

NEW ERIGONINAE FROM TENNESSEE

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The species described in this paper were collected by Mr. S. E. Crumb in Clarksville, Tennessee, in 1921. They form part of the collection made on 50 plats of one square yard each and sent to me for identification by Dr. L. O. Howard, of the Bureau of Entomology. By agreement with Dr. Howard the complete list of arachnids of this collection and the report of their distribution according to plats has been placed in his hands, and there is no further need to give the list here. Since six of the species, all belonging to the sub-family Erigoninae, proved to be new, I thought it advisable to give careful descriptions which would not only permit identification, but help in the understanding of the classification of this group.

The classification of the Erigoninae is still in an unsatisfactory state. Species are often easier identified than genera, especially in the case of males, when accompanied by good drawings. No comprehensive work on the group exists and the opinion of arachnologists as to the value of different characters is still divided. Simon was the first to give detailed descriptions of French Erigoninae in his excellent work, "Les Arachnides de France." He made use chiefly of characters derived from the structure of the sternum, the fangs, the eye group and the spines on legs. Later in his great "Histoire Naturelle des Araignées" he reclassified the Erigoninae, making use of a number of characters, but still basing his classification on structures mentioned. Dahl was the first to pay special attention to the distribution of auditory hairs or trichobothria, a character the value of which was later recognized by Chyzer and Kulczynski. Nevertheless the use of this character has not found general recognition, partly perhaps because Simon did not consider it of great value and thought that trichobothria are easily overlooked and as easily broken off and lost. The latter statement does not seem to find

support in fact, for it is easy to show that trichobothria are much less subject to injury and loss than are spines and bristles. Moreover, they can be detected without any difficulty under a binocular with sufficient power and with good artificial illumination. On the whole they seem to me to be not only quite reliable characters, but in many ways more reliable than the composition of the eyegroup which, as is well known, is greatly affected by the eyetubercle in some males, so that males do not quite agree with females of the same species in this respect. I have lately examined a number of genera with the result that I cannot recommend too strongly the use of trichobothria as distinctive characters.

Diplocephalus crumbi new species. Male.

Total length 1.58 mm., Carapace 0.75 mm. long, 0.65 mm. wide. Thoracic groove wanting. Clypeus about as high as the quadrangle. Head elevated in the shape of a cube carrying the posterior middle eyes. Foveæ wanting. Margins of carapace smooth, plain. First row of eyes strongly recurved, second row slightly recurved. Viewed from in front first row straight, second row curved downward. Side eyes contiguous, ALE slightly larger than PLE. Eyes of first row equidistant, separated by less than the diameter of the AME. Posterior middle eyes closer together than AME, slightly larger than PLE and only very slightly smaller than AME. Quadrangle wider in front than behind, as long as wide behind. Chelicerae long and powerful, lower margin with three equidistant teeth, upper margin with three teeth of which the distal one is near the base of the fang and separated from the median tooth by double the space between the latter and the proximal tooth. Anterior surface of chelicerae with a tooth situated a little in advance of the median tooth of the upper margin. Fangs normal. Sternum triangular, broadly truncated in front, rounded behind between the hind coxae which are separated from each other by more than their width, slightly wider than long in the ratio of 12/11. Lip occupies middle third of the anterior truncature of the sternum, strongly rebordered, its anterior portion triangular, extending beyond middle of maxillæ which are long, with subparallel sides, converging. Legs slender, without spines. Anterior tarsi slightly longer than half of metatarsi (13/22), metatarsi slightly shorter than tibiae (22/27). Posterior tarsi 9/16ths of metatarsi, posterior metatarsi 16/19ths of tibiae. Upper claws of first leg with several strong teeth, those of fourth leg smooth. Third claw smooth. Trichobothria on first leg: 1 on femur near proximal end, 2-2-1 on tibia (first pair close to proximal end, the single one a little before middle), 1 on metatarsus 1/3 from proximal end. A "drum" in middle of tarsus. (The drum is a sense-organ of unknown function.) Trichobothria on fourth leg: 1-2-2-1 on tibia, the last one in middle, none on metatarsus or any of the other joints.

Palpus as figured (Figures 1 and 2). Tibial apophysis long, thin and slightly curved outward, with rounded end. Bulb very large, almost globular. Embolus in the shape of a question mark. Dorsal median line of patella of palp twice as long as the greatest width, strongly convex. Ventral median line slightly longer than greatest width, straight. Cymbium of a very peculiar shape. Its basal half bearing the hæmatodocha is ovoid, then follows a narrow stem which ends in a curved, spoon-shaped dilation. Few short hairs on patella, several long, curved hairs on tibia.

