky smudge; abdomen dull yellow.

Clypeus 0.1 mm high, as long as width of front eyes, little shorter than length of eye group. Eyes of front row of medium size (Fig. 6), evanescent, subequal and subcontiguous; oval posterior eyes little smaller, separated from front lateral eyes by narrow diameter. Sternum 0.4 mm long, 0.3 mm wide, abnormal.

Leg formula 1423. First leg 5.5 times, first femur 1.4 times as long as carapace.

Male palpus (Figs. 18-19) with short segments; tarsus with trivial transverse groove, without special modification or enlarged setae; tibia with lateral lobe bearing short seta.

	I	II	III	IV	Palpus
Femur	0.76	0.60	0.55	0.77	0.26
Patella	0.20	0.18	0.16	0.18	0.10
Tibia	0.77	0.54	0.44	0.60	0.12
Metatarsus	0.60	0.43	0.45	0.58	—
Tarsus	<u>0.42</u>	<u>0.38</u>	<u>0.32</u>	<u>0.40</u>	<u>0.18</u>
Total	2.75	2.13	1.92	2.53	0.66

Type Data—Male holotype from ravine in Partlow Hospital grounds, Alberta City, Tuscaloosa County, Alabama, 8 March 1940 (A. F. Archer).

Leptoneta fiskei, new species

Diagnosis—Dusky yellow, long-legged troglophile with spotted abdomen; posterior eyes about one-fourth diameter of anterior lateral eyes; first leg 6.4 times as long as carapace; epigynum (Fig. 40).

Etymology—Named for Mr. A. Fiske.

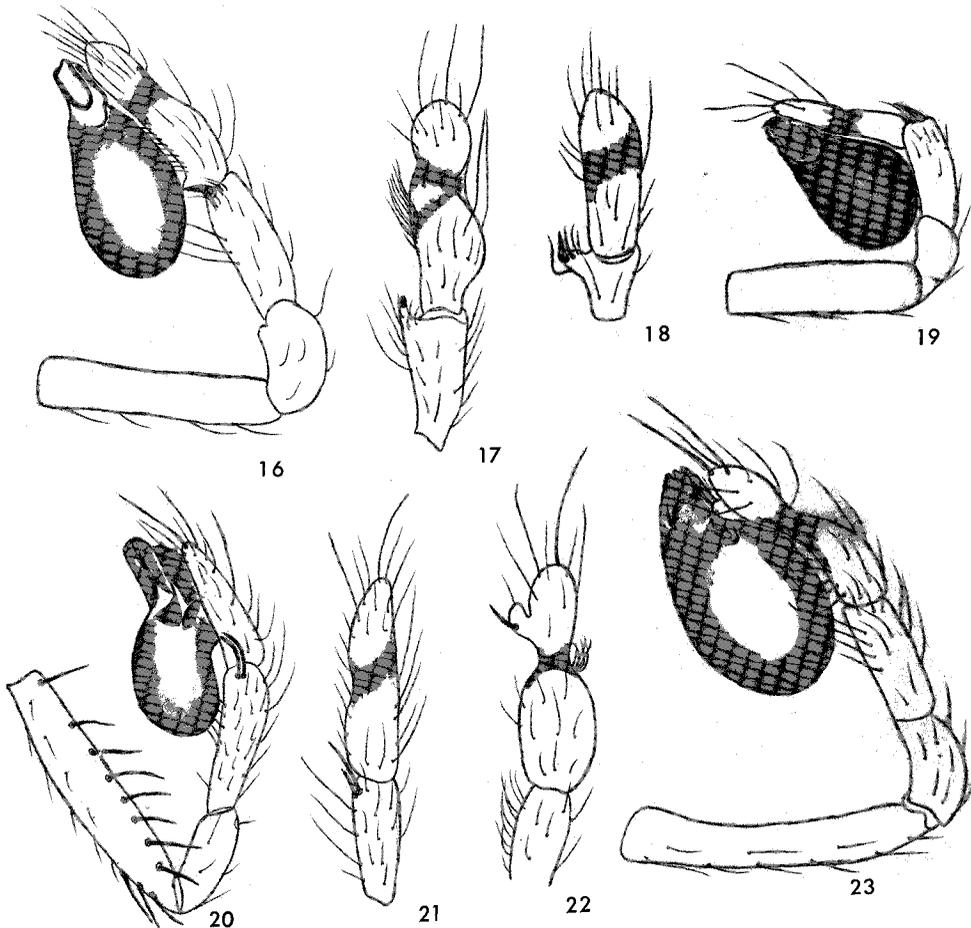
Female—Total length 1.45 mm. Carapace 0.65 mm long, 0.55 mm wide. Abdomen 0.8 mm long, 0.55 mm wide.

Carapace yellow with lateral duskiness; front eyes enclosing black field, posterior eyes with faint dusky margins; legs dull yellow with duskiness on coxae, patellae and segment

junctions; labium, endites, chelicerae dusky yellow. Abdomen dull white with pattern of small subintegumental flecks.

Clypeus 0.15 mm high, longer than width of front eye group, as long as ocular group. Eyes small; front eyes subequal, contiguous; posterior eyes small, about fourth diameter of and separated from lateral front eye by its full diameter. Sternum 0.45 mm long, 0.4 mm wide. Cheelicera: promargin with seven teeth, with apical three slightly larger and more widely spaced; retromargin with three denticles.

	I	II	III	IV	Palpus
Femur	1.17	1.00	0.84	1.11	0.40
Patella	0.22	0.22	0.19	0.21	0.12
Tibia	1.15	0.94	0.71	1.00	0.23
Metatarsus	0.96	0.78	0.70	0.84	—
Tarsus	<u>0.70</u>	<u>0.60</u>	<u>0.51</u>	<u>0.62</u>	<u>0.40</u>
Total	4.20	3.54	2.95	3.78	1.15



Figs. 16-23.—Left male palpi of species of *Leptoneta*: 16, *L. alabama*, whole palpus, retrolateral view; 17, *L. alabama*, tibia and tarsus, dorsal view; 18, *L. archeri*, tibia and tarsus, dorsal view; 19, *L. archeri*, whole palpus, retrolateral view; 20, *L. sandra*, whole palpus, retrolateral view; 21, *L. sandra*, tibia and tarsus, dorsal view; 22, *L. jonesi*, tibia and tarsus, dorsal view; 23, *L. jonesi*, whole palpus, retrolateral view.

Leg formula 1423. First leg 6.4 times, first femur 1.5 times as long as carapace.

Epigynum (Fig. 40) subtriangular, presenting lateral pouches surmounted by small, twisted tube on each side.

Type Data—Female holotype from Harrisburg Cave, four mi W Center Post, Walker County, Georgia, 12 July 1967 (S. Peck, A Fiske).

Distribution—Caves of northwestern Georgia.

Record—*Georgia*: Walker County: Pettijohn Cave, SW LaFayette, 10 June 1969 (J. Holsinger, S. Peck, A. Fiske, R. Baroody), penultimate male probably this species.

Leptoneta georgia, new species

Diagnosis—Pale, eyeless, long-legged troglobite; first leg 7.4 times as long as carapace; epigynum with S-shaped tube on each side (Fig. 34).

Etymology—Named for State of Georgia.

Female—Total length 1.75 mm. Carapace 0.8 mm long, 0.6 mm wide. Abdomen 1.05 mm long, 0.8 mm wide.

Celphalothorax and legs clear yellow; sternum with narrow dusky seam; abdomen dirty white.

Structure typical; carapace (Fig. 5) rather short, gently rounded in front, with median line of bristles from trivial linear groove forward to clypeus, smooth on ocular region and without trace of eyes. Sternum 0.52 mm long, 0.46 mm wide. Chelicera: promargin with eight teeth, apical ones larger and more widely spaced like those of *alabama* (Fig. 13).

Leg formula 1423; legs long and thin, first femora weakly enlarged. First leg 7.4 times, first femur 2.1 times as long as carapace.

Epigynum as shown in Fig. 34.

	I	II	III	IV	Palpus
Femur	1.68	1.40	1.15	1.53	0.43
Patella	0.27	0.26	0.21	0.24	0.14
Tibia	1.76	1.43	1.10	1.46	0.31
Metatarsus	1.40	1.10	1.03	1.32	—
Tarsus	<u>0.84</u>	<u>0.70</u>	<u>0.82</u>	<u>0.82</u>	<u>0.44</u>
Total	5.95	4.89	4.11	5.37	1.32

Type Data—Female holotype from Byers Cave, 1.5 mi SW Rising Fawn, Dade County, Georgia (J. Holsinger, S. Peck, A Fiske, R. Baroody).

Leptoneta arkansa, new species

Diagnosis—Yellowish troglophile with small, separated eyes; first leg 5.5 times as long as carapace; epigynum (Fig. 36) with S-shaped tubes on each side widely separated.

Etymology—Named for State of Arkansas.

Female—Total length 1.5 mm. Carapace 0.58 mm long, 0.48 mm wide. Abdomen 0.9 mm long, 0.6 mm wide.

Carapace yellow; eyes narrowly bordered with black; appendages dusky yellow; abdomen whitish.

Structure typical with obvious relationship to *alabama* and relatives; clypeus 0.1 mm high, sloping, about as high as eye group. Eyes (Fig. 7) small, on weakly developed tubercles; anterior eyes in rather widely recurved row, subequal in size; posterior eyes

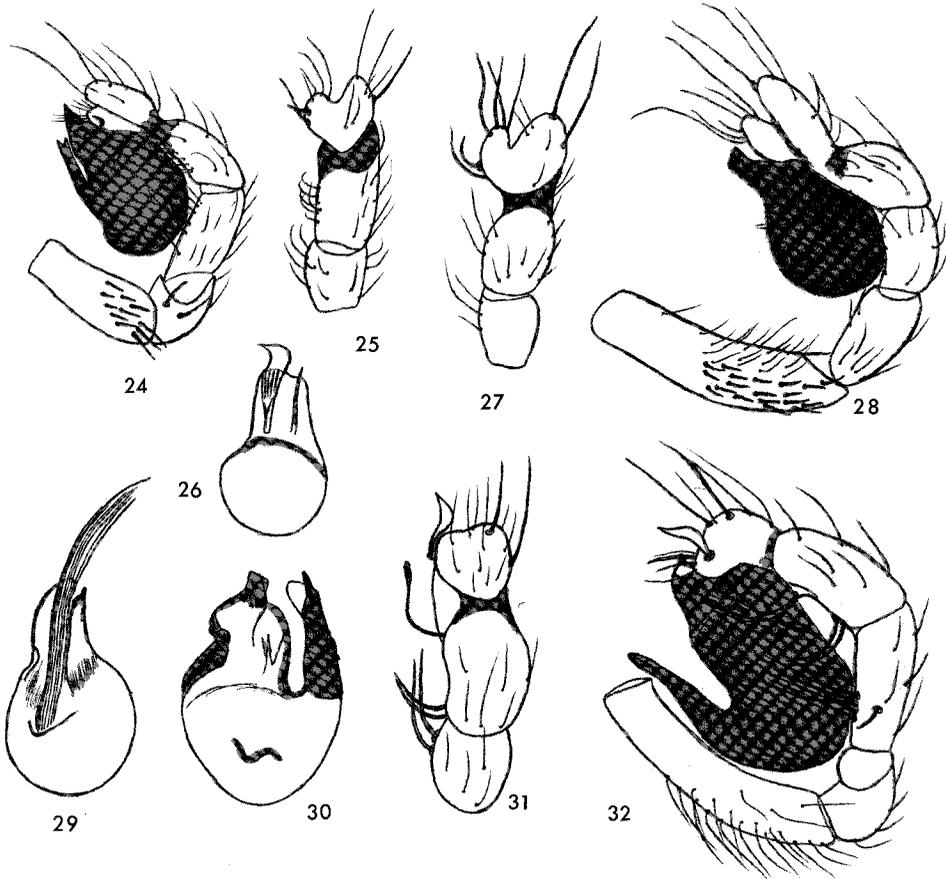
small, separated from anterior lateral by full diameter of latter. Sternum 0.4 mm long, 0.36 mm wide. Chelicera typical: promargin with seven teeth; retromargin with three denticles.

Leg formula 1423. First leg 5.5 times, first femur 1.4 times as long as carapace.

Epigynum as shown in Fig. 36.

	I	II	III	IV	Palpus
Femur	0.86	0.70	0.63	0.86	0.30
Patella	0.20	0.20	0.19	0.20	0.10
Tibia	0.88	0.68	0.56	0.94	0.18
Metatarsus	0.73	0.55	0.55	0.74	—
Tarsus	<u>0.55</u>	<u>0.46</u>	<u>0.40</u>	<u>0.52</u>	<u>0.26</u>
Total	3.22	2.59	2.33	3.26	0.84

Type Data—Female holotype, female and immature from Blanchard Springs Caverns, Stone County, Arkansas, 27 September 1967 (T. Barr, T. Marsh).



Figs. 24-32.—Left male palpi of species of *Leptoneta*: 24, *L. silvicultrix*, whole palpus, retrolateral view; 25, *L. silvicultrix*, tibia and tarsus, dorsal view; 26, *L. silvicultrix*, bulb, subventral view; 27, *L. coma*, tibia and tarsus, dorsal view; 28, *L. coma*, whole palpus, retrolateral view; 29, *L. coma*, bulb, subventral view; 30, *L. gertschi*, bulb, subventral view; 31, *L. gertschi*, tibia and tarsus, dorsal view; 32, *L. gertschi*, whole palpus, retrolateral view.

Leptoneta alabama, new species

Diagnosis—Yellowish, long-legged troglophile with rather small, evanescent eyes (Fig. 3); first leg of female 6.4 times, of male 6.7 times as long as carapace; male palpus with elongated segments, tarsus without lobe and tibia with retrolateral spur bearing short spine; epigynum (Fig. 31) with S-shaped tube on each side.

Etymology—Named for State of Alabama.

Female—Total length 1.9 mm. Carapace 0.7 mm long, 0.56 mm wide. Abdomen 1.3 mm long, 0.8 mm wide.

Cephalothorax and legs dull yellow to orange; carapace with dusky shadings on pars thoracica; sternum with narrow dusky seam on margins; abdomen dull white.

Structure typical; outline of carapace and abdomen as shown in Fig. 4; clypeus 0.13 mm high, fully as high as length of eye group. Eyes (Fig. 3) of medium size, with little pigment; anterior row of eyes recurved, eyes subequal and subcontiguous; posterior eyes smaller, separated from anterior lateral eyes by their diameter. Chelicerae somewhat variable (Figs. 12-13).

Leg formula 1423, legs long and thin. First leg 6.4 times, first femur 1.7 times as long as carapace.

Epigynum as shown in Fig. 33.

	I	II	III	IV	Palpus
Femur	1.20	1.03	0.86	1.23	0.35
Patella	0.24	0.22	0.22	0.23	0.15
Tibia	1.35	0.95	0.87	1.20	0.25
Metatarsus	1.00	0.80	0.71	0.95	—
Tarsus	<u>0.72</u>	<u>0.59</u>	<u>0.53</u>	<u>0.65</u>	<u>0.39</u>
Total	4.51	3.59	3.19	4.26	1.14

Male—Total length 1.6 mm. Carapace 0.7 mm long, 0.57 mm wide. Abdomen 0.85 mm long, 0.6 mm wide.

Leg formula 1423; legs long and thin. First leg 6.7 times, first femur 1.8 times as long as carapace.

Male palpus (Figs. 16-17); tarsus with moderate transverse groove beyond middle, broadly rounded but lacking lobe and spine; tibia with blunt retrolateral process armed with short spine; bulb of medium size, suboval, tipped with blunt embolus.

	I	II	III	IV	Palpus
Femur	1.26	1.03	0.82	1.15	0.35
Patella	0.26	0.23	0.20	0.22	0.12
Tibia	1.42	1.05	0.83	1.25	0.18
Metatarsus	1.10	0.82	0.72	1.05	—
Tarsus	<u>0.76</u>	<u>0.64</u>	<u>0.57</u>	<u>0.70</u>	<u>0.26</u>
Total	4.80	3.77	3.14	4.37	0.91

Type Data—Male holotype and four females from Painted Bluff Cave, Marshall County, Alabama, 16 March 1966 (S. Peck).

Distribution—Caves of Alabama

Records—*Alabama*: Marshall County: Painted Bluff Cave, 16, June 1967 (S. Peck, A. Fiske), three females. Calhoun County: Kilgore Cave, near Weaver Station, 15 March 1962 (W. B. Jones), two males, two females, two immature. Weaver Cave, 5 June 1940 (W. B. Jones, A. Archer), female. Lady Cave, 5 June 1940 (W. B. Jones, A. Archer), three

males, 12 females, immature. DeKalb County: Cemetery Cave No. 444, six mi W Fort Payne, 28 August 1965 (S. Peck), two females.

Leptoneta jonesi, new species

Diagnosis—Yellowish troglophile with eyes of medium size and fairly long legs; first leg of female 5.5 times, of male 6.1 times as long as carapace; male palpus with elongated segments, narrow tarsus bearing small retrolateral lobe bearing thin spine; epigynum (Fig. 39) with transverse, semilunar bursa and long, tightly coiled tube on each side.

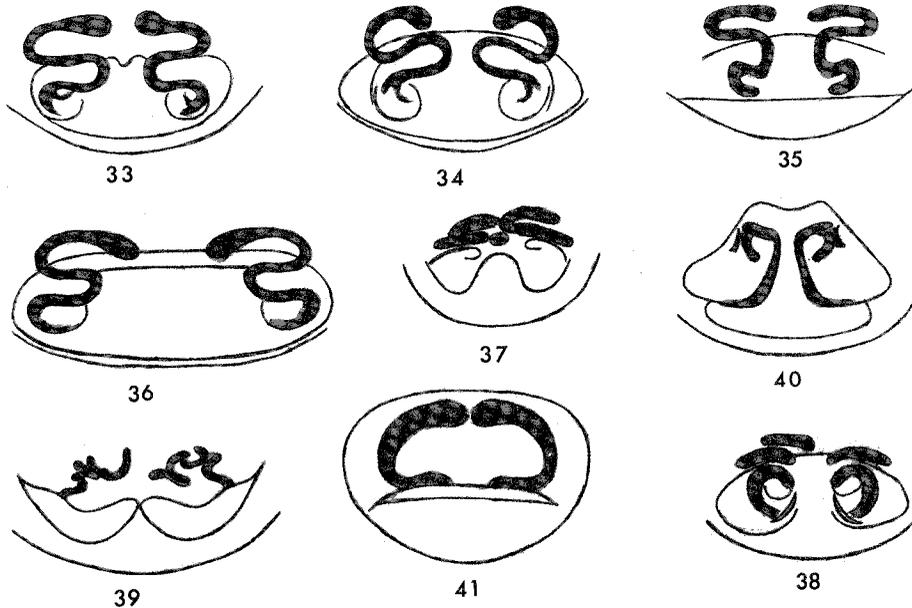
Etymology—Named for Dr. W. B. Jones of the Alabama Museum of Natural History.

Female—Total length 1.7 mm. Carapace 0.8 mm long, 0.55 mm wide. Abdomen 1 mm long, 0.8 mm wide.

Cephalothorax and appendages dull yellow to orange; front eyes enclosing dusky field; sternum with narrow dusky seam. Abdomen whitish, with dusky markings on sides and venter.

Structure like that of *alabama*; clypeus 0.14 mm high, strongly declining, shorter than height of eye group. Eyes of medium size (Fig. 9); posterior eyes smaller than anterior lateral and separated from them by full diameter of latter. Sternum 0.4 mm long and wide. Chelicerae variable like those of *alabama*.

