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NOTES ON GEOPHILOIDEA FROM IOWA AND SOME NEIGHBOURING STATES.

BY RALPH V. CHAMBERLIN.

University of Pennsylvania, Philadelphia.

During several weeks in June and July of 1910 I had opportunity for making collections of chilopods in the district indicated by the title of this paper. Unfortunately, the season was unusually dry in these States, particularly in Michigan and Wisconsin, and, as a result, unfavourable for securing an abundance of material. The members of the Geophiloidea seemed especially difficult to uncover; but among the species obtained are several of exceptional interest, two representing new genera, for which it seems necessary to erect a new family. The families of the Geophiloidea now recognized as occurring in the United States, east of the Rocky Mts., may be separated as follows:

- a. Mandibles with a dentate lamella.
 - b. Mandibles with a single pectinate lamella; antennæ filiform or somewhat clavate..... Family *Schendyiidae*.
 - bb. Mandibles with several pectinate lamellæ; antennæ flattened, attenuated distad..... Family *Himantariidae*.
- aa. Mandibles with no dentate lamella; with a single pectinate lamella.
 - b. Labrum fused for a short distance at middle; antennæ flattened, at least narrowly elliptic in cross-section, attenuated distad..... Family *Sogonidae*.
 - bb. Labrum entirely free; antennæ cylindrical, filiform or a little clavate.
 - c. Median piece of labrum extending along and, at least in part, fused with the lateral; at middle of free edge with two much larger and more strongly-chitinized teeth directed more or less ventrad..... Family *Soniphilidae*, fam. nov.
 - cc. Three divisions of labrum distinct; without two such larger and ventrally-directed teeth..... Family *Geophilidae*.

Of these families, representatives of the Geophilidæ and Soniphilidæ alone were secured in the region covered by this paper. However, the Schendylidæ is represented, *Escaryus urbicus* (Meinert), having been taken in Minnesota, and the same species having been found by the writer to be quite common in New York State. The family Himantariidæ is represented in Texas and Mississippi by a species of Haplophilus, and by at least one of the genus Gosiphilus, *G. laticeps* (Wood). These genera may be found to range into the present section. The family Sogonidæ is at present known to be distributed in Texas (*Timpina texana* Chamberlin, a form with but five joints to the anal legs), and in South Carolina and Tennessee (*Sogona minima* Chamberlin). On the Pacific Coast occur several families not found east of the Rockies.

Family Geophilidæ.
Subfamily Geophiliræ.
Genus Geophilus Leach.

Geophilus rubens Say.

Syn. *Geophilus cephalicus* Wood.

Geophilus lævis Wood.

Geophilus okolonæ Bollman.

Localities.—DeWitt, Mongona and Boone, Iowa; Franklin Grove, Ill.; Saunder's, Mich.

This is a very common species in Indiana, Ohio and more Eastern States. The form described by Bollman from Arkansas agrees perfectly with this species, excepting that the number of pairs of legs is higher than usual in northern specimens. This, however, is in line with a tendency shown by many other species for the number of legs to show an increase in going from the north to the south or from high elevations to low. It is one of the commonest forms in this district. California specimens also frequently have a larger number of legs.

Genus *Arenophilus* Chamberlin.

Arenophilus bipuncticeps (Wood).

Syn. *Geophilus attenuatus* Bollman (but not certainly of Say).

Geophilus georgianus and *latro* Meinert.

Schendyla perforata McNeill.

Localities.—Mongona, Boone, DeWitt, Tama, Marshalltown, Iowa; Fremont, Neb.; Peoria, Ill.; Janesville, Wis.

This is by far the most abundant species. It ranges as a common form through the greater part of the United States in and east of the

Mississippi Valley. At Mongona (June 22), and Marshalltown (June 24), Iowa, and at Sterling, Ill. (June 26), females were taken with recently-laid eggs.

Genus *Pachymerium* Koch.

Pachymerium ferrugineum Koch.

