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REPORT ON SOME ARACHNIDS FROM BARRO COLORADO ISLAND, CANAL ZONE

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The arachnids on which this paper is based were placed in my hands for study by Dr. E. G. Williams, Jr., formerly of Northwestern University. The material was collected in 1938 during the course of an ecological study on Barro Colorado Island, Canal Zone. As was to be expected from such an intensive survey of a limited plot of ground, the bulk of the material has proved to be immature and for the most part unidentifiable to species. Approximately twenty families of spiders were represented and identifiable to genera, about forty genera being noted. Of the specimens identified to species only the ones described below as new have not been reported previously from Barro Colorado Island.

Several tiny, secretive spiders which live in leaf mold and detritus were contained in the collection. Especially notable are the species of the family Symphytognathidae,

that name used here in the broader sense of Dr. Louis Fage. One of them is a four-eyed spider which is related to *Symphytognatha globosa* Hickman from Tasmania. Of nearly equal interest is a new genus of the Tetrablemmidae in which the front eyes are apparently fused together, the resultant condition being a single median eye placed at the edge of the clypeal declivity. The other spiders belong for the most part to familiar tropical genera.

The collection included a number of miscellaneous arachnids in addition to the spiders. The order Opiliones is well represented with species of the common tropical families. A single representative of the family Schizomidae of the Pedipalpi is described as new.

The types of the various species are deposited in the collection of The American Museum of Natural History through the generosity of Dr. Williams.

ORDER ARANEAE

Symphytognathidae

The above family name is used in the sense of Dr. Louis Fage to include, in addition to the typical genus *Symphytognatha* of Hickman, a small number of genera and species related to *Anapis* Simon. Dr. Fage has given adequate reasons (1937, Bull. Soc. Zool. France, LXII, pp. 93-105) for incorporating *Symphytognatha* and the genera assigned by Kratochvil to the family Anapidae into a single family which should be known as the Symphytognathidae, the older name.

The symphytognathids possess a number of unusual characters of which the following are most important. Lung-books are completely absent, and they are re-

placed by a single pair of tracheal spiracles. The normal number of eyes is presumably six, the anterior median eyes being lost in all the genera. In *Anapistula* the posterior median eyes are also missing, the complete number present being four. In some of the species the pedipalpi of the female are completely missing; in others it is greatly reduced in size.

Four species of the Symphytognathidae occur on Barro Colorado Island and represent three genera. The four genera now known from the Americas may be separated by the following key.

- 1.—Four eyes present; pedipalp of female missing.....*Anapistula*.
Six eyes present; pedipalp of female present.....2.

- 2.—Posterior row of eyes essentially straight.*Anapisona*.
 Posterior row of eyes strongly procurved. . 3.
 3.—Eyes of first row (anterior lateral of each side) separated by the diameter. . *Anapis*.
 Eyes of first row subcontiguous. . . *Epectchina*.

ANAPISTULA, NEW GENUS

Carapace broader than long, of moderate height, evenly convex, highest at the crest of the posterior declivity, the sutures obsolete. Eyes four, all median eyes completely missing. Anterior and posterior lateral eyes of each side group contiguous, equal in size, widely separated from the other group by two full diameters. Sternum widely truncated in front and behind, the posterior coxae separated by twice their length. Chelicerae soldered together in the basal half, of average size, the margins with a pale tooth. Pedipalp completely missing in female. Male unknown.

GENOTYPE.—*Anapistula secreta*, new species.

This interesting genus conforms in all important family characters with *Symphytognatha globosa* Hickman from Tasmania. It is easily differentiated from that genus and others (*Pseudanapis* and *Chasmocephalon*) in completely lacking all median eyes, the full number being four, the lateral eyes, which are widely separated.

Anapistula secreta, new species

Figures 14, 15, 16 and 17

FEMALE.—Total length, 0.50 mm.

Carapace, 0.20 mm. long, 0.24 mm. wide; abdomen, 0.32 mm. long, 0.30 mm. wide.

Carapace dull yellow, unmarked except for the narrow black rings around the eyes and inconspicuous dusky shading on the margins, with two weak setae at the front of the posterior declivity, otherwise apparently unclothed. Sternum dusky over a dull yellow base. Legs dull yellow, the terminal joints darkened, the juncture between the tarsi and metatarsi appearing as an indistinct pale annulus. Abdomen dull yellow, concolorous with the carapace, clothed evenly with rather long pale hairs.

Carapace broader than long, nearly truncate in front, the sides moderately rounded, the caudal end truncated. Pars cephalica relatively high, evenly convex, the median groove and cephalic sutures obsolete. Carapace highest at the crest of the precipitous posterior declivity, gently and evenly declining forward to the eyes. Clypeus subvertical, rather narrow, equal in height to the radius of an anterior lateral eye. Eyes four, in two groups, no vestiges of median eyes being present. Eye area nearly as wide as the width of the carapace at that point. Eyes of each side (anterior lateral and posterior lateral) contiguous, subequal in size, separated from the group of the opposite side by

fully twice their diameter. Eyes as illustrated in Fig. 17.

Sternum as broad as long, broadly truncated in front, very gently rounded on the sides, broadly truncated behind where the sternum projects between the posterior coxae and separates them by twice the length of the coxae (Fig. 16). Labium short, about two-thirds as long as broad, broadly rounded in front. Maxillae scarcely twice as long as the labium, rounded and convergent around the labium so that the tips nearly touch in front. Chelicerae soldered together in the basal half.

Legs of moderate length, without true spines, sparsely clothed with inconspicuous hairs and bristles. Patellae with a projection on the retrolateral surface and with an erect bristle above at distal end which is as long as the joint. Legs essentially equal in thickness. Femora with a double series of weak bristles beneath, about four pairs beneath the first femur; other segments with subprocumbent bristles or hairs. Tarsi on all legs much longer than the metatarsi. Pedipalpi completely missing in the female.

	I	II
FEMUR	0.18 mm.	0.16 mm.
PATELLA	0.10	0.08
TIBIA	0.13	0.11
METATARSUS	0.10	0.08
TARSUS	0.16	0.15
TOTAL	0.67 mm.	0.58 mm.

	III	IV
FEMUR	0.13 mm.	0.19 mm.
PATELLA	0.08	0.08
TIBIA	0.09	0.14
METATARSUS	0.07	0.10
TARSUS	0.15	0.14
TOTAL	0.52 mm.	0.65 mm.

Abdomen subglobose. Epigynum as illustrated in Fig. 15.

TYPE LOCALITY.—Female holotype from Barro Colorado Island, Canal Zone, July 21, 1938 (E. G. Williams, Jr.).

This species is distinguished from all other species of the family in completely lacking both pairs of median eyes.