	I	II	III	IV	Palpus
Femur	1.00	0.86	0.75	1.00	0.37
Patella	0.24	0.21	0.19	0.22	0.14
Tibia	1.04	0.83	0.65	0.95	0.26
Metatarsus	0.85	0.72	0.65	0.86	—
Tarsus	<u>0.63</u>	<u>0.55</u>	<u>0.46</u>	<u>0.60</u>	<u>0.37</u>
Total	3.76	3.17	2.70	3.63	1.14



Figs. 33-41.—Epigyna of species of *Leptoneta*: 33, *L. alabama*, dorsal view; 34, *L. georgia*, dorsal view; 35, *L. serena*, dorsal view; 36, *L. arkansa*, dorsal view; 37, *L. blanda*, dorsal view; 38, *L. blanda*, ventral view; 39, *L. jonesi*, dorsal view; 40, *L. fiskei*, ventral view; 41, *L. iviei*, dorsal view.

Leg formula 1423. First leg 5.5 times, first femur 1.5 times as long as carapace.

Epigynum as shown in Fig. 39.

Male—Total length 1.55 mm. Carapace 0.7 mm long, 0.55 mm wide. Abdomen 0.8 mm long, 0.55 mm wide.

Leg formula 1423. First leg 6.1 times, first femur 1.6 times as long as carapace; first tibia without ventral spines but with few prolateral and retrolateral spines.

Male palpus (Fig. 22-23) with all segments elongated; tibia without enlargements or special setae; tarsus deeply grooved beyond middle, with small retrolateral lobe near apex armed with thin spine; bulb large, suboval, with embolar part bluntly rounded.

	I	II	III	IV
Femur	1.12	0.96	0.80	1.08
Patella	0.24	0.22	0.21	0.23
Tibia	1.24	0.94	0.73	1.07
Metatarsus	1.02	0.80	0.72	1.04
Tarsus	<u>0.70</u>	<u>0.60</u>	<u>0.52</u>	<u>0.63</u>
Total	4.32	3.52	2.98	4.05

Type Data—Male holotype, male and female from Crystal Caverns, Jefferson County, Alabama, 18 March 1966 (S. Peck).

Distribution—Known only from Crystal Caverns.

Record—*Alabama*: Jefferson County: Crystal Caverns, 29 July 1958 (W. B. Jones, T. Semmes, T. W. Daniel, Jr.), two females.

***Leptoneta serena*, new species**

Diagnosis—Dusky brown, long-legged species with reduced eyes; first leg 6.8 times as long as carapace; epigynum (Fig. 35) with S-shaped tube on each side.

Etymology—Specific name from Latin *serenus*, serene.

Female—Total length 2 mm. Carapace 0.8 mm long, 0.65 mm wide. Abdomen 1.2 mm long, 0.8 mm wide.

Cephalothorax and appendages dull yellowish brown; front eyes enclosing black smudge; sternum dusky brown with narrow marginal brown seam; abdomen dirty white.

Clypeus 0.15 mm high, much wider than width of front eye row, about as long as eye group. Eyes small; front eyes subequal and subcontiguous; posterior eyes smaller, separated from each other by their radius and from front lateral eyes by two full diameters of latter. Chelicera: promargin with seven evenly spaced teeth, apical four larger.

Leg formula 1423. First leg 6.8 times, first femur 1.8 times as long as carapace.

Epigynum as shown in Fig. 35.

	I	II	III	IV	Palpus
Femur	1.48	1.10	1.02	1.34	0.43
Patella	0.29	0.25	0.22	0.22	0.14
Tibia	1.58	0.95	0.90	1.40	0.32
Metatarsus	1.25	0.83	0.86	1.22	—
Tarsus	<u>0.84</u>	<u>0.60</u>	<u>0.60</u>	<u>0.83</u>	<u>0.44</u>
Total	5.44	3.73	3.60	5.01	1.33

Type Data—Female holotype and two females from Collier Cave, five miles W Florence, Lauderdale County, Alabama, 20 August 1965 (S. Peck).

Leptoneta credula, new species

Diagnosis—Yellowish troglophile with legs of medium length and small eyes; first femur about 1.2 times as long as carapace; epigynum (Fig. 42) of distinctive form.

Etymology—Specific names from Latin *credulus*, credulous.

Female—Total length 1.6 mm. Carapace 0.72 mm long, 0.58 mm wide. Abdomen 0.9 mm long, 0.65 mm wide.

Cephalothorax and appendages dusky yellow; front eyes enclosing black field; sternum with dusky shadings.

Clypeus 0.17 mm high, nearly twice as long as width of front eye row and longer than eye group. Eyes small, forming tight semicircle with lateral eyes separated by diameter; posterior eyes half diameter of front lateral eye and separated by more than full diameter of latter. Sternum 0.42 mm long and wide. Chelicera: promargin (Fig. 14) with seven teeth, basal three widely spaced; retromargin with four denticles.

Legs mostly missing; femur I 0.95 mm long, about 1.2 times as long as carapace.

Epigynum as shown in Fig. 42.

Type Data—Female holotype and immature from Bat Cave, Shoal Creek, Lauderdale County, Alabama 1 May 1942 (W. B. Jones).

Leptoneta blanda, new species

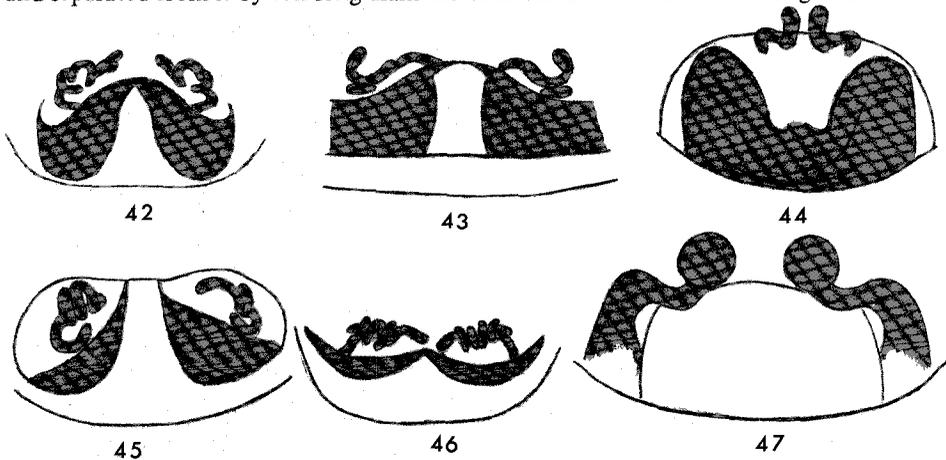
Diagnosis—Yellowish, long-legged troglophile with evanescent eyes of medium size; first leg seven times as long as carapace; epigynum (Figs. 37-38) of distinctive design with tightly coiled tubes close together on midline.

Etymology—Specific name from Latin *blandus*, flattering.

Female—Total length 1.55 mm. Carapace 0.75 mm long, 0.61 mm wide. Abdomen 0.7 mm long, 0.5 mm wide.

Cephalothorax and appendages dull yellow; eyes evanescent, with dusky smudge enclosed by front row; abdomen whitish.

Clypeus 0.15 mm high, longer than eye group. Eyes small (Fig. 8); anterior front eyes smaller than front lateral eyes; posterior eyes small, about half diameter of front lateral and separated from it by full long diameter of latter. Sternum 0.45 mm long and wide.



Figs. 42-47.—Dorsal view of epigyna of species of *Leptoneta*: 42, *L. credula*; 43, *L. silvicultrix*; 44, *L. coma*; 45, *L. gertschi*; 46, *L. barrowsi*; 47, *L. sandra*.

	I	II	III	IV	Palpus
Femur	1.45	1.23	1.00	1.35	0.43
Patella	0.25	0.25	—	0.24	0.15
Tibia	1.55	1.20	—	1.40	0.30
Metatarsus	1.20	0.96	—	1.10	—
Tarsus	<u>0.82</u>	<u>0.70</u>	<u>—</u>	<u>—</u>	<u>0.48</u>
Total	5.27	4.34	—	—	1.36

Epigynum as shown in Figs. 37-38.

Type Data—Female holotype, two females and immature from Ingram Cave, near Allgood, Blount County, Alabama, 8 March 1940 (W. B. Jones).

Leptoneta barrowsi, new species

Diagnosis—Yellowish troglophile with evanescent eyes of medium size and fairly long legs; first leg about 5.6 times as long as carapace; epigynum (Fig. 46).

Etymology—Named for the late Professor William A. Barrows of Ohio State University.

Female—Total length 1.65 mm. Carapace 0.65 mm long, 0.56 mm wide. Abdomen 1 mm long, 0.73 mm wide.

Cephalothorax and appendages dusky yellow; eyes faintly ringed with dusky, abdomen whitish.

Clypeus 0.15 mm high, longer than width of front eye row and slightly longer than length of eye group. Eyes evanescent; front median eyes slightly larger than laterals; posterior eyes slightly smaller and separated from front lateral eye by little more than full diameter of latter. Sternum 0.42 mm long and wide. Chelicera: promargin with 10 teeth, apical three widely separated; retromargin with four denticles.

Leg formula 1423. First leg about 5.6 times, first femur about 1.5 times as long as carapace.

	I	II	III	IV	Palpus
Femur	0.95	0.87	0.73	0.96	0.40
Patella	0.22	0.21	0.19	0.19	0.12
Tibia	1.00	0.80	0.64	0.95	0.27
Metatarsus	0.84	0.70	0.62	0.82	—
Tarsus	<u>0.62</u>	<u>0.56</u>	<u>0.46</u>	<u>0.55</u>	<u>0.41</u>
Total	3.63	3.14	2.64	3.47	1.20

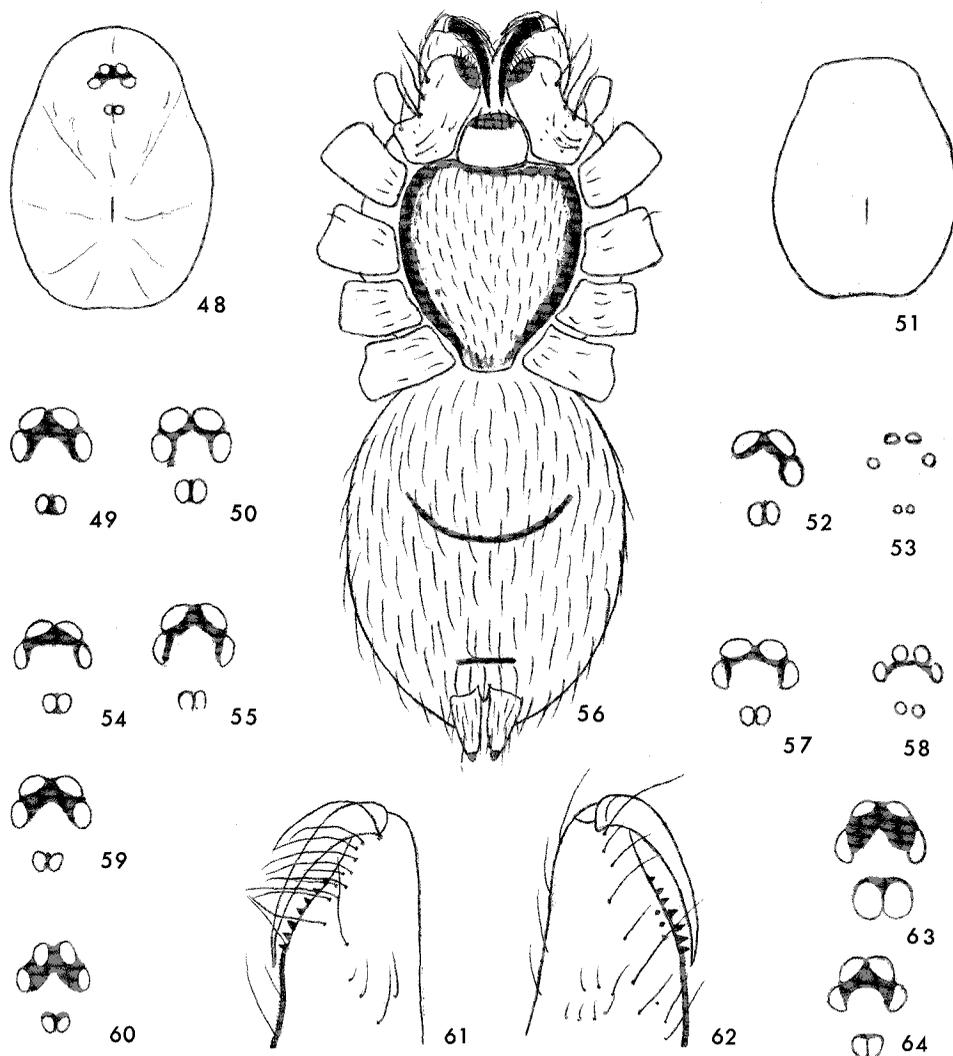
Type Data—Female holotype from Bangor Cave, one mi N Bangor, Blount County, Alabama, 28 June 1967 (S. Peck, A. Fiske).

THE TEXAS FAUNA

The dozen species assigned to this group come mostly from caves of the Edwards Plateau Region of middle Texas and some outlying districts. One closely allied species from Durango, México, is assigned here and a more variant species from the Chiricahua Mountains of Arizona is placed here as a matter of convenience. The group can appropriately be dubbed the *coeca* group in deference to the first described species and also to the fact that most species are cavernicoles. The three epigeal species come from ground detritus in moist areas but they differ little from those from caves. The cave species comprise a closely allied series showing the same kind of variation as those from caves in

the Appalachian region. They are all small with pale coloration and fairly long legs. Their small eyes vary from medium size to complete obsolescence. One species, *anopica*, is eyeless but several others with rudimentary eyes are probably troglobites, restricted to single caves or cave systems in a generally drier area than Appalachia.

Males of only five of the dozen species of the *coeca* group are presently known. The palpal tarsi of these are similar to those of *alabama*, *sandra* and others with shallow transverse grooves bearing on the retrolateral margins no especially notable setae or spines. Only one, *valverdae*, has developed a retrolateral lobe on the tarsus and this lacks a modified seta. All five males have well developed retrolateral apophyses on the tibiae



Figs. 48-64.—Species of *Leptoneta*: 48, *L. myopica*, carapace of female, dorsal view; 49, *L. myopica*, eyes of female; 50, *L. coeca*, eyes female; 51, *L. anomica*, carapace, dorsal view; 52, *L. concinna*, eyes of female; 53, *L. microps*, eyes of female; 54, *L. devia*, eyes of female; 55, *L. uvaldea*, eyes of female; 56, *L. myopica*, cephalothorax and abdomen, ventral view; 57, *L. valverdae*, eyes of female; 58, *L. valverdae*, eyes of male; 59, *L. chisosea*, eyes of female; 60, *L. limpida*, eyes of female; 61, *L. myopica*, right chelicera of female, dorsal view; 62, *L. myopica*, right chelicera of female, ventral view; 63, *L. apachea*, eyes of male; 64, *L. furtiva*, eyes of female.

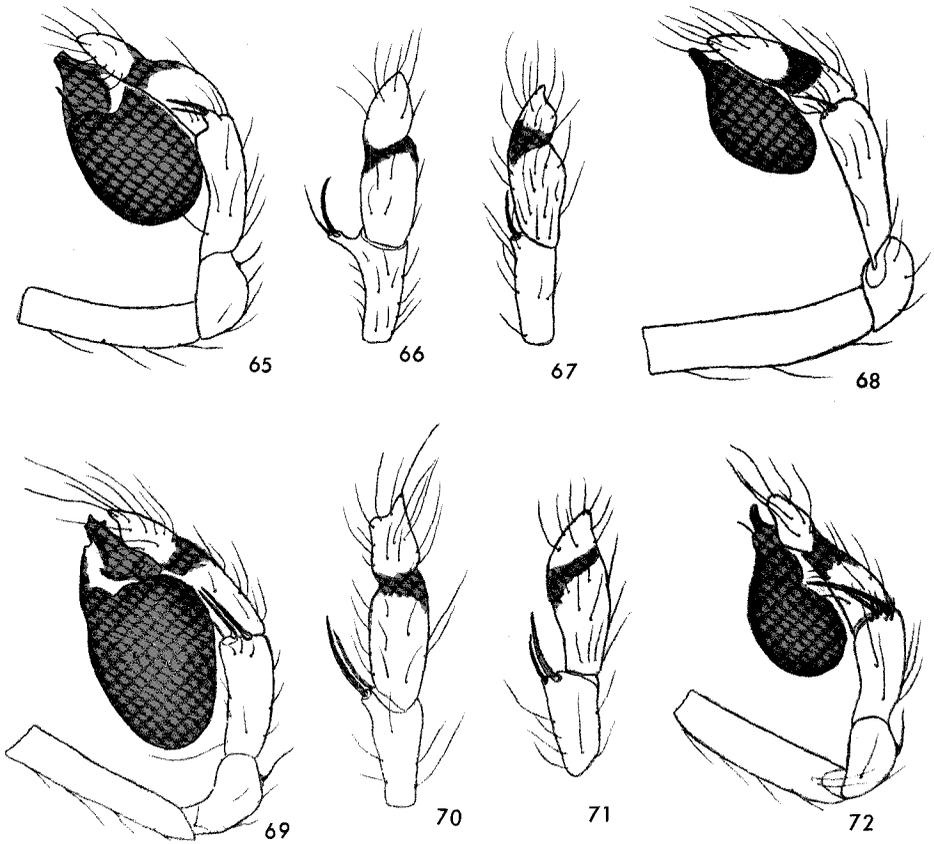
similar to those of the *alabama* series to which they in most respects seem closely related. The chelicerae of the *coeca* series are mostly armed with seven or eight small, subcontiguous teeth on the promargin. The epigyna are all of quite similar design and present on each side a heavy tubular receptacle and a broad shallow atrium between. The presumed course of the embolus of the male is pictured by arrows in Fig. 73.