Syn. *Geophilus foveatus* (McNeill).

Localities.—DeWitt, Iowa; Peoria, Ill.; Devil's Lake and Fond du Lac, Wisc.

At Fond du Lac (July 6), the species was found in great abundance among the stones at a river's edge, partly grown individuals being common, and a considerable number of females being found with bodies still coiled about their recently-hatched young.

This is a species widespread in the Eastern United States, as it is in Europe. The specimens secured are similar in size to Austrian specimens, most being under 25 mm. in length.

Subfamily Chilenophilinæ

Genus *Taiyuna* Chamberlin.

Taiyuna opita, sp. nov.

Proportionately robust; attenuated strongly caudad, and also decidedly but less strongly cephalad. Sparsely clothed throughout with long bristles.

Head with corners rounded; sides convexly curving; caudal margin straight; anterior margin extended forward from corners to middle, and a little incurved at median line; longer than wide in ratio, 19:16, and five times longer than exposed portion of basal plate. Prebasal plate absent. Basal plate overlapped in front by the cephalic, and behind by the first dorsal plate; free portion wider than median length in about ratio 34:7. Antennæ short; articles moderate and short, the ultimate equal in length to the two preceding taken together.

Claws of prehensorial feet when closed reaching the distal end of the first antennal article. Claw at base with a subcylindric, apically truncate, tooth; prefemur also with a strongly chitinized tooth at distal end; the intermediate joints also each with a distinct, conical and well-chitinized tooth. Prosternum unarmed; its anterior median margin nearly straight, not excised; chitinous lines not evident; suture parallel with margin; wider than long in ratio 39:35, longer than prefemur in ratio 7:4. Dorsum weakly bisulcate, also with a more median pair of fine sulci. Anterior præscuta short, being of moderate length in the middle region, and then

again shortening caudad. Spiracles all circular, the first greatly exceeding the second in size. First pair of legs much reduced; anterior pairs more robust than the caudal, not shorter. Anterior ventral plates with a rather weak median sulcus, most plates plane; pores not detected. Last ventral plate moderately wide; margins straight, the lateral moderately converging caudad. Coxopleuræ with about four pores in a row under edge of plate, and four or five free on the sides, well separated from each other. Anal legs longer and more crassate than the penult; without claws. Pairs of legs (in female) 4r.

Length of female 15 mm.; width .9 mm.

Localities.—Posers and Kimball's, Mich.

Genus *Gnathomerium* Ribaut.

Gnathomerium umbraticum (McNeill).

Syn. *Gnathomerium americanum* Ribaut.

Locality.—Manitou, Colorado.

This seems to be a southern species, occurring widely and abundantly throughout the Southern States. In favourable seasons it may be found to be not rare in the present region, as Bollman reports it as common in Indiana.

Subfamily Linoteniinæ.

Genus *Linotenia* Koch.

Linotenia chionophila (Wood).

Localities.—Devil's Lake and Ashland, Wis.

Many specimens were taken at the former locality under leaves and stones about the margin of the lake. This species is boreal, being abundant, comparatively, in Alaska and adjacent islands. It was first described from specimens taken at Fort Simpson on the Red River of the North. It is very close to *Linotenia acuminata* (Leach) of Europe, and may have to be merged with it.

Linotenia fulva (Sager).

Localities.—Mongona, Boone, DeWitt and Marshalltown, Iowa; Franklin Grove, Ill.; Sterling, Ill.

Very much the commonest *Linotenia* in the Northern United States, and one of the commonest members of the entire order.

Family Soniphilidæ, fam. nov.

Genus *Soniphilus*, gen. nov.