Abdomen eggshaped, overlapping carapace, slightly coriaceous. Color in alcohol: Carapace rufous, median eyes surrounded by black rings. Legs yellowish brown, without markings, darker than abdomen. Chelicerae, lip, maxillæ and sternum of the same color as carapace, sternum with darker margins. Bulb of palpi darker than legs, grayish-brown. Abdomen yellow above, with 4 pairs of transverse narrow white lines in posterior third, below grayish-yellow. Spinnerets with smoky tips. Hair on sternum long, on abdomen short and sparse, dark in color. Three males.

Erigone clarksvillense new species. Female.

Total length 2.7 mm. Carapace strongly emarginate behind. Measured in median line only 1.080 mm. long, but fully 1.224 mm. long when measured to greatest extension of posterior edge. Width between 2d and 3d pair of legs 0.936 mm. Width in front 0.396 mm. Abdomen 1.944 mm. long, soft, considerably overhanging carapace, reaching quite to the cephalic portion, sparsely covered with hair. Edge of carapace normal, neither rebordered, nor toothed. Head low. First row of eyes recurved. AME smaller than ALE, separated from each other by their radius, more than by their radius from ALE (by the radius of the latter). Second row viewed from above straight, slightly longer than anterior row. Posterior eyes equidistant, separated from each other by almost their diameter. Lateral eyes contiguous. Quadrangle narrower in front than behind, as long as wide behind. Viewed from in front first row straight, by lower edges, second row strongly curved downward. Clypeus $\frac{4}{6}$ ths the length of the quadrangle, plane, vertical. Sternum triangular, as wide as long, very slightly narrowed in front, with straight anterior margin. Posterior end of sternum extending into a widened portion which is continuous with the carapace, so that the exact length and shape of the sternum cannot be ascertained. Viewed in a certain position, however, when the posterior extension referred to is invisible, the sternum appears truncated straight between the hind coxæ. Lip strongly rebordered, narrower at base, occupying middle third of anterior truncature of sternum. Maxillæ large, longer than wide, slightly converging. Chelicerae powerful, their outer outline parallel, margins strongly oblique. On front surface near outer edge a row of five very small granules with a tiny spine on each, absent in one of the specimens. Similar granules near upper margin and a small bristle near middle of inner edge. Upper margin with 5 strong teeth, lower margin with 4 smaller

teeth. Thoracic groove longitudinal. On head in front of groove three median hairs, equidistant, curved forward. Hind coxæ separated by slightly less than their width. A median dorsal spine at end of each patella and on all tibiæ $1/3$ d from base. A ventral spine near end of femur. Legs strong. Tarsi of first leg $15/24$ ths of metatarsi, tarsi of fourth leg $13/24$ ths of metatarsi. Metatarsi only by $1/24$ th shorter than tibiæ. Upper claws on all legs with a row of small teeth increasing in length distally. Third claw with a single strong tooth. Palpus without claw. Trichobothria on first leg: 1-1-1-1 on tibia and same on fourth leg, but there is also a small "drum" in middle of fourth tarsus.

Color in alcohol: Carapace yellow-brown with indistinct black marginal line. Legs of the same color as carapace. Chelicerae slightly darker. Sternum much darker, greyish-brown. Abdomen grey with a darker median line and four darker indistinct transverse lines in posterior half. Sides of abdomen with numerous indistinct yellowish spots. Epigynum dark, prominent. (Figures 3 and 4.) Three females.

Tennesseellum new genus.

Abdomen soft. Tracheal spiracle large and placed considerably in advance of the spinnerets. Carapace flat. Anterior row of eyes recurved, posterior row slightly procurved. Quadrangle as long as wide. Clypeus narrow, inclined. Sternum convex, broadly truncated between hind coxæ, slightly longer than wide, reticulated. Upper margin of chelicerae with 1 tooth, lower margin with two teeth. Legs short and slender. Tarsi longer than half of metatarsus, the latter almost as long as tibia. First metatarsus with a trichobothrium $1/3$ from base, fourth metatarsus without trichobothria. Typus *T. minutum*.

Tennesseellum minutum new species. Female.