KEY TO THE FEMALES

- 1a. Eyeless species (Fig. 51) from Cobb Cave, Williamson County, Texas
 *anopica*, new species
- 1b. Eyes present 2
- 2a(1b). Eyes small, reduced to trivial vestiges (Fig. 53); Government Canyon Bat Cave, Bexar County, Texas *microps*, new species
- 2b. Eyes larger 3
- 3a(2b). Posterior eyes separated from front lateral eyes by two or more diameters . . 4
- 3b. Posterior eyes separated by less than two diameters 5
- 4a(3a). Bulb of seminal receptacle of medium size (Fig. 74); Story Cave, Uvalde County, Texas *uvaldea*, new species
- 4b. Bulb larger (Fig. 81); Schulze Cave, Travis County, Texas . . *devia*, new species
- 5a(3b). Legs longer, first at least 6.1 times as long as carapace, femur at least 1.8 times as long as carapace 6
- 5b. Legs shorter, first not more than 4.3 times, first femur 1.2 times as long as carapace 8
- 6a(5a). Eyes of front row subcontiguous 7
- 6b. Eyes of front row well separated (Fig. 60); Cueva de los Riscos, Durango, México *limpida*, new species
- 7a(6a). Promargin of chelicera with eight teeth; bulb of seminal receptacles separated at midline (Fig. 73); Tooth Cave, Travis County, Texas
 *myopica*, new species
- 7b. Promargin of chelicera with seven teeth; bulb of seminal receptacle larger, subcontiguous, pointed posteriorly; caves of Val Verde County, Texas
 *valverdae*, new species
- 8a(5b). Cavernicolous species 9
- 8b. Epigean species 10
- 9a(8a). Bulb of seminal receptacle of medium size (Fig. 76); caves of Travis County, Texas *concinna*, new species
- 9b. Bulb larger, directed posteriorly; caves of Comal County, Texas
 *coeca* Chamberlin & Ivie
- 10a(8b). Epigynum (Fig. 121) with heavy tubular receptacles; Chisos Mountains, Brewster County, Texas *chisosea*, new species
- 10b. Epigynum (Fig. 122) with small, tightly coiled, tubular receptacles; Blackwell, Nolan County, Texas *furtiva*, new species

KEY TO THE MALES

- 1a. Tarsus of palpus with small retrolateral lobe (Fig. 70); eyes small, separated (Fig. 58) *valverdae*, new species
- 1b. Tarsus of palpus without retrolateral lobe 2
- 2a(1b). Tibial apophysis of palpus conspicuous, retrolaterally directed spur 3
- 2b. Tibial apophysis small apical enlargement 4
- 3a(2a). Tibial apophysis heavy spur (Fig. 96); short-legged epigean species of Arizona. *apachea*, new species
- 3b. Tibial apophysis thin spur (Fig. 66); long-legged cavernicole from Travis County, Texas *myopica*, new species
- 4a(2b). Male palpus (Fig. 71-72) with shorter segments and fairly large bulb; shorter-legged species from caves of Travis County, Texas . . . *concinna*, new species
- 4b. Male palpus (Figs. 67-68) with longer segments and small pointed bulb; longer-legged species from caves of Comal County, Texas *coeca* Chamberlin & Ivie



Figs. 65-72.—Left male palpi of species of *Leptoneta*: 65, *L. myopica*, whole palpus, retrolateral view; 66, *L. myopica*, tibia and tarsus, dorsal view; 67, *L. coeca*, tibia and tarsus, dorsal view; 68, *L. coeca*, whole palpus, retrolateral view; 69, *L. valverdae*, whole palpus, retrolateral view; 70, *L. valverdae*, tibia and tarsus, dorsal view; 71, *L. concinna*, tibia and tarsus, dorsal view; 72, *L. concinna*, whole palpus, retrolateral view.

Leptoneta myopica, new species

Diagnosis—Small, whitish, long-legged cavernicole with obsolescent eyes, probable troglobite; first leg in both sexes 6.1 times as long as carapace; tibia of male palpus with thin retrolateral process set with curved spine; epigynum (Fig. 73).

Etymology—Specific name from Greek *myopia*, nearsighted.

Female—Total length 1.6 mm. Carapace 0.7 mm long, 0.5 mm wide. Abdomen 0.9 mm long, 0.6 mm wide.

Base color of cephalothorax and appendages whitish to dull yellow; sternum with very faint marginal dusky seam; legs faintly dusky at junctures of segments; abdomen whitish to gray.

Structure typical (Figs. 48, 56); clypeus 0.12 mm long, gradually sloping, about as long as eye group. Eyes (Fig. 49) of medium size, without dark pigment; front eye row moderately recurved, eyes subcontiguous and subequal in size; posterior eyes subcontiguous, set back from anterior lateral eyes by width of both. Sternum 0.45 mm long, 0.37 mm wide. Labium 0.12 mm long and wide. Endite 0.25 mm long, 0.18 mm wide at base; scutula on outer corner at apex. Chelicera narrowed moderately to apex; promargin with eight small, subcontiguous teeth; retromargin with three denticles; see Figs. 61-62.

Leg formula 1423. First leg 6.1 times, first femur 1.8 times as long as carapace; femora with slight thickening in basal half. Clothing of legs fine hairs and few weak spines; first tibia with 2-2-0 ventral spines; all patellae with single apical spine above. Female palpus with thin claw.

Abdomen suboval, as high as broad, sparsely clothed on all surfaces with suberect dusky hairs (Fig. 56).

Epigynum as shown in Fig. 73.

	I	II	III	IV	Palpus
Femur	1.25	1.05	0.86	1.14	0.33
Patella	0.23	0.23	0.23	0.23	0.11
Tibia	1.28	0.96	0.75	1.23	0.25
Metatarsus	0.98	0.80	0.70	0.88	—
Tarsus	<u>0.57</u>	<u>0.46</u>	<u>0.46</u>	<u>0.57</u>	<u>0.33</u>
Total	4.31	3.50	3.00	4.05	1.02

Male—Total length 1.6 mm. Carapace 0.7 mm long, 0.5 mm wide. Abdomen 0.9 mm long, 0.5 mm wide.

Coloration and structure like those of female; femora of legs more dusky.

Leg formula 1423; legs long and thin. First leg 6.1 times, first femur 1.7 times as long as carapace; femora slightly thickened. Legs with few more spines than female; first femur with two ventral pairs and two single spines.

Male palpus (Figs. 65-66) with segments moderately elongated; tarsus with moderately deep transverse groove in apical part, without lobe or special setal armature; tibia with thin retrolateral spur set with principal curved spine; bulb suboval, or medium size.

	I	II	III	IV	Palpus
Femur	1.23	1.15	0.83	1.10	0.37
Patella	0.22	0.20	0.20	0.21	0.13
Tibia	1.24	0.87	0.75	1.18	0.22
Metatarsus	1.00	0.80	0.67	1.00	—
Tarsus	<u>0.66</u>	<u>0.49</u>	<u>0.43</u>	<u>0.57</u>	<u>0.22</u>
Total	4.35	3.39	2.88	4.06	0.94

Type Data—Male holotype from Tooth Cave, 15 mi NW of Austin, Travis County, Texas, 30 March 1965 (J. Reddell).

Distribution—Known only from Tooth Cave.

Records—Texas: Travis County: Tooth Cave, 25 February 1963 (D. McKenzie, J. Reddell), male, three females; 9 June 1967, four males, seven females; 19 August 1970, three females; 5 March 1964 (J. Reddell, D. McKenzie, T. Phillips), female; 14 May 1966 (W. Russell), female; 30 March 1965 (J. Reddell), male; 8 March 1968 (J. Reddell, W. Russell, S. Fowler), female; 19 August 1970, male.

Leptoneta concinna, new species

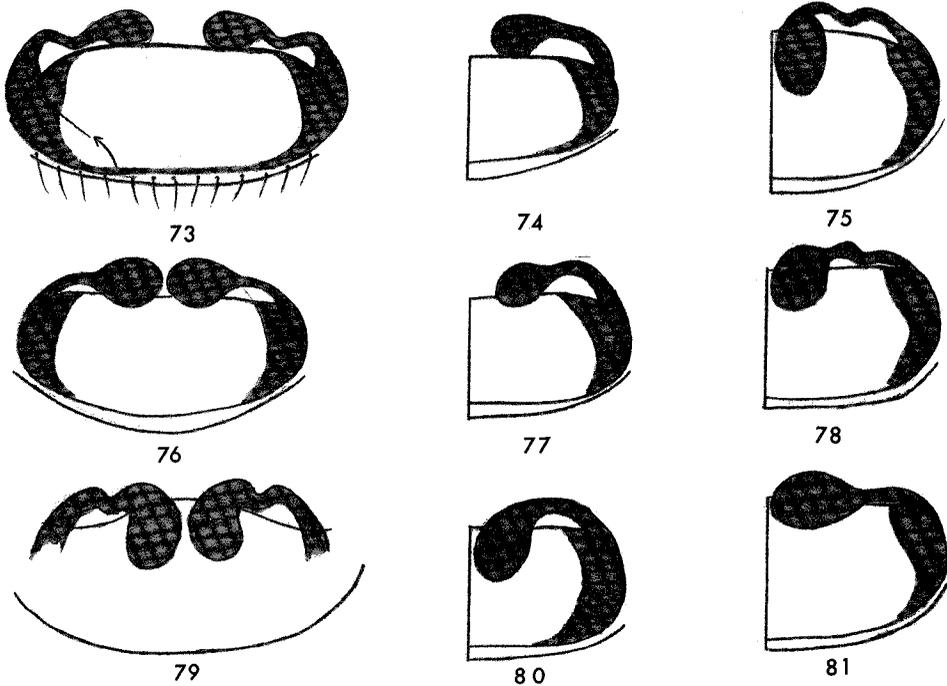
Diagnosis—Small, whitish, short-legged cavernicole, probably troglobite; first leg of female 2.7 times, of male four times as long as carapace; tibia of male palpus with trivial lateral spur armed with long spine; epigynum (Fig. 76).

Etymology—Specific name from Latin *concinus*, pleasing.

Female—Total length 1.5 mm. Carapace 0.59 mm long, 0.44 mm wide. Abdomen 0.9 mm long, 0.65 mm wide.

Cephalothorax and appendages dusky yellow; eyes narrowly ringed with black; abdomen white.

Structure like that of *myopica* unless otherwise noted. Carapace suboval, short, quite high, narrowly rounded in front; clypeus 0.07 mm high, equal to half length of eye group. Eyes (Fig. 52) of medium size; anterior eye row strongly recurved, eyes subequal and contiguous (left lateral eye missing); posterior eyes contiguous, separated from anterior



Figs. 73-81.—Dorsal and right half dorsal view of epigyna of species of *Leptoneta*: 73, *L. myopica*; 74, *L. uvaldea*; 75, *L. valverdae*; 76, *L. concinna*; 77, *L. microps*; 78, *L. anopica*; 79, *L. limpida*; 80, *L. coeca*; 81, *L. devia*.

lateral by full diameter. Sternum 0.4 mm long, 0.36 mm wide. Chelicera: promargin with seven teeth; retromargin with two denticles.

Leg formula 4123; legs short, moderately stout. First leg 3.7 times, first femur about as long as carapace.

Epigynum as shown in Fig. 76.

	I	II	III	IV	Palpus
Femur	0.62	0.53	0.46	0.64	0.24
Patella	0.18	0.16	0.15	0.17	0.10
Tibia	0.61	0.46	0.38	0.65	0.15
Metatarsus	0.46	0.39	0.37	0.52	—
Tarsus	<u>0.31</u>	<u>0.29</u>	<u>0.27</u>	<u>0.33</u>	<u>0.22</u>
Total	2.18	1.83	1.63	2.31	0.71

Male—Total length 1.45 mm. Carapace 0.61 mm long, 0.47 mm wide. Abdomen 0.8 mm long, 0.5 mm wide.

Coloration and structure like those of female. Eyes narrowly ringed with black. Carapace proportionately broader and subtruncate in front. Clypeus 0.08 mm, narrower than length of eye group.

Leg formula 4123. First leg four times, first femur 1.1 times as long as carapace.

Male palpus (Figs. 71-72) with segments fairly short; tarsus with moderately developed transverse groove beyond middle; tibia with trivial retrolateral spur bearing long spine and four subsidiary, overlapping spines.

	I	II	III	IV	Palpus
Femur	0.68	0.55	0.45	0.69	0.23
Patella	0.18	0.18	0.17	0.15	0.11
Tibia	0.63	0.53	0.44	0.68	0.15
Metatarsus	0.53	0.43	0.40	0.55	—
Tarsus	<u>0.40</u>	<u>0.33</u>	<u>0.30</u>	<u>0.40</u>	<u>0.20</u>
Total	2.42	2.02	1.76	2.57	0.69

Type Data—Male holotype from Lost Gold Cave, 5 mi W Austin, Travis County, Texas 27 May 1963 (J. Reddell, B. Frank), found in second room in darkness.

Distribution—Travis County caves.

Record—*Texas*: Travis County: Stark's North Mine, 9 mi NNE Austin, 20 August 1963 (W. Russell), female described above.

Leptoneta coeca Chamberlin & Ivie

Leptoneta coeca Chamberlin & Ivie, 1942, p. 10, Fig. 9. Vogel, 1967, p. 87. Brignoli, 1972, p. 135.

Diagnosis—Small, whitish, short-legged cavernicole, probable troglobite; first leg of female 4.3 times, of male 5.2 times as long as carapace; male palpus with elongated segments, tarsus without accessory lobe, tibia with trivial lateral spur set with fairly long spine; epigynum (Fig. 80).

Etymology—Specific name from Latin *caecus*, blind, hidden.

Female—Total length 1.35 mm. Carapace 0.53 mm long, 0.45 mm wide. Abdomen 0.8 mm long, 0.5 mm wide.

Cephalothorax and appendages yellow; eyes narrowly margined with black; abdomen whitish.

Structure typical; clypeus 0.07 mm high, subvertical, much shorter than length of eye group. Eyes (Fig. 50) small; anterior eyes subequal, contiguous; posterior eyes smaller, separated from front lateral by more than diameter of latter. Sternum 0.36 mm long, 0.33 mm wide.

	I	II	III	IV	Palpus
Femur	0.66	0.56	0.45	0.63	0.35
Patella	0.18	0.16	0.16	0.15	0.10
Tibia	0.64	0.50	0.38	0.65	0.23
Metatarsus	0.50	0.42	0.37	0.57	—
Tarsus	<u>0.33</u>	<u>0.30</u>	<u>0.30</u>	<u>0.35</u>	<u>0.19</u>
Total	2.31	1.95	1.66	2.35	0.87

Leg formula 4123. First leg 4.3 times, first femur 1.2 times as long as carapace.

Epigynum as shown in Fig. 80.

Male—Total length 1.45 mm. Carapace 0.62 mm long, 0.5 mm wide. Abdomen 0.77 mm long, 0.55 mm wide.

Coloration and structure like those of female. Carapace suboval, with front gently rounded. Clypeus 0.14 mm high, equal to length of eye group.

Leg formula 1423. First leg 5.2 times, first femur 1.4 times as long as carapace.

Male palpus (Figs. 67-68) with long, thin segments; tarsus with deep transverse groove beyond middle, without lobes or other modifications, tibia with weak retrolateral spur bearing quite long spine; bulb small, suboval, with pointed embolus.

	I	II	III	IV	Palpus
Femur	0.89	0.72	0.60	0.86	0.35
Patella	0.20	0.17	0.16	0.18	0.10
Tibia	0.95	0.66	0.56	0.93	0.23
Metatarsus	0.72	0.56	0.55	0.73	—
Tarsus	<u>0.44</u>	<u>0.38</u>	<u>0.32</u>	<u>0.40</u>	<u>0.19</u>
Total	3.20	2.49	2.19	3.10	0.87

Type Data—Male holotype from Brehmmer Cave (=Heidrich's Cave), 5 mi W New Braunfels, Comal County, Texas, 20 June 1938, in American Museum of Natural History (University of Utah Collection).

Distribution—Caves of Comal County, Texas.

Records—*Texas*: Comal County: Brehmmer (=Heidrich's) Cave 19 March 1960 (W. J. Gertsch), male, female. Natural Bridge Cave, 13 mi W New Braunfels, 13 July 1963 (J. Reddell), two females, 3 juvenile; 23 February 1963 (J. Reddell, D. McKenzie), female in pit 50 feet from entrance.

Leptoneta devia, new species

Diagnosis—Small, whitish, short-legged cavernicole, probable troglobite; first leg 4.4 times as long as carapace; epigynum (Fig. 81) with large receptacles nearly touching at midline.

Etymology—Specific name from Latin *devius*, out of the way.

Female—Total length 1.3 mm. Carapace 0.57 mm long, 0.43 mm wide. Abdomen 0.7 mm long, 0.45 mm wide.

Cephalothorax and appendages dull yellow; eyes enclosing dusky field; abdomen whitish.

Structure like that of *myopica*; clypeus 0.09 mm high, equal in height to nearly length of eye group. Eyes (Fig. 54) small, on low tubercles; posterior eyes small, separated from anterior lateral eye by nearly two diameters. Sternum 0.4 mm long, 0.33 mm wide. Chelicera: promargin with seven small teeth; retromargin with three separated denticles.

	I	II	III	IV	Palpus
Femur	0.70	0.53	0.49	0.73	0.21
Patella	0.19	0.18	0.17	0.19	0.07
Tibia	0.70	0.54	0.40	0.72	0.15
Metatarsus	0.54	0.43	0.39	0.56	—
Tarsus	<u>0.40</u>	<u>0.34</u>	<u>0.31</u>	<u>0.40</u>	<u>0.23</u>
Total	2.53	2.02	1.76	2.60	0.66

Leg formula 4123. First leg 4.4 times, first femur 1.2 times as long as carapace.

Epigynum as shown in Fig. 81.

Type Data—Female holotype and three females from Schulze Cave, 13 mi NNW Austin, Travis County, Texas, 21 August 1963 (W. Russell).

Leptoneta anopica, new species

Diagnosis—Small, whitish, long-legged troglobite without trace of eyes; first femur 2.7 times as long as carapace; epigynum (Fig. 78).

Etymology—Specific name from Greek *a*, without, *nops*, eyes, without eyes.

Female—Total length 1.4 mm. Carapace 0.6 mm long, 0.4 mm wide. Abdomen 0.82 mm long 0.54 mm wide.

Cephalothorax and appendages dull yellow; abdomen whitish.

Structure like that of *myopica*; carapace suboval, nearly truncated in front (Fig. 51); eyes completely obsolete. Sternum 0.45 mm long, 0.36 mm wide. Chelicera: promargin with seven small teeth; retromargin with three denticles.

Legs fragmented; first femur 1.35 mm, second femur 1.13 mm, third femur 0.95 mm, fourth femur 1.26 mm. Palpus: femur 0.35 mm, patella 0.09 mm, tibia 0.21 mm, tarsus 0.35 mm, total 1 mm.

Epigynum as shown in Fig. 78.

Type Data—Female holotype from Cobb Cavern, 10 mi NNW Georgetown, Williamson County, Texas, 31 March 1963 (J. Reddell, D. McKenzie).

Leptoneta microps, new species

Diagnosis—Small, yellowish, short-legged, essentially eyeless cavernicole, probable troglobite; first leg 4.4 times as long as carapace; epigynum (Fig. 77).

Etymology—Specific name from Greek *mikros*, small, and *ops*, eyes, small eyed.

Female—Total length 1.7 mm. Carapace 0.6 mm long, 0.45 mm wide. Abdomen 1.1 mm long, 0.7 mm wide.

Carapace dull yellow to orange; appendages dusky orange; abdomen dull yellowish.

Structure typical; clypeus 0.07 mm high, narrower than length of eye group. Eyes (Fig. 53) small, nearly obsolete, represented by trivial corneal spots; anterior row moderately recurved, eyes subequal in size and separated by more than radius; posterior eyes very small round spots placed far back from anterior lateral by nearly three diameters of anterior lateral eye. Sternum 0.4 mm long, 0.35 mm wide.

First leg 4.4 times, first femur 1.3 times as long as carapace.

Epigynum as shown in Fig. 77.

	I	II	III	IV	Palpus
Femur	0.78	0.65	0.57	0.77	0.27
Patella	0.18	0.17	0.17	0.16	0.10
Tibia	0.70	0.55	0.48	—	0.19
Metatarsus	0.60	0.50	0.46	—	—
Tarsus	<u>0.40</u>	<u>0.34</u>	<u>0.31</u>	<u>—</u>	<u>0.24</u>
Total	2.66	2.21	1.99	—	0.80

Type Data—Female holotype from Government Canyon Bat Cave, 5 mi SW Helotes, Bexar County, Texas 11 August 1965 (J. Reddell, J. Fish).

Leptoneta uvaldea, new species

Diagnosis—Small, yellowish, short-legged cavernicole; first leg 4.7 times as long as carapace; epigynum (Fig. 74).

Etymology—Named for Uvalde County, Texas.

Female—Total length 1.4 mm. Carapace 0.65 mm long, 0.5 mm wide. Abdomen 0.8 mm long, 0.6 mm wide.