ANAPIS SIMON

The generic name *Anapis* was proposed by Simon (1892–95, Histoire Naturelle des Araignees, I, p. 923) to supplant *Amazula* Keyserling, a name previously used for a genus of beetles. *Amazula hetschki* Keyserling automatically became the genotype of *Anapis* and was cited thus by Simon. The presence of a species closely allied to *hetschki* in the present collection has made necessary a review of the genus

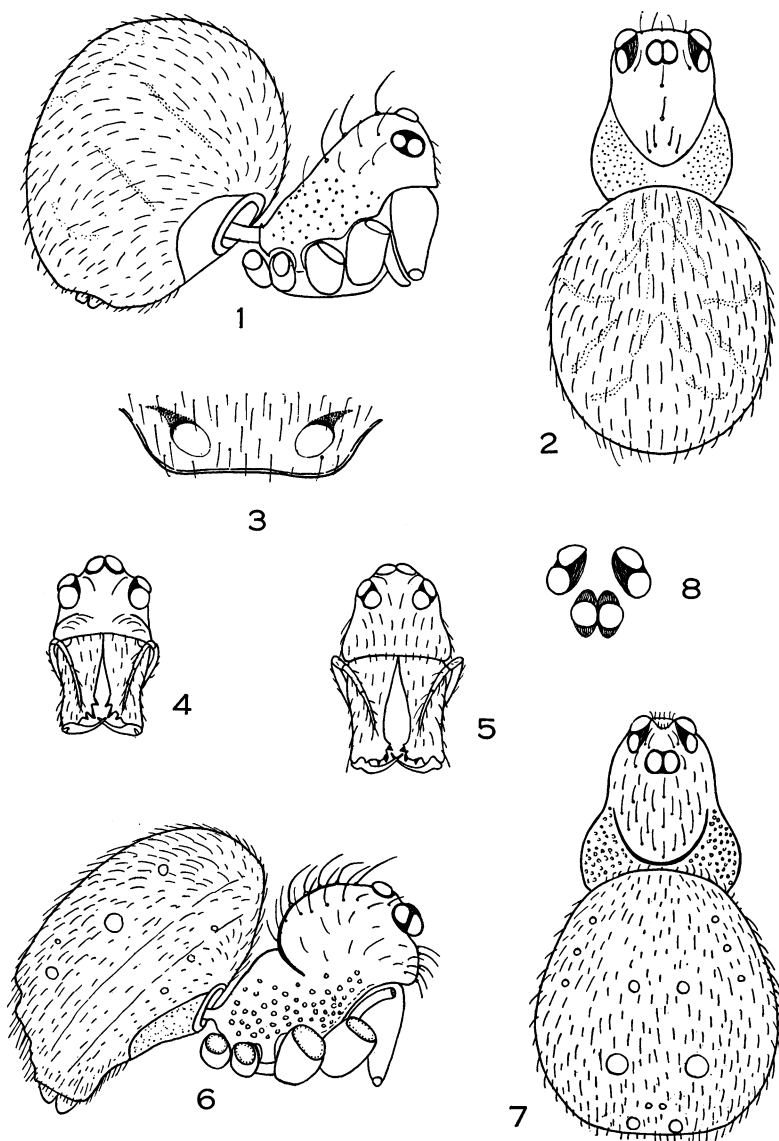


Fig. 1. *Anapisona simoni*, new species, lateral view of female, appendages omitted.
 Fig. 2. Idem, dorsal view of female, appendages omitted.
 Fig. 3. Idem, epigynum of female.
 Fig. 4. Idem, front and chelicerae of female.
 Fig. 5. *Anapis keyserlingi*, new species, front and chelicerae of female.
 Fig. 6. Idem, lateral view of female, appendages omitted.
 Fig. 7. Idem, dorsal view of female, appendages omitted.
 Fig. 8. Idem, eyes of female, dorsal view.

inasmuch as Simon evidently did not have examples of that species for study.

The generic diagnosis for *Anapis* as given by Simon is based on various undescribed species of anapids in which the contiguous lateral eyes of each side are widely separated groups and form with the two contiguous median eyes what is essentially a straight transverse row. Two of Simon's species were from Venezuela and two species are represented in the material before me from Barro Colorado Island. A study of Keyserling's figures and description of *Amazula hetschki* shows clearly that the median and lateral eyes form a triangular figure with the apex directed caudad, thus forming a strongly procurved row. The species described below as *Anapis keyserlingi*, new species, shares the characters given for Keyserling's *Amazula* and represents the second authentic species of the true *Anapis*. For those species in which the posterior row of eyes is essentially straight, erroneously referred to *Anapis* by Simon in his description of the genus, a new generic name, *Anapisona*, is proposed below.

Anapis keyserlingi, new species

Figures 5, 6, 7, 8 and 13

FEMALE.—Total length, 1.50 mm.

Carapace, 0.70 mm. long, 0.61 mm. wide; abdomen, 0.97 mm. long, 0.97 mm. wide.

Carapace dark reddish brown, the pars cephalica somewhat paler, the eye tubercles black, clothed sparsely with inconspicuous hairs and armed on the mid-line behind the eyes and on the clypeus with stouter bristles. Sternum dark reddish brown. Legs paler than the carapace, bright orange brown, the anterior legs darker, the fourth tibia and metatarsus with an apical dusky ring. Abdomen gray, dusky, the whole dorsum sclerotized to form a scutum.

Carapace longer than broad, narrowed in front, the sides broadly rounded. Pars cephalica elevated, differentiated by a deep semicircular groove, the median groove obsolete. Pars cephalica finely roughened, the margins with shallow pits. Pars thoracica more coarsely roughened and with a series of large shallow pits around the margins. Clypeus coarsely roughened, gently rounded, convex as seen from the side, essentially vertical, equal in height to a little more than twice the diameter of an anterior lateral eye. Eyes in three separate groups, the lateral eyes of each side contiguous, the anterior lateral eyes separated from each other by their diameter. Posterior row of eyes very strongly

procurved, the contiguous median separated by scarcely their diameter from the posterior lateral eyes. Details of structure of carapace and eye relations as shown in Figs. 5 to 8.

Sternum five-sixth as broad as long, coarsely roughened, truncated behind where the posterior coxae are separated by their length. Labium triangular, broader than long. Maxillae enlarged and truncated at the apex. Chelicera armed with three teeth on the upper margin, unarmed below, excavated on the inner side (Fig. 5).

Legs clothed with black hairs and a few longer bristles. All patellae with a long apical bristle above. First and second metatarsi with a ventral pair of cusps at distal end; first and second tarsi with three smaller cusps beneath. First two legs more robust than the posterior ones, their femora roughened. Pedipalp thin and short as in *Anapisona*.

