GEOLOGICAL SURVEY OF ALABAMA
WALTER B. JONES, STATE GEOLOGIST (ON LEAVE)

MUSEUM PAPER 14

THE ARGIOPIDAE OR ORB-WEAVING SPIDERS OF ALABAMA

BY
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UNIVERSITY, ALABAMA
1940

LETTER OF TRANSMITTAL

University, Alabama
September 1, 1940

Honorable Frank M. Dixon,
Governor of Alabama,
Montgomery, Alabama.

Sir:

I have the honor to transmit herewith the manuscript of a report entitled "The Argiopidae or Orb-Weaving Spiders of Alabama" by Allan F. Archer. It is requested that this be printed as Museum Paper 14 of the Geological Survey of Alabama.

Respectfully,

STEWART J. LLOYD,
Asst. State Geologist.

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by
Allan F. Archer

INTRODUCTION

This paper is based on collections made by myself from 1938 to 1940. I wish to acknowledge my indebtedness to Dr. Walter B. Jones for his energetic collecting of specimens in and around caves. My thanks also go to Dr. H. P. Loding and Dr. T. S. Van Aller for the material collected in localities in Alabama. To Dr. W. J. Gertsch of the American Museum of Natural History, New York, I wish to express my gratitude for the identification of questionable specimens, comments, helpful suggestions, and the generous sending of specimens for comparative purposes. Likewise much is due to Miss Elizabeth B. Bryant, Museum of Comparative Zoology, Cambridge, Massachusetts, for her patient collaboration with myself in various problems relating to the orb-weavers of Alabama. To Dr. S. J. Lloyd and to the following institutions thanks are due: The Alabama Museum of Natural History and the two museums mentioned above. Dr. R. S. Hodges of the Alabama Department of Conservation has assisted materially in photographic work.

The specimens on which this work is based are deposited in my collection which is housed in the Alabama Museum of Natural History, Tuscaloosa.

It is of great significance that pioneering work done on North American spiders was undertaken for the most part in Alabama by an American naturalist. Nicholas Marcellus Hentz spent many of his active years in Alabama, where he resided from 1834 to 1847. He lived in Florence, then in Tuscaloosa, and finally in Tuskegee before removing to Columbus, Georgia. Edward Burgess (see *general bibliography*) has given a brief biography of Hentz. In 1900 Nathan Banks listed a number of Argiopidae in his paper on Alabama Arachnida (q. v.). Inasmuch as the identity of many species described in the first half of the nineteenth century can only be established on the basis of drawings, it is fortunate that

we can now compare specimens collected in Hentz's original territory with the figures in his publications. In the case of the Argiopidae this procedure has enabled me to establish the identity of certain species that had long remained in obscurity.

The Argiopidae or orb-weavers are three-clawed, eight-eyed, sedentary spiders. To the lay observer their most characteristic feature is the web made up of concentric circles, radii, and foundation lines (Plate 2, fig. 1). With the exception of certain conspicuous species (mostly large) these spiders spend a great deal of time, particularly in the heat of the day, in a nest placed outside the web proper. One other family, the Uloboridae (only distantly related), may produce an orb web. The Argiopidae differ significantly from the closely related families, the Linyphiidae, Theridiidae, Archaeidae and Mimetidae.

In spite of the short time in which the collections have been made (since the days of Banks' list) the list of species is impressive and compares favorably with lists from other states. To date there are 67 species recorded, one of them new to science. More should turn up in the future. Florida has a list of approximately similar size. North Carolina yields a list of 53 species (certainly incomplete), while New York, a very thoroughly worked state, yields 59 species. There are at least 38 species recorded for Michigan by Chickering.

Zoogeography and Distribution. Spiders as sedentary as are the Argiopidae require potent factors of distribution to account for their extremely wide occurrence. Nothing is more striking than the manner in which the Argiopidae reoccupy areas devastated by frequent fires. This can be accounted for by two factors, lateral migration and aerial distribution. Glick (see *general bibliography*) states that in an airplane survey in Louisiana young orb-weavers have been seen at least 1,500 feet above the ground. In view of this fact were it not for the limiting factors of ecological adaptations, we could expect an even more hodge-podge and general distribution of species than is actually the case. However, it does certainly account for rapid invasions of localities devastated by fires, floods, and rapid erosion. Finally it should be noted that man, vehicles, and probably birds are factors in the spread of

spiders. Human factors certainly account for introduced species, although in Alabama there is as yet only one probable exotic species of Argiopidae.

From the start, the geography of such predatory species as we are considering is quite different in detail from that of ground-inhabiting organisms like the Mollusca. Therefore we must consider argiopid zoogeography in broad terms.

1. *The Sedimentary Highlands.* In the areas of sedimentary rocks we find the smallest list of Argiopidae. The affinities of the fauna belong in with that of the areas further to the north, the western Appalachian complex. One species, *Neoscona minima,* of Mexican affinity entirely replaces the related *N. arabesca.* Two species, *Meta menardi* and *Aranea cavatica* are known only from this area.

2. *The Crystalline Highlands.* This comprises the Blue Ridge and Piedmont Provinces. The latter constitutes an ecological transition into the Coastal Plain, and must be regarded as intermediate between the true highlands and the southern division of Alabama. The area constitutes a zone of migration of eastern Appalachian species into the Coastal Plain. Its fauna seems to be larger than that of the north Alabama division. Among other species more or less peculiar to it are *Kaira alba, Aranea trifolium,* and *Neoscona arabesca.*

3. *The Coastal Plain.* This division comprises the southern half of Alabama and the extensive western strip. With the exception of broad valleys and a flat coastal area it is by no means as much of a plain as its name implies. It is a vast complex of uplands, narrow valleys, ravines, and swampy lowlands. Here we have the richest fauna of Argiopidae imaginable for North America. It is blessed with many subtropical species of Floridian and Mexican affinities of which the following may be mentioned: *Nephila clavipes, Scoloderus tuberculiferus, Wagneriana tauricornis, Aranea detrimentosa, Neoscona domiciliorum, Eriophora balaustina,* while *Acanthepeira moesta* and *Gasteracantha cancriformis* occur both here and sporadically in the northern division. The Chattahoochee River area seems to have been an avenue of distribution for certain eastern Appa-

lachian species like *Mastophora bisaccata,* which occurs as far south as northern Florida.

It is a sound rule that those counties that have been collected intensively during all months of the year will yield a maximum of species. Tuscaloosa County, partly located in the southern division, furnishes the largest list, 38 species (year-around collecting). Houston County (probably richer than the last) as yet yields only 31 species for the summer months. Hale County comes next with 29 species, Baldwin County with 27 and Mobile County with 23. Lee County furnishes 37 species and Coosa County 27 species, both in the Piedmont, but the first collected the year around. Year-around collecting from one area in Madison County (northern division) gives only 25 species.

Ecology. The Argiopidae occupy every conceivable type of habitat, from the sea coast to mountain summits, from the banks of streams to human habitations. The ecological classification given below is based on species thus far known from various plant-animal communities of Alabama. The following symbols are used: L = limited range, S = south to central Alabama, N = central to north Alabama, NE = northeast Alabama.

HYGRIC COMMUNITIES

1. Salt Marshes (rushes, reeds, etc.).

Tetragnatha pallescens
Tetragnatha lacerta (S)
Argiope trifasciata
Neoscona pratensis (L)
Eustala anastera emertoni

2. Fresh Marshes.

Tetragnatha pallescens
Tetragnatha lacerta (S)
Argiope aurantia
Argiope trifasciata
Aranea trifolium (L)
Neoscona minima
Mangora gibberosa
Larinia directa
Eustala anastera
Eustala anastera emertoni

3. Non-alluvial Swamps (red gum, tupelo, other hardwoods, evergreen shrubs, conifers).

Tetragnatha elongata
Tetragnatha limnocharis
Wagneriana tauricornis (S)
Aranea miniata

Allepeira conferta
Leucauge venusta
Nicholasia pentagona
Nephila clavipes (S)
Argiope aurantia
Scoloderus tuberculiferus (S)
Cyclosa caroli
Neoscona domiciliorum (S)
Mangora placida
Eustala anastera
Gasteracantha cancriformis
Micrathena reduviana
Micrathena gracilis
Micrathena sagittata

MESIC COMMUNITIES

4. Flood-plain Woods (sycamore, cottonwood, box elder, beech, swamp chestnut oak).

Theridiosoma radiosum
Tetragnatha elongata
Tetragnatha seneca
Tetragnatha pallescens
Tetragnatha limnocharis
Tetragnatha straminea
Allepeira conferta
Leucauge venusta
Nicholasia pentagona
Wagneriana tauricornis (S)
Singa maura
Singa rubens
Aranea miniata
Aranea thaddeus
Aranea raji
Neoscona benjamina
Neoscona domiciliorum (S)
Mangora maculata
Mangora placida
Larinia directa
Eustala anastera
Micrathena gracilis

TRANSITION FROM MESIC TO XERIC COMMUNITIES

5. Flat Woods (oak, hickory, beech, pine).

Tetragnatha seneca
Tetragnatha limnocharis
Tetragnatha straminea
Leucauge venusta
Nicholasia pentagona
Acanthepeira moesta (L)
Metepeira labyrinthea
Wixia ectypa
Aranea miniata
Aranea corticaria (L)
Aranea pegnia
Aranea thaddeus
Aranea raji
Nephila clavipes (S)
Argiope aurantia
Cyclosa caroli
Cyclosa turbinata
Acanthepeira stellata
Neoscona minima
Neoscona benjamina
Mangora maculata
Mangora placida
Eustala anastera
Gasteracantha cancriformis
Micrathena reduviana
Micrathena gracilis
Micrathena sagittata

6. Ravine Woods and Forested Slopes (mixed mesophytic hardwoods; oak-hickory, oak-pine).

Theridiosoma radiosum
Theridiosoma argentatum
Tetragnatha elongata
Tetragnatha munda
Tetragnatha marianna (L)
Tetragnatha limnocharis
Tetragnatha seneca
Tetragnatha straminea
Tetragnatha lacerta (S)
Allepeira conferta
Leucauge venusta
Nicholasia pentagona
Nephila clavipes (S)
Argiope aurantia
Gea heptagon
Scoloderus tuberculiferus (S)
Mastophora bisaccata (L)
Mastophora cornigera (L)
Kaira alba (L)
Cyclosa caroli
Cyclosa turbinata
Acanthepeira moesta (L)
Wagneriana tauricornis (S)
Singa maura
Singa keyserlingi (L)
Singa rubens
Metepeira labyrinthea
Verrucosa arenata
Wixia ectypa
Aranea cavatica (NE)
Aranea miniata
Aranea corticaria (L)
Aranea nivea (L)
Aranea displicata (L)
Aranea pegnia
Aranea thaddeus
Aranea raji
Aranea undata (N)
Neoscona benjamina
Neoscona domiciliorum (S)
Mangora maculata
Mangora placida
Larinia directa
Eustala anastera
Gasteracantha cancriformis
Micrathena reduviana
Micrathena gracilis
Micrathena sagittata

XERIC COMMUNITIES

7. Summit Woods (oak-pine; oak-hickory).

Tetragnatha laboriosa
Leucauge venusta
Nicholasia pentagona (dry stream beds)
Nephila clavipes (S)
Argiope aurantia
Cyclosa turbinata
Acanthepeira stellata
Wagneriana tauricornis (S)
Neoscona minima
Neoscona benjamina
Mangora gibberosa
Mangora placida
Acacesia folifera
Eustala anastera
Eustala anastera emertoni
Gastercantha cancriformis
Micrathena reduviana

Metepeira labyrinthea
Aranea miniata
Aranea pegnia
Micrathena sagittata

8. Slash-pine Woods (some live oak and palmetto undergrowth).

Leucauge venusta
Nephila clavipes (S)
Singa variabilis (L)
Aranea detrimentosa (L)
Aranea pegnia
Neoscona benjamina
Mangora placida
Eustala anastera emertoni

9. Longleaf-pine Woods.

Tetragnatha laboriosa
Leucauge venusta
Cyclosa caroli
Cyclosa turbinata
Acanthepeira stellata
Acanthepeira moesta (L)
Wixia ectypa
Aranea miniata
Aranea pegnia
Neoscona minima
Neoscona benjamina
Eriophora balaustina (L)
Mangora gibberosa
Acacesia folifera
Eustala anastera
Eustala anastera emertoni
Gastercantha cancriformis

10. Prairies (Selma-chalk area).

Tetragnatha laboriosa
Leucauge venusta
Argiope aurantia
Argiope trifasciata
Acanthepeira stellata
Neoscona minima
Mangora gibberosa
Larinia directa
Eustala anastera
Micrathena sagittata

CAVERNS

11. Caves and Cave Entrances.

Theridiosoma radiosum
Tetragnatha elongata
Meta menardi (N)
Leucauge venusta
Azilia vagepicta
Wixia ectypa
Aranea cavatica (NE)
Neoscona benjamina
Eustala anastera

ARTIFICIAL COMMUNITIES

12. Old-field Pine.

Leucauge venusta
Cyclosa caroli
Cyclosa turbinata
Aranea pegnia
Mangora gibberosa
Mangora placida
Larinia directa
Eustala anastera
Gasteracantha cancriformis
Micrathena reduviana
Micrathena gracilis

13. Open Fields (ruderal, shrubby areas and grasslands).

Mimognatha foxi (L)
Tetragnatha laboriosa
Leucauge venusta
Argiope aurantia
Argiope trifasciata
Gea heptagon
Cyclosa turbinata
Acanthepeira stellata
Singa rubens
Metepeira labyrinthea
Aranea detrimentosa (L)
Neoscona minima
Neoscona arabesca
Mangora gibberosa
Larinia directa
Acacesia folifera
Eustala anastera

14. Thickets and Orchards in Open Country.

Tetragnatha laboriosa
Leucauge venusta
Nephila clavipes (S)
Argiope aurantia
Cyclosa turbinata
Acanthepeira stellata
Acanthepeira moesta (L)
Metepeira labyrinthea
Wixia ectypa
Aranea miniata
Aranea pegnia
Aranea raji
Aranea undata (N)
Neoscona minima
Neoscona benjamina
Mangora placida
Acacesia folifera
Eustala anastera
Gasteracantha cancriformis
Micrathena sagittata

15. Artificial Ponds.

Tetragnatha elongata
Tetragnatha limnocharis
Tetragnatha seneca
Tetragnatha pallescens
Tetragnatha straminea
Argiope aurantia
Argiope trifasciata
Gea heptagon
Acanthepeira stellata
Larinia directa

16. Urban Areas (gardens, lawns, vacant lots).

Allepeira conferta
Leucauge venusta
Nephila clavipes (S)
Argiope aurantia
Cyclosa caroli
Cyclosa turbinata
Acanthepeira stellata
Metepeira labyrinthea
Verrucosa arenata
Aranea pegnia
Aranea raji
Aranea undata (N)
Neoscona minima
Neoscona benjamina
Neoscona domiliorum (S)
Neoscona vulgaris
Mangora gibberosa
Mangora maculata
Mangora placida
Acacesia folifera
Eustala anastera
Gasteracantha cancriformis
Micrathena gracilis
Micrathena sagittata

17. Aedificarian Communities (barns, houses, etc.).

Leucauge venusta
Cyclosa turbinata
Metazygia wittfeldae
Aranea pegnia
Aranea undata (N)
Neoscona minima
Neoscona benjamina
Neoscona vulgaris
Eustala anastera emertoni

It is admitted from the start that certain species in the list probably occupy habitats other than those designated, but the above scheme is based on factual data. It is a commentary on the remarkable adaptiveness of certain species of Argiopidae that they occupy nearly every type of community in the list. One of the species (*Neoscona vulgaris*) is found only in close association with man and domestic animals. Under No. 6, the richest of the natural habitat complexes, we find the largest list of species, forty-eight in all.