Cephalothorax and abdomen bright yellow; eyes enclosing reduced black field; abdomen white.

Structure typical; clypeus 0.09 mm high, shorter than length of eye group. Eyes (Fig. 55) of average size; anterior median eyes distinctly separated by fourth of diameter; posterior eyes slightly smaller than anterior lateral and separated from them by about diameter of latter. Sternum 0.4 mm long, 0.3 mm wide. Chelicera: promargin with seven teeth; retromargin with three denticles.

Leg formula 4123; first and fourth pairs subequal. First leg 4.7 times, first femur 1.4 times as long as carapace.

Epigynum as shown in Fig. 74.

	I	II	III	IV	Palpus
Femur	0.92	0.72	0.62	0.88	0.30
Patella	0.20	0.18	0.16	0.17	0.10
Tibia	0.90	0.66	0.54	0.88	0.19
Metatarsus	0.70	0.58	0.47	0.70	—
Tarsus	<u>0.36</u>	<u>0.36</u>	<u>0.32</u>	<u>0.44</u>	<u>0.26</u>
Total	2.08	2.50	2.11	3.07	0.85

Type Data—Female holotype from Story Cave, 22 mi NE Uvalde, Uvalde County, Texas, 18 October 1964 (J. Reddell, D. McKenzie).

Leptoneta valverdeae, new species

Diagnosis—Small, whitish, long-legged cavernicole with small, evanescent eyes, probable troglobite; first leg of female 6.3 times, first leg of male seven times as long as carapace; male palpus with very large bulb, tarsus bearing small retrolateral process and tibia with long retrolateral spine; epigynum (Fig. 75).

Etymology—Named for Val Verde County, Texas.

Female—Total length 1.5 mm. Carapace 0.65 mm long, 0.53 mm wide. Abdomen 0.8 mm long, 0.65 mm wide.

Cephalothorax and appendages pale, dull yellow; eyes very narrowly margined with black; abdomen whitish.

Structure like that of *myopica* unless otherwise noted. Carapace oval, gently rounded in front; clypeus 0.1 mm high, equal in length to that of eye group. Eyes (Fig. 57) small, evanescent; anterior eyes subequal and subcontiguous; posterior eyes smaller, separated from anterior lateral by diameter of these eyes. Sternum 0.46 mm long, 0.38 mm wide. Chelicera: promargin with seven teeth; retromargin with three denticles.

Leg formula 1423. First leg 6.3 times, first femur 1.8 times as long as carapace.

Epigynum as shown in Fig. 75.

	I	II	III	IV	Palpus
Femur	1.12	1.05	0.86	1.14	0.34
Patella	0.23	0.23	0.20	0.20	0.10
Tibia	1.16	0.93	0.77	1.15	0.20
Metatarsus	0.95	0.77	0.72	0.90	—
Tarsus	<u>0.67</u>	<u>0.60</u>	<u>0.50</u>	<u>0.60</u>	<u>0.30</u>
Total	4.13	3.61	3.05	3.99	0.94

Male—Total length 1.55 mm. Carapace 0.69 mm long, 0.55 mm wide. Abdomen 0.8 mm long, 0.55 mm wide.

Coloration and structure like those of female. Eyes (Fig. 58) smaller, evanescent, with anterior lateral indistinctly apparent; posterior eyes small, separated by radius and from anterior lateral by two diameters of these eyes. Clypeus 0.12 mm high, more widely rounded, higher than length of eye group. Sternum 0.45 mm long, 0.4 mm wide.

Leg formula 1423. First leg seven times, first femur about twice as long as carapace; first tibia with 2-2-2-0 spines, first pair close to base of segment.

Male palpus (Figs. 69-70) with elongated segments; tarsus moderately grooved in apical third, pointed at apex and bearing small rounded lobe on retrolateral side lacking prominent seta; tibia with moderately developed retrolateral apophysis at apex bearing long spine.

	I	II	III	IV	Palpus
Femur	1.35	1.18	1.00	1.30	0.40
Patella	0.25	0.23	0.21	0.23	0.11
Tibia	1.44	1.20	0.96	1.43	0.16
Metatarsus	1.16	0.92	0.84	1.08	—
Tarsus	<u>0.80</u>	<u>0.68</u>	<u>0.58</u>	<u>0.70</u>	<u>0.27</u>
Total	5.00	4.21	3.59	4.74	0.94

Type Data—Male holotype from Oriente Milestone Molasses Bat Cave, about 8 mi NE Del Rio, Val Verde County, Texas, 25 January 1964 (J. Reddell, D. McKenzie, J. Porter), from under rocks beyond the bat room.

Distribution—Caves of Val Verde County, Texas.

Records—*Texas*: Val Verde County: Fawcett's Cave, 36 mi NE Del Rio, 10 April 1968 (J. Reddell), two females, immature; 25 March 1961 (M. Tandy), two juvenile.

***Leptoneta limpida*, new species**

Diagnosis—Pale, long-legged cavernicole with reduced eyes, probable troglobite, related to species of Texas; first leg 6.7 times as long as carapace; epigynum (Fig. 79).

Etymology—Specific name from Latin *limpidus*, clear, limpid.

Female—Total length 1.4 mm. Carapace 0.63 mm long, 0.58 mm wide. Abdomen 0.72 mm long, 0.6 mm wide.

Cephalothorax and appendages pale yellow; front eyes enclosing black field; abdomen whitish.

Clypeus 0.12 mm high, wider than width of front eyes, about equal to length of eye group. Eyes (Fig. 60) reduced in size; front eyes small, oval, well separated; posterior pair smaller, separated from anterior lateral by more than long diameter of latter.

First leg 6.7 times, first femur 1.8 times as long as carapace.

Epigynum (Fig. 79) presenting enlarged receptacle on each side nearly touching at midline.

	I	II	III	IV	Palpus
Femur	1.13	1.04	0.85	1.16	0.34
Patella	0.24	0.20	0.20	0.20	0.11
Tibia	1.21	—	0.76	—	0.22
Metatarsus	0.98	—	0.70	—	—
Tarsus	<u>0.70</u>	<u>—</u>	<u>0.47</u>	<u>—</u>	<u>0.36</u>
Total	4.26	—	2.98	—	1.03

Type Data—Female holotype and one immature from Cueva de los Riscos, 4 km S Mapimí, Durango, México, 15 June 1972 (J. Reddell, E. Alexander, W. Elliott, C. Kunath).

Leptoneta chisosea, new species

Diagnosis—Small, yellowish, short-legged epigean species with features differing little from cavernicolous representatives; first leg four times as long as carapace; epigynum (Fig. 121) with receptacles widely separated on midline.

Etymology—Named for Chisos Mountains of Texas.

Female—Total length 1.55 mm. Carapace 0.65 mm long, 0.55 mm wide. Abdomen 0.9 mm long, 0.7 mm wide.

Cephalothorax and abdomen dull yellow; front eyes enclosing dusky field and posterior eyes narrowly ringed with black; sternum with dusky line around margins; abdomen whitish, with faint brown shadings on sides of venter.

Clypeus 0.12 mm high, as long as width of front eyes, narrower than length of eye group. Eyes (Fig. 59) of medium size; eyes of front row subequal and subcontiguous; posterior eyes about equal with front eyes and separated by full diameter of latter. Sternum 0.4 mm long, 0.36 mm wide. Chelicera: promargin with single row of seven teeth; retromargin with two denticles.

Leg formula 4123. First leg four times, first femur 1.1 times as long as carapace.

Epigynum as shown in Fig. 121.

	I	II	III	IV	Palpus
Femur	0.75	0.68	0.55	0.81	0.28
Patella	0.20	0.18	0.18	0.20	0.10
Tibia	0.80	0.60	—	0.82	0.18
Metatarsus	0.58	0.47	—	0.62	—
Tarsus	<u>0.43</u>	<u>0.36</u>	<u>—</u>	<u>0.43</u>	<u>0.30</u>
Total	2.76	2.29	—	2.88	0.86

Type Data—Female holotype and female from The Basin, Chisos Mountains, Big Bend National Park, Texas, 28 September 1950 (W. J. Gertsch), from ground detritus in ravine.

Leptoneta furtiva, new species

Leptoneta californica: Gertsch, 1935, p. 21 (not Banks). Bonnet, 1957, p. 2392 (part: Texas record).

Diagnosis—Small, yellowish epigeal species with distinctive epigynum (Fig. 122).

Etymology—Specific name from Latin *furtivus*, furtive.

Female—Total length 1.43 mm. Carapace 0.58 mm long, 0.43 mm wide. Abdomen 0.85 mm long, 0.7 mm wide.

Cephalothorax and appendages yellowish to dusky orange; front eyes enclosing narrow dusky field; sternum with narrow dusky line along margins; abdomen dull yellow.

Clypeus 0.12 mm high, longer than width of front eyes, about as long as length of eye group. Eyes (Fig. 64) of medium size; median eyes of front row larger than lateral, all subcontiguous; posterior eyes about equal to front lateral eyes and separated by full diameter. Sternum 0.38 mm long, 0.3 mm wide. Chelicera like that of *sibiculatrix*, with six small teeth and two enlarged, separated ones at apex of row.

Legs mostly missing; leg IV, femur 0.7 mm, patella 0.18 mm, tibia 0.7 mm. Palpus: femur 0.29 mm, patella 0.11 mm, tibia 0.21 mm, tarsus 0.28 mm, total 0.89 mm.

Epigynum as shown in Fig. 122.

Type Data—Female holotype from Blackwell, SW Abilene, Nolan County, Texas, 15 August 1927.

Leptoneta apachea, new species

Diagnosis—Small, yellowish epigeal species readily recognized by distinctive features of male palpus (Figs. 96-97).

Etymology—Named for the Apache Indians.

Male—Total length 1.55 mm. Carapace 0.68 mm long, 0.57 mm wide. Abdomen 0.8 mm long, 0.55 mm wide.

Cephalothorax and appendages mostly yellow; sternum with narrow dark seam; front eyes enclosing black field and posterior eyes narrowly ringed with black; femora of legs somewhat dusky; abdomen whitish.

Clypeus 0.12 mm high, about as long as width of front eye row, not as long as eye group. Eyes (Fig. 63) of medium size; posterior eyes oval, separated from front lateral eye by nearly their diameter. Sternum 0.42 mm long, 0.39 mm wide. Chelicera: promargin with seven, close-set teeth.

Leg formula probably 1423. First femur 1.1 times as long as carapace.

Palpus (Figs. 96-97) with short segments; tarsus shallowly grooved beyond middle, without lobe or modifications; tibia with heavy retrolateral process bearing fairly long spine.

	I	II	III	IV	Palpus
Femur	0.98	0.80	0.70	0.90	0.31
Patella	0.20	0.20	0.19	0.19	0.12
Tibia	—	0.81	0.66	—	0.15
Metatarsus	—	0.65	0.63	—	—
Tarsus	—	0.45	0.43	—	0.27
Total	—	2.91	2.61	—	0.85

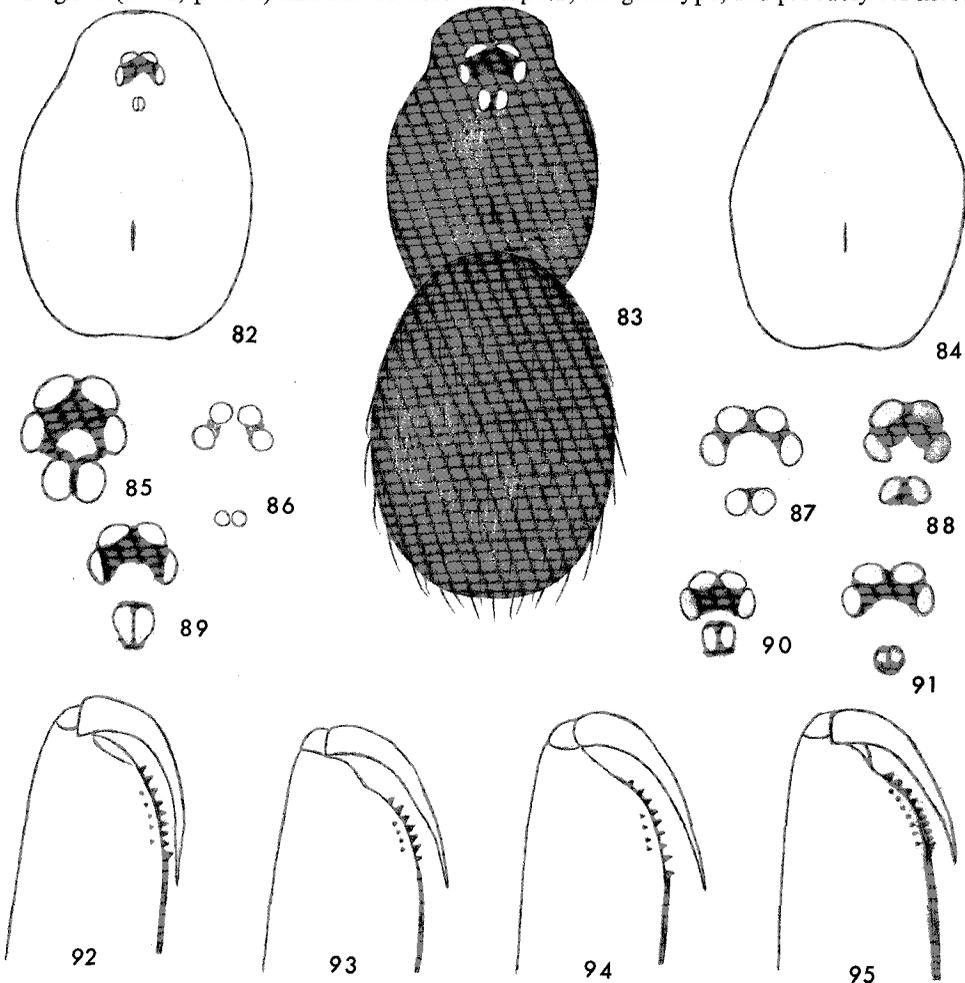
Type Data—Male holotype from Southwestern Research Station, 5 mi SW Portal, Cochise County, Arizona, August 1956 (A. F. Archer).

Distribution—Chiricahua Mountains of Arizona.

Record—Arizona: Cochise County: above Southwestern Research Station, 5400 feet, 5 mi SW Portal, 15 April 1967 (V. Roth), penultimate male from oak leafmold.

THE MEXICAN FAUNA

The typical *Leptoneta* so far known from eastern México present only small differences from those of Texas and Appalachia and are here maintained in the same genus. In an earlier paper (Gertsch, 1971) I described six species and three others are added here. The new generic name *Neoleptoneta* was applied to the Mexican series by Brignoli (1972, p. 134) and can be used for *capilla*, the genotype, and probably for most



Figs. 82-95.—Species of *Leptoneta*: 82, *L. capilla*, carapace and eyes of male from Cueva Mina; 83, *L. brunnea*, carapace and eyes of female, dorsal view; 84, *L. capilla*, carapace of male; 85, *L. brunnea*, eyes of female; 86, *L. reclusa*, eyes of female; 87, *L. pecki*, eyes of female; 88, *L. modica*, eyes of female; 89, *L. rainesi*, eyes of female; 90, *L. bonita*, eyes of male; 91, *L. delicata*, eyes of female; 92, *L. capilla*, right chelicera of female, ventral view; 93, *L. brunnea*, right chelicera of female, ventral view; 94, *L. isolata*, right chelicera of female, ventral view; 95, *L. reclusa*, right chelicera of male, ventral view.

of the other American species. For this paper I have decided to follow the conservative course and regard all our American taxa as comprising a single generic group with a number of intergradient species groups. The basic differences between epigean and cave species hold for the Mexican series. The cavernicoles are usually paler with longer legs. The essentially eyeless species, *capilla* and *isolata*, are claimed to be troglobites and others with reduced eyes may also qualify. A male of *capilla* with eyes is discussed in the formal description of that species.

Males of all nine species from eastern México are known and their palpi are of special interest since they clearly show relationship to Texas and Alabama species. The tarsi are provided with transverse grooves of various development but this segment bears few modified setae and only in species, *pecki* and *isolata*, are retrolateral lobes developed and these without enlarged setae. *Leptoneta modica* is unique in having a prominent prolateral lobe on the tarsus. Most of the Mexican species have well developed tibial apophyses armed with heavy spines. *Leptoneta brunnea* has heavy spines below the femur borne on elevated, peglike alveolae. The chelicerae of the Mexican series are notable mainly in having more numerous teeth on the promargin but these are typically closely spaced and of similar size. The epigyna are diagnostic for each species and feature the typical tubular receptacle on each side and variously developed transverse bursae.

KEY TO THE MALES

- | | | |
|---------|---|------------------------------|
| 1a. | Eyes obsolete or nearly so | 2 |
| 1b. | Eyes present | 3 |
| 2a(1a). | Tarsus of male palpus with retrolateral lobe (Fig. 108); Grutas de García, Nuevo León | <i>isolata</i> Gertsch |
| 2b. | Tarsus of palpus without retrolateral lobe (Fig. 115); caves of Tamaulipas | <i>capilla</i> Gertsch |
| 3a(1b). | Femur of palpus with subventral row of six heavy spines; epigean species of Hidalgo | <i>brunnea</i> , new species |
| 3b. | Femur of palpus without heavy spines | 4 |
| 4a(3b). | Tarsus of palpus with prolateral lobe (Fig. 99); epigean species of Nuevo León | <i>modica</i> , new species |
| 4b. | Tarsus of palpus without prolateral lobe | 5 |
| 5a(4b). | Tarsus of palpus with retrolateral lobe (Fig. 105); Grutas de San Bartolo, Nuevo León | <i>pecki</i> Gertsch |
| 5b. | Tarsus of palpus without retrolateral lobe | 6 |
| 6a(5b). | Tibia of palpus with trivial retrolateral apophysis set with long seta (Fig. 109); Cueva Bonita, Tamaulipas | <i>bonita</i> , new species |
| 6b. | Tibia of palpus with well marked retrolateral apophysis | 7 |
| 7a(6b). | Tibial apophysis directed apically, armed with long flat spine (Fig. 104); caves of Tamaulipas | <i>rainesi</i> Gertsch |
| 7b. | Tibial apophysis directed retrolaterally | 8 |
| 8a(7b). | Tibial apophysis long sharp spur (Fig. 113); Iron Mine of Querétaro | <i>delicata</i> Gertsch |
| 8b. | Tibial apophysis shorter (Fig. 11); Cueva de Chorros de Agua, Nuevo León | <i>reclusa</i> Gertsch |

KEY TO THE FEMALES

- 1a. Eyes obsolete or nearly so 2
- 1b. Eyes present 3
- 2a(1b). Legs longer, first femur 2.8 times as long as carapace; epigynum (Fig. 119) with broad bursa and pair of thin tubular receptacles; caves of Tamaulipas *capilla* Gertsch
- 2b. Legs shorter, first femur 2.2 times as long as carapace; epigynum (Fig. 123) broad with heavier tubular receptacles; Grutas de García, Nuevo León *isolata* Gertsch
- 3a(1b). Dark epigean species of Hidalgo with large eyes (Figs. 83, 84); legs short, first femur 1.4 times as long as carapace *brunnea*, new species
- 3b. Pale cavernicolous species with smaller eyes and longer legs 4
- 4a(3b). Promargin of chelicera with seven teeth 5
- 4b. Promargin with eight or nine teeth 6
- 5a(4a). Legs longer, first femur twice as long as carapace; epigynum (Fig. 120); Grutas de San Bartolo, Nuevo León *pecki* Gertsch
- 5b. Legs shorter, first femur 1.5 times as long as carapace; epigynum (Fig. 117); caves of Tamaulipas *rainesi* Gertsch
- 6a(4b). Promargin of chelicera with eight teeth; epigynum (Fig. 124); Iron Mine of Querétaro *delicata* Gertsch
- 6b. Promargin of chelicera with nine teeth; epigynum (Fig. 118); Cueva de Chorros de Agua, Nuevo León *reclusa* Gertsch

Leptoneta capilla Gertsch

Leptoneta capilla Gertsch, 1971, p. 52, Figs. 1-2. *Neoleptoneta capilla* Brignoli, 1972, p. 135, Figs. 6-10.