	I	II
FEMUR	0.70 mm.	0.60 mm.
PATELLA	0.31	0.31
TIBIA	0.54	0.45
METATARSUS	0.26	0.24
TARSUS	0.54	0.48
TOTAL	2.35 mm.	2.08 mm.

	III	IV
FEMUR	0.35 mm.	0.48 mm.
PATELLA	0.18	0.20
TIBIA	0.24	0.34
METATARSUS	0.18	0.23
TARSUS	0.35	0.33
TOTAL	1.30 mm.	1.58 mm.

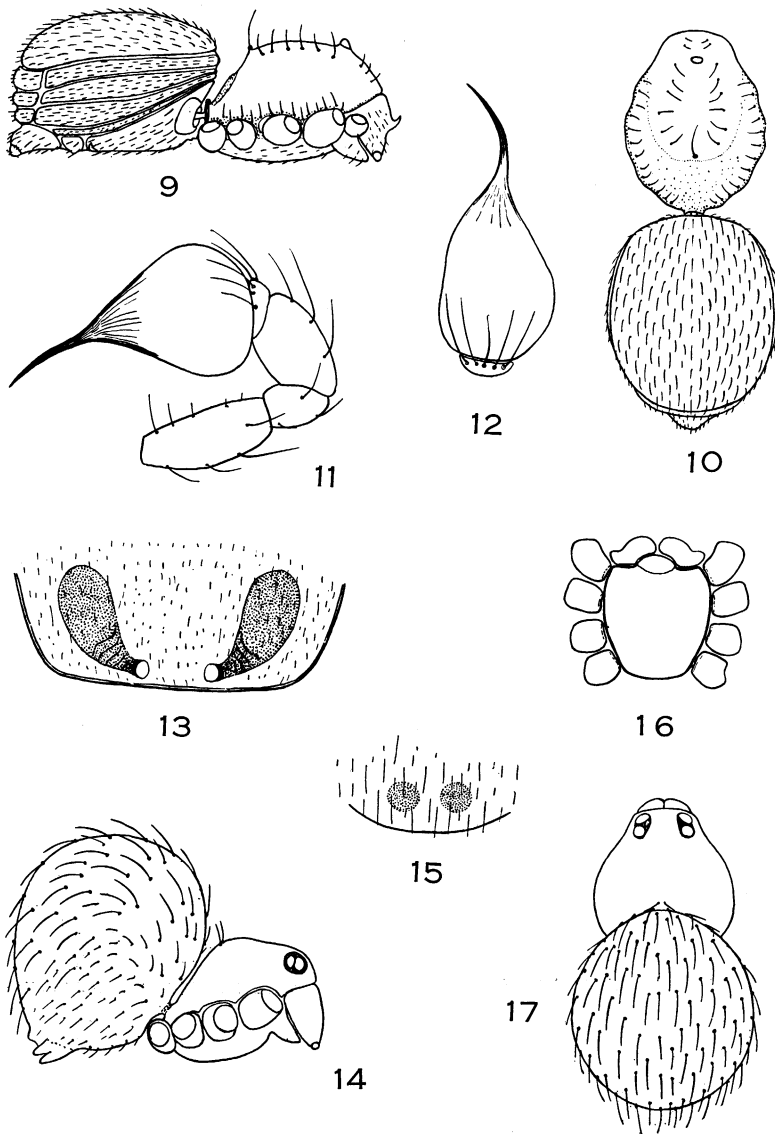
Abdomen suboval, as broad as long, flattened as seen from the side. Epigynum as shown in Fig. 13.

TYPE LOCALITY.—Female holotype from Barro Colorado Island, Canal Zone, July 13, 1938 (E. G. Williams, Jr.).

This species is apparently closely related to *Anapis* (*Amazula*) *hetschki* Keyserling of Brazil. The eyes of *hetschki* are more widely separated, the posterior median being two diameters from the lateral eyes whereas in *keyserlingi* they are separated by about one diameter. The legs are seemingly somewhat shorter in proportion, the first femora equalling the cephalothorax in length, not exceeding it as in *hetschki*.

ANAPISONA, NEW GENUS

Carapace longer than broad, the pars cephalica high, convex, truncated in front, the sutures obsolete. Eyes six, the anterior median eyes missing. Posterior row of eyes straight or lightly procurved, the contiguous median eyes separated from the lateral by their diameter. Clyp-



- Fig. 9. *Monoblemma unica*, new species, lateral view of male, appendages omitted.
 Fig. 10. Idem, dorsal view of male, appendages omitted.
 Fig. 11. Idem, left male palp, retrolateral view.
 Fig. 12. Idem, tarsus of left male palp, dorsal view.
 Fig. 13. *Anapis keyserlingi*, new species, epigynum of female.
 Fig. 14. *Anapistula secreta*, new species, lateral view of female, appendages omitted.
 Fig. 15. Idem, epigynum of female.
 Fig. 16. Idem, under side of carapace of female.
 Fig. 17. Idem, dorsal view of female, appendages omitted.

eus high, vertical, exceeding the diameter of an anterior lateral eye. Sternum longer than broad, truncated behind, the posterior coxae separated by their length. Chelicerae free, robust, the upper margin armed with three stout teeth, the lower margin smooth. First leg longer and more robust than the second. Posterior legs considerably shorter than the anterior pairs. Pedipalp of female slender, greatly reduced in size, as long as the first tarsus. Male palpus with a distal apophysis on the femur. Embolus long and coiled. Paracymbium a long thin process which supports the fine embolus.

GENOTYPE.—*Anapisona simoni*, new species.

This genus is distinguished from *Epechthina* and *Anapis* (*Amazula* Keyserling) in having the eyes of the posterior row in a nearly straight, transverse row. In these genera the pedipalp of the female is greatly reduced in size and represents an intermediate step between normality and the condition found in *Symphytognatha* and *Anapistula* where the appendage is completely lost.

Anapisona simoni, new species

Figures 1, 2, 3, 4 and 27

FEMALE.—Total length, 1.50 mm.

Carapace, 0.70 mm. long, 0.54 mm. wide; abdomen, 0.95 mm. long, 0.87 mm. wide.

Carapace bright reddish brown, the pars cephalica somewhat paler, the eyes narrowly ringed with black, unclothed except for several weak setae on the mid-line behind the median eyes and several on the clypeal margin. Sternum dusky reddish brown. Legs bright yellowish brown, paler than the carapace, the fourth tibia dusky at tip but the legs otherwise unmarked. Abdomen dull, dusky blue, with an indistinct pale pattern of narrow lines.