Economics. The economic importance of the Argiopidae, as well as most other families of spiders, to man and to the balance of nature is impressive. The orb-weavers, being purely predatory, exercise a powerful influence on the insects, their chief food, for they destroy enormous quantities of pests and on the whole help to keep harmless insects from becoming too numerous.

The large orb-weavers trap the larger insects, such Orthoptera, beetles, Lepidoptera, Hymenoptera, and the larger flies, as well as the small Diptera (mosquitoes and crane flies). Although

they ignore the very small insects, the commensal spiders of the genus *Argyrodes* which live with them in their webs take care of this aspect of predation. The small orb-weavers prey mainly on small and minute insects. *Cyclosa* feeds extensively on mosquitoes and ants both in the wild and in domestic situations. It is entirely possible that small birds occasionally fall prey to the large silk spider, *Nephila clavipes.*

The orb-weavers probably have plenty of enemies. Spiderlings fall victim to birds and insects, and to a certain extent this is true in the case of the adults. Dirt-dauber wasps prey on most of the orb-weavers with the possible exception of the Gasteracanthinae which have hard, horny abdomens (I have found none so far in dirt-dauber nests). Some species fall prey to spiders of the genus *Mimetus.* I have sometimes found the latter occupying the nests of *Metepeira labyrinthea.*

From the medical standpoint none of the Argiopidae of Alabama can be classified as venomous. *Nephila clavipes,* much feared on account of its size, is timid and docile in the presence of man. The large Neosconas will attempt to bite in self-defense when handled. *Argiope aurantia,* the writing spider, has a decidedly nervous disposition, and can inflict an unpleasant bite when handled against its will.

The silk spider, already mentioned, is a potential source of silk, a source so far entirely unexploited. B. G. Wilder experimented with this problem at least seventy-five years ago.

That the Argiopidae are as yet a poorly explored resource in the predatory control of wildlife goes without saying. To the Department of Conservation of Alabama goes the credit for sponsoring investigations and inventories of this valuable and useful economic resource. It is for this reason that these studies presented in this publication have received such an impetus.

THE ARGIOPIDAE

In Comstock's "Spider Book" the Argiopidae are divided into the following subfamilies: Theridiosomatinae, Tetragnathinae,

Metinae, Nephilinae, Argiopinae, Araneinae, Gasteracanthinae. All are as amply represented in Alabama as they are in any area in North America. In the discussion of certain species references to a few localities in west Georgia and northwest Florida are included, inasmuch as those areas hold much in common geographically with Alabama.

Subfamily Theridiosomatinae

Theridiosoma *Cambridge,* 1879.

Theridiosoma radiosum (McCook).

Epeira radiosa McCook, Proc. Acad. Nat. Sci. Phila., 1881, 33: 163.

Theridiosoma radiosa McCook, American Spiders, 1893, 3: 257, Pl. 27, figs. 8-9.

A small fat-bodied spider whose habits are so secretive that it is no wonder that it was overlooked by the early workers.

Some authorities believe that this species is the same as the European *T. gemmosum* Keyserling, but it is now known to be distinct.

DISTRIBUTION: Counties: (McQueen) Autauga, (Weaver Cave) Calhoun, Clay, (Cheaha State Park) Cleburne, (Gist Cave) Colbert, (Hatchet Creek) Coosa, (Cullman) Cullman, (Moundville) Hale, (Clear Creek, North Sauty Creek) Jackson, (Morris, Warrior, Cooley Creek) Jefferson, (Chewacla Creek State Park) Lee, (Elk River Fish Hatchery) Limestone, (Fort Deposit) Lowndes, (Monte Sano, Herrin Cave) Madison, (Claiborne) Monroe, (Cave Spring Cave, Flint Creek) Morgan, (Tuscaloosa) Tuscaloosa, (Black Warrior National Forest) Winston.

ECOLOGY: Vertical webs under overhangs of ledges over water, on the faces of banks along streams, across cataracts of small streams; under the roofs of caves; on palmettoes (*Rhapidophyllum hystrix*) on steep banks above streams. This spider occurs in the following situations: Bluffs and ledges close to streams; on seepage and drip areas of undercuts of ledges; in caves having

permanent streams; wooded mesophytic ravines. It is always close to permanent water or in stream beds that are dry part of the year. This spider is common. Mature in spring and early summer, it retires to dark places in the winter. Egg-sacs are usually much in evidence hanging from roots and stems of ground plants. Its prey are small flying insects, especially Diptera.

Theridiosoma argentatum Keyserling.

Theridiosoma argentatum Keyserling, Spinnen Amerikas, 1884, 1: 218, Pl. 10, fig. 132.

This minute spider has a red abdomen with a conspicuous silver, transverse band across the middle. The red fades to greyish in alcohol. The abdomen is so high and globose that it resembles that of *Theridion globosum* Hentz. The epigynum is distinct from that of *T. radiosum* (see Plate 1, fig. 4) the valuted anterior rim being much reduced, while there are two scleritic projections in the aperture.

DISTRIBUTION: Fort Dale Cemetery, Butler Co.; Hatchet Creek, Coosa Co.; Dothan, Houston County; ravine 5 miles east of Opelika, Lee County. Described from Georgia.

ECOLOGY: The web is more or less horizontal or at least roughly paralleling the surface of the ground. It is a small orb web like that of *Nicholasia pentagona* (Hentz), and the spider hangs underneath from the hub. It is located among low ground plants over the leaf carpet on banks some feet above the water. The spider does not seem to prefer as close proximity to the water as does *T. radiosum*. The egg-sac is paler and slenderer than that of *T. radiosum*.

Subfamily Tetragnathinae.

Mimognatha *Banks*, 1929.

Mimognatha foxi (McCook).

Theridium foxi McCook, American Spiders, 1893, 3: Pl. 29, fig. 1.

DISTRIBUTION: Yellow Creek, Tuscaloosa County.

ECOLOGY: Horizontal webs deep down in grasses in open, dry, upland fields.

Tetragnatha *Latreille,* 1804.

Tetragnatha elongata Walckenaer

Tetragnatha elongata Walckenaer, Tabl. Aran., 1805, p. 69.

Tetragnatha grallator Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 27, Pl. 4, figs. 1-2.

DISTRIBUTION: Counties: Autauga, Calhoun, Clay, Cleburne, Coosa, Dale, Elmore, Escambia, Hale, Houston, Jackson, Jefferson, Lee, Mobile, Montgomery, Morgan, Talladega, Tuscaloosa.

ECOLOGY: Oblique or vertical webs on beech and ironwood (*Carpinus*) along woodland streams or in swamps; on hydrangea on slopes above artificial lakes and ponds; common on bridge timbers and on the walls of bath houses. On grasses and herbaceous vegetation along streams and ditches in open country and around ponds and garden pools. This spider is not always found close to water. During mayfly flights it has been found on awnings in front of downtown buildings in Decatur. Generally its webs span the smaller streams. This spider is one of the members of the genus which is apt to be found in artificial and disturbed situations. It does valuable work in destroying emerging mosquitoes; it preys on a large variety of aquatic insects. Mature in summer.

Tetragnatha munda Chamberlin and Gertsch.

Tetragnatha munda Chamberlin and Gertsch, Jour. Ent. Zool., Claremont, 1929, 21: 3-4.

DISTRIBUTION: Counties: (Weaver Cave) Calhoun, (Auburn) Lee, (Decatur) Morgan.

ECOLOGY: Oblique webs on shrubs in river valleys and on banks of streams issuing from cave entrances.

Tetragnatha limnocharis Seeley.

Tetragnatha limnocharis Seeley, N. Y. State Mus. Bull. 278, 1928: 129-130.

DISTRIBUTION: Counties: (Pea River Project) Dale, (Moundville) Hale, (Big Creek, Chattahoochee State Park) Houston, (Drake's Cove) Madison, (Black Warrior National Forest) Winston.

ECOLOGY: Oblique webs on shrubs on banks of streams, forested ravines or in flat woods; on tall herbaceous vegetation around artificial ponds in open fields. It preys extensively on aquatic insects. Mature in summer and fall.

Tetragnatha marianna, *new species.*

Plate 1, fig. 1.

MALE—Total length 8.0 mm.

	Length	Width
Carapace	2.9 mm.	1.5 mm.
Front	1.0	1.0
Sternum	1.5	1.0
Chelicera	3.0	
Labium	0.4	0.5
Maxilla	1.1	0.4
Abdomen	5.1	1.0

	I	II	III	IV
Femur	9.0 mm.	6.0 mm.	3.0 mm.	6.4 mm.
Patella	1.0	0.6	0.4	0.5
Tibia	9.9	5.5	2.1	5.0
Metatarsus	7.6	6.2	2.2	6.0
Tarsus		1.3	0.7	1.0
Total		19.6	8.4	18.9

Carapace pale above; grey on the sides and in the cervical grooves. Chelicerae ivory white tinged with light brown on the teeth, on the distal ends and on the claws. Sternum, labium, and mandibles grey. Palpi dirty white except for the cymbium, paracymbium, and genital bulb which are faintly tinged with brown. Legs dirty white tinged with brown at the joints; femora and tibiae having black splotches at the base of each spine; tarsi nearly black.

Abdomen grey flecked with dull silver except for the yellowish epigastric plates and the dull grey ventral stripe.

Anterior row of eyes procurved. Posterior row of eyes recurved. Lateral eyes not as far apart as anterior median and posterior median

eyes, thus placing the species in the subgenus *Tetragnatha*. Carapace and legs with scattered spines on their dorsal faces, 4 on femora I and II, 2 on femur III, 3 on femur IV. Sternum, labium, and mandibles hirsute. Chelicerae hirsute, diverging, curved, at least as long as the carapace. Claw long and curved, having a hump near the base distally located; the tip meeting the end of the maxilla. Upper margin of the furrow bearing seven teeth, (one not shown in figure), the most distal being blunt and bearing an apical cone, the second rather stout and short, the following four becoming shorter. Dorsal apophysis of the chelicera nearly erect and curved distad, bifid. Juncture of the chelicera with the claw margined with three small teeth, one dorsally and two ventrally located. Ventral margin of the furrow having prominent, paired distal teeth, and six small teeth succeeding.

Palpal organ as shown in Plate I, fig. 1.

This species differs from both *T. limnocharis* Seeley and *T. seneca* Seeley in the chelicerae.

TYPE LOCALITY.—Male holotype from Randon's Creek, 4 miles east of Frisco City, Monroe County, Alabama, April 11, 1940, collected by A. F. Archer. Archer Collection, Alabama Museum of Natural History, Tuscaloosa.

Immature females from this same locality.

ECOLOGY: More or less inclined webs on *Hydrangea arborcens* and other shrubs on the tops of steep bluffs of Marianna limestone. The webs extend across narrow, deep canyon-like ravines having sand-bottom streams.

Tetragnatha seneca Seeley.

Tetragnatha seneca Seeley, N. Y. State Mus. Bull., 1928, No. 278, p. 134, Pl. 4, figs. 44-48.

DISTRIBUTION: Counties: Calhoun, Coosa, Dale, Hale, Lawrence, Limestone, Marshall, Morgan, Tuscaloosa.

ECOLOGY: More or less oblique webs on beech, ironwood (*Carpinus*), and various shrubs in evergreen swamps and along streams in ravines and rich woods; shrubs in open river valleys; on herbaceous vegetation around artificial ponds in fields. Apparently mature in late summer.

Tetragnatha laboriosa Hentz.

Tetragnatha laboriosa Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 27, Pl. 4, fig. 3.

DISTRIBUTION: Counties: Autauga, Baldwin, Calhoun, Dale, Geneva, Houston, Jefferson, Lee, Limestone, Mobile, Monroe, Montgomery, Morgan, Sumter, Tuscaloosa. Probably statewide.

ECOLOGY: More or less horizontal webs in tall grasses, annuals and low shrubs in open fields, pine savannas, and oak-pine cover; also on deforested shores of creeks and rivers down to the water's edge; on evergreen shrubs in gardens in Tuscaloosa and Montgomery. This is one of the first spiders to occupy an area after fires (north Alabama). Unlike other members of the genus in Alabama this species prefers to live on dry slopes and on uplands as well as prairies, not over water, although it may be found close to the water's edge in weedy situations. It traps a large variety of insects including mosquitoes and other Diptera, when available. Mature in summer.

Tetragnatha pallescens F. Cambridge.

Tetragnatha pallescens F. Cambridge, Biol. Centr. Amer., 1903, 2: 437.

Tetragnatha pallida Banks, Proc. Acad. Nat. Sci. Phila., 1892, 42: 51, Pl. 5, fig. 88.

DISTRIBUTION: Counties: Baldwin, Calhoun, Escambia, Hale, Mobile, Morgan, Pickens, Tuscaloosa.

ECOLOGY: Oblique webs on cane in woodlands close to streams; on rushes and reeds in salt marshes and around fresh water ponds (in back of dunes along the Gulf of Mexico); on tall grasses around artificial ponds and along streams in open country. This species traps large quantities of aquatic insects including emerging mosquitoes. Mature in summer.

Tetragnatha straminea Emerton.