Diagnosis—Pale, long-legged, eyeless troglobite; first leg of female and male 10 times as long as carapace; tarsus of male palpus with simple, apically rounded principal branch without accessory lobe; epigynum (Fig. 119).

Discussion—The discovery of a male with eyes from Cueva de la Mina, in Tamaulipas, is most interesting and shows that the eyeless condition is not completely erased from the genes. The male agrees completely with typical *capilla* except for somewhat shorter appendages, the disparity probably falling well within the range of the species. In the same collection were two eyeless juvenile specimens, these maintaining the presumed normal condition of the species.

Female—Total length 2 mm. Carapace 0.85 mm long, 0.75 mm wide. Abdomen 1.2 mm long, 0.8 mm wide.

	I	II	III	IV	Palpus
Femur	2.40	2.00	1.65	2.20	0.50
Patella	0.30	0.26	0.25	0.30	0.20
Tibia	2.60	1.85	1.45	2.20	0.36
Metatarsus	2.00	1.60	1.35	1.75	—
Tarsus	<u>1.30</u>	<u>1.10</u>	<u>0.85</u>	<u>1.15</u>	<u>0.26</u>
Total	8.60	6.80	5.55	7.60	1.32

Right chelicera as shown in Fig. 92.

Leg formula 1423. First leg 10 times, first femur 2.8 times as long as carapace.

Epigynum as shown in Fig. 119.

Male holotype—Total length 1.85 mm. Carapace 0.85 mm long, 0.7 mm wide. Abdomen 1 mm long, 0.7 mm wide.

Carapace of normal eyeless male (Fig. 84) and eyed male from Cueva de la Mina (Fig. 82).

Leg formula 1423. First leg about 10 times, first femur about three times as long as carapace.

Male palpus (Figs. 115-116) with greatly elongated segments; tarsus deeply grooved at middle, lacking lobe or special setal development; tibia with thin retrolateral spur bearing long spine.

	I	II	III	IV	Palpus
Femur	2.65	2.15	1.80	2.20	0.80
Patella	0.30	0.30	0.28	0.25	0.40
Tibia	2.60	2.10	1.70	2.30	0.40
Metatarsus	2.10	1.65	1.50	1.85	—
Tarsus	<u>1.30</u>	<u>1.15</u>	<u>0.95</u>	<u>1.15</u>	<u>0.40</u>
Total	8.95	7.35	6.23	7.75	2.00

Type Data—Male holotype from Cueva de la Capilla, 13.5 km NNW Gómez Farías, Tamaulipas, México, in the American Museum of Natural History.

Distribution—Caves of Tamaulipas, México.

Record—México: *Tamaulipas*: Cueva de la Mina, 8 km NW Gómez Farías, 10 January 1971 (J. Reddell, R. W. Mitchell, J. Cooke, S. Wiley, W. Elliott), male and two juvenile.

Leptoneta isolata Gertsch

Leptoneta isolata Gertsch, 1971, p. 51, Figs. 9-11. *Neoleptoneta isolata* Brignoli, 1972, p. 137.

Diagnosis—Pale, long-legged, essentially eyeless troglobite; first leg of female 7.8 times, of male 9.9 times as long as carapace; tarsus of male palpus with rounded lobe on retrolateral side; epigynum (Fig. 123).

Female—Total length 2.7 mm. Carapace 1.9 mm long, 0.8 mm wide. Abdomen 1.7 mm long, 1 mm wide.

Clypeus 0.15 mm high. Eyes obsolete, sometimes with trivial corneal vestiges. Chelicera (Fig. 94); promargin with nine small teeth; retromargin with three denticles.

Leg formula 1423. First leg 7.8 times, first femur 2.2 times as long as carapace.

Epigynum (Fig. 123) with heavy tube on each side similar to those of *coeca* group of Texas.

	I	II	III	Palpus
Femur	2.65	2.15	1.70	0.45
Patella	0.30	0.30	0.30	0.17
Tibia	2.65	2.00	1.70	0.35
Metatarsus	2.15	1.75	1.45	—
Tarsus	<u>1.30</u>	<u>1.20</u>	<u>0.85</u>	<u>0.50</u>
Total	9.05	7.40	6.00	1.47

Male holotype—Total length 2.7 mm. Carapace 1 mm long, 0.8 mm wide. Abdomen 1.5 mm long, 0.9 mm wide.

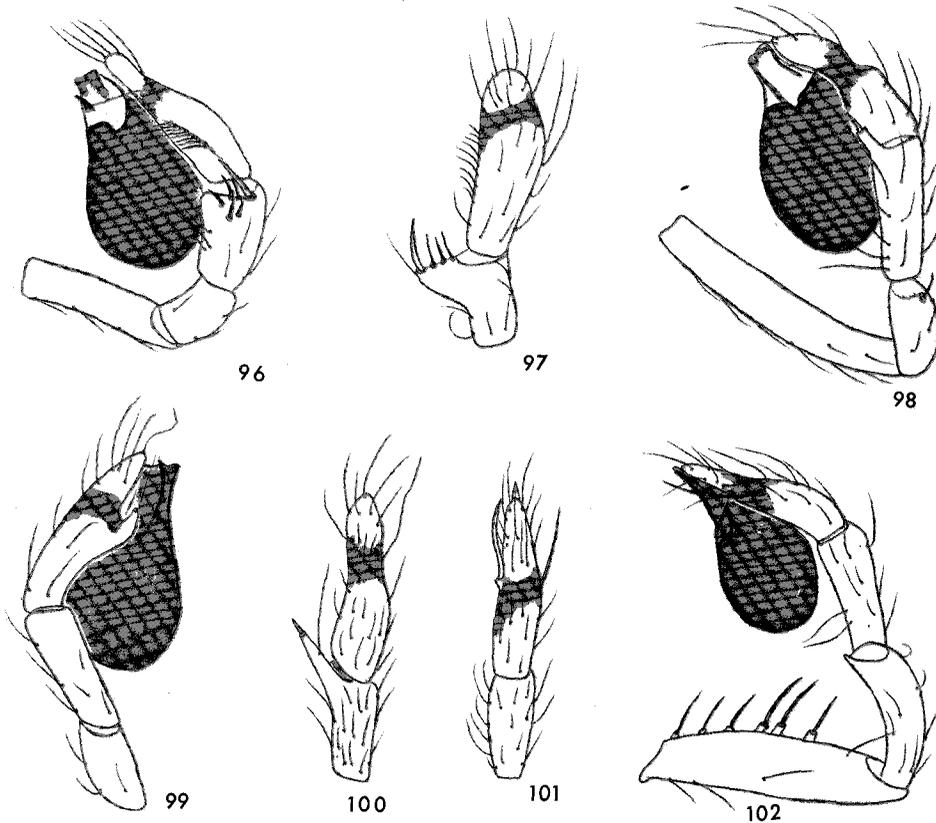
Leg formula 4123. First leg 9.9 times, first femur 2.7 times as long as carapace.

Male palpus (Figs. 107-108) with elongated segments; tarsus with shallow transverse groove and rounded retrolateral lobe; tibia with retrolateral apophysis bearing heavy spine.

	I	II	III	IV	Palpus
Femur	2.70	2.30	1.75	2.35	0.40
Patella	0.60	0.60	0.60	0.60	0.12
Tibia	2.80	2.20	1.70	2.60	0.29
Metatarsus	2.50	2.00	1.65	2.50	—
Tarsus	<u>1.35</u>	<u>1.20</u>	<u>0.85</u>	<u>2.25</u>	<u>0.30</u>
Total	9.95	8.30	6.55	10.30	1.11

Type Data—Male holotype from Grutas de García, Nuevo León, México, 14 June 1942, in American Museum of Natural History.

Distribution—Known only from above cave.



Figs. 96-102.—Left male palpi of species of *Leptoneta*: 96, *L. apachea*, whole palpus, retrolateral view; 97, *L. apachea*, tibia and tarsus, dorsal view; 98, *L. modica*, whole palpus, retrolateral view; 99, *L. modica* distal part of palpus, prolateral view; 100, *L. modica*, tibia and tarsus, dorsal view; 101, *L. brunnea*, tibia and tarsus, dorsal view; 102, *L. brunnea*, whole palpus, retrolateral view.

Leptoneta delicata Gertsch

Leptoneta delicata Gertsch, 1971, p. 52, Figs. 3-4. *Neoleptoneta delicata* Brignoli, 1972, p. 137.

Diagnosis—Pale, long-legged cavernicole; first leg of female eight times, of male 8.5 times as long as carapace; tarsus of male palpus grooved beyond middle, without retrolateral lobe, tibia with prominent, laterally directed process bearing short spine; epigynum (Fig. 124).

Female—Total length 1.9 mm. Carapace 0.8 mm long, 0.7 mm wide. Abdomen 1.1 mm long, 0.85 mm wide.

Eyes of female (Fig. 91).

Leg formula 1423. First leg eight times, first femur 2.4 times as long as carapace.

Epigynum as shown in Fig. 124.

	I	II	III	IV	Palpus
Femur	1.88	1.62	1.30	1.65	0.58
Patella	0.22	0.25	0.22	0.23	0.18
Tibia	2.00	1.50	1.15	1.85	0.38
Metatarsus	1.45	1.20	1.00	1.35	—
Tarsus	<u>1.20</u>	<u>0.88</u>	<u>0.75</u>	<u>1.00</u>	<u>0.56</u>
Total	6.80	5.45	4.42	5.08	1.70

Male—Total length 2 mm. Carapace 0.8 mm long, 0.7 mm wide. Abdomen 1.2 mm long, 0.8 mm wide.

Leg formula 1423. First leg 8.5 times, first femur 2.3 times as long as carapace.

Male palpus (Figs. 113-114) with greatly elongated segments; tarsus grooved beyond middle, pointed at apex, without retrolateral lobe or modified setae; tibia with prominent, laterally directed process armed with short spine.

	I	II	III	IV	Palpus
Femur	1.90	1.68	1.32	1.75	0.72
Patella	0.25	0.25	0.25	0.25	0.31
Tibia	2.00	1.60	1.25	1.80	0.32
Metatarsus	1.45	1.25	1.00	1.85	—
Tarsus	<u>1.25</u>	<u>1.00</u>	<u>0.80</u>	<u>1.00</u>	<u>0.45</u>
Total	7.03	5.78	4.62	6.65	1.80

Type Data—Male holotype from Iron Mine 2 km E Pinal de Amoles, Querétaro, México, in American Museum of Natural History.

Distribution—Known only from above mine.

Leptoneta pecki Gertsch

Leptoneta pecki Gertsch, 1971, p. 51, Figs. 7-8. *Neoleptoneta pecki* Brignoli, 1972, p. 137.

Diagnosis—Small, pale, short-legged species with reduced eyes; first leg of female and male about seven times as long as carapace; tarsus of male palpus with conical retrolateral lobe and tibia with spur bearing short spine; epigynum (Fig. 120).

Female—Total length 1.6 mm. Carapace 0.75 mm long, 0.6 mm wide. Abdomen 0.9 mm long, 0.6 mm wide.

Eyes of female (Fig. 87).

Leg formula 1423. First leg seven times, first femur twice as long as carapace.

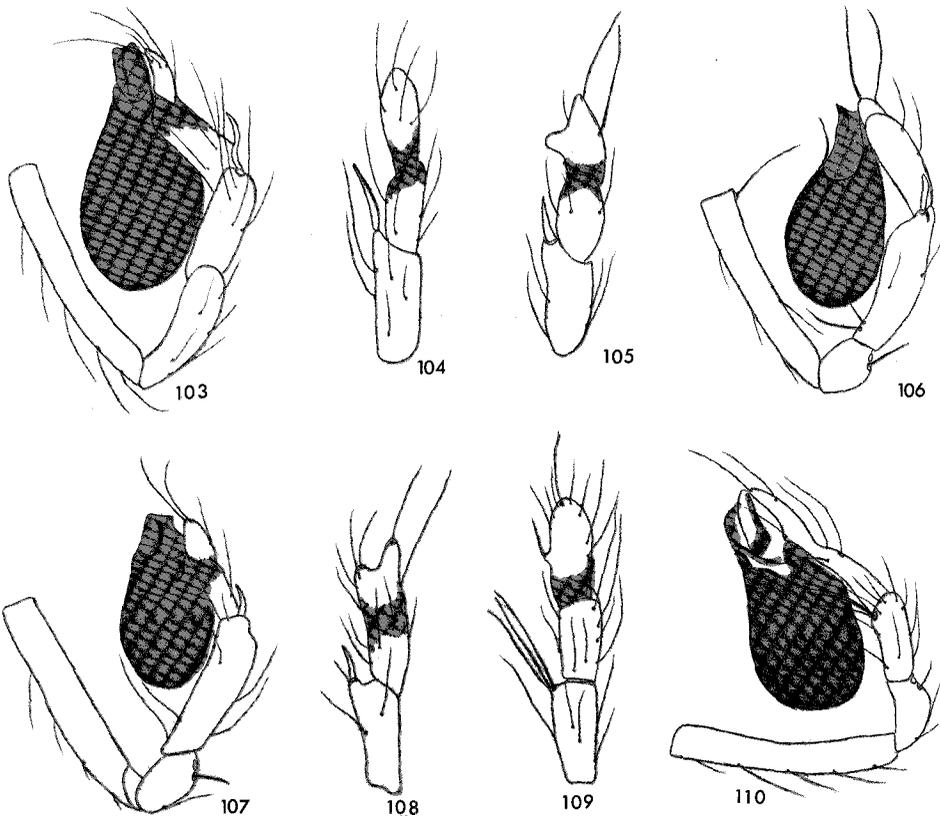
Epigynum as shown in Fig. 120.

	I	II	III	IV	Palpus
Femur	1.50	1.20	1.10	1.35	0.32
Patella	0.25	0.22	0.20	0.20	0.11
Tibia	1.60	1.15	1.15	1.60	0.21
Metatarsus	1.20	0.87	0.87	1.15	—
Tarsus	<u>0.80</u>	<u>0.65</u>	<u>0.65</u>	<u>0.70</u>	<u>0.31</u>
Total	5.35	4.09	3.45	4.95	0.95

Male holotype—Total length 1.5 mm. Carapace 0.6 mm long, 0.5 mm wide. Abdomen 0.8 mm long, 0.6 mm wide.

Leg formula 1423. First leg about seven times, first femur 1.8 times as long as carapace.

Male palpus (Figs. 105-106) with elongated segments; tarsus deeply grooved at middle and armed with conical retrolateral lobe without special spine; tarsus with retrolateral spur armed with short spine.



Figs. 103-110.—Left male palpi of species of *Leptoneta*: 103, *L. rainesi*, whole palpus, retrolateral view; 104, *L. rainesi*, tibia and tarsus, dorsal view; 105, *L. pecki*, tibia and tarsus, dorsal view; 106, *L. pecki*, whole palpus, retrolateral view; 107, *L. isolata*, whole palpus, retrolateral view; 108, *L. isolata*, tibia and tarsus, dorsal view; 109, *L. bonita*, tibia and tarsus, dorsal view; 110, *L. bonita*, whole palpus, retrolateral view.

	I	II	III	IV
Femur	1.10	0.85	0.72	1.05
Patella	0.21	0.21	0.19	0.19
Tibia	1.20	0.90	0.68	1.25
Metatarsus	0.95	0.75	0.60	1.00
Tarsus	<u>0.64</u>	<u>0.53</u>	<u>0.43</u>	<u>0.59</u>
Total	4.10	3.24	2.62	4.08

Type Data—Male holotype from Grutas de San Bartolo, 16 km SW Monterrey, Nuevo León, México, in American Museum of Natural History.

Distribution—Known only from above caves.

Leptoneta reclusa Gertsch

Leptoneta reclusa Gertsch, 1971, p. 53, Figs. 12-13. *Neoleptoneta reclusa* Brignoli, 1972, p. 137.

Diagnosis—Small, dusky, long-legged species with obsolescent eyes, probable troglobite; first femur of female 2.4 times as long as carapace; first leg of male nine times as long as carapace; male palpus with elongated segments, tarsus without lateral lobe, tibia armed with retrolateral spur bearing spine; epigynum (Fig. 117).

Female—Total length 2.2 mm. Carapace 0.9 mm long, 0.73 mm wide. Abdomen 1.3 mm long, 1 mm wide.

Eyes of female (Fig. 86); right chelicera (Fig. 95).

Legs fragmented; first femur 2.2 mm, second femur 1.75 mm, third femur 1.4 mm, fourth femur 2 mm. Palpus: femur 0.52 mm, patella 0.14 mm, tibia 0.37 mm, tarsus 0.5 mm, total 1.53.

Epigynum as shown in Fig. 117.

Male holotype—Total length 2.2 mm. Carapace 0.82 mm long, 0.7 mm wide. Abdomen 1.2 mm long, 0.85 mm wide.

Leg formula 4123. First leg nine times, first femur 2.6 times as long as carapace.

Male palpus (Figs. 111-112) with elongated segments; tarsus moderately grooved at middle, without lateral lobe or special setae; tibia with long retrolateral spur and thin apical spine.

	I	II	III	IV	Palpus
Femur	2.25	1.80	1.40	1.85	0.55
Patella	0.25	0.25	0.25	0.25	0.20
Tibia	2.20	1.80	1.40	2.50	0.23
Metatarsus	1.70	1.60	1.20	2.15	—
Tarsus	<u>1.00</u>	<u>1.00</u>	<u>0.85</u>	<u>1.20</u>	<u>0.33</u>
Total	7.40	6.45	5.10	7.95	1.41

Type Data—Male holotype from Cueva de Chorros de Agua, W of Montemorelos, Nuevo León, México, in American Museum of Natural History.

Distribution—Known only from above cave.

Record—México: *Nuevo León*: Cueva de Chorros de Agua, 20 km W. Montemorelos, 19 June 1969 (S. & J. Peck, R. Norton), female, immature.

Leptoneta rainesi Gertsch

Leptoneta rainesi Gertsch, 1971, p. 54, Figs. 5-6. *Neoleptoneta rainesi* Brignoli, 1972, p. 137.

Diagnosis—Small, dusky, short-legged species; first leg of female 5.8 times, of male 5.6 times as long as carapace; tarsus of male palpus slender, apically rounded, without accessory lobe; epigynum (Fig. 118).