Carapace longer than broad, the broad front gently rounded, the sides rounded, the caudal end subtruncate but the corners angled. Pars cephalica high, strongly convex, the median groove and cephalic sutures obsolete but the head portion clearly defined. Pars thoracica evenly and finely roughened. Carapace with a shallow pit above the first coxa on each side. Carapace highest at the median eyes as seen in lateral view, strongly but evenly declining to the caudal margin. Clypeus and front broad, vertical or nearly so, the clypeus equal in height to about one and one-half times the diameter of an anterior lateral eye. Details of structure of carapace and eye relations as shown in Figs. 1, 2 and 4.

Eyes six, in three groups. Lateral eyes of each side contiguous, subequal in size. Median eyes contiguous on the mid-line of the area, separated from the subequal lateral eyes by the diameter. Second row of eyes in a procurved line. Median eyes elevated above the lateral eyes (Figs. 1 and 4).

Sternum three-fourths as broad as long, truncated behind where the posterior coxae are separated by their length. Labium short, subtriangular, broader than long, apparently fused to the sternum but separated by a deep transverse groove. Maxillae about twice as long as the labium, broadly expanded and subtruncated at the distal end. Chelicerae free, the upper margin of the furrow with three stout teeth (Fig. 4), the lower margin smooth.

Legs of moderate length, clothed with black hairs and a few longer bristles. First metatarsus with a short prolateral spine near middle of joint and one at distal end. All patellae with a long black bristle above at distal end. Anterior legs longer, more robust than the posterior pairs. Tarsi on all legs longer than the metatarsi. Pedipalps greatly reduced in size, short and thin, about equal in length to the first tarsus.

	I	II
FEMUR	0.74 mm.	0.60 mm.
PATELLA	0.29	0.25
TIBIA	0.59	0.45
METATARSUS	0.36	0.28
TARSUS	0.45	0.39
TOTAL	2.43 mm.	1.97 mm.

	III	IV
FEMUR	0.42 mm.	0.55 mm.
PATELLA	0.18	0.19
TIBIA	0.29	0.42
METATARSUS	0.22	0.26
TARSUS	0.31	0.33
TOTAL	1.42 mm.	1.75 mm.

Abdomen subglobose. Epigynum as illustrated in Fig. 3.

MALE.—Total length, 1.26 mm.

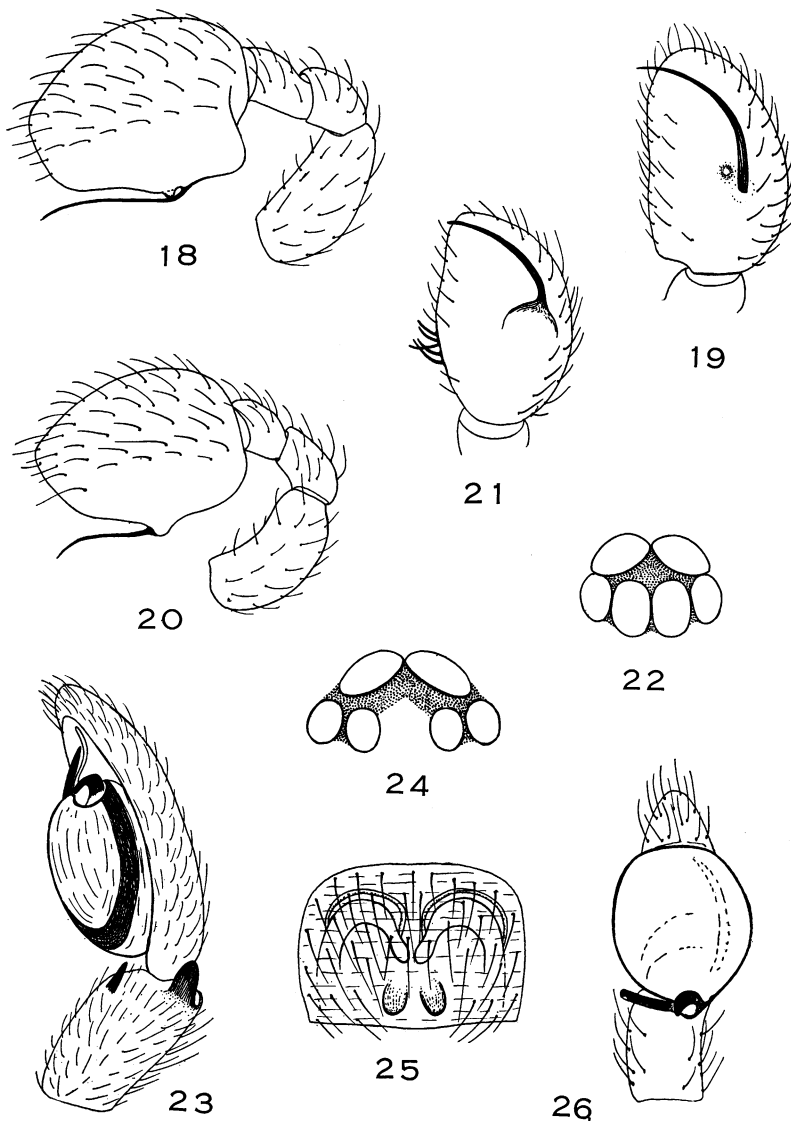
Carapace, 0.60 mm. long, 0.50 mm. wide; abdomen, 0.70 mm. long, 0.73 mm. wide.

Coloration essentially as in the female. Abdomen dusky, with a yellowish scutum covering most of the dorsum but not extending forward to the base.

Structure in general agreement with the female. Carapace proportionately higher, subtriangular as seen from the side, the apex at the median eyes. Carapace with a small pit above the first coxae. Eyes as in the female but the clypeus slopes gently forward and is higher, equal to more than twice the diameter of an anterior lateral eye (18/8). Chelicera with three teeth on the upper margin but the two distal ones are reduced in size.

Legs proportionately longer than in the female. First tibia with a short ventral spine on the prolateral side near the center of the segment. First metatarsus with a ventral spine on the prolateral side near the middle and an apical pair. First leg: femur, 0.80 mm., patella, 0.27 mm., tibia, 0.66 mm., metatarsus, 0.36 mm., and tarsus, 0.41 mm. long.

Palpus as illustrated in Fig. 27. The femoral spine is more strongly curved than in *furtiva*.



- Fig. 18. *Scaphiella williamsi*, new species, left male palpus, retrolateral view.
 Fig. 19. Idem, left male palpus, ventral view.
 Fig. 20. *Scaphiella barroana*, new species, left male palpus, retrolateral view.
 Fig. 21. Idem, left male palpus, ventral view.
 Fig. 22. Idem, eyes of male.
 Fig. 23. *Lygromma chamberlini*, new species, left male palpus, retrolateral view.
 Fig. 24. Idem, eyes of male.
 Fig. 25. Idem, epigynum of female.
 Fig. 26. *Oonopinus centralis*, new species, left male palpus, ventral view.