Tetragnatha straminea Emerton, Trans. Conn. Acad. Sci., 1885, 6: 335, Pl. 39, figs. 15, 17, 20-21.

DISTRIBUTION: Counties: (Eastaboga Fish Hatchery) Calhoun, Clay, (Cheaha State Park) Cleburne, (Hatchet Creek) Coosa, (Chewacla Creek State Park) Lee, (Tuscaloosa) Tuscaloosa. Upatoie Creek, Muscogee County, Georgia.

ECOLOGY: Oblique webs on shrubs and cane along streams in ravines; on herbaceous vegetation on the margins of ponds. This species traps aquatic insects. Mature in summer.

Tetragnatha lacerta Walckenaer.

Tetragnatha lacerta Walckenaer, Ins. Apt., 1837, 2: 224.

Tetragnatha caudata Emerton, Trans. Conn. Acad. Sci., 1885, 6: 335, Pl. 29, figs. 16-22.

DISTRIBUTION: Bayou La Batre, Petit Bois Island, Mobile County. Marianna, Jackson County, Florida.

ECOLOGY: More or less horizontal webs on shrubs in ravine woods; on herbaceous vegetation along streams in fresh water marshes and meadows; on reeds and tall vegetation of salt-water ponds. Not much is known of the habits of this spider in Alabama. It is notable for having a retractile, tail-like appendage at the caudal end of the abdomen. Mature in summer.

Subfamily Metinae.

Allepeira *Banks,* 1932

Allepeira conferta (Hentz)

Linyphia conferta Hentz, Journ. Boston Soc. Nat. Hist., 1850, 6: 30, Pl. 4, fig. 7.

Epeira basilica McCook, Proc. Acad. Nat. Sci. Phila., 1878, 30: 133-134, fig. 2.

It is unfortunate that McCook's name must give way to Hentz's name, since the former described the species very fully as to morphology and web habit. Hentz's figure is plainly that of an immature female such as is so common in certain localities in the late spring. The latter made the natural mistake of assigning the spider to the family Linyphiidae on account of its web habit, a mistake not unusual in dealing with metine Argiopidae of the Tropics. The Linyphia type of web is made throughout life, but the orb web is not added until the female has nearly reached maturity.

FEMALE NEOTYPE: Tuscaloosa, Tuscaloosa County, Alabama. Aug. 1939. Archer Collection, Alabama Museum of Natural History, Tuscaloosa.

DISTRIBUTION: Counties: (McQueen) Autauga, (McLarty) Blount, (Fort Dale) Butler, (Cheaha State Park) Cleburne, (Hatchet Creek) Coosa, (Cullman) Cullman, (Ariton, Ozark) Dale, (North Souty Creek) Jackson, (Monte Sano) Madison, (Decatur) Morgan, (Tuscaloosa) Tuscaloosa.

ECOLOGY: Webs (described in Comstock's "Spider Book") in alder (*Alnus incana*), black gum, beech, oaks, and vines, lower slopes of ravines and in swamp woods—always in predominantly hardwood cover. In *Obelia grandiflora* and rose bushes in gardens in Tuscaloosa and Decatur. This spider rivals *Leucauge venusta* Walck. in being one of the most beautiful orb-weavers in Alabama. The bead-like egg-sacs are suspended from a strong, white, horizontal thread in the upper part of the web. The webs are often inhabit-

ed by commensal spiders of the genus *Argyrodes* (particularly *Argyrodes trigonum* Hentz). On or about July 20 the males wander widely in search of females, sometimes being found far from the natural habitats. Mature in summer.

Meta *C. Koch,* 1893.

Meta menardi (Latreille).

Aranea menardi Latreille, Hist. Nat. Crust. et Ins., 1804, 7: 266.

DISTRIBUTION: Saltpetre Cave and Cave Stand Cave, Clear Creek, Jackson Co.; Panther Knob, Monte Sano, Madison Co.; Mac Hardin Cave and Cave Ms5 (Bishop Mountain), Marshall County.

ECOLOGY: The upper portion of the web is suspended from a horizontal overhang under which the spider generally rests —the wall areas of caves. The spider lives in partial and total darkness, either in deep crevices around caves or most commonly inside of the caves where they are found as far as the back ends. In Alabama this species is not known outside of cave areas. Mature females and males are found in winter and spring.

Leucauge *White,* 1840

Leucauge venusta (Walckenaer).

Epeira venusta Walckenaer, Ins. Apt., 1837, 2: 90.

Epeira hortorum Hentz, Journ. Boston Soc. Nat. Hist., 1847, 5: 477, Pl. 31, fig. 19.

This spider varies a little in size. The largest specimens were taken in north Alabama. In south Alabama there are two red spots above the spinnerets in addition to the red spot on the venter. In north Alabama the latter spot, always present, tends to be orange yellow. This is one of the most beautiful spiders in Alabama. The legs are green and the abdomen combines silvery white, yellow, red, green, and ebony.

DISTRIBUTION: Counties; Autauga, Baldwin, Barbour, Blount, Bullock, Butler, Calhoun, Chambers, Chilton, Clarke, Clay, Cleburne, Coffee, Colbert, Conecuh, Coosa, Covington, Cullman, Dale, Dallas, Elmore, Escambia, Hale, Houston, Jackson, Lamar, Lawrence, Lee, Limestone, Lowndes, Macon, Madison, Marshall, Mobile Monroe, Montgomery, Morgan, Perry, Pickens, Randolph, Russell, Shelby, Sumter, Talladega, Tuscaloosa, Wilcox, Winston; Calhoun, Jackson Counties, Florida.
Statewide in Alabama.

ECOLOGY: Horizontal webs in tall grasses, weeds, vines, shrubs, and trees—open fields, thickets, and woods, in all conceivable habitats. It is abundant in urban gardens, and is even found in old barns. This species is one of the most common and most universally present of all Alabama orb-weavers, and is predaceous on a variety of the larger insects. Its webs do not harbor commensal spiders of the genus *Argyrodes*. Mature in late spring and early summer, but mature females may be found until January in extreme south Alabama.

Azilia *Keyserling*, 1881.

Azilia vagepicta Simon.

Azilia vagepicta Simon, Ann. Soc. Entom. France 1895, 64: 153.

This species has a superficial resemblance to some of the tunnel-weavers (Agelenidae). The abdomen is rounded at the base, narrowed and sloping at the apex.

DISTRIBUTION: Cave Ms2, Town Creek, Marshall County.

ECOLOGY: More or less horizontal webs. These are found in fissures of walls of caves in total darkness. This species is apparently rare, being known from only one cave in Alabama out of fifty-seven caves explored in seven north Alabama counties. Mature in winter.

Nicholasia *Bryant* and *Archer,* 1940

Nicholasia pentagona (Hentz) Plate 2, fig. 1., Plate 5, figs. 1-2.

Epeira pentagona Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 18, Pl. 3, fig. 1.

Cyrtophora tuberculata Keyserling, Spinnen Amerikas, Epeiridae, 1893, p. 265, Pl. 14, fig. 197.

Dolichognatha tuberculata, F. Cambridge, Biol. Centr. Amer. 1903, 2: 447.

This species is known as *Dolichognatha tuberculata* Keyserling in the recent literature. Hentz' name preoccupies that of Keyserling, and the genus *Dolichognatha* is based on a male from Ceylon, a name inapplicable to the American genus, now designated as *Nicholasia.*

DISTRIBUTION: Counties; Autauga, Baldwin, Butler, Calhoun, Chilton, Clay, Cleburne, Coosa, Covington, Cullman, Dale, Dallas, Elmore, Escambia, Hale, Houston, Jackson, Jefferson, Lawrence, Lee, Limestone, Lowndes, Macon, Madison, Mobile, Montgomery, Morgan, Randolph, Russell, Shelby, Tuscaloosa, Winston; Muscogee County, Georgia. The fine series of specimens before me indicates a statewide distribution for this species in Alabama.

ECOLOGY: Horizontal webs in scars at the bases of oaks, gums, magnolias, tulip poplars, and pines; between the roots of beech; in general associated with evergreen and deciduous hardwood species and pines; also in the following situations: Undercuts of ledges; hollows under large rocks; undercut banks; hollows and concavities in ripe logs (*Passalus cornutus* stage); accumulated soil at the base of a wire fence in second-growth woods near Andalusia. In general this species occurs on ravine slopes from the top down to the vicinity of the stream bed (both permanent and temporary streams), on river bluffs, in flat woods, both dry and swampy. On one occasion it was found in summit woods of the dry upland type, but close to a dry stream bed. It is a species that prefers slopes or flat lands not too far from temporary or permanent water, and, moreover, favors natural timber cover. However, it does have a definite tendency to spread into cut-over areas, open pastured woods, and reforested localities on the preferred slope or flat-land terrains. It is absent from areas of annual fires.

This spider is so vigorous and adaptive that it gives the impression of being able to hold its own in spite of modifications of environment due to human intervention. Until the field collector knows how to find it, he is apt to consider it as a rare or very local species, neither of which is the case. In cramped quarters the web is barely more than 1½ inches across, but I have found a few webs at least 5 inches in diameter. The spider (see Plate 2, fig. 1) is well disguised against its somber background in dark shelters where it hangs from a shroud suspended outside the web, usually behind the shroud. The shroud of the female contains the egg-sacs, and is covered with debris. Adult males are active for a period extending from mid July to early October, but are rare in contrast with the females. The species preys on springtails, ants, and small Diptera.

Subfamily Nephilinae.

Nephila *Leach,* 1815

Nephila clavipes (Linneaus).

Aranea clavipes Linnaeus, Syst. Nat., 1758, 12th ed., p. 1034, No. 27.

This is the only representative in Alabama of a group of large Tropical spiders. The Alabama species (which resembles certain other species of the genus in size) was entirely overlooked by Hentz. Females from southeast Alabama are seemingly a little larger than those from other parts of the state.

DISTRIBUTION: Counties; Baldwin, Barbour, Covington, Dale, Escambia, Houston, Mobile, Montgomery, Pike, Tuscaloosa; Calhoun County, Florida. Apparently distributed over the Coastal Plain south of the fall line and the elevated section of northwest Alabama. The most northern record was taken on the bluffs of the Black Warrior River above Holt, Tuscaloosa County, just within the edge of the highlands.

ECOLOGY: Huge vertical webs between the trunks of hardwood species or pine trees, sometimes at great heights from the ground (up to 15 feet). This spider inhabits ravine slopes up to

the summits, in evergreen hardwood, deciduous hardwood, and hardwood-pine cover. It is occasionally found in lowland pine woods. It is also present in swamp woods, being absent from the extensive long-leaf pine woods that are subject to frequent fires. In the hills of southeast Alabama it is not at all limited in its habitat preferences. There it is common in trees of thickets in open fields on slopes. In the last fifteen years it has established itself in urban gardens in Mobile, much to the consternation of the local citizenry. In the last two years it has been invading gardens in Montgomery. No doubt this spider is on the increase under man-made conditions, but need cause no alarm as it is not venomous.

This species is known as the silk spider as its webs contain a great deal of strong, yellow silk. There is no doubt but that it is useful in preying on large insects, some of which are economic pests. It is possible that small birds are very infrequently trapped in the webs. The female is docile and easy-going, and unless routed out of the web is almost deliberate in her movements. She normally tolerates the presence of two or three diminutive males in the web as well as a host of commensal spiders such as *Argyrodes nephilae* Tacz. and *A. globosus* Keys. The latter feed on insects that are caught in the web but that are too small to merit the attention of *Nephila*. The species breeds in summer and early fall, but females remain active in December in north Florida.

Subfamily Argiopinae.

Argiope *Audouin*, 1827.

Argiope aurantia Lucas.

Argiope aurantia Lucas, Ann. Soc. Entom. France, 1833, **2**: 87, Pl. 5, fig. 1.

Epeira riparia Hentz, Jour. Boston Soc. Nat. Hist., 1847, **5**: 468, Pl. 30, fig. 5.

Epeira sutrix id ibid., p. 478, Pl. 31, fig. 23.

DISTRIBUTION: Counties; Baldwin, Bullock, Coffee, Covington, Dale, Dallas, Elmore, Houston, Jefferson, Lawrence, Lee, Macon, Madison, Mobile, Montgomery, Morgan, Pickens, Shelby, Talladega, Tuscaloosa, Winston. Probably statewide.

ECOLOGY: Vertical webs rather low down in tall grasses and shrubs, open fields, thickets, and sunny openings in woods. This spider occupies a wide variety of situations in lowlands, on slopes, or near water. It is found on bridge supports, under eaves of porches, on walls, under signs in city lots, and on shrubs in urban gardens. This species is known as the writing spider on account of the stabilimentum in the center of the web, which looks like handwriting. The spider is ordinarily timid, but is ready to bite when handled. The bite is not serious, but is apt to produce a secondary infection. This species preys on large insects, such as locusts, grasshoppers, beetles, and moths. This type of prey comes to the webs in late summer and fall during the breeding season of the spider.

Argiope trifasciata (Forskal).

Aranea trifasciata Forskal, Descript. Anim. 1775.

Epeira fasciata Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 468, Pl. 30, fig. 5.

DISTRIBUTION: Counties; Baldwin, Dale, Geneva, Hale, Lee, Lowndes, Macon, Madison, Mobile, Montgomery, Tuscaloosa. Probably statewide.

ECOLOGY: Vertical webs low down in tall grasses and on herbaceous vegetation in open fields and very open pine lands (flat country); in cane (*Arundinaria*) at the edge of swamp timber; on reeds and rushes in salt marshes; in grasses around artificial ponds; on low annuals and perennials on dry, open ledges in highland country. This species seems to range all the way from swamps to upland summits as long as the habitats constitute fairly open country. Unlike the previous species it does not seem to occur close to man or in cities. This is also one of the writing spiders, but differs externally from the last species in its silvery color. It is

predaceous on grasshoppers, locusts, and large beetles. Abundant and mature in late summer and fall.

Gea *C. Koch,* 1843

Gea heptagon (Hentz).

Epeira heptagon Hentz, Jour. Boston Soc. Nat. Hist., 1847, 4: 20, Pl. 3, figs. 5-6.

DISTRIBUTION: Havana and Moundville, Hale Co., Monte Sano, Madison County; Bristol County, Florida.

ECOLOGY: Vertical webs on low shrubs on slopes of ravine woods; on limestone ledges in narrow ravines; vertical webs in grasses and herbaceous vegetation around an artificial pond in an open field at Moundville. Mature in late summer. This spider is timid, and will drop from its web to the ground at the slightest disturbance.