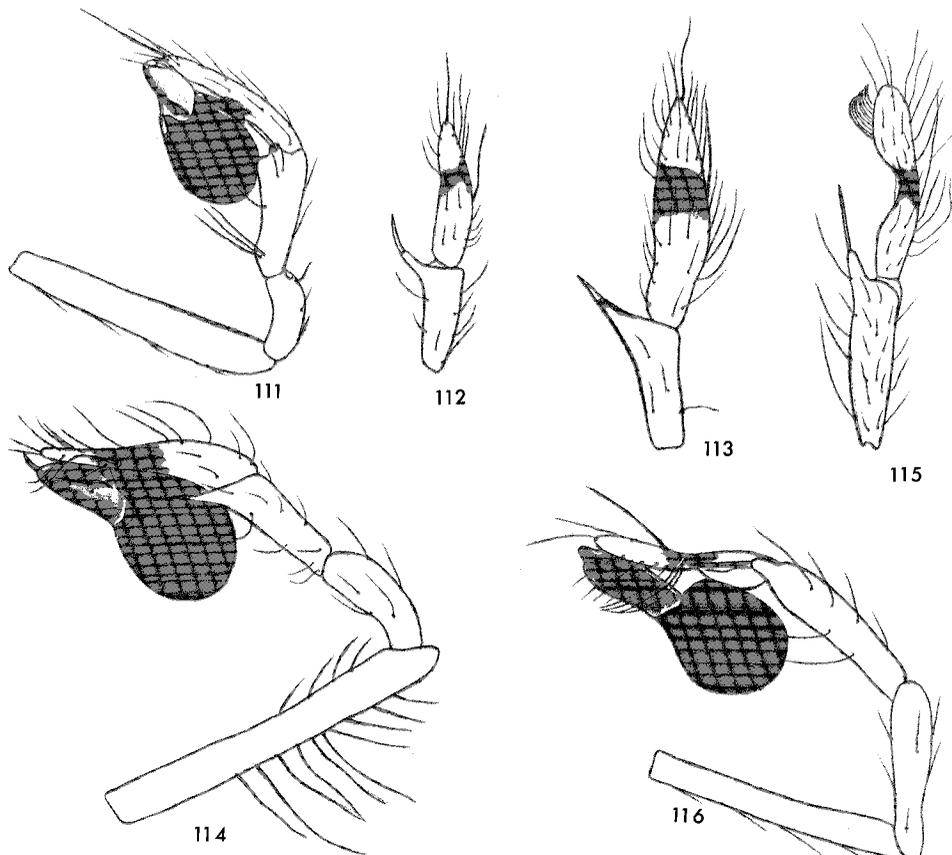
Female—Total length 1.6 mm. Carapace 0.55 mm long, 0.5 mm wide. Abdomen 1 mm long, 0.8 mm wide.

Eyes as shown in Fig. 89.

Leg formula 1423. First leg 5.8 times, first femur 1.5 times as long as carapace.

Epigynum as shown in Fig. 118.

	I	II	III	IV
Femur	0.85	0.75	0.63	0.85
Patella	0.15	0.17	0.16	0.19
Tibia	0.94	0.70	0.55	0.90
Metatarsus	0.75	0.60	0.54	0.65
Tarsus	<u>0.55</u>	<u>0.45</u>	<u>0.40</u>	<u>0.50</u>
Total	3.25	2.67	2.28	3.09



Figs. 111-116.—Left male palpi of species of *Leptoneta*: 111, *L. reclusa*, whole palpus, retrolateral view; 112, *L. reclusa*, tibia and tarsus, dorsal view; 113, *L. delicata*, tibia and tarsus, dorsal view; 114, *L. delicata*, whole palpus, retrolateral view; 115, *L. capilla*, tibia and tarsus, dorsal view; 116, *L. capilla*, whole palpus, retrolateral view.

Male holotype—Total length 1.6 mm. Carapace 0.65 mm long, 0.52 mm wide. Abdomen 0.9 mm long, 0.7 mm wide.

Leg formula 1423. First leg 5.6 times, first femur 1.5 times as long as carapace.

Male palpus (Figs. 103-104) with elongated segments; tarsus deeply grooved at middle, rounded at apex, without lobes or modified setae; tibia with blunt retrolateral spur bearing long spine.

	I	II	III	IV	Palpus
Femur	0.98	0.80	0.67	0.95	0.40
Patella	0.19	0.18	0.16	0.19	0.20
Tibia	1.00	0.78	0.62	0.96	0.15
Metatarsus	0.90	0.66	0.62	0.85	—
Tarsus	<u>0.60</u>	<u>0.50</u>	<u>0.41</u>	<u>0.56</u>	<u>0.26</u>
Total	3.67	2.92	2.48	3.51	1.01

Type Data—Male holotype from Cueva de El Pachón, 7.5 km NE Antiguo Morelos, Tamaulipas, México, in the American Museum of Natural History.

Distribution—Caves of Tamaulipas, México.

Record—México: *Tamaulipas*: Wet Cave, 8 km NW Gómez Farías, 2 June 1964 (J. Reddell, D. McKenzie), female.

Leptoneta bonita, new species

Leptoneta rainesi Gertsch, 1971, p. 55 (Cueva Bonita record only).

Diagnosis—Small, grayish cavernicole with dusky band on each side of carapace and eyes of medium size; first femur 1.9 times as long as carapace; male palpus without lobe on tarsus, with angle on tibia bearing thin spine.

Etymology—Specific name for Cueva Bonita, Spanish *bonita*, pretty.

Male—Total length 1.65 mm. Carapace 0.6 mm long, 0.57 mm wide. Abdomen 1 mm long, 0.6 mm wide.

Cephalothorax and legs grayish; carapace with broad dusky band on each side; front eyes enclosing black field and posterior eyes smudged with dusky; sternum brown; legs tinged with brown; abdomen whitish above but venter light brown.

Clypeus 0.13 mm high, equal to about length of eye group. Eyes (Fig. 90) of medium size, subequal; oval posterior eyes separated from front lateral by radius. Chelicera: promargin with eight subequal, closely spaced teeth; retromargin with four denticles.

First femur 1.9 times as long as carapace.

Male palpus (Figs. 109-110) with elongated segments; tarsus deeply grooved at middle, broadly rounded at apex, without retrolateral lobe but bearing one enlarged spine; tibia with slight retrolateral enlargement at apex with one long spine and two lesser ones.

	I	II	III	IV	Palpus
Femur	1.14	0.84	0.77	0.95	0.33
Patella	0.20	0.20	0.19	0.19	0.15
Tibia	—	0.90	0.62	—	0.16
Metatarsus	—	0.72	0.63	—	—
Tarsus	<u>—</u>	<u>0.53</u>	<u>0.49</u>	<u>—</u>	<u>0.27</u>
Total	—	3.19	2.70	—	0.91

Type Data—Male holotype from Cueva Bonita, 36 km SW Victoria, Tamaulipas, 18 July 1967 (J. Fish).

Leptoneta brunnea, new species

Diagnosis—Small, brown, short-legged epigeal species; first femur 1.4 times as long as carapace; femur of male palpus armed with six heavy spines.

Etymology—Specific name from Latin *brunneus*, brown.

Female, subadult: Total length 1.6 mm. Carapace 0.7 mm long, 0.53 mm wide. Abdomen 1 mm long, 0.7 mm wide.

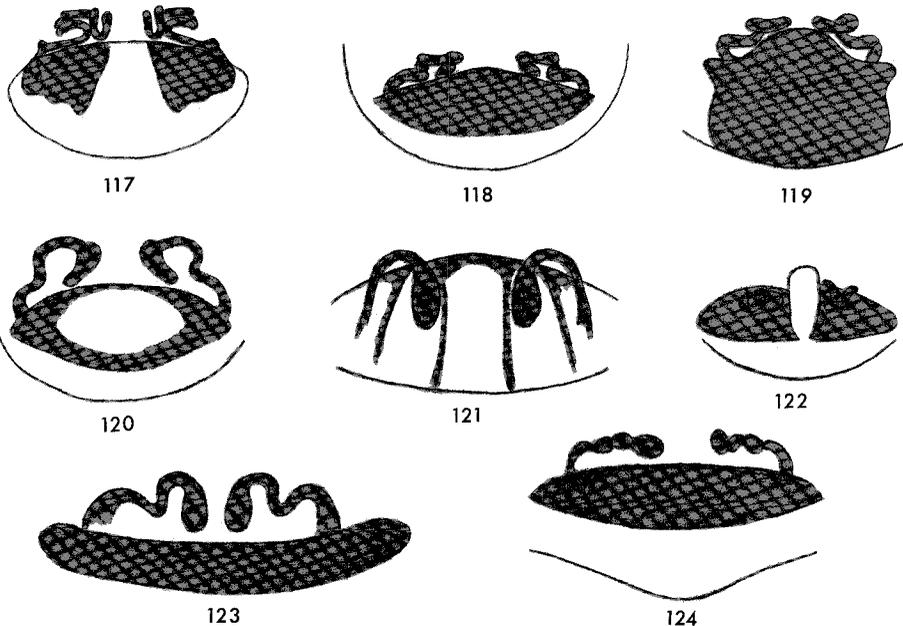
Carapace dusky brown, darker on sides, with small black linear groove and lateral radiations apparent; front eyes enclosing black area and posterior pair narrowly ringed with black; sternum, endites and labium dark brown; legs dusky brown. Abdomen brown with purplish cast.

Carapace and abdomen as shown in Fig. 83; clypeus 0.14 mm high, equal to width of front eyes, shorter than eye group. Eyes (Fig. 85) large, group of six nearly as broad as long; posterior eye separated from anterior lateral eye by radius. Chelicera (Fig. 93); promargin with seven slightly separated teeth; retromargin with four denticles.

First femur 1.4 times as long as carapace.

	I	II	III	IV	Palpus
Femur	1.02	0.86	0.77	—	0.42
Patella	0.24	0.22	0.21	—	0.14
Tibia	1.14	0.80	0.62	—	0.24
Metatarsus	0.70	0.70	0.63	—	—
Tarsus	—	0.55	0.50	—	0.42
Total	—	3.13	2.73	—	1.12

Male—Total length 2 mm. Carapace 0.76 mm long, 0.62 mm. Abdomen 1.2 mm long, 0.7 mm wide.



Figs. 117-124.—Dorsal view of epigyna of species of *Leptoneta*: 117, *L. reclusa*; 118, *L. rainesi*; 119, *L. capilla*; 120, *L. pecki*; 121, *L. chisosea*; 122, *L. furtiva*; 123, *L. isolata*; 124, *L. delicata*.

Leg formula 1423. First leg 5.7 times, first femur 1.5 times as long as carapace.

Male palpus (Figs. 101-102) with elongated segments; tarsus grooved beyond middle, unmodified except for long spine on retrolateral side; tibia unmodified; femur stout, with row of six heavy spines on elevated alveolae.

	I	II	III	IV	Palpus
Femur	1.15	0.82	0.80	1.05	0.50
Patella	0.22	0.20	0.20	0.20	0.28
Tibia	1.30	0.92	0.73	1.13	0.22
Metatarsus	1.00	1.00	0.70	0.92	—
Tarsus	<u>0.70</u>	<u>0.60</u>	<u>0.58</u>	<u>0.63</u>	<u>0.34</u>
Total	4.37	3.54	3.01	3.93	1.32

Type Data—Male holotype and subadult female from 18 km S. Tenango de Doria, 2500 m, Hidalgo, México, 24-28 July 1969 (S. & J. Peck), from can trap in open pine forest.

Leptoneta modica, new species

Diagnosis—Small, reddish brown, short-legged epigeal species; carapace with pair of small erect spurs on posterior margin; first leg five times as long as carapace; tarsus of male palpus with spur at apex on prolateral side and long spur bearing apical spine on retrolateral side of tibia.

Etymology—Specific name from Latin *modicus*, moderate.

Male—Total length 1.5 mm. Carapace 0.65 mm long, 0.52 mm wide. Abdomen 0.83 mm long, 0.6 mm wide.

Cephalothorax and appendages light reddish brown; front eyes enclosing black area and posterior eyes narrowly margined in black; abdomen dusky brown with faint purplish cast.

Clypeus 0.13 mm high, much longer than width of front eyes and about as high as length of eye group. Eyes (Fig. 88) of medium size; posterior eyes smaller, separated from front lateral eye by nearly diameter. Carapace narrowed in front, with only faint trace of linear groove; posterior margin with pair of small, sharp spurs best seen in lateral view. Chelicera: promargin with eight subequal teeth; retromargin with three denticles.

Leg formula 1423. First leg five times, first femur 1.37 times as long as carapace. Palpus: femur 0.36 mm, patella 0.14 mm, tibia 0.2 mm, tarsus 0.24 mm, total 0.94.

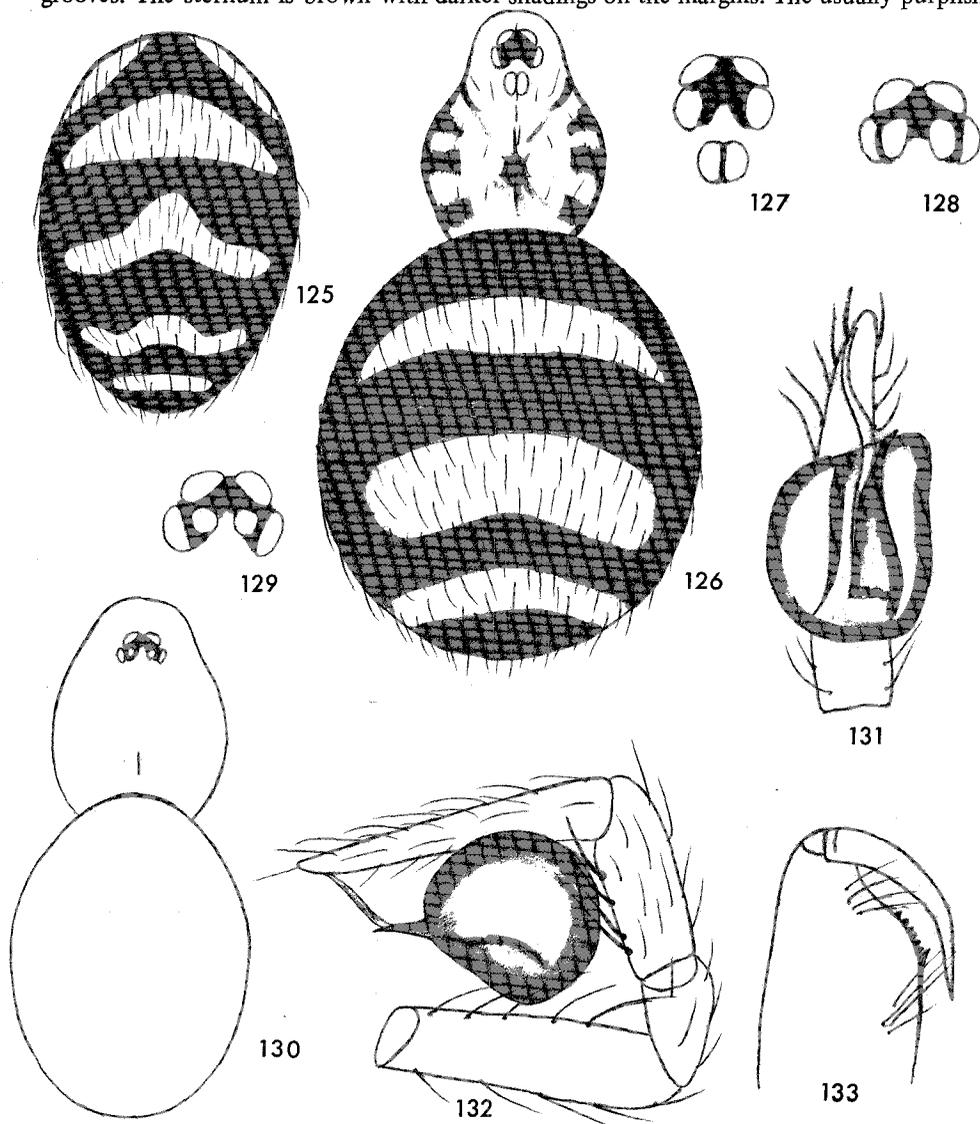
Male palpus (Figs. 98-100) with elongated segments; tarsus grooved beyond middle of segment, slender, with thin spur near apex on prolateral side; tibia with retrolateral process tipped with short spine.

	I	II	III	IV	Palpus
Femur	0.89	0.73	0.70	0.80	0.36
Patella	0.20	0.18	0.17	0.20	0.14
Tibia	0.89	0.62	0.52	0.88	0.20
Metatarsus	0.71	0.50	0.46	0.70	—
Tarsus	<u>0.54</u>	<u>0.45</u>	<u>0.41</u>	<u>0.52</u>	<u>0.24</u>
Total	3.23	2.48	2.26	3.10	0.94

Type Data—Male holotype from Chipinque, Monterrey, Nuevo León, México, 25, September 1943 (F. Bonet).

THE CALIFORNIAN FAUNA

This group of taxa is distributed from south California north into Oregon, mostly in the Coast Ranges and especially in the redwood country. The five known species live in various kinds of ground litter in mesic situations. All are quite large and average about 2 mm in length. Their legs are long, the first pair averaging about six times the length of the carapace, and they are set with quite robust spines. All are big-eyed types with yellowish to brown carapaces marked with dusky shadings on the sides and distinctly marked linear grooves. The sternum is brown with darker shadings on the margins. The usually purplish



Figs. 125-133.—Species of Leptonetidae: 125, *L. californica*, abdomen of subadult female, dorsal view; 126, *L. californica*, carapace and abdomen of subadult female, dorsal view; 127, *L. oasa*, eyes of male; 128, *Archoleptoneta obscura*, eyes of female; 129, *A. schusteri*, eyes of female; 130, *A. schusteri*, carapace and abdomen of female, dorsal view; 131, *A. schusteri*, tarsus of left male palpus, ventral view; 132, *A. schusteri*, left male palpus, retrolateral view; 133, *A. schusteri*, right chelicera of female, ventral view.

brown abdomens are provided with more or less distinct pale and dark chevrons on the dorsum, these being especially well marked in subadult specimens.

The *californica* group is here considered to be a complex derived from a single basic stock, even though the features of some taxa seem derivative ones. The large eyes are subequal in size and the front row forms a tight semicircle; the posterior eyes are separated from the front lateral by somewhat less than their diameter. The epigyna of the females present lightly sclerotized atrial pouches which give rise to small convoluted tubes lying on the dorsal surface and forming posteriorly directed coils. The male palpi of *oasa* and *wapiti* are little modified from the basic *Leptoneta* pattern: their tarsi bear deep transverse grooves and have retrolateral lobes each bearing a single stiff, modified seta; the suboval bulbs are of standard design and some have an accessory subapical appendage. *Leptoneta noyoana* shares these features but has the basal segments of the palpus greatly elongated, to the extent that the palpus is longer than the third leg. The male palpi of *californica* and *helferi* also have the segments elongated and the femora bear sublateral rows of stout spines on the ventral margins, these most numerous in the latter. Also in these species the palpal bulb is drawn out to a thin appendage projecting back along the venter of the tibia. The key to males is based only on palpal features. The four known females are of similar appearance and offer features mainly in their quite stereotyped epigyna for a key.

KEY TO THE MALES

- 1a. Bulb of male palpus with long, posteriorly directed appendage 2
 1b. Bulb rounded behind, without thin appendage 3
- 2a(1a). Bulbal appendage reaching to end of tibia (Fig. 146) *californica* Banks
 2b. Bulbal appendage reaching only beyond middle of tibia (Fig. 148)
 *helferi*, new species
- 3a(1b). Tibia more than twice as long as tarsus (Fig. 142) *noyoana*, new species
 3b. Tibia much shorter 4
- 4a(3b). Bulb with subapical appendage (Figs. 137-138) *wapiti*, new species
 4b. Bulb lacking subapical appendage (Figs. 134, 136) *oasa*, new species

KEY TO THE FEMALES

- 1a. Front margin of epigynum in recurved line 2
 1b. Front margin essentially straight 3
- 2a(1a). Epigynal pattern (Fig. 147), with tubular receptacles smaller
 *helferi*, new species
 2b. Epigynal pattern (Fig. 150), with receptacles larger *wapiti*, new species
- 3a(1b). Epigynal pattern (Fig. 151); Riverside County, California *oasa*, new species
 3b. Epigynal pattern (Figs. 143, 149); Contra Costa County, California and
 northward *californica* Banks

Leptoneta californica Banks

Leptoneta californica Banks, 1904, p. 333; 1910, p. 6. Comstock, 1913, p. 307. Fage, 1913, p. 566. Moles, 1921, p. 40. Roewer, 1942, p. 313. Bonnet, 1957, p. 2392. *Leptoneta sylvia* Chamberlin & Ivie, 1942, p. 9. Vogel, 1967, p. 88.