TYPE LOCALITY.—Male holotype, female allotype and one male and female paratype from Barro Colorado Island, Canal Zone, March 10, 1936 (W. J. Gertsch).

Anapisona simoni may be distinguished from *furtiva* by its larger size. The structural differences are noted in the description of *furtiva*.

Anapisona furtiva, new species

Figure 28

FEMALE.—Total length, 0.92 mm.

Carapace, 0.45 mm. long, 0.40 mm. wide; abdomen, 0.53 mm. long, 0.53 mm. wide.

Coloration in close agreement with *simoni*. Structure essentially as in that species but differing as follows: Carapace proportionately shorter and lower, less strongly elevated, high and convex behind the ocular region. Highest point of the carapace just behind the eyes. Pars thoracica evenly and finely roughened. Carapace with a shallow pit above the first coxa on each side. Clypeus equal in height to only one diameter of an anterior lateral eye. Eyes essentially as in the female of *simoni*.

Legs clothed as in *simoni* but lacking two spines on the first metatarsus.

	I	II
FEMUR	0.42 mm.	0.34 mm.
PATELLA	0.17	0.15
TIBIA	0.32	0.25
METATARSUS	0.20	0.15
TARSUS	0.27	0.24
TOTAL	1.38 mm.	1.13 mm.

	III	IV
FEMUR	0.25 mm.	0.35 mm.
PATELLA	0.12	0.12
TIBIA	0.19	0.25
METATARSUS	0.13	0.15
TARSUS	0.21	0.23
TOTAL	0.90 mm.	1.10 mm.

Epigynum differing in no important details from that of *simoni*.

MALE.—Total length, 0.76 mm.

Carapace, 0.39 mm. long, 0.36 mm. wide; abdomen, 0.42 mm. long, 0.46 mm. wide.

Coloration in close agreement with the female. Structure differing chiefly in having the carapace more strongly elevated but not as much as in the male of *simoni*. Clypeus equal in height to about one and one-half times the diameter of an anterior lateral eye. Eyes as in the female.

Legs of average length, unspined except for a short spine beneath the metatarsus on the pro-lateral side. First leg: femur, 0.40 mm., patella, 0.16 mm., tibia, 0.32 mm., metatarsus, 0.18 mm., and tarsus, 0.26 mm. long.

Palpus as illustrated in Fig. 28. Femoral apophysis gently curved.

TYPE LOCALITY.—Male holotype and female allotype from Barro Colorado Island, Canal Zone, August 4 and July 21, 1938 (E. G. Williams, Jr.).

This species is considerably smaller than *simoni* and shows numerous structural differences. The carapace is proportionately lower and more rounded in both sexes and the height of the clypeus reflects this difference. In the female the clypeus is equal in height to one diameter of the anterior lateral eye, whereas in *simoni* it is equal to one and one-half diameters. In the male the clypeus is as high as one and one-half diameters whereas in *simoni* it is more than two diameters. True spines are lacking on the first metatarsus in the female of *furtiva* and only one is present in the male. The palpi of the males are similar in general appearance but in *furtiva* the femoral apophysis is gently curved and the embolus has a lesser number of coils.

Tetrablemmidae

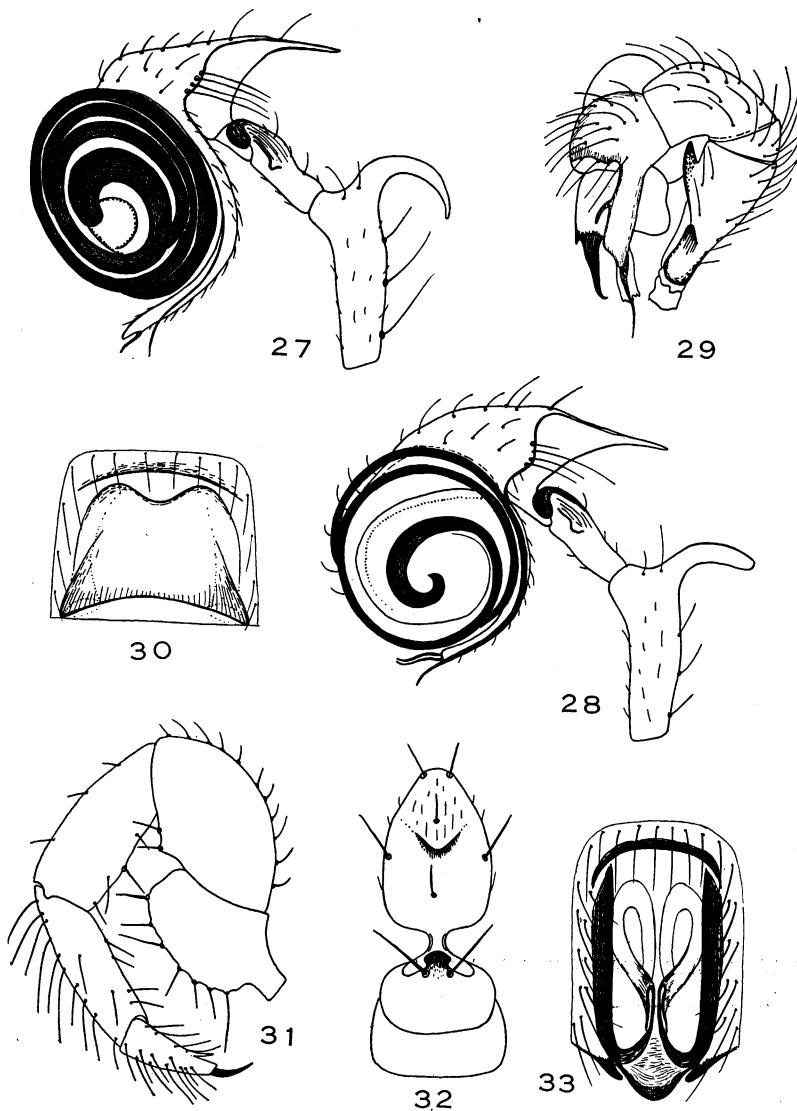
MONOBLEMMMA, NEW GENUS

Carapace longer than broad, moderately high above, equal in height from the eyes to the posterior declivity. A single median eye present at the edge of the clypeal declivity. Chelicerae with a stout spur on the face. Abdomen sclerotized, the principal dorsal plate covering the whole of the dorsum, the lateral plates typical, as in *Matta* and *Tetrablemma*.

GENOTYPE.—*Monoblemma unica*, new species.