Subfamily Araneinae.

Scoloderus *Simon,* 1887

Scoloderus tuberculiferus (Cambridge).

Carepalxis tuberculifera Cambridge, Biol. Centr. Amer. 1889, 1: 48, Pl. 4, fig. 9.

DISTRIBUTION: Dothan, Houston Co., Union Church, Mobile County; Bristol, Calhoun County, Florida.

ECOLOGY: On shrubs in ravines and on slopes, wooded country. Evidently mature in winter.

Mastophora *Holmberg,* 1876.

Mastophora bisaccata (Emerton). Plate 5, fig. 4.

Cyrtarachne bisaccata Emerton, Trans. Conn. Acad. Sci., 1885, 6: 325, Pl. 34, fig. 11.

DISTRIBUTION: Chattahoochee River, Houston County; Bristol, Calhoun County, Florida. This is a southward extension of its known range.

ECOLOGY: Its nest, just above the vertical web, is found eight to ten feet off the ground on the under sides of evergreen hardwood leaves, especially beech (*Fagus*) and *Magnolia grandiflora*, on the lower slopes of deep ravines characterized by beech trees. This spider seems to be limited to very restricted habitats. Nathan Banks states that spiders of this genus are not uncommon in corn fields in the South. However, it does not seem to be the case in Alabama where corn fields are occupied by Argiopid genera like *Neoscona, Mangora, Acacesia,* and *Argiope*. *Mastophora* seems to be exceedingly rare. Apparently mature in winter and spring. Miss Bryant believes that the tiny males winter in the egg-sacs.

Mastophora cornigera (Hentz).

Epeira cornigera Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 20, Pl. 31, fig. 8.

This species is well figured in Comstock's "Spider Book". Hentz' figure represents the immature stage of the species as it occurs in mid summer.

DISTRIBUTION: Spring Hill, Mobile County.

ECOLOGY: Nests high up in tall shrubs and trees, evergreen and deciduous Hardwoods in deep ravines. Very rare in Alabama. Mature in winter.

Kaira *Cambridge,* 1889.

Kaira alba (Hentz).

Epeira alba Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 20, Pl. 3, fig. 7.

DISTRIBUTION: Hatchet Creek, Coosa County.

ECOLOGY: Immatures of this rare species were taken in June 1940 off ferns (*Phegopteris*) on the banks of small streams or near waterfalls in shady woods (beech, *Magnolia macrophylla,* tulip poplar, mulberry, dogwood, holly, *Rhododendron punctatum,* hydrangea, *Illicium floridanum,* cane) or in clearings at the edge of the woods.

Cyclosa *Menge* 1866.

Cyclosa caroli (Hentz)

Epeira caroli Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 24, Pl. 3, fig. 15.

DISTRIBUTION: Counties: Baldwin, Butler, Chilton, Coosa, Covington, Dale, Houston, Lee, Mobile, Montgomery, Sumter, Tuscaloosa; Jackson County, Florida.

ECOLOGY: Vertical webs between trunks of pines and hardwood trees, ravines, lowland woods, swamp woods, old-field pine; webs in undercuts of ledges; also on sides of buildings in urban Montgomery. This spider is not abundant. It preys on small Diptera, including mosquitoes, as well as small Hymenoptera. It kills large quantities of Argentine ants in Montgomery. It disposes of the corpses of its prey by winding them in a shroud around the egg-sacs on the stabilimentum of the web. When disturbed the spider oscillates the web violently. Mature in summer and fall.

Cyclosa turbinata (Walckenaer)

Epeira turbinata Walckenaer, Ins. Apt., 1842, 2: 140.

Epeira caudata Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 23, Pl. 3, fig. 14.

DISTRIBUTION: Counties; Baldwin, Blount, Bullock, Clarke, Clay, Cleburne, Coffee, Conecuh, Covington, Escambia, Geneva, Houston, Jefferson, Lee, Madison, Mobile, Montgomery, Morgan, Pickens, Sumter, Talladega, Tuscaloosa.

ECOLOGY: Vertical webs between branches or between trunks of hardwood or pine trees, at various heights from the ground. Occasionally in heavy timber, but most often in thickets in open fields and in oak and pine barrens, as well as in old-field pine. It is common on hedges and on ornamental shrubs in gardens of every city in Alabama; also on vines along railroad embankments. It invades buildings, especially those not used as dwellings. This little spider is useful in destroying pest ants and mosquitoes. Like the previous species it oscillates the web violently when disturbed. It is more abundant than *C. caroli*. The egg-sacs are woven into the mid line of the web. Mature in summer.

Acanthepeira *Marx,* 1883.

Acanthepeira stellata (Walckenaer).

Epeira stellata Walckenaer, Tabl. Aran., 1805, p. 65, fig. 54.

Epeira stellata Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 22, Pl. 3, fig. 12.

DISTRIBUTION: Counties; Baldwin, Clay, Cleburne, Coosa, Covington, Escambia, Geneva, Hale, Houston, Jefferson, Lawrence, Lee, Limestone, Mobile, Montgomery, Morgan, Pickens, Tuscaloosa, Winston.

ECOLOGY: Vertical webs rather low down in grasses and other herbaceous vegetation in open fields or in openings in dry summit woods; on shrubs and vines in thickets in open fields; on fences and in orchards (fig, vine, *Zizyphus,* and pecan); on grasses along ditches and margins of ponds; on brick walls; on the sides of buildings, at the bases of signs, and on weeds and ornamental shrubs in cities. This spider is mostly confined to open situations, tending to avoid the shade of closed canopies; ranges from the water's edge to dry summits. Mature in summer.

Acanthepeira moesta (Keyserling).

Epeira moesta Keyserling, Spinnen Amerikas, Epeiridae, 1892, 6: 108, Pl. 5, fig. 80.

DISTRIBUTION: Counties; (Dyas Creek) Baldwin, (Mount Roszell Road) Limestone, (Cave Spring Cave) Morgan.

ECOLOGY: On shrubs in longleaf-pine woods; low down in honeysuckle (*Lonicera*) along roads at the base of wooded slopes; on low shrubs covered with honeysuckle in weedy woods along a stream issuing from a cave. November, April.

Wagneriana *F. Cambridge,* 1904

Wagneriana tauricornis F. Cambridge.

Wagneriana tauricornis F. Cambridge, Biol. Centr. Amer., 1904, 2: 498, Pl. 47, figs. 14-15.

DISTRIBUTION: Counties; (Dyas Creek) Baldwin, (Pea River Project) Dale, (Dothan, Chattahoochee State Park) Houston, (Spring Hill) Mobile.

ECOLOGY: Vertical webs about 6 feet off the ground on shrubs (evergreen) and in young trees (evergreen and deciduous) along streams, ravines, and swamp woods (pines, evergreen and deciduous hardwoods); on shrubs near ravines, oak-pine savannas. Apparently mature in the fall.

Metazygia F. *Cambridge,* 1904

Metazygia wittfeldae (McCook).

Epeira wittfeldae McCook, American Spiders, 1893, 3: 168, Pl. 7, figs. 6, 7.

This genus resembles *Aranea* in appearance, but differs from it particularly in having the tibiae of the first and second pairs of legs devoid of spines on the dorsal surface.

DISTRIBUTION: Spanish Fort, Baldwin County.

ECOLOGY: Under eaves and in corners of walls, outside of buildings.

Singa *C. Koch,* 1837.

Singa maura (Hentz) Plate 3, fig. 5.

Epeira maura Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 474, Pl. 31, fig. 8.

The epigynum of this species (Plate 1, fig. 2) is very distinct. The abdomen is marked with reddish brown or purplish black punctuated with characteristic light markings. Hentz' *Epeira sanguinalis* (id ibid. p. 476) may be an immature male of this species, but the pattern is atypical.

FEMALE AND MALE NEOTYPES: Cheaha State Park and Yellow Creek, Tuscaloosa County, Alabama. Archer Collection, Alabama Museum of Natural History.

DISTRIBUTION: Counties; (Grove Hill) Clarke, (Cheaha State Park) Cleburne, (Hatchet Creek) Coosa, (Harrison Church) Hale, (Clear Creek) Jackson, (Randon's Creek) Monroe, (Trinity Mountain) Morgan, (Alberta City, Yellow Creek) Tuscaloosa, (Pine Hill) Wilcox. (Black Warrior National Forest) Lawrence and Winston Counties.

ECOLOGY: Vertical webs 3-7 feet off the ground on maple, beech, dogwood, buckeye, hydrangea, azalea, yucca, vines, and other large plants, middle and lower slopes of ravines along permanent and temporary streams. Always close to aquatic areas. Mature in late spring and summer.

Singa variabilis Emerton.

Singa variabilis Emerton, Trans. Conn. Acad. Sci., 1882, 6: 322, Pl. 34, fig. 16, Pl. 37, figs. 19-21.

DISTRIBUTION: Dauphin Island, Mobile County.

ECOLOGY: Small vertical webs usually on the south and west sides of the trunks of slash pines (*Pinus caribaea*), 5 to 7 feet off the ground. The web is regular. There is no apparent nest; the spider hides under a loose tag of bark to which the upper angle of the web is attached (usually the left angle). Occasionally the spider is found on the hub of the web, and drops quickly to the ground when disturbed. On the other hand, when hiding under bark, it clings to its location with tenacity, and is apt to be overlooked even when the piece has been removed from the tree. It is not rare, since two or three spiders can be found on each tree that has loose bark. The slash-pine woods are characterized by clumps ol palmetto (*Serenoa serrulata*); ground plants are not numerous; there is a heavy pine-straw carpet occasionally shallow pools are present. The *Singa* occurs in that zone of woods that is closest to sand dunes on the south side of the island. Its prey are midges and other small Diptera. Mature in summer.

Singa keyserlingi (McCook)

Epeira keyserlingi McCook, American Spiders, 1893, 3: 230, Pl. 19, fig. 2.

DISTRIBUTION: Black Warrior National Forest, Winston County. Apparently rare.

ECOLOGY: Vertical webs on dogwood on ravine slopes along streams. Evidently mature in late spring.

Singa rubens (Hentz).

Epeira rubens Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 477, Pl. 31, fig. 18.

FEMALE NEOTYPES: Black Warrior National Forest, Winston County, Alabama. A. F. Archer collector, June 1939. Archer Collection, Alabama Museum of Natural History.

In Alabama this species has a red carapace and abdomen. The area around the eyes is black and the legs are black except for red pigment at the bases of the femora. There are two black spots on the apex of the abdomen. Hentz' species has an epigynum (Plate 2, fig. 3) which seems to be identical with that of Emerton's *Singa maculata* (Trans. Conn. Acad. Sci., 1884, 6: 323, Pl. 37, fig. 18). If this is the case, then Hentz' name takes precedence over *maculata* on the grounds of priority. Dr. Gertsch writes that the latter varies in color pattern, and *S. maculata* of the northern states certainly differs from *rubens* in color.

DISTRIBUTION: Counties; (Grove Hill) Clarke, (Moundville) Hale, (Tuscaloosa) Tuscaloosa, (Black Warrior National Forest) Winston.

ECOLOGY: On dogwood in shady ravines on forested banks of streams, ravine areas: in tall grasses along streams in small deforested valleys. Mature in June.

Metepeira *F. Cambridge,* 1904

Metepeira labyrinthea (Hentz).

Epeira labyrinthea Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 471, Pl. 31, fig. 3.

DISTRIBUTION: Counties; Autauga, Baldwin, Blount, Chambers, Chilton, Clay, Cleburne, Coffee, Coosa, Covington, Cullman, Dale, Dallas, Elmore, Houston, Jackson, Lee, Lowndes,

Macon, Madison, Mobile, Montgomery, Morgan, Perry, Pickens, Randolph, Russell, Shelby, Sumter, Tuscaloosa, Wilcox.

ECOLOGY: Vertical webs in oaks, dogwood, pines, and an endless variety of shrubs, both on ravine slopes and in flat woods; in tall grasses in open fields; in all sorts of shrubs in urban gardens. This species tends to prefer rather dry situations. It hides in a tent-like mass of dead leaves in crossed lines above the main web. The latter is apt to be missing during immature stages, thus making it appear that the spider lives in the same sort of web as that of *Tidarren fordum* Keys. This spider sometimes falls prey to spiders of the genus *Mimetus*. I have found the latter in the tent of *Metepeira,* a fact which no doubt led early workers to believe that *Mimetus* inhabits webs that combine the features of the Argiopidae and Theridiidae (actually the web of *Metepeira*). The button-shaped egg-sacs of *M. labyrinthea* remain suspended from the original cord all winter. The species is mature in summer and fall, persisting till the end of January.

Verrucosa *McCook,* 1888.

Verrucosa arenata (Walckenaer) Plate 3, fig. 4.

Epeira arenata Walckenaer, Ins. Apt., 1837, 2: 133.

Epeira verrucosa Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 19, Pl. 3, fig. 2.

In Alabama this species is rather variable in color, the conspicuous dorsal shield ranging from white, through yellow, to pink.

Some authorities consider the genus to belong to *Aranea,* but it is distinct in certain respects. The pars cephalica is much elevated above the thoracic region; the cervical groove is deeply marked; the scape of the epigynum is very long.

DISTRIBUTION: Counties; Autauga, Baldwin, Blount, Butler, Chilton, Covington, Cullman, Dallas, Elmore, Hale, Houston, Jackson, Jefferson, Lee, Lowndes, Macon, Madison, Perry, Randolph, Russell, Tuscaloosa. Apparently statewide, but extending into the Gulf Coast strip only in the hammock woods of the bluffs of Mobile Bay.

ECOLOGY: Large vertical webs up to about 7 feet off the ground, between tall shrubs or trees in sunny glades in the woods; preferring ravine slopes both in hardwood and coniferous cover; on tall shrubs in urban gardens. This species is very abundant in pines in Tuscaloosa County, in beech ravines in Hale County, and on the rich deciduous slopes of Monte Sano, Madison County. It preys on medium-sized and large insects that fly in sunlight along paths or up slopes in woods. Mature in summer, at which time males are much in evidence.

Wixia *Cambridge*, 1882

Wixia ectypa (Walckenaer), Plate 4, fig. 4.

Epeira ectypa Walckenaer, Ins. Apt., 1837, 2: 129.

Epeira infumata Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 19, Pl. 3, fig. 4.

This genus differs from *Araneа* in the large size of the posterior median eyes which are located on prominent, arched elevations. The American species, at least, has a prominent, chitinized epigynum.