Labrum free; the median part firmly fused to the lateral, at least at ends; edge of median portion directed ventrad and bearing a number of

very stout teeth, which extend directly ventrad (the figure accompanying suggests a bedding of these teeth somewhat caudad, which does not exist); of these teeth the two median are clearly largest, the others decreasing from median to outermost; lateral portions with edge bearing a few spinous processes much more weakly chitinized than the teeth of middle portion. (See pl. 1, fig. 3.) Mandibles with a single pectinate lamella; no dentate lamella. Both branches of first maxillæ set off by a suture; the outer branch biarticulate, entirely without lappets or with a single short, conical one on outer edge of base; coxæ completely fused at mesal line. Coxæ of second maxillæ fused at middle; palpi short, bearing a simple claw of normal size.

Chitinous lines of prosternum strongly developed. Prehensorial feet with joints all unarmed; claws when closed not attaining front margin of head. Frontal plate not discrete. Prebasal plate absent. At least the anterior sterna with caudal margin strongly chitinized in a sharp edge or blade-like form, which fits into a transverse groove in anterior margin of succeeding plate. (See fig. 5.) Pores not detected. Dorsal plates bisulcate. Last ventral plates very wide. Anal legs six-jointed, ending in claws.

Type.—*Soniphilus embius*, sp. nov.

Soniphilus secundus Chamb., a Californian species, also belongs here.

Soniphilus embius, sp. nov.

Slender, attenuated cephalad and caudad; body very sparsely provided with short straight hairs, the head with longer ones.

Yellowish-white, the anterior region more strongly yellow or lemon colored; head with prosternum and prehensorial feet pale reddish brown; antennæ yellowish white.

Head widest over caudal portion, the sides from middle caudad but very slightly converging, the sides in front of middle nearly straight and clearly converging; anterior margin with middle part straight, transverse, on each side a little oblique, extending a little caudad in running from middle to lateral cornea, straight. Frontal suture absent. Prebasal plate absent. Basal plate four times as wide as its median length, a little wider than cephalic plate (24:23). Antennæ filiform, of moderate length; articles longer than wide, decreasing in length distad to the penult, the ultimate about equal in length to the two preceding taken together.

Claws of prehensorial feet when closed not attaining the anterior margin of head, short, the inner free margin of prefemur very short or

almost obliterated ; claw within a very small conical tooth at base, other articles unarmed. Prosternum with chitinous lines well developed ; two submedian longitudinal sulci ; anterior margin unarmed, weakly angularly depressed from sides to median line ; much wider than long (14:9), longer than greatest length of prefemur nearly in ratio 9:5. Dorsum weakly bisulcate. Prescuta of middle region moderate or short, not much decreasing in length cephalad and caudad. Spiracles all circular, relatively large, the first considerably larger than the second, the others gradually decreasing from the second caudad. Legs of first pair decidedly shorter and more slender than the second. Ventral pores not detected. Plates of anterior portion of body with a transverse groove along cephalic edge, which is protected by a flange-like extension on the ventral side ; into this groove fits the well-chitinized, extended blade-like caudal edge of the preceding plate in each case. Last ventral plate very wide, strongly narrowed caudad, the lateral margins a little incised below middle ; caudal margin straight. Coxo-pleuræ each with a single free isolated pore of small size, and two larger pits covered by the edge of the plate. (See fig. 4.) Anal legs longer and slightly stouter than the penult (female). Pairs of legs (female) 43.

Length, 13 mm.

Localities.—DeWitt, Iowa.

The type is a single female, which was taken with her recently-laid eggs.

Genus *Poaphilus*, gen. nov.

Agreeing in general with *Soniphilus*, as described above, but readily distinguished in having the joints of the prehensorial feet dentate within and its claws extending much beyond the front margin of the head. The last ventral plate is narrow or but moderate in width, not very wide, as in the preceding genus.

Type.—*Poaphilus kewinus*, sp. nov.

Aside from the species here described, a second one from New Mexico is also known.

Poaphilus kewinus, sp. nov.

Body very small, strongly attenuated cephalad and caudad.

Antennæ and legs pale yellow ; body light yellowish brown ; head with prosternum and prehensorial feet light reddish brown.