The most interesting peculiarity of the species on which this genus is based is the presence of a single median eye. In view of the fact that only a single specimen is available, it may be argued that this represents an abnormal condition for the genus. However, the median position and apparent normality of the eye itself makes the possibility good that this is a constant feature of the species. It is almost certain that the single eye is the result of the fusion of the front eyes present in species where the normal number is two or four.

The genera in this group are based for the most part on the number of eyes present, there being two in *Matta* and *Diblemma*, four in *Tetrablemma* and six in *Hexablemma*. *Uniblemma unica* seems to be most closely related to *Matta* with which it agrees in the



- Fig. 27. *Anapisona simoni*, new species, left male palp, subretrolateral view.
 Fig. 28. *Anapisona furtiva*, new species, left male palp, subretrolateral view.
 Fig. 29. *Modisimus dilutus*, new species, left male palp, retrolateral view.
 Fig. 30. Idem, epigynum of female.
 Fig. 31. *Schizomus centralis*, new species, left male pedipalp, retrolateral view.
 Fig. 32. Idem, flagellum of male, dorsal view.
 Fig. 33. *Tentabunda chickeringi*, new species, epigynum of female.

armature of the face of the chelicera and in the generalized type of palpus. In *Matta*, however, the two eyes are widely separated.

***Monoblemma unica*, new species**

Figures 9, 10, 11 and 12

MALE.—Total length, 0.80 mm.

Carapace, 0.35 mm. long, 0.30 mm. wide; abdomen, 0.45 mm. long, 0.37 mm. wide.

Carapace bright yellow to orange brown, clothed sparsely with weak bristles as shown in Fig. 10. Femora of legs nearly concolorous with the carapace, the distal joints paler. Sternum and mouth parts bright orange brown. Abdomen smooth, shining, concolorous with the carapace.

Carapace longer than broad, moderately high, convex, equal in height from the median eye to the posterior declivity which drops rather abruptly to the caudal margin (Fig. 9). Median groove and cephalic sutures obsolete. Carapace rather coarsely roughened, particularly on the thoracic portion. Clypeus sloping forward, the distance from the median eye to the margin being about equal to the length of the chelicera. Only a single eye present as shown in Figs. 9 and 10, which is placed on the mid-line at the top of the clypeal declivity.

Sternum roughened, longer than broad (33/30), convex, subtruncated in front, rounded on the sides, truncated behind and separating the posterior coxae by a little more than their length. Labium much broader than long, truncated apically. Maxillae broader than long, converging around the labium. Chelicerae armed on the frontal surface with a stout, curved spur.

Legs of average length, without true spines, sparsely clothed with inconspicuous hairs. First leg: femur, 0.25 mm., patella, 0.09 mm., tibia, 0.17 mm., metatarsus, 0.12 mm., and tarsus, 0.14 mm. long. Tibia and patella IV, 0.27 mm. long.

Abdomen sclerotized, the principal scutum covering the whole dorsum. Arrangement of the plates and other details as shown in Figs. 9 and 10.

Palpus as illustrated in Figs. 11 and 12, the bulb less expanded than in *Matta hambletoni* Crosby and the embolus proportionately longer.

TYPE LOCALITY.—Male holotype from Barro Colorado Island, Canal Zone, July 9, 1938 (E. G. Williams, Jr.).

Oonopidae

***Scaphiella barroana*, new species**

Figures 20, 21 and 22

FEMALE.—Total length, 1.40 mm.

Carapace, 0.55 mm. long, 0.42 mm. wide; abdomen, 0.90 mm. long, 0.40 mm. wide.

Carapace and sternum bright orange brown, shining, clothed sparsely with fine bristles in three rows behind the eye group and with a few on the clypeus. Legs and mouth parts concolorous with the carapace but duller. Abdominal sclerites bright orange brown, the softer membranes gray.

Structure typical for the genus. Carapace moderately high, convex, gently rounded above, essentially equal in height from the eyes to the edge of the posterior declivity which is moderately precipitous. Clypeus sloping forward, equal in height to the diameter of the front (lateral) eye. Margin of pars thoracica finely roughened. First row of eyes (anterior laterals) scarcely five-sixths as wide as the posterior row, the two eyes subcontiguous, much larger than the posterior eyes. Second eye row procurved, the eyes contiguous, the median slightly larger than the posterior lateral but very much smaller than the front eyes. Sternum four-fifths as broad as long, broadly truncated in front, narrowly behind where the posterior coxae are separated by their length.

Legs without true spines. Tibia and patella I, 0.41 mm. long; IV, 0.48 mm. long.

Abdomen armed with a single ventral scutum which is continuous from the venter up the sides to the edge of the dorsum. Dorsum with a pale longitudinal strip of integument, broader behind and bridging the space between the edges of the scutum, which is lightly sclerotized. Whole abdomen clothed with short hairs. Annular scutum around spinnerets narrow.

MALE.—Total length, 1.18 mm.

Carapace, 0.53 mm. long, 0.40 mm. wide; abdomen, 0.65 mm. long, 0.40 mm. wide.

Coloration in close agreement with the female. Structure in nearly complete agreement with the female. Eyes as shown in Fig. 22. Tibia and patella I, 0.40 mm. long; IV, 0.45 mm. long. Abdomen with an oval scutum above. Ventral scutum as in the female but the lateral extensions do not pass so far around the sides as in that sex.

Palpus as shown in Figs. 20 and 21.

TYPE LOCALITY.—Male holotype, female allotype and male and female paratypes from Barro Colorado Island, July 12 and 13, 1938 (E. G. Williams, Jr.).

This and the following species differ from *Scaphiella hespera* Chamberlin in the palpus. In *hespera* the embolus arises from a stout tubercle near the end of the tarsus. The embolus of *barroana* is proportionately longer and arises from a small tubercle near the middle of the tarsus. Simon's species of *Scaphiella* from Venezuela are insufficiently described for comparison with the present species.

Scaphiella williamsi, new species

Figures 18 and 19

MALE.—Total length, 1.50 mm.

Carapace, 0.60 mm. long, 0.47 mm. wide; abdomen, 0.95 mm. long, 0.46 mm. wide.

Coloration in complete agreement with *barroana*.

Structure in close agreement with the male of *barroana*. Pars thoracica with a series of fine tubercles just above the finely roughened margin. First eye row about three-fourths as wide as the second row, the two eyes subcontiguous and larger than the other eyes. Second row of eyes essentially straight, very gently procurved, subcontiguous, the eyes subequal in size. Clypeus sloping, equal in height to the diameter of a front eye. Sternum as broad as long, the truncate caudal end separating the posterior coxae by one and one-half times their length.