DISTRIBUTION: Counties; (McQueen) Autauga, (Fort Dale) Butler, (Verbena) Chilton, (Grove Hill) Clarke, (Cheaha State Park) Cleburne, (Hatchet Creek) Coosa, (Wetumpka) Elmore, (Moundville) Hale, Jefferson, Lawrence, (Fort Deposit) Lowndes, (Monte Sano) Madison, Morgan, Russell, Shelby, (Tuscaloosa) Tuscaloosa, (Black Warrior National Forest) Winston; Upatoie Creek, Muscogee County, Georgia; Marianna, Jackson County, Florida.

ECOLOGY: Vertical webs in mountain laurel, dogwood, oaks, and bay trees 5½-6½ feet off the ground; on shrubs in ravine woods and longleaf pine savannas; on shrubs in fields in stream valleys or flat lands. Adult females can be found sometimes under overhangs of ledges near cave entrances or springs. The species seems to avoid upland woods and summit situations in general, preferring slopes and lowlands. Immature spiders are found in every month of the year, but adults are rather hard to find. Mature females have been found in Alabama and Florida in June, July, and December, so that it is difficult assign any season of maturity. However, summer yields the maximum number of

adults. At best it is not a common spider. It is my observation that *Wixia* traps beetles in its web.

Aranea *Linnaeus,* 1758

Aranea cavatica (Keyserling), Plate 4, fig. 1.

Epeira cavatica Keyserling, Verh. Zool. Bot. Ges. Wien., 1881, **31**: 269, Pl. 11, fig. 1.

The Alabama specimens are of large size, the largest one before me leaving a length of 23 mm., about 7/8 of an inch, from the front of the carapace to the apex of the abdomen.

DISTRIBUTION: Saltpetre Cave, Clear Creek, Jackson Co., Monte Sano, Madison County. Apparently this is the southern limit of this Appalachian species.

ECOLOGY: Large vertical webs under overhangs of high ledges above springs, drip areas, or cave entrances, all in limestone country; webs on faces of large rocks, walls, and under roofs in the twilight zone of caves. This large spider lives in such inaccessible places that it has been seen by few residents of Alabama. Saltpetre Cave, one of its habitats, was reached only by an arduous trip up an almost perpendicular ravine wall. The webs of *A. cavatica* are inhabited by many commensal spiders, especially *Argyrodes nephilae* Tacz. Crane flies and other large Diptera are trapped by this species. Mature in late summer and fall.

Aranea miniata (Walckenaer), Plate 5, fig. 5.

Epeira miniata Walckenaer, Ins. Apt., 1837, **2**: 39.

Epeira scutulata Hentz, Jour. Boston Soc. Nat. Hist., 1847, **5**: 19, Pl. 3, fig. 3.

This spider is rather variable in color patterns. The horns on the shoulders are pronounced in adult females.

DISTRIBUTION: Counties: (Dyas Creek, Bay Minette, Magnolia Springs, Fort Morgan) Baldwin, (Searcy) Butler, (Verbena) Chilton, (Hatchet Creek) Coosa, Fayette, (Dothan) Houston, (Clear Creek) Jackson, Jefferson, (Kennedy) Lamar, (Chewacla Creek State Park) Lee, (Cave Spring Cave) Morgan, (Rock Mountain) Tuscaloosa; Bay Co., Calhoun Co., Gadsden Co., Jackson County, Florida.

ECOLOGY: The vertical web is usually in the angle between a branch and the trunks of shrubs (hydrangea, dogwood, red bud, black gum) and trees (deciduous and evergreen oaks). It occurs on the middle and upper slopes of ravines, in upland woods and in thickets in open fields; in longleaf pine woods; also in hammock woods in the wiregrass region and along the Gulf Coast. This species traps numerous small insects including smaller beetles. Mature in spring. Adult males persist in July.

Aranea corticaria (Emerton).

Epeira corticaria Emerson, Trans. Conn. Acad. Sci., 1884, 6: 300, Pl. 33, fig. 14, Pl. 35, fig. 9.

DISTRIBUTION: Chewacla Creek State Park, Lee County.

ECOLOGY: Vertical webs on alder and hazel along streams in ravines.

Aranea nivea (Hentz).

Epeira nivea Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 474, Pl. 31, fig. 9.

A lot needs to be learned about this species, one of the most obscure of Hentz' Argiopidae. The epigynum of a slightly immature female seems to indicate the presence of a rather broad scape. The carapace is that of *Aranea*. The legs have the usual 1, 2, 4, 3, arrangement. The carapace is greenish yellow. The abdomen is snowy white except for a yellow zone around the oval, dusky border which bounds the folium. The latter is 6-pointed, and has a tiny red spot at the apex of each point. The abdomen is oval, and there are two small humps on the shoulders. The eyes are as usual in *Aranea*.*

*Subsequent to the completion of the manuscript an adult female was collected from *Hamamelis virginiana* (witch hazel) on August 19, 1940 at Oak Mountain State Park, Shelby County. I hereby designate the above as the *type locality* of *Aranea nivea* (Hentz). Total length of carapace and abdomen 3.5 mm., or about 1/8 inch. Abdomen light yellow, but otherwise like Hentz' figure of the species. Epigynum having a broad, fleshy scape something like that of *A. attestor* (Pet.) Lateral margins of the atriolum indented on each side at the base of the scape, and bearing a scleritic projection from each hole; outline of basal plate expanding slightly, forming subangular curves which narrow abruptly and caudally forming two sinuses at the posterior termination.

DISTRIBUTION: McQueen, Autauga Co., Five Points, Chambers County.

ECOLOGY: Vertical webs on hazel at the bottoms of ravines; on alder in second growth along a stream in flatwoods. A rare species.

Aranea displicata (Hentz).

Epeira displicata Hentz, Jour. Boston Soc. Nat. Hist., 1847, **5**: 476, Pl. 31, fig. 17.

DISTRIBUTION: Counties: (Opelika) Lee, (Oak Mountain State Park) Shelby.

ECOLOGY: Vertical webs on hazel and alder along streams in ravines and in flat woods; on grass and in thickets on the borders of fields. Mature in summer. Rather uncommon in Alabama.

Aranea detrimentosa (Cambridge).

Epeira detrimentosa Cambridge, Biol. Centr. Amer., 1889, **1**: 26, Pl. 6, fig. 7.

Epeira detrimentosa, Banks, Proc. Calif. Acad. Sci., 1898, **1**: 253, Pl. 15, fig. 7.

DISTRIBUTION: Dauphin Island, Mobile County.

ECOLOGY: Vertical webs up to 6½ feet off the ground; nests located on ribs on upper surfaces of the palmettoes, *Serenoa serrulata* and *Sabal minor,* and on the upper and under surfaces of the leaves of *Yucca filamentosa;* also in irregularities in the bark of branches or in angles between branches of *Xanthoxylum clava-herculis* (Hercules' club), live oak, slash pine and tall annuals. This spider prefers the following situations: Dry open country dominated by cacti, yuccas, and Hercules club; yuccas and palmettoes on shell mounds; live oak groves; light openings on the borders of woods. It preys on Orthoptera and on beetles such as *Eudiagogus rosenschoeldi* (the coffee-pea beetle). Mature in July.

Aranea pegnia (Walckenaer), Plate 4, fig. 3.

Epeira pegnia Walckenaer, Ins. Apt., 1837, **2**: 80.

Epeira globosa Keyserling, Verh. Zool. Bot. Ges. Wien. 1865, **14**: 820, Pl. 18, figs. 19-20.

DISTRIBUTION: Counties; Autauga, Baldwin, Barbour, Butler, Chambers, Chilton, Coffee, Covington, Dale, Dallas, Elmore, Escambia, Hale, Houston, Jackson, Lee, Macon, Mobile, Monroe, Montgomery, Morgan, Perry, Sumter, Tuscaloosa; Muscogee County, Georgia.

ECOLOGY: Vertical webs in tall shrubs of all sorts up to 8 feet off the ground. Its favorite habitual range is on ravine slopes, in dry upland woods, second-growth pines, woodland borders, and in open fields. It is common along the beaches of Mobile Bay. It is characteristic in pecans and shade trees; also on ornamental shrubs in urban parks and gardens. Being one of the house Araneas, this species can be found in barns and buildings. This rather small orb-weaver is a useful insect-killer (especially farm and orchard pests), as well as being of attractive appearance. It is quite timid, preferring to hide in its nest. Mature in summer.

Aranea thaddeus (Hentz), Plate 3, fig. 2.

Epeira thaddeus Hentz, Jour. Soc. Nat. Hist., 1847, 5: 473, Pl. 31, fig. 6.

The dorsal shield of the abdomen varies from green to yellow. The deep pigment bordering the base of the abdomen shades from brown, through buff, to dark green.

DISTRIBUTION: Counties; (McQueen) Autauga, (Verbena) Chilton, (Hatchet Creek) Coosa, (Valley Creek State Park, Beech Creek) Dallas, (Moundville) Hale, (Dothan) Houston, (Cooley Creek) Jefferson, (Opelika, Chewacla Creek State Park) Lee, (Monte Sano) Madison, (Cave Spring Cave) Morgan, (Tuscaloosa) Tuscaloosa; (Bristol) Calhoun County, Florida.

ECOLOGY: Vertical webs in dogwood, holly, black gum, and other shrubs, as well as on young oaks—ravine bottoms and flat woods. This species never seems to occur far from streams. Once it was found on tangles on honeysuckle (*Lonicera*) on young trees along a stream issuing from a cave. In the day time the spider prefers to hide in a lattice-like nest in a curled leaf at an upper angle of the web. It preys on all sorts of flying insects that fre-

quent the vicinity of streams. Mature in fall. Adult females persist until January.

Aranea raji Scopoli, Plate 3, figs. 1, 3.

Aranea raji Scopoli, Entom. Carniolica Exhib. Ins. Carn. Indig., 1763, p. 394.

Epeira gigas Leach, Zool. Misc., 1815, **2**: 132, Pl. 109.

Epeira insularis Hentz, Jour. Boston Soc. Nat. Hist., 1947, **5**: 470, Pl. 30, fig. 10.

This beautifully colored, large species varies its color markings with the seasons. The orange (*marmorea*) pattern appears on the gravid females after the first frosts, at least in north Alabama.

DISTRIBUTION: Counties; Autauga, Butler, Chilton, Clay, Cleburne, Coosa, Dallas, Elmore, Jackson, Jefferson, Lawrence, Lee, Lowndes, Madison, Montgomery, Morgan, Perry, Randolph, Talladega, Tuscaloosa, Winston. This species occurs in the highland provinces of Alabama and down into the red hills of the Coastal Plain. Evidence of its occurrence in extreme south Alabama is so far lacking.

ECOLOGY: The nest is placed in a partly curled leaf at an upper angle of the large, vertical web in tall shrubs (dogwood, hazel, black gum, persimmon, buckeye, etc.) and trees—six to seven feet off the ground. This spider is usually found both in flatwoods and on forested slopes, but occasionally occurs in tall thickets in open fields. It also lives on ornamental shrubs in urban gardens, especially in Montgomery and Decatur. In Tuscaloosa it has never been found inside city limits, and is rare in the neighboring woods. It prefers to hide in the nest during the day, and is therefore seldom noticed. This species is a voracious feeder, and preys on a wide variety of larger insects. Commensal spiders of the genus *Argyrodes,* especially *A. nephilae* Tacz., are common in its webs. Mature in late summer and fall.

Aranea trifolium (Hentz).

Epeira trifolium Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 471, Pl. 31, fig. 1.

Epeira septima Hentz, id ibid., p. 470, Pl. 30, fig. 9.

DISTRIBUTION: Auburn, Lee County, Apparently rare in Alabama.

ECOLOGY: Vertical webs in tall herbaceous vegetation in freshwater marshes.

Aranea undata Olivier.

Aranea undata Olivier, Encyl. Method., 1789, 4: 200.

Epeira frondosa Walckenaer, Ins. Apt., 1837, 2: 26, Pl. 46, fig. 113.

Epeira strix Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 473, Pl. 31, fig. 5.

Hentz cited both Pennsylvania and Alabama as localities for *Epeira strix*. The situation is confusing when we consider that several species of this group look nearly alike. I have specimens before me from both Alabama and Tennessee and the female genitalia conform with those of the species now recognized as *undata*. The Alabama specimen is figured in Plate 1, figure 3.

DISTRIBUTION: Elk River Fish Hatchery, Limestone Co., Decatur, Morgan County. Dr. Jones and I also found the species in Townsend, Blount County, Tennessee.

ECOLOGY: Uncommon in tall shrubs in bluff woods along Elk River; vertical webs common on the walls of buildings (warehouses, stores, dwellings) and inside buildings, urban areas along the Tennessee River; in tall shrubs in vacant lots along the river. Mature in summer and fall. Adult females of various sizes occur from July to November, but the only males before me were collected in late October. This species preys on willow flies, crane flies, house flies, and other insects.

Neoscona *Simon,* 1864.

Neoscona arabesca (Walckenaer).

Epeira arabesca Walckenaer, Ins. Apt., 1837, 2: 74.

Epeira trivittata Keyserling, Sitzungsberichte Isis, 1863, p. 95, Pl. 5, figs. 6-9.

Epeira arabesca, McCook. American Spiders, 1894, 3: 148.

DISTRIBUTION: Lee County. The presence of this species in the Piedmont Province and elsewhere in east Alabama should occasion no surprise, since eastern Appalachian species do intrude into that region of the state.

ECOLOGY: Occurs in open country as does *N. minima.* My specimens have been mislaid, but Mr. Banks also reported the species from Lee County in 1900.

Neoscona minima F. Cambridge.

Neoscona minima F. Cambridge, Biol. Centr. Amer., 1904, 2: 471, Pl. 64, figs. 11-12.

This species replaces *N. arabesca* over most of the state, and is of especial interest as being of Texan and Mexican affinities. In males the tibiae are curved instead of being straight as in the case of *N. arabesca.* Dr. Gertsch says that the spinal formula is also different.

DISTRIBUTION: Counties; Autauga, Baldwin, Calhoun, Chilton, Coffee, Coosa, Cullman, Dale, Dallas, Elmore, Escambia, Geneva, Hale, Houston, Jefferson, Lee, Lowndes, Macon, Mobile, Montgomery, Morgan, Pickens, Pike, Shelby, Tuscaloosa, Wilcox.