Diagnosis—Typical dark species of series; first leg of female 6.7 times, of male 7.7 times as long as carapace; bulb of male palpus with thin appendage reaching to patella; epigynum (Figs. 143, 149).

Female holotype of sylvia—Total length 2.8 mm. Carapace 1.03 mm long, 0.9 mm wide. Abdomen 1.6 mm long, 1.3 mm wide.

Carapace dusky yellowish brown, with dusky shadings on sides, narrow marginal brown seam and black linear groove; front eye row enclosing black field, posterior eyes narrowly ringed with black; sternum dusky brown, darkened on margins; legs dusky yellow. Abdomen mostly purplish brown; dorsum paler, with faint traces of dark chevrons (see Fig. 126), with distinct chevrons in immature (Fig. 125); venter with dark lines on sides and in front of spinnerets.

Dorsal view of carapace and abdomen as in Fig. 126. Clypeus 0.12 mm high, subvertical, narrower than front eye row and much shorter than eye length. Eyes large (Fig. 126); front eyes subequal, subcontiguous, forming tight semicircle, front lateral eyes being separated by about long diameter; posterior eyes smaller, suboval, separated from front lateral eye by less than short diameter of former. Sternum 0.6 mm long and wide. Chelicera (Fig. 155); promargin with six or seven teeth, of which apical two are larger, more widely spaced, and basal one at end of carina largest; retromargin with three or four denticles. Abdomen subglobose, about as high as wide.

Leg formula 1423. First leg 6.7 times, first femur 1.8 times as long as carapace. Palpus: femur 0.63 mm, patella 0.23 mm, tibia 0.45 mm, tarsus 0.55 mm, total 1.86 mm.

Epigynum (Figs. 143, 149) presenting thin tube on each side usually directed posteriorly and between them shallow atriobursal pouch; Fig. 149 from female from Mt. Diablo.

	I	II	III	IV
Femur	1.90	1.40	1.24	1.66
Patella	0.35	—	0.32	0.30
Tibia	2.00	—	1.15	1.68
Metatarsus	1.62	—	1.14	1.46
Tarsus	<u>1.03</u>	<u>—</u>	<u>0.65</u>	<u>0.80</u>
Total	6.90	—	4.50	5.90

Male from Crescent City—Total length 2.2 mm. Carapace 1.03 mm long, 0.81 mm wide. Abdomen 1.1 mm long, 0.9 mm wide.

Coloration more yellow than that of female but pattern essentially same on cephalothorax and abdomen.

Carapace much longer than broad, moderately narrowed and subtruncated in front, in lateral view highest behind eyes, with thin, shallow linear depression distinct. Clypeus 0.15 mm high, subvertical, narrow, equal to width of front median eyes, narrower than front eye row and half as long and eye group. Eyes large, subequal in size, oval in shape; posterior eyes oval, separated from front lateral by nearly long diameter. Sternum 0.62 mm long, 0.61 mm wide, thinly clothed with erect setae. Endite 0.4 mm long, 0.3 mm wide. Chelicera (Fig. 154): promargin like that of female but both apical teeth larger,

more widely spaced; retromargin with four denticles. Abdomen elevated, subglobose like that of female.

Leg formula 1423. First leg 7.7 times, first femur 2.1 times as long as carapace.

Male palpus (Figs. 144-146) with elongated segments; tarsus deeply grooved at middle, with rounded retrolateral lobe bearing short spine; tibia enlarged at apex and with heavy spine near apex on retrolateral side; femur with seven heavy spines mainly in single row below retromargin; bulb produced behind into long thin appendage with tip near patella, with series of spurs at apex of embolar portion.

	I	II	III	IV	Palpus
Femur	2.20	1.72	1.45	1.85	1.33
Patella	0.35	0.32	0.28	0.32	0.54
Tibia	2.43	1.77	1.33	1.83	0.86
Metatarsus	1.90	1.43	1.26	1.40	—
Tarsus	<u>1.10</u>	<u>0.90</u>	<u>0.70</u>	<u>0.95</u>	<u>0.40</u>
Total	7.98	6.14	5.02	6.35	3.13

Type Data—Female type of *L. californica* Banks from Mt. Diablo, Contra Costa County, California June (Fuchs collector), originally in California Academy of Sciences, presumed lost. Female type of *L. sylva* Chamberlin & Ivie from 19 mi N Wolf Creek, Oregon, 6 April 1937 (J. C. Chamberlin) in American Museum of Natural History (University of Utah Collection).

Distribution—North California and Oregon.

Records—*California*: Contra Costa County: Mt. Diablo, 23 April 1953 (R. Schuster), female. Oakland Hills, 9 January 1954 (R. Schuster), female. Napa County: Mt. St. Helena, 31 December 1953 (G. Marsh, R. Schuster, V. Roth), female, immature. Two mi W Oakville, 31 December 1953 (V. Roth), male, female. 10 mi S Monticello, 17 March 1957 (R. Schuster), female. Sonoma County: Mark West Springs, 31 December 1953 (G. Marsh, R. Schuster, V. Roth), two females, immature. One mi S Trenton, 15 May 1957 (R. Schuster), two females, immature. Armstrong Park, 14 March 1954 (J. Helfer), female. El Norte County: Near Crescent City, 9 November 1956 (J. Schuh), male from redwood duff. *Oregon*: Jackson County: Three mi N Gold Hill, 22 January 1972 (E. Benedict), two females. 10 mi NW Central Point, 1200 feet, 22 January 1972 (E. Benedict), female. Josephine County: 10 mi E Placer, 22 July 1962 (V. Roth), female. Grave Creek, 30 May 1952 (V. Roth), female. Curry County: 12 mi N Gold Beach, 1 October 1959 (V. Roth), two females. Douglas County: Canyonville County Park, two mi E Canyonville, 1000 feet, 6 November 1971 (E. Benedict), female from berlese duff. Uncertain stations: Summit Camas Mt., 27 April 1937 (J. C. Chamberlin), female. Middle Fork of Smith River, 4 September 1963 (J. & W. Ivie), penultimate male, immature. Eight mi S Divide Guard Station, 27 July 1955 (R. Roth), two females from pine-oak woods.

Leptoneta helferi, new species

Diagnosis—Near relative of *californica* distinguished by genitalic features: first leg of female 6.6 times, of male 7.4 times as long as carapace; tibia of male palpus longer, with thin appendage of bulb not reaching patella; epigynum (Fig. 147).

Etymology—Named for Jacques R. Helfer of Mendocino, California.

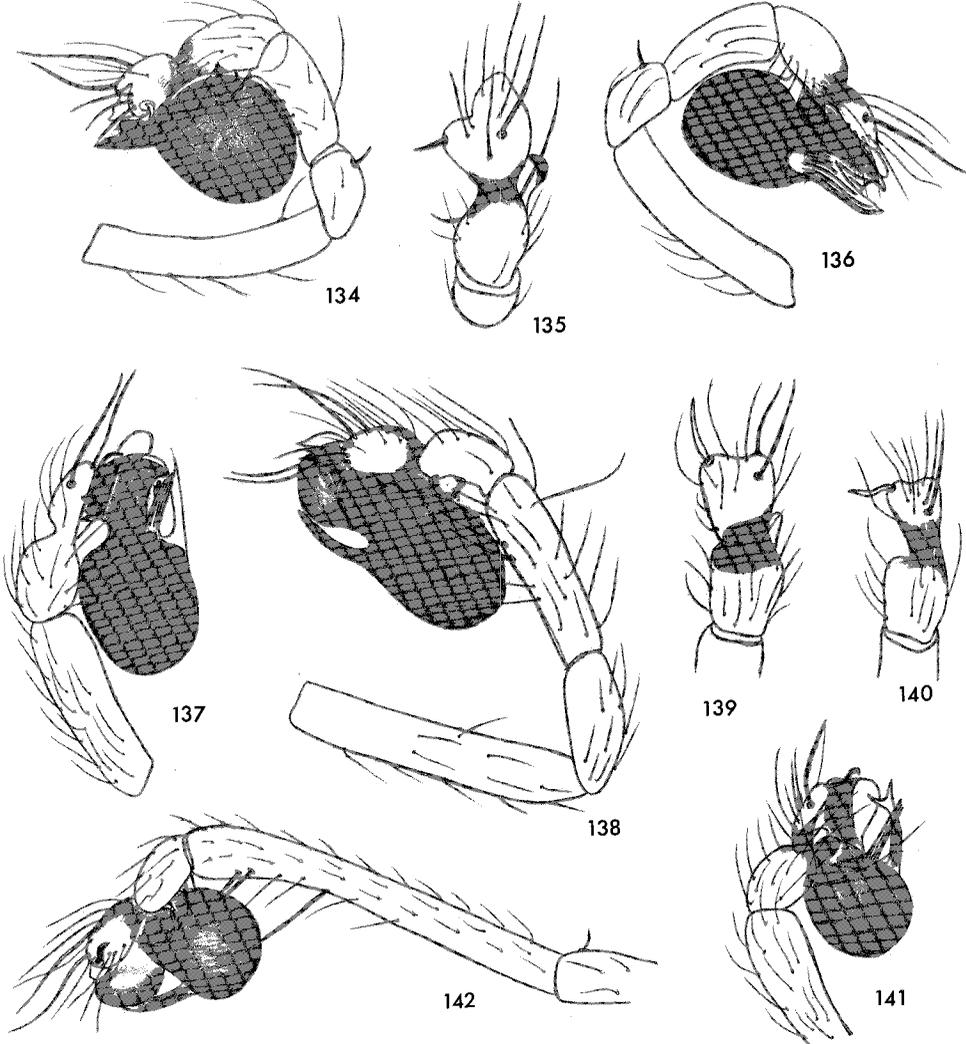
Female—Total length 2 mm. Carapace 0.97 mm long, 0.75 mm side. Abdomen 1.1 mm long, 0.9 mm wide.

Coloration and structure like those of *californica*.

Leg formula 1423. First leg 6.6 times, first femur 1.8 times as long as carapace.

Epigynum as shown in Fig. 147.

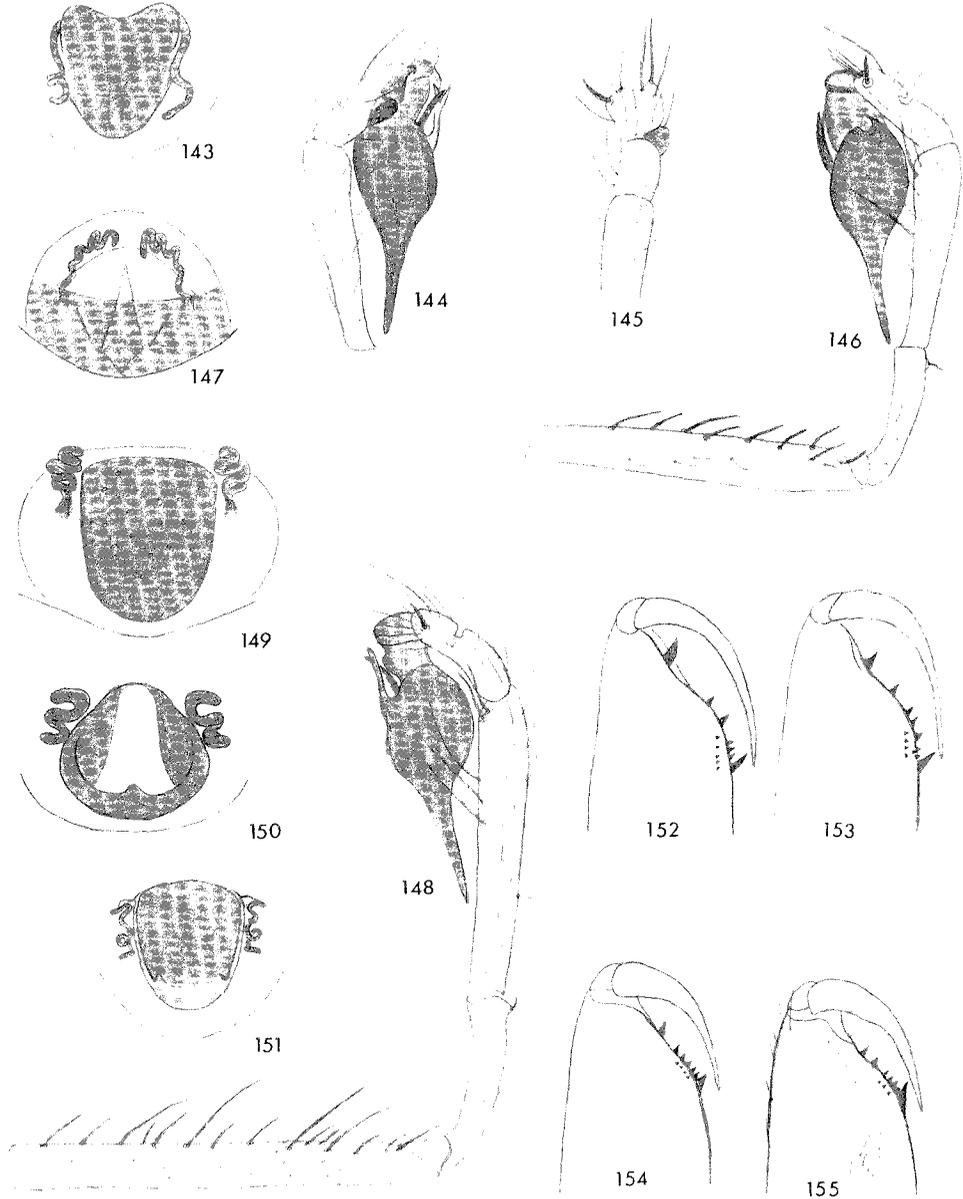
	I	II	III	IV	Palpus
Femur	1.75	1.40	1.20	1.60	0.65
Patella	0.32	0.28	0.26	0.24	0.19
Tibia	1.95	1.45	1.10	1.55	0.49
Metatarsus	1.47	1.12	0.95	1.34	—
Tarsus	<u>0.94</u>	<u>0.80</u>	<u>0.65</u>	<u>0.80</u>	<u>0.55</u>
Total	6.43	5.05	4.16	5.53	1.88



Figs. 134-142.—Left male palpi of species of *Leptoneta*: 134, *L. oasa*, whole palpus, prolateral view; 135, *L. oasa*, tibia and tarsus, dorsal view; 136, *L. oasa*, whole palpus, retrolateral view; 137, *L. wapiti*, tibia and tarsus, prolateral view; 138, *L. wapiti*, whole palpus, retrolateral view; 139, *L. wapiti*, tibia and tarsus, dorsal view; 140, *L. noyoana*, tibia and tarsus, dorsal view; 141, *L. noyoana*, tibia and tarsus, prolateral view; 142, *L. noyoana*, tibia and tarsus, retrolateral view.

Male—Total length 2.2 mm. Carapace 1.08 mm long, 0.9 mm wide. Abdomen 1.2 mm long, 1 mm wide.

Coloration and structure like those of *californica* unless otherwise noted. Chelicera



Figs. 143-155.—Species of *Leptoneta*: 143, *L. californica*, epigynum, dorsal view; 144, *L. californica*, tibia and tarsus of left male palpus, prolateral view; 145, *L. californica*, tibia and tarsus of left male palpus, dorsal view; 146, *L. californica*, left male palpus, retrolateral view; 147, *L. helferi*, epigynum, dorsal view; 148, *L. helferi*, left male palpus, retrolateral view; 149, *L. californica*, epigynum of female from Mt. Diablo, dorsal view; 150, *L. wapiti*, epigynum of female, dorsal view; 151, *L. oasa*, epigynum of female, dorsal view; 152, *L. noyoana*, right chelicera of male, ventral view; 153, *L. helferi*, right chelicera of male, ventral view; 154, *L. californica*, right chelicera of male, ventral view; 155 *L. californica*, right chelicera of female, ventral view.

(Fig. 153) promargin with eight teeth, apical one widely separated from others; retro-margin with four denticles.

Leg formula 1423. First leg 7.4 times, first femur twice as long as carapace.

Male palpus (Fig. 148) like that of *californica* but segments much longer; tarsus with deep transverse groove and rounded lobe bearing short spine; tibia much longer, far exceeding length of bulb; femur very long, with 15 heavy spines in linear series on ventral edge of retrolateral side.

	I	II	III	IV	Palpus
Femur	2.20	1.70	1.43	1.86	1.50
Patella	0.34	0.32	0.30	0.31	0.60
Tibia	2.45	1.73	1.37	1.84	0.96
Metatarsus	1.92	1.40	1.25	1.53	—
Tarsus	<u>1.07</u>	<u>0.85</u>	<u>0.75</u>	<u>0.95</u>	<u>0.33</u>
Total	7.98	6.00	5.10	6.49	3.39

Type Data—Male holotype from Carlotta, Humboldt County, California, 15 September 1961 (W. Ivie, W. J. Gertsch).

Distribution—Northwestern California.

Records—*California*: Mendocino County: 4.2 mi S Piercy, 17 February 1967 (V. Roth), male. Five mi N Piercy, 6 April 1960 (W. J. Gertsch, W. Ivie), female. Mendocino, 19 July 1962 (V. Roth), female. Humboldt County: 18 m S Klamath, 13 August 1953 (G. A. Marsh, R. O. Schuster), female. F. K. Lane State Park, near Phillippsville, 1 October 1959 (V. Roth), male. Two mi N Phillippsville, 14 September 1961 (W. Ivie, W. J. Gertsch), female, penultimate male. Miranda 4 June 1936, female, immature. Two mi S Weott, 1 October 1959 (V. Roth), penultimate male. Del Norte County: Two mi N Fort Dick, 21 November 1953 (V. Roth), female. Two mi E Fort Dick, 1 May 1951 (V. Roth), female.

Leptoneta wapiti, new species

Diagnosis—Pale species of *californica* group with standard genitalia; first leg of female 6.6 times, of male 6.8 times as long as carapace; tarsus of male palpus deeply grooved, with rounded retrolateral lobe bearing long spine, and bulb lacking posterior appendage; epigynum (Fig. 150).

Etymology—Specific name from Shawnee *wapiti*, American elk, in reference to type locality.

Female—Total length 1.9 mm. Carapace 0.93 mm long, 0.78 mm wide. Abdomen 1.05 mm long, 0.7 mm wide.

Coloration paler than that of *californica*; carapace dusky yellow; sternum yellowish brown; legs pale yellow; abdomen purplish with faint dusky chevrons on dorsum.

	I	II	III	IV	Palpus
Femur	1.66	1.42	1.20	1.60	0.60
Patella	0.31	0.30	0.25	—	0.20
Tibia	1.80	1.30	1.00	—	0.46
Metatarsus	1.40	1.07	0.95	—	—
Tarsus	<u>0.95</u>	<u>0.80</u>	<u>0.65</u>	<u>—</u>	<u>0.70</u>
Total	6.12	4.89	4.05	—	1.96

Clypeus 0.12 mm high, narrower than front eye row, half as long as eye group. Eyes large; front eyes subequal and subcontiguous; posterior eyes oval, equal to and separated from front eyes by narrow diameter. Sternum 0.54 mm long and wide. Chelicera with dentition of *californica*.