Legs without true spines. Tibia and patella I, 0.51 mm. long; IV, 0.58 mm. long.

Palpus as shown in Figs. 18 and 19.

TYPE LOCALITY.—Male holotype from Barro Colorado Island, Canal Zone, July 9, 1938 (E. G. Williams, Jr.).

This species may be distinguished from *barroana* by the slightly larger size, the rougher pars thoracica and in having the eyes of the posterior row subequal. The embolus of the palpus is proportionately longer and originates at a point nearer the base of the tarsus.

Oonopinus centralis, new species

Figure 26

FEMALE.—Total length, 0.90 mm.

Carapace, 0.43 mm. long, 0.36 mm. wide; abdomen, 0.46 mm. long, 0.35 mm. wide.

Carapace dusky yellow, marked with fine black radiating lines, the eyes enclosing a black field. Sternum dusky purple, variegated with numerous tiny yellow flecks. Legs dull yellow, lightly flecked with black. Abdomen dusky purple over a paler base.

Carapace longer than broad, relatively low and moderately convex, inclined forward from the highest point near the obsolete median groove and more abruptly declining behind. Clypeus equal in height to the length of the eye group. Anterior lateral eyes separated by their diameter, the posterior median eyes forming with them a moderately procurved line. Posterior eyes in a strongly recurved line, the median set far forward, slightly separated, scarcely a diameter from the posterior lateral eyes. Sternum slightly broader than long, broadly truncated in front, narrowly truncated behind, the posterior coxae separated by their length.

Legs relatively long, without true spines. Tibia and patella I, 0.50 mm. long; IV, 0.60 mm. long.

MALE.—Total length, 0.90 mm.

Carapace, 0.42 mm. long, 0.35 mm. wide; abdomen, 0.47 mm. long, 0.35 mm. wide.

Coloration in the poorly preserved specimens essentially as in the female. Eye relations and general structure closely approximating the female. Legs somewhat longer. Tibia and patella I, 0.84 mm. long.

Palpus as illustrated in Fig. 26. Bulb greatly inflated, suboval, armed beneath at base with a transverse process. Tibia normal.

TYPE LOCALITY.—Male holotype and female allotype from Barro Colorado Island, Canal Zone, July 14, 1938 (E. G. Williams, Jr.). A number of mature males, females and immature specimens from the same locality.

This tiny species is congeneric with and closely allied to *Oonopinus minutissimus* Petrunkevitch from Porto Rico. It may be distinguished in having the eyes more closely spaced and in the separation of the posterior median from the posterior lateral eye by less than the diameter. The palpus is distinct from Cuban specimens identified as *minutissimus* by Miss Elizabeth B. Bryant in the complete lack of a conspicuous spur on the tibia.

Pholcidae**Modisimus dilutus**, new species

Figures 29 and 30

FEMALE.—Total length, 1.35 mm.

Carapace, 0.57 mm. long, 0.60 mm. wide; abdomen, 0.85 mm. long, 0.80 mm. wide.

Carapace pale yellowish brown, somewhat dusky, darkened in the deep Y-shaped median and cephalic grooves. Eye tubercles black. Sternum dusky. Legs pale yellowish brown, with inconspicuous dusky annulae at tip of femur, on patella, and at tip of tibia. Abdomen pale green.

Carapace typical in form, about as broad as long, the clypeus sloping, equal in height to the length of the eye group. Eyes six, the anterior median missing. Ocular tubercle moderately elevated. First row of eyes (anterior lateral) separated by their radius. Second row of eyes procurved, the median separated by their radius, subcontiguous with the smaller lateral eyes. Quadrangle of front and posterior median eyes broader than long (30/24), narrowed behind in about the same ratio, the front eyes somewhat larger. Sternum three-fourths as long as broad, truncated behind, the posterior coxae widely separated by one and one-half times their length.

Legs without true spines. First leg: femur, 2.65 mm., patella, 0.20 mm., tibia, 2.50 mm.,

metatarsus, 3.75 mm., and tarsus, 1.00 mm. long.

Abdomen globose. Epigynum as shown in Fig. 30.

MALE.—Total length, 1.60 mm.

Carapace, 0.70 mm. long, 0.77 mm. wide; abdomen, 1.00 mm. long, 0.90 mm. wide.

Coloration much as in the female but the abdomen is gray, marked with pink and white flecks. Structure essentially as in the female. Chelicera with a slight rounded projection on the frontal face on which are four or five small cusps.

First leg missing. Second leg: femur, 3.35 mm., patella, 0.20 mm., tibia, 3.20 mm., metatarsus, 4.70 mm., and tarsus, 1.00 mm. long. Palpus as illustrated in Fig. 29.

TYPE LOCALITY.—Male holotype, female allotype and female paratype from Barro Colorado Island, Canal Zone, July 14, 18, and 8, 1938 (E. G. Williams, Jr.).

This species is closely related to *Modisimus maculatipes* Cambridge. The much smaller size and the slight differences in the epigynum will serve to separate it from that species.

Gnaphosidae

Lygromma chamberlini, new species

Figures 23, 24 and 25

FEMALE.—Total length, 3.00 mm.

Carapace, 1.30 mm. long, 1.15 mm. wide; abdomen, 1.70 mm. long, 1.05 mm. wide.

Carapace and appendages pale yellowish brown, without contrasting markings. Area enclosed by the eyes black. Abdomen white, the dorsum with a pale yellow scutum at base.

Carapace longer than broad, rather broad in front, the width at the second eye row nearly half the greatest width of the carapace (53/115). Carapace moderately elevated, convex, the median groove a linear depression situated back nine-thirteenths of the length. Eye group compact, equal in width to slightly less than half the width of the head. Front row of eyes (anterior lateral) contiguous. Second row of eyes procurved, the median separated by their diameter, contiguous with the subequal lateral eyes. Quadrangle of front eyes and posterior median broader than long (24/16), narrowed in front (24/20), the front eyes larger. Clypeus equal in height to scarcely a diameter of a front eye. Sternum longer than broad (0.83 mm./0.70 mm.), truncated in front, bluntly produced behind between the posterior coxae and separating them by three-fourths their width. Lower margin of the furrow of the chelicera with five small teeth.

First legs missing. Second femur with two dorsal spines; second tibia with a weak spine beneath near the middle of the joint; metatar-

sus with a weak median pair beneath; this leg otherwise unspined. First leg: femur, 0.85 mm., patella, 0.53 mm., tibia 0.60 mm., metatarsus, 0.60 mm., and tarsus, 0.50 mm. long.

Epigynum as shown in Fig. 25.

MALE.—Total length, 2.70 mm.

Carapace, 1.20 mm. long, 0.96 mm. wide; abdomen, 1.45 mm. long, 0.90 mm. wide.