ECOLOGY: Vertical webs on rather low shrubs in dry, upland woods (hardwood and coniferous); also in dry flatwoods; on shrubs, perennial, and annual weeds in open fields; on fences; on weeds and on ornamental shrubs, waste lots and urban gardens; on walls of buildings; in windows of barns, inside buildings. This is a common species. It is a useful predator on pest insects of farms. Rather common in dirt-dauber nests. Mature in summer.

Neoscona benjamina (Walckenaer).

Epeira benjamina Walckenaer, Ins. Apt., 1837, 2: 42.

Epeira benjamina, McCook, American Spiders, 1893, 3: Pl. 1, fig. 7, Pl. 2, figs. 4-5.

There is some variation in color in this species. Some individuals are very dark, while others are pale brown. Spiders taken in south Alabama occasionally have femora nearly as rufous as those of *N. domiciliorum,* but invariably lack the well-defined pattern on the dorsum of the abdomen.

DISTRIBUTION: Counties; Autauga, Baldwin, Calhoun, Chambers, Chilton, Clay, Cleburne, Coosa, Covington, Cullman, Dallas, Elmore, Escambia, Geneva, Hale, Jackson, Jefferson, Lee, Lowndes, Macon, Madison, Mobile, Montgomery, Morgan, Randolph, Russell, Shelby, Sumter, Talladega, Winston. Evidently statewide, but not known from Houston or Tuscaloosa Counties. Occurs with *N. domiciliorum* at Moundville in Hale County.

ECOLOGY: Vertical webs in tall shrubs and trees in all sorts of woodland from ravine bottoms to upland woods; also in shrubs at borders of woods; in longleaf-pine woods; in thickets in open fields; in very open blackjack-oak savannas in south Alabama. It is common on walls and eaves of porches of dwelling houses (Mobile, Birmingham); in barn windows (Birmingham); on garden shrubs. It is ordinarily timid, but will attempt to bite anyone who tries to rout it from the nest. The nest is located in a curled leaf at an upper angle of the web, although in the case of immature spiders it is apt to be located at a lower angle. This species traps large insects, including grasshoppers and locusts. Mature in late summer and fall.

Neoscona domiciliorum (Hentz), Plate 4, fig. 2.

Epeira domiciliorum Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 469, Pl. 3, fig. 7. Spiders U. S., Hentz, Occ. Papers Soc. Nat. Hist., ed. E. Burgess, Pl. 19, fig. 123 (abdomen).

This species has hitherto been considered synonymous with *N. benjamina* Walck. (q.v.), but is certainly distinct from it. Hentz evidently confused the two species, but figured *domiciliorum* supposing no differences between them. The specific name would be more appropriate for *benjamina,* since the latter is the one that lives "in dark

apartments not much frequented", while *domiciliorum* lives outside of buildings. The species which Hentz figured differs from *benjamina* as follows: 1. The epigynum (Plate 2, fig. 2) has a shorter scape, the spoon-like termination being rather stubby and strongly curved over (see Hentz' figure in Burgess, cited above); the median enlargement of the scape is proportionately wider but less flaring. 2. The median apophysis (?) of the male palpus is slightly different (according to Dr. Gertsch). 3. The dorsal pattern of the abdomen is much more strongly marked, forming a series of black markings flaring at right angles from the light central zone which forms a cross. The pattern renders field recognition of the species a rather simple matter.

Variation in color is found occasionally. One female from Tuscaloosa has a light yellow abdomen, but the dorsal pattern is plainly traceable. A specimen from Dothan has the dorsal pattern reduced to a series of black, curved lines on either side of the folium. Some specimens from Tuscaloosa and all adults from Chattahoochee State Park approximate the size of the specimen figured by Hentz. On the whole this species is smaller than *N. benjamina*.

FEMALE NEOTYPES: Tuscaloosa, Tuscaloosa County, Alabama. A. F. Archer, collector. Archer collection, Alabama Museum of Natural History, Tuscaloosa, Alabama.

DISTRIBUTION: Counties; (Dyas Creek) Baldwin, (Moundville) Hale, (Dothan, Chattahoochee State Park) Houston, (Fort Deposit) Lowndes, (Tuscaloosa) Tuscaloosa. Dr. Gertsch states that this species occurs in Florida. In Alabama it is only locally abundant, and seems to have a rather scattering distribution south of the fall line. In general it does not occur in the same localities as *N. benjamina*.

ECOLOGY: This spider places its vertical webs in tall shrubs (deciduous and evergreen), ravines and shady woods not far from streams; also in tall grasses in sunny openings in woods; on the trunks of trees in gum swamps and cypress bays. It is quite common on ornamental shrubs in gardens in Tuscaloosa. Eighteen mosquito corpses were counted in one large web, early in the

morning, Chattahoochee State Park. The egg-sac is button-shaped. Mature in late summer and fall.

Neoscona vulgaris (Hentz).

Epeira vulgaris Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 469, Pl. 30, fig. 6.

Epeira nautica L. Koch, Aegypt. u. Abyss. Ar., 1875, p. 17, Pl. 2, fig. 2.

Epeira volucripes Keyserling, Verh. Zool. Ges. Wein, 1884, 34: 528, Pl. 13, fig. 27.

Some authorities have regarded Hentz' species as one of the house Araneas. Comstock regarded it as *Neoscona.* Emerton, who held the former view, considered it the same as *Aranea sclopetaria* or *A. sericata,* a species now known as *A. undata* Olivier. According to Dr. Gertsch this species more nearly approximates *Aranea foliata* Fourer (formerly *cornuta*). If we regard this species as *Neoscona,* it is at once evident that it is the tropical species known as *N. nautica* L. Koch. Hentz' *vulgaris* would then supersede *nautica* on the grounds of priority. When dealing with Alabama specimens there is no mystery about Hentz' spider. They duplicate it in pattern and other external characters. The Alabama species is certainly a *Neoscona* because it has the longitudinal cervical groove. The groove can also be seen in Hentz' figure, and indicates that he did not have an *Aranea* before him. The scape of the epigynum (Plate 2, fig. 4) is proportionately wide but not as short as that figured by Comstock (his specimen may have been immature). The apex of the scape is bluntly pointed and widely expanded behind; the proximal portion is broadly expanded.

LOCALITY OF HENTZ' SPIDER; South Carolina.

FEMALE NEOTYPES: Foley, Baldwin County, Alabama, A. F. Archer, collector, July 28, 1940. Archer Collection, Alabama Museum of Natural History, Tuscaloosa.

DISTRIBUTION: Counties; Baldwin, Dale, Escambia, Lee, Montgomery, Pickens, Talladega, Tuscaloosa.

ECOLOGY: Vertical webs on the walls of barns or suspended from the ceilings; on the walls and under the eaves of filling stations and other buildings, either in cities or in much frequented rural localities (Ozark); occasionally on garden plants (Atmore). This species was formerly confined to barns and country stores, but has now spread to other types of buildings, especially roadside stands and eating places along highways in south Alabama. The spider is more than holding its own under present-day conditions. It is one of the most domesticated of all orb-weavers, never being found far from buildings. It is of especial economic significance for it preys extensively on stable flies, and other farm pests. The abundance of house flies around restaurants and other eating places has no doubt served as an attraction for it. Contrary to Hentz' belief, this species often falls victim to dirt-daubers (*Sphex*). Mature in summer.

Neoscona pratensis (Hentz).

Epeira pratensis Hentz, Jour. Boston Soc. Nat. Hist., 1847, **5**: 475, Pl. 31, fig. 11.

DISTRIBUTION: Petit Bois Island, Mobile County.

ECOLOGY: Vertical webs on reeds, rushes, and graminaceous vegetation in salt marshes and ponds. The spider takes its stand under a leaf at the end of an upper supporting line. Mature in late summer.

Eriophora *Simon,* 1864.

Eriophora balaustina (McCook).

Epeira balaustina McCook, Proc. Acad. Nat. Sci. Phila. 1888, **40**: 198.

Idem, American Spiders, 1893, **3**: 155, Pl. 4, fig. 2.

DISTRIBUTION: Bay Minette, Baldwin County.

ECOLOGY: On gallberry (*Ilex glabra*) and huckleberry bushes in longleaf-pine woods. Apparently mature in fall. Mature spiders lose the blisters on the abdomen.

Mangora *Cambridge,* 1889

Mangora gibberosa (Hentz)

Epeira gibberosa Hentz, Jour. Boston Soc. Nat. Hist., 1847; 5: 457, Pl. 31, fig. 20.

DISTRIBUTION: Counties; Baldwin, Blount, Butler, Calhoun, Coffee, Conecuh, Coosa, Covington, Cullman, Dale, Escambia, Geneva, Hale, Houston, Jefferson, Lee, Lowndes, Mobile, Montgomery, Morgan, Sumter, Tuscaloosa, Winston. Probably statewide.

ECOLOGY: More or less horizontal webs on grasses, herbaceous vegetation, and pitcher plants (*Sarracenia*); open fields, open longleaf-pine woods, dry, upland woods, wet meadows (locally called savannas), palmetto pastures; on annual and perennial weeds, roadsides and fields; on shrubs in fields; on crops in cultivated fields; on *Spirea thunbergii* in urban gardens, in Tuscaloosa. This species is largely confined to open, sunlit situations. In Hentz' time (prior to 1847) it was reported as uncommon. Today it has become very abundant. In open areas in south Alabama there are often two webs per square foot. Its increase may well be due to the extension of clearings, but at any rate it must always have been common in natural prairies. It traps small insects. Mature in spring and summer.

Mangora maculata (Keyserling)

Epeira maculata Keyserling, Verh. Zool. Bot. Ges. Wien, 1865, 14: 827, Pl. 18, figs. 24-27.

DISTRIBUTION: Counties; Autauga, Blount, Chambers, Chilton, Dale, Hale, Houston, Lee, Lowndes, Madison, Montgomery, Morgan, Randolph, Russell, Tuscaloosa.

ECOLOGY: More or less vertical webs on cane (*Arundinaria*), on dogwood, ironwood (*Carpinus*), etc., in ravines, on wet slopes, and in flatwoods close to streams or sources of streams; on wooded seepage slopes. Also found in thickets in open fields along the Tennessee River; on ornamental shrubs in urban gardens and back yards, Montgomery. Mature in summer.

Mangora placida (Hentz)

Epeira placida Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 475, Pl. 31, fig. 12.

Epeira spiculata id ibid., p. 475, Pl. 31, fig. 13.

The form *spiculata* differs from typical *placida* in lacking the line bordering the folium on the dorsum of the abdomen. It is most commonly found in south Alabama.

DISTRIBUTION: Counties; Autauga, Baldwin, Blount, Butler, Chilton, Clarke, Cleburne, Coosa, Covington, Dale, Dallas, Elmore, Geneva, Hale, Houston, Jackson, Jefferson, Lee, Limestone, Lowndes, Madison, Mobile, Monroe, Montgomery, Morgan, Perry, Pickens, Randolph, Russell, Sumter, Talladega, Tuscaloosa, Wilcox; Calhoun, Jackson, Florida.

ECOLOGY: Vertical webs on shrubs in all types of woodland (mesophytic hardwoods to xeric conifers) as well as in open fields. On shrubs of gardens and lawns in cities. This species preys on small insects. Mature females have been found in winter, spring, and summer, and it is hard to assign any particular season for the species. In the winter of 1939 it was the commonest orb-weaver in city gardens, but in the winter of 1940 was very scarce.

Larinia *Simon*, 1874

Larinia directa (Hentz).

Epeira directa Hentz, Jour. Boston Soc. Nat. Hist., 1847, 5: 478, Pl. 31, fig. 21.

Epeira rubella Hentz, id ibid., p. 478, Pl. 31, fig. 22.

This species is elongate, rather unlike spiders of related genera. The abdomen varies somewhat in color and markings.

DISTRIBUTION: Counties (Hatchet Creek) Coosa, (River Falls) Covington, (Brown's Station) Dallas, (Little River State Park) Escambia, (Clear Creek) Jackson, (Auburn) Lee, (Mount Meigs) Montgomery, (Decatur) Morgan, (Calera) Shelby, (Yellow Creek, Tuscaloosa) Tuscaloosa.

ECOLOGY: Vertical webs between cane grass in oldfield-pine woods, on shrubs on low, hardwood slopes along creeks, or in ravines; oblique or vertical webs on grasses and rather low herbaceous vegetation in prairies, or open fields on slopes above streams. This species is seldom obtained in the daytime except in the beating net. It is most easily obtained at night in fields and pine woods when the webs have been freshly made. The spider stays on the hub of the web at night. Mature in June.

Acacesia *Simon,* 1895.

Acacesia folifera (Marx)

Epeira folifera Marx, Catalogue, 1889, p. 545.

Epeira foliata Hentz, Jour. Boston Soc. Nat. Hist., 5: 475, Pl. 31, fig. 14 (not *Epeira foliata* Walckenaer).

DISTRIBUTION: Counties; Autauga, Baldwin, Chilton, Coffee, Coosa, Cullman, Dale, Elmore, Escambia, Hale, Houston, Jefferson, Lee, Madison, Montgomery, Tuscaloosa, Winston.

ECOLOGY: Vertical webs on shrubs in upland woods, dry pine savannas, and in open fields. It is also common on roadside shrubs and weeds; on ornamental shrubs in urban gardens. This spider is quite common in the hotter months of the year. Mature in summer.

Eustala *Simon,* 1895.

Eustala anastera (Walckenaer).

Epeira anastera Walckenaer, Ins. Apt., 1837, 2: 33.

Epeira prompta Hentz, Jour. Boston Soc. Nat. Hist., 1847, **5**: 473, Pl. 31, fig. 4.

Epeira hebes id ibid., p. 473, Pl. 31, fig. 7.

Epeira bombycinaria id ibid., p. 476, Pl. 31, fig. 16.

If it were not for Hentz' statement about the habits of the spider, there would be some difficulty in recognizing *Epeira prompta* as being *Eustala anastera.* The figure suggests the bluish variation of *Aranea pegnia,* a species which Hentz appears never to have described (although it must have been common in his day). It is by no means clear that *bombycinaria* is not the same as *E. anastera emertoni* (q. v.).

DISTRIBUTION: Counties; Baldwin, Clarke, Clay, Cleburne, Coosa, Dallas, Greene, Hale, Jackson, Jefferson, Madison, Mobile, Monroe, Perry, Pickens, Shelby, Sumter, Tuscaloosa, Winston. Typical *anastera* occurs in the highland sections of the state, and extends beyond the fall line into the hilly sections of the Coastal Plain. It crops up in the flat areas of Mobile County, particularly in the City of Mobile.