Head much longer than wide (11:8) ; ten or eleven times as long as the very short basal plate ; relatively narrow, leaving sides of prehensorial

feet exposed for entire length; caudal margin truncate, sides weakly bowed outward from end to end, the anterior margin rounded on each side, mesally incised. Frontal plate not discrete. Prebasal plate absent. Basal plate greatly abbreviated, the exposed portion eight times as wide as long.

Antennæ filiform, as compared with body length rather long; articles moderately long, decreasing distad, the ultimate a little longer than the two preceding together; bristles very long, distad, becoming shorter and denser as usual.

Claws of prehensorial feet when closed attaining distal end of first antennal article; claw armed at base with an acute conical tooth, prefemur with a low, conical and subdentiform protrusion on mesal surface, other joints unarmed. Prosternum wider than long in ratio 20:17; longer than the prefemur in the ratio 17:10, nearly; chitinous lines distinct. Dorsal plates bisulcate; also with a weak median sulcus. All prescuta short. All spiracles circular, the first larger than the second. First pair of legs shorter and much more slender than the second; anterior pairs shorter and thicker than those of posterior portion of body. Last ventral plate moderately wide, narrowed caudad, the margins nearly straight, the caudal slightly excised. Coxopleural pores four, small, two of these covered or partly covered by the edge of the last ventral plate and the other two free. Anal legs longer and thicker than the penult, ending in a long slender claw. Pairs of legs in female, 37.

Length, 6.5 mm.

Locality.—Marshalltown, Iowa.

The type, as with the preceding species, is a single female which was taken—her eggs were very few in number.

EXPLANATION OF PLATE.

Soniphilus embius, gen. et sp. nov.

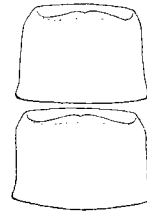
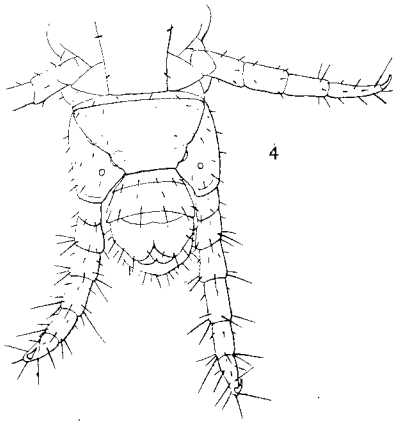
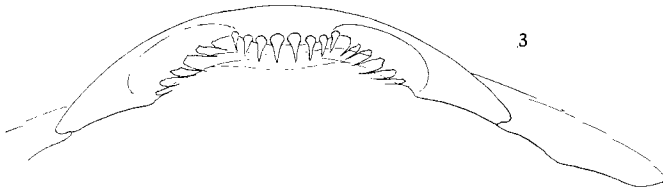
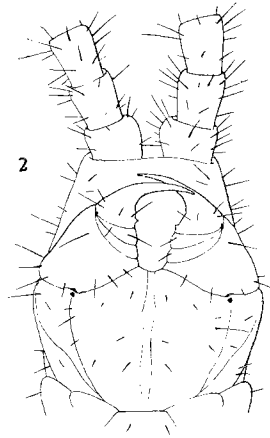
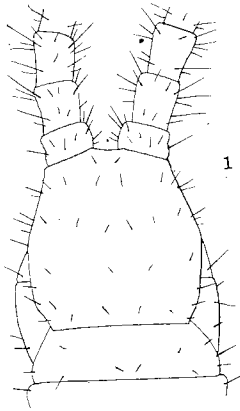
Fig. 1.—Dorsal view of anterior portion.

Fig. 2.—Ventral view of anterior portion.

Fig. 3.—Labrum, ventral aspect. (The teeth of median portion normally extend directly ventrad; the figure shows them extending caudo-ventrad, this resulting from depression by the cover-glass).

Fig. 4.—Ventral view of posterior portion.

Fig. 5.—Ninth and tenth ventral plates.



SONIPHILUS EMBIUS, GEN. ET SP. NOV.