Coloration essentially as in the female but the abdomen is darker. Structure closely approximating that of the female. Eyes as illustrated in Fig. 24, differing slightly from the female in having the posterior median somewhat smaller and more widely separated. Quadrangle of front eyes and posterior median broader than long and slightly wider in front. Chelicera with five small teeth on the lower margin.

Front legs missing. Tibia and patella of fourth leg, 1.30 mm. long.

Palpus as illustrated in Fig. 23.

TYPE LOCALITY.—Male holotype and female allotype from Barro Colorado Island, Canal Zone, July 14 and 12, 1938 (E. G. Williams, Jr.).

This species differs from *Lygromma senoculatum* Simon in having the eyes of the posterior row less strongly procurved and in the shorter dorsal spur on the tibia of the male palpus.

Heteropodidae

Tentabunda chickeringi, new species

Figure 33

FEMALE.—Total length, 11.75 mm.

Carapace, 5.25 mm. long, 4.20 mm. wide; abdomen, 6.50 mm. long, 3.50 mm. wide.

Carapace and appendages yellowish brown, without distinctive contrasting markings. Abdomen dusky brown, with an indistinct pattern of dark chevrons on the dorsum.

Carapace longer than broad, the front gently rounded, broad, the sides rounded. Median groove a deep linear depression set back four-fifths of the total length. Cephalic sutures indistinct. Carapace highest at the median groove as seen from the side, gradually sloping forward, moderately convex, to the frontal margin, abruptly declining behind the median groove. Clypeal margin and space between the median eyes with a thick patch of erect black setae, the rest of the ocular area with scattered setae. Pars thoracica with fine black setae in addition to the fine procumbent hairs that cover all the carapace. Clypeus gently sloping, equal in height to scarcely the diameter of an anterior median eye. First row of eyes gently procurved, the median separated by their diameter, a little nearer the much smaller lateral eyes. Second row of eyes more strongly procurved, the median separated by more than twice their diameter (25/62), nearer the larger lateral eyes

(25/45). Median ocular quadrangle broader than long (12/9), narrowed in front (12/11), the anterior median eyes about twice as large.

Sternum longer than broad (2.20 mm./1.80 mm.). Labium broader than long (0.75 mm./0.63 mm.). Lower margin of the furrow of the chelicera with two widely spaced teeth, the upper margin with three teeth of which the two nearer the claw are larger.

First tibia with 2-2-2-0, the first metatarsus with 2-2-0 stout ventral spines, otherwise none. First leg: femur, 4.30 mm., patella, 2.50 mm., tibia, 4.10 mm., metatarsus, 3.60 mm., and tarsus, 1.00 mm. long. Tibia and patella IV, 5.10 mm. long.

Spinnerets elevated on an annular segment as usual in the group.

Epigynum as illustrated in Fig. 33.

TYPE LOCALITY.—Female holotype and female paratype from Barro Colorado Island, Canal Zone, July 12, 1938 (E. G. Williams, Jr.).

This species differs from *Pseudosparianthis mirabilis* Cambridge in having two pairs of spines beneath the first metatarsus and in the details of the epigynum.

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Schizomidae

Schizomus centralis, new species

Figures 31 and 32

MALE.—Total length, including chelicerae and flagellum, 5.20 mm.

Coloration a uniform yellowish brown, the abdominal tergites somewhat darker. Pale eye spots clearly visible on cephalic tergite. Cephalic tergite (propeltidium) strongly convex, longer than broad (1.10 mm./0.66 mm.), produced in front into a narrowly rounded lobe. Mesopeltidia narrowly triangular, separated by about their length, the rest of the tergite membranous. Metapeltidium entire, normal. All tergites finely reticulated, with a shining luster.

Structure of both cephalothorax and abdomen typical for the genus. Ratio of the coxae I:II:III:IV = 65:40:33:27. Second coxae with a short spur on the prolateral side at the distal end.

Legs essentially typical for the group, the differences reflected in the following measurements.

	I	II
TROCHANTER	0.35 mm.	0.18 mm.
FEMUR	1.28	0.80
PATELLA		0.47
TIBIA	1.65	0.53
BASITARSUS	1.15	0.35
TARSUS	0.93	0.45
TOTAL	5.36 mm.	2.78 mm.
	III	IV
TROCHANTER	0.13 mm.	0.22 mm.
FEMUR	0.65	1.06
PATELLA	0.35	0.52
TIBIA	0.36	0.75
BASITARSUS	0.40	0.65
TARSUS	0.35	0.44
TOTAL	2.24	3.64 mm.

Form and spination of pelipalp as illustrated in Fig. 31. Trochanter broadly rounded distally.

Flagellum as shown in Fig. 32, a longer than broad process subspatulate in shape, evenly narrowed distally and gently rounded at the tip. Distal end of flagellum depressed, excavated forward to the V-shaped groove, the basal portion stouter, evenly convex.

FEMALE.—Total length, including the chelicerae, 4.20 mm.

Coloration as in the male. Structure closely approximating that of the male. Palpi less than half the length of the body, essentially as shown for the male. Trochanter of palpus rounded at the distal end; femur longer than deep (0.46 mm./0.27 mm.); tibia about as long as femur, about two-thirds as deep; basitarsus about as long as and tarsus half as long as tibia. Tarsus of first leg, 0.75 mm. long, slender, about twelve times as long as thick. Fourth femur about half as deep as the length. Ratio of the coxae I:II:III:IV = 50:40:31:30.

	I	II
TROCHANTER	0.26 mm.	0.12 mm.
FEMUR	0.90	0.63
PATELLA		0.40
TIBIA	1.15	0.40
BASITARSUS	0.83	0.35
TARSUS	0.71	0.33
TOTAL	3.85 mm.	2.23 mm.
	III	IV
TROCHANTER	0.12 mm.	0.18 mm.
FEMUR	0.55	0.95
PATELLA	0.28	0.46
TIBIA	0.30	0.52
BASITARSUS	0.36	0.55
TARSUS	0.32	0.40
TOTAL	1.93 mm.	3.06 mm.

All the terminal joints of the flagellum have been broken off and lost.

TYPE LOCALITY.—Male holotype and female allotype from Barro Colorado

Island, July 19 and 20, 1938 (E. G. Williams, Jr.). One juvenile specimen from same locality, July 31, 1938 (Williams).

This species is most closely allied to *Schizomus guatemalensis* Chamberlin of Guatemala and *S. simonis* Hansen and

Sorensen from Venezuela. From the latter it is easily differentiated by reference to the flagella of the males, that of *simonis* being very much longer and narrower than in *centralis*. The female differs from *guatemalensis* in having well-marked eye spots.