ECOLOGY: Vertical webs between twigs and branches of shrubs and trees of all sorts—ravines, upland woods (hardwood and pine), and flatwoods. Also on shrubs in city gardens; on walls of buildings; in thickets, in tall grasses, and on fences in open fields; in barn windows. The spider remains motionless on a limb or branch during the warmer part of the day, but at sundown is very active in spinning its web, preferably between bare twigs or angles of doors and windows rather than in leafy situations. It preys actively on beetles and other insects. Mature in spring and early summer.

Eustala anastera emertoni (Banks).

Epeira emertoni Banks, Jour. New York Entom. Soc. 1904, **12**: 11.

Epeira emertoni Banks, Trans. Conn. Acad. Sci., 1813, **18**: Pl. 2, fig. 9.

Two authorities have independently confirmed my finding with reference to *Epeira emertoni*. The male and female genitalia are identical with those of *Eustala anastera* in every respect, not even differing in proportions. However, *emertoni* is either a race of a form of *anastera*. The general facts seem to confirm this. The distribution is roughly geographical, but not consistent enough to warrant the status of a true geographical race. In general *emertoni* and *anastera* do not occur together in the same terrain, but when they do there appears to be some overlapping (Monroe and Escambia Counties). *E. anastera emertoni* differs from typical *anastera* as follows 1. Females have the apex of the abdomen blunt and rounded off instead of being keeled or having the *Cyclosa*-like tail. 2. Males also have the apex of the abdomen rounded off instead of being prominent. On an average *emertoni* is smaller. The length of the carapace and abdomen of the two is as follows: *E. anastera,* 7-12 mm.; *E. anastera emertoni,* 4-8 mm. Exceptionally large females have been taken in Tuscaloosa and Decatur, 8 mm., for elsewhere the largest females are 6 mm. The color and pattern vary much as in typical *anastera*. Light-colored specimens are the rule in salt marshes and along dunes of the Gulf Coast. Mr. Banks states that he has found the latter in Spanish moss (*Tillandia usneoides*), but *emertoni* from hammcok woods in Alabama, where that plant flourishes, is usually gray.

DISTRIBUTION: Counties; Baldwin, Calhoun, Chambers, Chilton, Clarke, Cleburne, Coosa, Covington, Dale, Escambia, Geneva, Houston, Lee, Mobile, Monroe, Morgan, Montgomery, Tuscaloosa. Also recorded from Washington, D. C., Buttonwood, Rhode Island, and Sea Cliff, Long Island, New York. Mr. Banks recorded this form from Auburn, Alabama, and the specimens collected there recently conform to his description. In Alabama *emertoni* occurs in the Coastal Plain and apparently all over the Piedmont. It has also been found at the base of the Blue Ridge Mountains, and is recorded from lowland areas around Tuscaloosa and the flats of the Tennessee Valley in Decatur. In the latter two localities its presence is puzzling. The females are large, but the males are more nearly of the usual size.

ECOLOGY: *E. emertoni* has about the same habits and habitat preferences as does *anastera*. Active at sunset it spins its webs on bare twigs. It tends to occur more frequently on low, ground vegetation than does *anastera*. It is also more partial to culture situations, being vigor-

ously represented in such cities as Decatur, Auburn, and Tuscaloosa. During the heat of the day it can be found in upper angles of window panes directly exposed to the heat of the sun. During that time it is very sluggish, acting as though it were asleep. Mature in spring and summer.

Subfamily Gasteracanthinae.

Gasteracantha *Sundevall,* 1833.

Gasteracantha cancriformis (Linnaeus), Plate 5, fig. 3.

Aranea cancriformis Linnaeus, Syst. Nat., 1767, 11th ed., 2: 1037.

Epeira cancer Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 23, Pl. 3, fig. 13.

The spiny crab spider is a familiar object in the out-of-doors. In Alabama this species varies in color, the disk of the abdomen being white as a usual thing, but sometimes yellow (south Alabama). Dr. H. P. Loding of Mobile found one specimen in which the white was streaked with pink. One specimen taken in Five Points, Chambers County, had red spines instead of the usual black.

DISTRIBUTION: Counties; Baldwin, Bullock, Butler, Chambers, Clarke, Cleburne, Chilton, Coffee, Conecuh, Coosa, Covington, Dale, Dallas, Escambia, Geneva, Hale, Houston, Jefferson, Lee, Lowndes, Macon, Madison, Mobile, Monroe, Montgomery, Morgan, Perry, Pike, Shelby, Sumter, Tuscaloosa, Walker, Wilcox; Muscogee, Georgia; Calhoun, Jackson, Florida. This spider occurs all over the southern half of Alabama, and is only sparingly represented above the fall line, apparently ascending the river valleys. In north Alabama it has been found only on Trinity Mountain, Morgan County and on Monte Sano, Madison County.

ECOLOGY: Large vertical webs (geometrical and marked with tufts of flocculent silk) between tall shrubs or trees (hardwood and pine), in upland, ravine, and lowland woods; in shortleaf-pine woods as well as in oldfield pines. It is common along the borders of woods and in thickets in open fields. It is characteristic on ornamental shrubs and shade trees (magnolias, pines)

in city gardens and lawns. Its webs are often thrown across sunny openings and paths in woods in order to take advantage of insect flights. It is one of the first species to occupy previously burned woodlands.

In the breeding season small black males are present on the upper supporting lines of the web. I have found many cases in which the female had killed the male after the mating. The species is mature in summer and fall. Although it disappears from uplands in winter, it has been found still active in December in ravines in Coosa County and in January in Calhoun County, Florida—long after the eggs had been laid.

It is remarkable that a species of tropical affinities is as hardy as is this one. It occurs on the summit of Cheaha Mountain, 2407 feet, the highest point in Alabama.

Micrathena *Sundevall,* 1833.

Micrathena reduviana (Walckenaer).

Plectana reduviana Walckenaer, Ins. Apt., 2: 201.

Epeira mitrata Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 22, Pl. 3, fig. 11.

DISTRIBUTION: Counties; Autauga, Baldwin, Butler, Chambers, Chilton, Clay, Cleburne, Coosa, Covington, Dale, Elmore, Houston, Lee, Lowndes, Macon, Madison, Morgan, Perry, Randolph, Russell, Sumter, Tuscaloosa, Winston; Muscogee, Georgia.

ECOLOGY: Vertical webs up to 6 feet off the ground between tall shrubs or trees (hardwood and pine) in sunny openings and across paths—wooded ravines and slopes. This is the only species of the genus that I have not found outside of woodlands. It traps flying Coleoptera, Orthoptera, and many Lepidoptera. Mature in summer.

Micrathena gracilis (Walckenaer).

Plectana gracilis Walckenaer, Ins. Apt. 1837, 2: 193.

Epeira rugosa Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 21, Pl. 3, fig. 10.

DISTRIBUTION: Counties; Autauga, Baldwin, Bullock, Butler, Chambers, Chilton, Cleburne, Colbert, Coosa, Covington, Dale, Elmore, Escambia, Franklin, Hale, Houston, Jackson, Jefferson, Lee, Lowndes, Macon, Madison, Monroe, Montgomery, Morgan, Perry, Randolph, Russell, Shelby, Tuscaloosa; Muscogee, Georgia.

ECOLOGY: Vertical or rarely horizontal webs rather high up between tall shrubs or trees (hardwood and pine). It prefers sunlit situations, often in company with *Verrucosa arenata* Walck., on ravine slopes and in flatwoods. It is not uncommon in trees overhanging small streams and rivulets; also present on river bluffs and on bluffs above Mobile Bay below hammock woods. I have not found it to any extent in open fields, but it is partial to shrubs in city gardens. This spider traps a great many insects of all sizes in the webs. A goodly proportion of the prey that I have examined consists of beetles and moths. In spite of the prominent spines on the abdomen of *M. gracilis* and other members of the genus, it is very harmless to man. When dislodged from the web, it is awkward and helpless in its efforts to escape due to its short legs. Like *Gasteracantha cancriformis* (q. v.) it will scramble about helplessly when held in the palm of the hand. When forced to bite (which it never does voluntarily), it can inflict a wound similar to a bee sting, but the effect is only momentary. This species is mature in summer and fall.

Micrathena sagittata (Walckenaer).

Plectana sagittata Walckenaer, Ins. Apt. 1837, 2: 174.

Epeira spinea Hentz, Jour. Boston Soc. Nat. Hist., 1850, 6: 21, Pl. 3, fig. 9.

DISTRIBUTION: Counties; Autauga, Baldwin, Blount, Butler, Chambers, Chilton, Clarke, Clay, Cleburne, Covington, Dale, Hale, Houston, Jackson, Jefferson, Lawrence, Lee, Lowndes, Macon, Madison, Monroe, Montgomery, Morgan, Perry, Randolph, Russell, Tuscaloosa, Wilcox, Winston; Muscogee, Georgia.

ECOLOGY: Vertical webs from above 5 feet to close to the ground on shrubs and young trees of all sorts, as well as on vines—sunny situations in hardwood and pine timber, flatwoods, ravines, and bluffs. This species is very partial to openings, woodland borders, and low thickets. Like some others of the larger orb-weavers that build webs close to the ground it occurs on tall grasses, rank vegetation, and thickets in fields and prairies. It is fairly common on shrubs in gardens and on hedges in cities. The spider traps large numbers of insects. Like other members of the Gasteracanthinae it remains on the hub of the web day and night. Mature in summer. At the end of its season it seems to prefer to build its webs close to the ground.

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PLATE I

Fig. 1. *Tetragnatha marianna* Archer. Showing pars cephalica, dorsal and ventral view of chelicera, and the palpus of the male. Randon's Creek, Monroe County, Alabama.

Fig. 2. *Singa maura* (Hentz). Epigynum. Cheaha State Park, Cleburne County ,Alabama.

Fig. 3. *Aranea undata* Olivier. Epigynum. Decatur, Morgan County, Alabama.

Fig. 4. *Theridiosoma argentatum* Keyserling. Epigynum. Opelika, Lee County, Alabama

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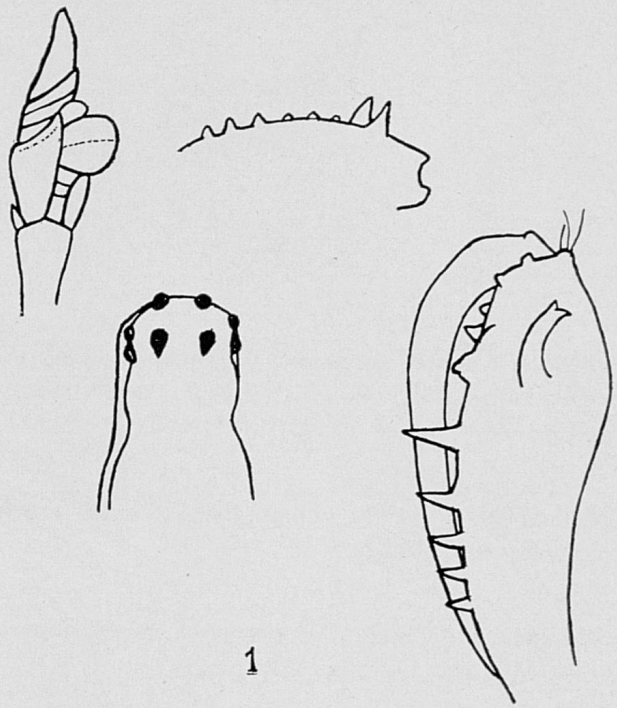

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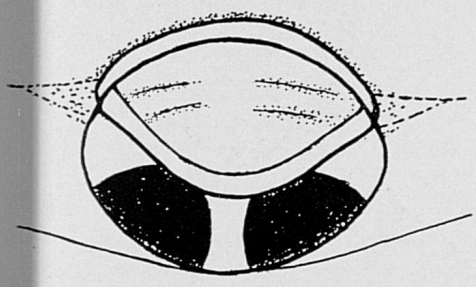

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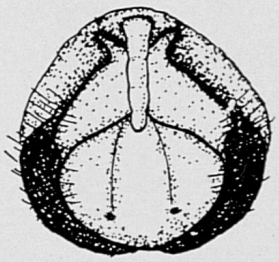

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PLATE II

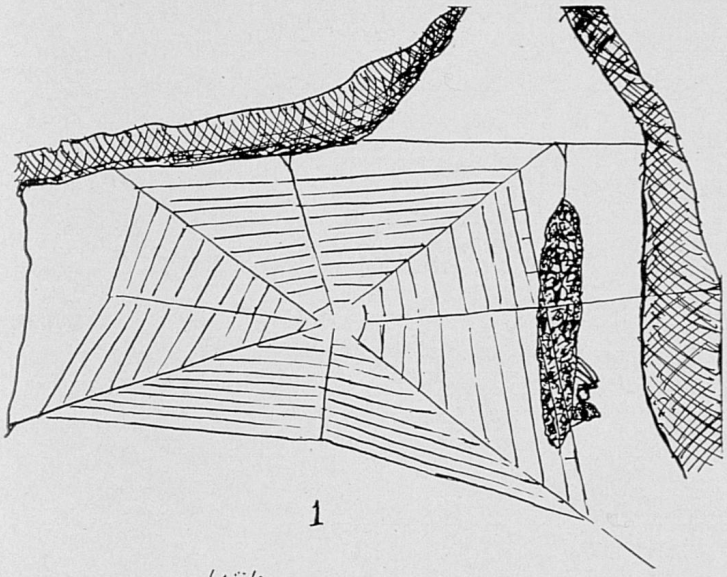
Fig. 1. Web of *Nicholasia pentagona* (Hentz) showing the spider on the cord hanging outside of the web. Moundville, Hale County, Alabama. August 1939.

Fig. 2. *Neoscona domiciliorum* (Hentz). Epigynum. Tuscaloosa, Tuscaloosa County, Alabama.

Fig. 3. *Singa rubens* (Hentz). Epigynum. Black Warrior National Forest, Winston County, Alabama.

Fig. 4. *Neoscona vulgaris* (Hentz). Epigynum. Foley, Baldwin County, Alabama.

Drawn by the author.