Total length 2.232 mm. Carapace 0.756 mm. long, 0.540 mm. wide, rounded in front, 0.252 mm. between outside edges of ALE which occupy the entire width. Longitudinal groove well marked. Carapace flat, head not elevated, with a row of 3 median bristles, first immediately in front of longitudinal groove, third near the eyes. Abdomen soft, 1.440 mm. long, barely overlapping carapace, so that in certain positions the entire petiolus is visible. The tracheal spiracle appears as a distinct transverse line considerably in advance of the spinnerets, the distance between the genital groove and the spiracle being double that between the spiracle and the anterior spinnerets. Anterior row of eyes recurved. AME slightly smaller than ALE. Posterior row slightly procurved. Eyes equidistant, separated by less than their diameter. Quadrangle very slightly wider behind than in front, as long as wide behind. AME overhanging the clypeus which is slightly inclined forward and only $1/2$ the length of the quadrangle. Viewed from in front anterior row is very slightly curved downward. AME separated from each other by their radius, slightly more than by their radius from the ALE which are a

little larger. Lateral eyes contiguous. Chelicerae weak, margins but slightly oblique, upper margin with a single tooth, lower margin with two teeth. On outer surface of chelicerae a well developed stridulating ridge. Lip wider than long, strongly rebordered. Maxillae short, stout. Sternum convex, broadly truncated between hind coxae, reticulated, slightly longer than wide (in the proportion of 13/11). Legs short and slender. Tarsi of first leg 50/73 ds of metatarsi, and these 73/75 ths of tibiae. Tarsi of fourth leg 46/80 ths of metatarsi and these 80/87 ths of tibiae. A slender spine below near distal end of each femur, and above on first tibia. A still weaker spine above near base of first tibia, while on other legs it is not different from other hairs. Upper claws on all legs with a few very small teeth, third claw with a single small tooth. Palpus without claw. Trichobothria on first leg: 1-1 on tibia and 1 on metatarsus 1/3 d from base. On fourth leg only 1-1-1 trichobothria on tibia, none on metatarsus. No "drum" on tarsi. Color in alcohol: Carapace, sternum and legs dark yellow, but first three pairs of femora and the distal end of the palpi are dark brown. Abdomen dark grey with indistinct transverse striation on sides. A single female. Figure 5.

Oedothorax howardi new species. Female.

Total length 2.448. Carapace 1.044 mm. long, 0.792 mm. wide between 2d and 3d pair of legs, 0.360 mm. wide in front, rounded behind with median semicircular emargination. Longitudinal groove barely discernible. Surface of carapace evenly reticulated. Lateral eyes on a tubercle. Clypeus vertical, plane, reticulated, not quite as high as quadrangle. First row of eyes straight by anterior edges, second row strongly procurved. Both rows equally long (Figure 9). Lateral eyes contiguous. ALE much the largest, AME the smallest. Posterior eyes equal in size, equidistant, separated from each other by almost their diameter. AME separated from each other by $1\frac{1}{2}$ (one and a half) their radius, and by almost their diameter from ALE which are almost twice as large. Chelicerae strong, short, with oblique margins. Lower margin with five equidistant small teeth, upper margin with five strong teeth of which the second proximal tooth is the longest. Fang with distinctly serrated outer edge (Stridulating organ?). Lip wider than long, occupies middle third of anterior margin of sternum. Maxillae widened in front. Sternum roughly reticulated, slightly convex, triangular, almost as wide in front as between 2d and 3d coxae. Anterior margin of sternum slightly procurved. Posterior end procurved between hind coxae, rounded. Hind coxae separated by their width. Legs short, stout. All tarsi only slightly shorter than metatarsi. A median dorsal spine at end of patella and a little before middle of tibia on all legs. One ventral spine near distal end of anterior femora. Upper claws on all legs with a few fine teeth, third claw with 2 very fine teeth. Palpus without claw. Trichobothria on first leg (Figure 7): on tibia 1-1-1-1, none on other segments. Trichobothria of fourth leg (Figure 8): on tibia 1-1-1-1, on metatarsus 1, very long, in middle. No "drum" on tarsi. No hairs on carapace. Abdomen soft, ovoid,

overlapping carapace, sparsely covered with minute hairs. Color in alcohol. Carapace, sternum, lip and maxillæ dark brown, legs yellow, almost orange. Abdomen dark grey-brown. Epigynum as figured (Figure 6). Three females.

Caseola howardi new species. Female.