Leg formula 1423. First leg 6.6 times, first femur 1.7 times as long as carapace.

Epigynum as shown in Fig. 150.

Male—Total length 1.75 mm. Carapace 0.8 mm long, 0.66 mm wide. Abdomen 1 mm long, 0.8 mm wide.

Coloration and structure like those of female unless otherwise noted. Clypeus 0.13 mm high, about as long as width of front eye row. Eyes smaller, somewhat evanescent, without pigment.

Leg formula 1423. First leg 6.8 times, first femur 1.7 times as long as carapace.

Male palpus (Figs. 137-139) with elongated segments; tarsus deeply grooved near middle with rounded retrolateral angle bearing long spine and at base two twisted setae; tibia with two long spines on retrolateral side beyond middle; bulb suboval, with blunt rounded embolar part and thin subapical appendage.

	I	II	III	IV	Palpus
Femur	1.40	1.20	1.05	1.30	0.60
Patella	0.28	0.25	0.25	0.25	0.23
Tibia	1.57	1.22	0.90	1.32	0.30
Metatarsus	1.30	1.00	0.90	1.10	—
Tarsus	<u>0.86</u>	<u>0.70</u>	<u>0.65</u>	<u>0.77</u>	<u>0.32</u>
Total	5.41	4.37	3.75	4.74	1.45

Type Data—Male holotype from Cameron Road, Elk, Mendocino County, California, 16 February 1967 (V. Roth).

Distribution—Northwestern California.

Records—*California*: Mendocino County: Mendocino, 4 January 1958 (J. P. Helfer), male. Casper, 7 March 1954 (J. P. Helfer), immature. One mi N Piercy, S Fork Elk River 1 October 1959 (V. Roth), immature. Humboldt County: One mi S Dyerville, 19 September 1953 (R. Schuster), female. Big Lagoon, 13 August 1953 (G. A. Marsh, R. Schuster), immature. Blue Lake, 19 September 1953 (R. Schuster), three immature. 20 mi W Willow Creek, 20 July 1965 (V. Roth), penultimate male. Lake County: Scott Valley, 22 February 1954 (J. P. Helfer), two immature probably this species.

Leptoneta noyoana, new species

Diagnosis—Derivative species of group related to *wapiti*, with distinctive features of chelicera and palpus: first leg of male seven times as long as carapace; apical tooth of chelicera considerably enlarged; palpus as long as third leg, with tibia and femur greatly elongated and bulb of distinctive design.

Etymology—Based on Noyo, the type locality

Male—Total length 2.3 mm. Carapace 1.03 mm long, 0.83 mm wide. Abdomen 1.2 mm long, 0.9 mm wide.

Carapace light dusky brown, with sides darker and median linear groove distinct; front eyes enclosing dark field and posterior eyes narrowly ringed with black; sternum uniform purplish brown; legs dusky yellow; abdomen purplish brown, with indistinct pale chevrons above.

Clypeus 0.16 mm high, shorter than width of front eye row and much more than eye group. Eyes large; oval posterior eyes smaller than front eyes, separated from front lateral by nearly diameter of posterior eye. Sternum 0.6 mm long and wide. Chelicera (Fig. 152) evenly attenuated, thin at apex; promargin with seven teeth, apical one widely removed from others and larger; retromargin with five denticles.

Leg formula 1423. First leg seven times, first femur about twice as long as carapace.

Male palpus (Figs. 140-142) longer than third leg, with greatly elongated basal segments; tarsus short, deeply grooved at middle, subtruncated at apex and with trivial retrolateral lobe bearing short spines, and with twisted setae at base; tibia greatly elongated, with three large spines near apex on retrolateral side; femur long, thin, without heavy spination; bulb with bluntly rounded embolar part and small, apically forked appendage.

	I	II	III	IV	Palpus
Femur	2.04	1.60	1.30	1.78	2.06
Patella	0.35	0.30	0.27	0.30	1.27
Tibia	2.20	1.60	1.23	1.75	1.14
Metatarsus	1.75	1.31	1.15	1.40	—
Tarsus	<u>1.05</u>	<u>0.82</u>	<u>0.65</u>	<u>0.85</u>	<u>0.42</u>
Total	7.39	5.63	4.60	6.08	4.89

Type Data—Male holotype from 12-15 mi E Noyo, Mendocino County, California, 13 September 1961 (W. J. Gertsch, W. Ivie).

Leptoneta oasa, new species

Diagnosis—South California representative of *californica* group recognized by distinctive genitalia; first leg of female eight times, of male 9.1 times as long as carapace; palpus like that of *wapiti* but segments shorter and retrolateral lobe distinctive; epigynum (Fig. 151).

Etymology—Specific name based on Latin *oasis*, a green spot in the desert.

Female—Total length 2 mm. Carapace 0.9 mm long, 0.73 mm wide. Abdomen 1.35 mm long, 1 mm wide.

Carapace dull orange, with faint dusky marginal seam and dark linear groove; front eyes enclosing black field, posterior eyes narrowly ringed with black; sternum dusky brown; legs dull orange. Abdomen dirty white above, with indistinct chevrons broken on midline, dull purplish below.

Clypeus 0.16 mm high, subvertical, higher than width of front eye row and shorter than eye group. Eyes of medium size; front eyes subequal and subcontiguous; posterior eyes same size, suboval, separated from front side eye by short diameter. Sternum 0.54 mm long, 0.52 mm wide. Chelicera with dentition of *californica*.

Leg formula 1423. First leg eight times, first femur 2.2 times as long as carapace.

Epigynum as shown in Fig. 151.

	I	II	III	IV	Palpus
Femur	2.02	1.53	1.35	1.77	0.50
Patella	0.30	0.28	0.26	0.25	0.16
Tibia	2.07	1.53	1.16	1.56	0.34
Metatarsus	1.80	1.33	1.10	1.40	—
Tarsus	<u>1.00</u>	<u>0.76</u>	<u>0.64</u>	<u>0.85</u>	<u>0.48</u>
Total	7.19	5.43	4.51	5.83	1.48

Male—Total length 1.95 mm. Carapace 0.85 mm long, 0.7 mm wide. Abdomen 1.1 mm long, 0.75 mm wide.

Coloration basically like that of female; legs and mouth parts dull yellow with some dusky shadings; abdomen with purplish over whitish base, broad dark basal band and broken chevrons behind on dorsum, white patch behind genital groove and white spinnerets on venter.

Carapace broader in front than that of female. Clypeus 0.17 mm high, sloping forward, about as long as width of front eye row, much shorter than eye group. Eyes (Fig. 127) of medium size. Sternum 0.55 mm long, 0.5 mm wide. Chelicera and dentition of *californica*.

Leg formula 1423. First leg 9.1 times, first femur 2.6 times as long as carapace.

Male palpus (Figs. 134-136) with relatively short segments; tarsus deeply grooved at middle, with prominent, laterally directed retrolateral lobe bearing short spine, with two modified setae at base; bulb suboval, similar to that of *wapiti* but lacking subterminal appendage.

	I	II	III	IV	Palpus
Femur	2.20	1.70	1.40	1.80	0.48
Patella	0.30	0.27	0.23	0.26	0.16
Tibia	2.30	1.70	1.25	1.64	0.22
Metatarsus	2.00	1.50	1.20	1.52	—
Tarsus	<u>1.00</u>	<u>0.82</u>	<u>0.64</u>	<u>0.78</u>	<u>0.32</u>
Total	7.80	5.99	4.72	6.00	1.18

Type Data—Male holotype from Andreas Canyon, off Palm Canyon, near Palm Springs, Riverside County, California, 26 March 1960 (W. J. Gertsch).

Distribution—Riverside County, California.

Records—*California*: Riverside County: Andreas Canyon, 3 March 1956 (V. Roth), in Museum of Comparative Zoology; 26 March 1960 (V. Roth), male, female; 26 March 1960 (W. J. Gertsch), male. Black Mountain Camp Ground, San Jacinto Mts., 13 August 1959 (W. J. Gertsch, V. Roth), immature probably this species.

ARCHOLEPTONETINAE, NEW SUBFAMILY

Diagnosis—American leptonetids with posterior eyes in transverse row. Tarsus of male palpus leg-like segment without transverse constriction.

Archoleptoneta, new genus

Diagnosis—Characters of family except as indicated or modified below: Minute haplogyne spiders with oval carapace rounded in front and behind. Clypeus inclined forward, as high as width of eye group. Eyes six, close together in transverse row; anterior (lateral) eyes contiguous in front; posterior eyes in slightly recurved transverse row with median eyes moderately separated but nearly touching lateral eyes. Chelicera with row of small teeth on promargin. Labium much wider than long, rounded at apex, set with two long setae on each side. Leg formula 1423; legs thin, with rows of dusky hairs but mostly lacking spines. Pedipalp of female with long terminal claw. Abdomen suboval; tracheal tubes opening through single spiracle in front of spinnerets; colulus small lobe set with fine hairs. Details of female epigynum as yet unknown. Tarsus of male palpus long, leg-like appendage without transverse suture, with bulb attached in basal half.

Type of Genus—*Archoleptoneta schusteri*, new species.

Discussion—The discovery of North American leptonetids in which the posterior median eyes are retained in a transverse row with the posterior lateral eyes makes possible a clearer understanding of the entire family. In the past the classic eye pattern of *Leptoneta*, in which the posterior median eyes having retreated far to the rear now form a V-shaped figure with the posterior lateral eyes, has made identification of the family relatively easy. *Archoleptoneta* seems to represent the kind of ancestral stock from which the stereotyped modern representatives were derived. It retains the prime characters of *Leptoneta* except for the eye pattern and type of male palpus. In some respects *Archoleptoneta* is reminiscent of *Telema*, of which the American genus *Usophila* seems to be an exact synonym, but lacks the pair of tracheal openings in the middle of the abdomen, having instead the single tracheal opening immediately in front of the spinnerets. The genera *Telema* and *Archoleptoneta* share the same kind of unspecialized, leg-like tarsus with trivial alveolae for attachment of the bulb, also similar in design, to the basal part of the tarsus. The close relationship of the leptonetids and telemids was affirmed by Fage (1913) who retained them as subfamilies in the single family Leptonetidae. Although the differences in the respiratory organs of *Telema* are weighty, the similarity in the male palpi of the two genera to some extent bridges the gap between the families. Similarly, the ochyroceratids also share many features of the group and are held separate by a few characters (notably lack of a tarsal claw on the female palpus) and unique features of the reproductive system.

Archoleptoneta schusteri, new species

Diagnosis—Pale species of California with posterior eye row slightly recurved and median eyes separated by nearly diameter.

Etymology—Named for Mr. Robert Schuster of the University of California, Davis, friend, colleague and collector of many of these tiny spiders.

Female—Total length 1.3 mm. Carapace 0.57 mm long, 0.45 mm wide. Abdomen 0.85 mm long, 0.55 mm wide.

Cephalothorax and appendages pale yellow; eyes enclosing dusky field; abdomen white; hairs on body dusky. Carapace and abdomen of female, Fig. 130.

Carapace smooth, with few weak setae; pars cephalica set off by faint sutures and trivial linear median groove present. Carapace longer than broad, broadly rounded behind and more narrowly in front; pars cephalica elevated, convex, highest near median groove. Clypeus 0.12 mm high, inclined forward, exceeding width of eye group. Eyes (Fig. 129) small, group occupying about third width of head at that point. Front eyes subcontiguous, slightly larger than others; posterior eye row procurved, with posterior median eyes separated by nearly diameter, touching slightly larger lateral eyes. Sternum 0.5 mm long and wide, subcordate, produced behind between posterior coxae and separating them by width of one, set sparsely with erect hairs. Labium with four setae at apex, lateral one of each side longer. Endite as long as basal width, broadly rounded at apex, only slightly convergent at ends, with conspicuous serrula and stout seta below it on side. Chelicera (Fig. 133) of medium stoutness, with evenly curved fang; promargin with seven teeth, basal one much larger; retromargin with single denticle. Abdomen elongate oval, as high as wide.

Leg formula 1423. First leg 4.5 times, first femur 1.2 times as long as carapace. Legs clothed with rows of fine hairs, almost none of spine size.

	I	II	III	IV	Palpus
Femur	0.73	0.64	0.60	0.75	0.24
Patella	0.24	0.21	0.20	0.21	0.11
Tibia	0.69	0.55	0.47	0.68	0.16
Metatarsus	0.56	0.50	0.46	0.53	—
Tarsus	<u>0.36</u>	<u>0.34</u>	<u>0.30</u>	<u>0.36</u>	<u>0.25</u>
Total	2.58	2.24	2.03	2.53	0.76

Male—Total length 1.3 mm. Carapace 0.54 mm long, 0.42 mm wide. Abdomen 0.8 mm long, 0.45 mm wide.

Coloration and structure like those of female. Posterior median eyes smaller. Clypeus 0.12 mm high.

Leg formula 1423. First leg five times, first femur 1.4 times as long as carapace.

Male palpus (Figs. 131-132) with segments of medium length; tarsus long cylindrical, apically narrowed, without transverse groove; tibia with four enlarged spines on retro-lateral margin; bulb suboval, with short dark spur and long pale spur at apex.

	I	II	III	IV	Palpus
Femur	0.74	0.61	0.57	0.74	0.25
Patella	0.21	0.20	0.20	0.21	0.11
Tibia	0.73	0.55	0.47	0.70	0.15
Metatarsus	0.61	0.50	0.45	0.53	—
Tarsus	<u>0.40</u>	<u>0.36</u>	<u>0.33</u>	<u>0.35</u>	<u>0.30</u>
Total	2.69	2.22	2.02	2.53	0.71

Type Data—Male holotype from six mi SE Half Moon Bay, San Mateo County, California, 5 December 1953 (V. Roth).

Distribution—Widespread in California from San Diego County north to Humboldt County in coastal area and Butte and Placer Counties in the Sierras.

Records—*California*: San Diego County: Borrego State Park, 25 April 1955 (R. Schuster), six females. Sheep Canyon, Borrego State Park, 27 April 1955 (R. Schuster), four females. Between Ramona and Julian, 26 December 1958 (L. M. Smith), five females. Riverside County: Five mi SW Riverside, 2 March 1956 (I. Newell), female. Los Angeles California: Five mi S Gorman, 25 March 1959 (H. L. McKenzie), female. Contra Costa County: One mi W Orinda, 12 December 1953 (V. Roth), male, four females; 5 December 1953 (W. Ferguson), two females. Alameda County: Berkeley, 2 March 1958, two females. Marin County: Seven mi E Point Reyes, 1 March 1960 (L. M. Smith, R. Schuster). Inverness, 1 November 1953 (V. Roth), female. Santa Clara County: Mt. Madonna, 2 January 1954 (R. Burdick), five females. Stevens Creek, 25 June 1957 (R. Schuster), male, five females; 27 July 1957 (G. A. Marsh), female. Santa Cruz County: Ben Lomond, 21 June 1953 (C. D. MacNeill), female. 9.5 mi NE Soquel, 31 December 1956 (S. M. Fidel), three males, 5 females. Napa County: Three mi N Calistoga, 31 December 1953 (G. A. Marsh, R. Schuster, V. Roth), female, egg sac. Mt. St. Helena, 31 December 1951 (G. A. Marsh, R. Schuster, V. Roth), two females. Sonoma County: Mark West Springs, 31 December 1953 (G. A. Marsh, R. Schuster, V. Roth), female. Solano County: Gates Canyon, 1 May 1952 (E. I. Schlinger), immature. Monterey County: Point Cypress, 4 mi NE Carmel, 23 February 1957 (G. A. Marsh), two females. Humboldt County: Freshwater, 13 August 1953 (G. A. Marsh, R. Schuster), immature. Placer County: Four mi W Newcastle, 10 March 1959 (L. M. Smith, R. Schuster), five females; 3 January 1959 (F. Raney, R. Schuster), two females. Amador County: Five mi N

Mokelumne River on Highway 49, 5 March 1958 (L. M. Smith, R. Schuster), female. Calaveras County: Two mi W San Andreas, 25 March 1958 (L. M. Smith, R. Schuster), female. Butte County: W. of Feather Falls, 27 November 1955 (R. Schuster), female.

Archoleptoneta garza, new species

Diagnosis—Pale Texas species related to *schusteri*; legs long, first femur being 1.5 times as long as carapace; promargin of chelicera with five teeth.

Etymology—Named for Garza County, Texas.

Female—Total length 1.1 mm. Carapace 0.44 mm long, 0.28 mm wide. Abdomen 0.75 mm long, 0.5 mm wide.

Carapace shiny white; eyes enclosing black field; appendages dusky white; abdomen snowy white.

Structure like that of *schusteri* except as follows: Clypeus 0.11 mm high, as long as width of eye group. Eyes small; posterior eye row straight, median eyes small, oval, separated by narrow diameter of larger lateral eye. Sternum 0.3 mm long and wide. Promargin of chelicera with five slightly separated teeth.

Leg formula 1423. First leg 5.2 times, first femur 1.5 times as long as carapace.

	I	II	III	IV	Palpus
Femur	0.64	0.56	0.54	0.64	0.19
Patella	0.17	0.14	0.13	0.15	0.08
Tibia	0.66	0.52	0.41	0.60	0.13
Metatarsus	0.47	0.42	0.39	0.47	—
Tarsus	<u>0.37</u>	<u>0.30</u>	<u>0.30</u>	<u>0.35</u>	<u>0.22</u>
Total	2.31	1.94	1.77	2.21	0.62

Type Data—Female holotype from 7 mi E Justiceburg, Garza County, Texas, 12 October 1972 (V. Roth, B. Firstman).

Archoleptoneta obscura, new species

Diagnosis—Dark species from Mexican cave with posterior median eyes in straight row and median eyes separated by radius.

Etymology—Specific name from Latin *obscurus*, dark, obscure.

Female—Total length 1.28 mm. Carapace 0.5 mm long, 0.4 mm wide. Abdomen 0.73 mm long, 0.55 mm wide.

Carapace light dusky brown; eye tubercles black; pars cephalica with dusky mottlings from eyes to median groove; pars thoracica with dusky striations and narrow dusky seam on side margins; sternum, labium, endites and chelicerae dusky brown; legs dull yellow; abdomen dull brown.

Structure like that of *schusteri* unless otherwise noted. Clypeus moderately inclined forward, equal in height to width of eye group. Eyes of medium size (Fig. 128); posterior row straight, median eyes separated by radius. Sternum 0.31 mm long and wide. Endites with three setae on outer side near apex. Chelicera of medium stoutness, with evenly curved fang; promargin with row of six small teeth; retromargin smooth.

Leg formula 1423. First leg 4.4 times, first femur 1.3 times as long as carapace; legs thin, set sparsely with dusky hairs.

	I	II	III	IV	Palpus
Femur	0.65	0.56	0.48	0.66	0.22
Patella	0.20	0.17	0.15	0.18	0.08
Tibia	0.57	0.42	0.35	0.58	0.14
Metatarsus	0.48	0.39	0.35	0.44	—
Tarsus	<u>0.31</u>	<u>0.27</u>	<u>0.27</u>	<u>0.32</u>	<u>0.24</u>
Total	2.21	1.81	1.60	2.18	0.68

Type Data—Female holotype from Cueva del Tío Ticho, 1.5 km S Comitán, Chiapas, México, 21 August 1967 (J. Reddell, J. Fish, T. R. Evans).

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