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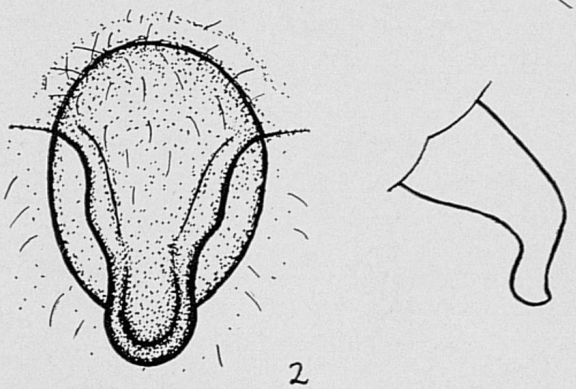

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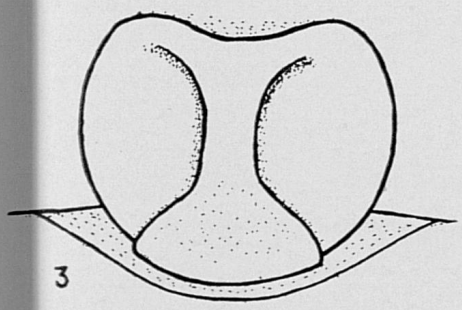

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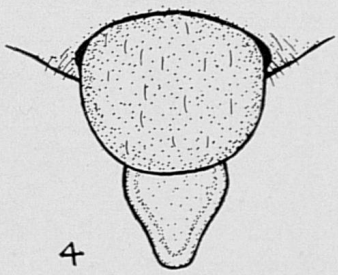

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PLATE III

Fig. 1. *Aranea raji Scopoli.* Female. Monte Sano, Madison County, Alabama. X 2.6.

Fig. 2. *Aranea thaddeus* (Hentz). Female. Monte Sano, Madison County, Alabama. X 3.4.

Fig. 3. *Aranea raji* Scopoli. Male. Monte Sano, Madison County, Alabama. X 2.6.

Fig. 4. *Verrucosa arenata* (Walckenaer). Female. Moundville, Hale County, Alabama. X 3.4.

Fig. 5. *Singa maura* (Hentz). Female. Cheaha State Park, Cleburne County, Alabama. X 3.4.

Photographs by R. S. Hodges.

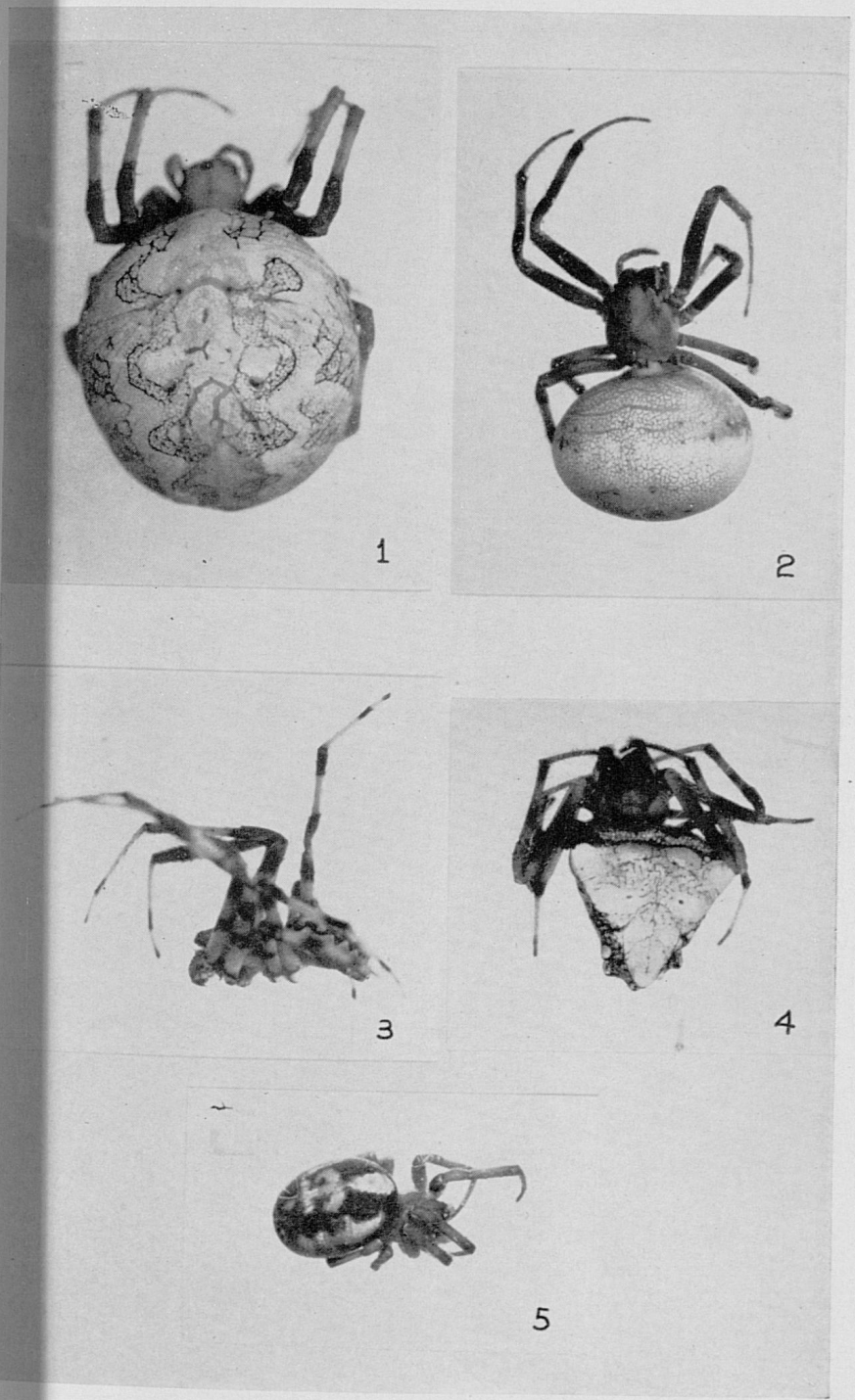
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PLATE IV

Fig. 1. *Aranea cavatica* (Keyserling). Female. Monte Sano, Madison County, Alabama. X 2.

Fig. 2. *Neoscona domiciliorum* (Hentz). Female. Chattahoochee State Park, Houston County, Alabama. X 3.2.

Fig. 3. *Aranea pegnia* (Walckenaer). Female. Verbena, Chilton County, Alabama. X 3.4.

Fig. 4. *Wixia ectypa* (Walckenaer). Female. Wetumpka, Elmore County, Alabama. X 3.4.

Photographs by R. S. Hodges.

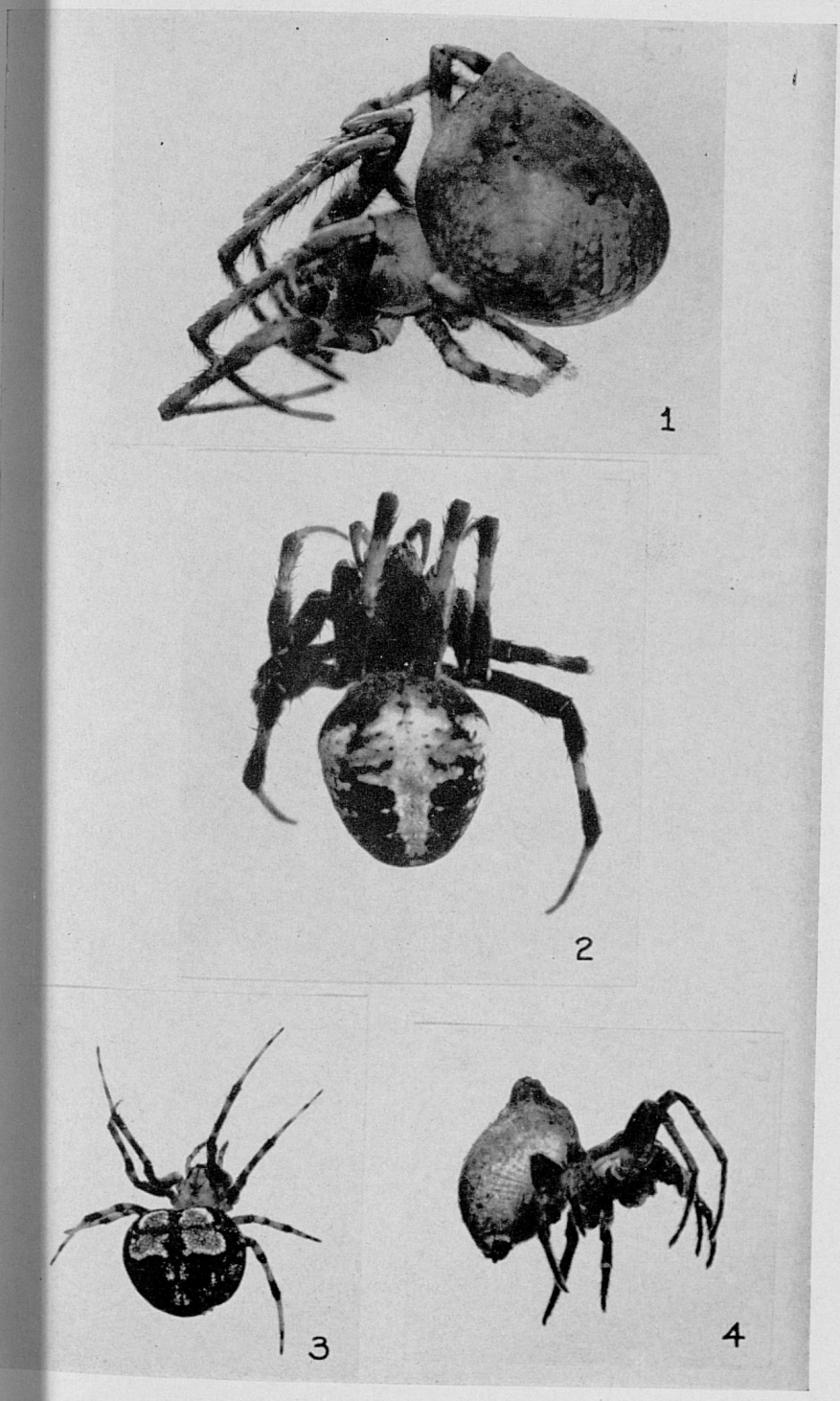

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PLATE V

Fig. 1. *Nicholasia pentagona* (Hentz). Male. Tuscaloosa, Tusca-
loosa County, Alabama. X 9.4.

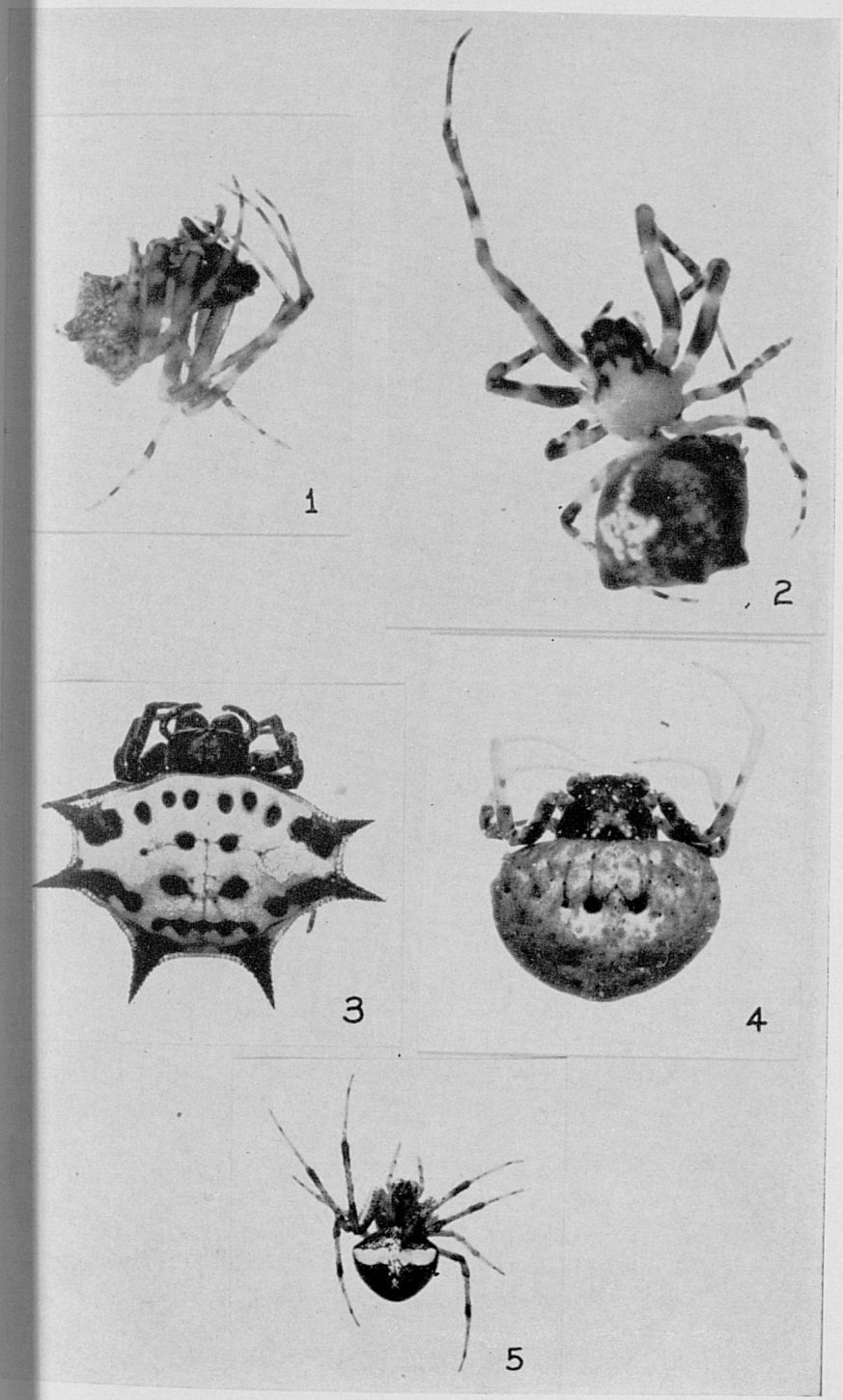
Fig. 2. *Nicholasia pentagona* (Hentz). Female. Tuscaloosa, Tusca-
loosa County, Alabama. X 9.4.

Fig. 3. *Gasteracantha cancriformis* (Linnaeus). Female. Yellow
Creek, Tuscaloosa County, Alabama. X 3.4.

Fig. 4. *Mastophora bisaccata* (Emerton). Female. Bristol, Calhoun
County, Florida. X 3.4

Fig. 5. *Aranea miniata* (Walckenaer). Female. Hatchet Creek
Coosa County, Alabama. X 3.4.

Photographs by R. S. Hodges.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