Total length 1.872 mm. Carapace 0.756 mm. long, 0.576 mm wide, little narrowed in front, so that the front is much wider than the eyegroup. Two small median bristles on head, first just at the posterior limit of the head, second slightly in front of first. Carapace smooth, without hair. First row of eyes straight, second strongly procurved, slightly longer. Lateral eyes contiguous. Viewed from in front first row is distinctly bent downwards, AME much smaller than ALE, separated by their diameter both from each other and from the laterals. Posterior eyes equal in size to ALE and equidistant. Quadrangle narrower in front than behind, as long as wide behind. Clypeus as high as quadrangle, simple, slightly oblique, with anterior eyes overhanging it. Lip much wider than long, rebordered. Maxillæ inclined over lip, curved, inner angle almost 90 degrees. Chelicerae parallel by outer edges. Margins oblique. Upper margin with 5 strong teeth, lower margin with 5 weaker teeth. Sternum triangular, produced between hind coxae where it is squarely truncated, convex, punctate, as wide as long, not narrowed in front. Legs short, first pair considerably shorter than fourth. A dorsal spine at end of all patellæ, and a ventral bristle near end of all femora, assuming the appearance of a slender spine only on femora of fourth pair. No spines elsewhere. Metatarsi much shorter than tibiae. First tarsus 42/50 ths of metatarsus, fourth tarsus 40/51 sts of metatarsus. Upper claws on all legs with a series of strong teeth, third claw with one minute tooth. Palpus without claw. Trichobothria of first leg: on tibia 1-1, on metatarsus 1 in middle. Trichobothria of fourth leg: on tibia 1-1-2-1-1, none elsewhere. No "drum" on tarsi. Abdomen soft, 1.189 mm. long, slightly overhanging carapace. Color in alcohol. Carapace, legs, palpi and maxillæ yellow. Sternum yellow with smoky edge, minutely mottled with black. Abdomen uniformly greyish above and below. Epigynum as figured (Figure 10), almost colorless, except for chitinized median lines. One female.

Gongylidiellum tennesseense new species. Female.

Total length 1.584 mm. Carapace 0.648 mm. long, 0.504 mm. wide, little narrowed in front which is wider than eye area. Longitudinal groove barely noticeable. Head not elevated. Clypeus $\frac{3}{4}$ as high as quadrangle. First row of eyes slightly recurved, second row slightly procurved. Laterals contiguous. AME smallest, ALE slightly larger than PLE. AME in a transversely oval black spot, sub-contiguous, slightly but distinctly separated from ALE. PME separated by their diameter from each other and by less than diameter from PLE. Quadrangle narrower in front than behind, as long as wide behind. Chelicerae weak. Upper margin with 5 teeth, lower

with 4 small teeth. Sternum flat, triangular, longer than wide, squarely truncated between hind coxæ. Legs slender, fourth leg the longest. First tarsus 41/52 ds of metatarsus, first metatarsus 52/62 ds of tibia. Fourth tarsus 37/54 ts of metatarsus, fourth metatarsus 54/68 ths of tibia. Spines very slender. One spine below, near distal end of all femora, while elsewhere legs are covered only with hair. Upper claws on all legs with a few small teeth, third claw with a single small tooth. Palpus without claw. Trichobothria of first leg: on tibia 1-1-1, none elsewhere. Trichobothria of fourth leg: on tibia 1-1-1, none elsewhere. No "drum" on tarsi. Abdomen soft, ovoid, 0.972 mm. long, overhanging carapace a little. Color in alcohol. Carapace, chelicerae, maxillæ and legs yellow. Sternum much darker, mottled with black. Abdomen greyish yellow. Epigynum as figured (Figure 11). One female.

EXPLANATION OF PLATE VIII

- Fig. 1. *Diplocephalus crumbi* n. sp. Left palpal bulb from above, showing the tibia with long bristles and the long, curved tibial apophysis.
- Fig. 2. Same palpal bulb from below, showing curved embolus, cymbium widened at the end, and the tip of the tibial apophysis behind the hæmatodocha, which is of an unusually large size and almost spherical in shape.
- Fig. 3. *Erigone clarcksvillense* n. sp. Epigynum in profile.
- Fig. 4. Same epigynum in surface view.
- Fig. 5. *Tennesseeellum minutum* n. g., n. sp. Epigynum.
- Fig. 6. *Oedothorax howardi* n. sp. Epigynum with the trapeze-shaped grey area surrounding it.
- Fig. 7. *Oedothorax howardi*. First leg, showing the proportions of the segments, spines and trichobothria.
- Fig. 8. *Oedothorax howardi*. Fourth leg, showing same structures and the trichobothrium of the metatarsus.
- Fig. 9. *Oedothorax howardi*. Eyegroup and clypeus. In the position shown only anterior middle eyes appear as circles, although all eyes are perfectly round when viewed in the proper direction.
- Fig. 10. *Caseola howardi* n. sp. Epigynum.
- Fig. 11. *Gongylidiellum tennesseense* n. sp. Epigynum and genital groove.



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