

ON THE GENERA OF THE ICHNEUMON-FLIES OF THE TRIBE PANISCINI ASHMEAD, WITH DESCRIPTIONS AND DISCUSSION OF RELATED GENERA AND SPECIES

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This paper is a review of the genera included by Ashmead and others in the tribe Paniscini. In the opinion of the writer most of these genera are not related to *Paniscus* but are more or less anomalous representatives of several groups, placed together because of general superficial resemblance to each other. Each genus is placed in what seems to the writer to be its natural position, with reasons assigned for this placing. The greater part of the paper consists of a study of certain genera of the Tryphonine subtribe Mesoleiina and a review of the North American representatives of the restricted tribe Paniscini.

The genera *Paniscus* Schrank, *Opheltes* Holmgren, and *Absyrtus* Holmgren were placed by Holmgren in close proximity with *Ophion*, and here they have been considered to belong by practically all subsequent workers, Ashmead¹ finally grouping them with three other genera to form the tribe Paniscini. But Thomson² dissented from this placing and insisted that they should be referred to the Tryphoninae in close proximity to *Perilissus*, pointing out the characters wherein they resemble the latter subfamily much more closely than the Ophioninae. Chief among these is the form of the first abdominal segment and the position of its spiracle. Thomson was, in my opinion, much nearer the truth in regard to the relationship of these genera than were the others, but with his placing of them within the subfamily I do not agree, as will appear later.

The tribe Paniscini of Ashmead, as originally constituted, included the genera *Paniscus* (Gravenhorst [sic!]) Schrank, *Absyrtus* Holmgren, *Opheltes* Holmgren, *Parabates* Foerster, *Cidaphus* Foerster, and

¹ Proc. U. S. Nat. Mus., vol. 23, 1900, p. 95.

² Opusc. Ent., fasc. 9, 1883, p. 873; fasc. 12, 1888, pp. 1185 and 1193.

Opheltoideus Ashmead. To these Morley³ has added his two Oriental genera, *Tetragonalys* and *Parca*, and Enderlein⁴ his *Sauterellus* and *Apatagium*, based on Oriental species, and *Prosthodocis*, based on the Ethiopian *Paniscus antefurcalis* Szepligeti and a South American species.

As thus constituted the tribe consists of at least five discordant elements.

Parca, as I have already pointed out,⁵ is Mesostenine and synonymous with *Earrana* Cameron.

Cidaphus and *Tetragonalys* are synonymous and belong rather to the Mesochorini. Here *Cidaphus* replaces *Plesiophthalmus* Foerster, which in the opinion of most of the recent authors is synonymous with it. Szepligeti⁶ separates the two on venational and claw characters and places them with the entirely unrelated *Nesomesochorus* Ashmead in the new subfamily Neomesochorinae (sic!). Szepligeti's determination of *Mesochorus alarius* Gravenhorst, the commonly accepted type of both *Cidaphus* and *Plesiophthalmus*, is apparently a quite different insect from that of practically all other writers, for he characterizes it as having the areolet nearly triangular, the subdiscoideus inserted somewhat above the middle of the postnervulus, and the claws simple. For the purpose of the present paper it seems best to follow the majority of the European writers and consider the two genera as synonyms. Because of the page precedence of *Cidaphus* in addition to the preoccupation by Motschulsky in 1857 of *Plesiophthalmus* it is necessary to use *Cidaphus* as the generic name. Viereck⁷ has proposed the genus *Plesiophthalmidea* for *Plesiophthalmus paniscoides* Ashmead. His reason for so doing is not clear, for this species does not disagree in any particular with the original description of *Plesiophthalmus*, and is certainly congeneric with *alarius* Gravenhorst as commonly interpreted by European authorities.

The type of the undescribed *Opheltoideus johnsoni* Ashmead, genotype of *Opheltoideus*, is apparently lost. As pointed out by Bradley⁸ certain species of *Parabates* will run to this genus because of their lack of the areolet, and the best disposition to make of the genus appears to be, as Bradley has done, to synonymize it with *Parabates*. Enderlein⁹ places three South American species in the genus and redescribes it on the basis of these species. Since Bradley has already synonymized it with *Parabates* and since Enderlein's species are certainly not *Parabates* the *Opheltoideus* of Enderlein needs a

³ Fauna Brit. Ind., Hym., vol. 3, pt. 1, 1913, p. 346.

⁴ Stett. Ent. Zeit., 1912, pp. 125-144.

⁵ Philippine Journ. Sci., vol. 20, 1922, p. 564, fig. 6.

⁶ Gen. Ins., fasc. 114, 1911, p. 70.

⁷ Bull. 83, U. S. Nat. Mus., 1914, p. 119.

⁸ Ann. Mag. Nat. Hist., ser. 9, vol. 3, 1911, pp. 319-324.

⁹ Stett. Ent. Zeit., 1912, pp. 125-144.

new name. The very small ocelli, lacking notauli and long ovipositor of Enderlein's species would seem to indicate that he has erred in placing them in the Paniscini. I have not been able to identify the genus as interpreted by Enderlein as anything in the United States National Museum, but since he has placed it in the Paniscini the first tergite is supposedly slender with the spiracles at or before the middle. This together with the long ovipositor and pectinate claws would seem to indicate that he has referred to this tribe representatives of some Lissonotine genus, which, as is shown in the next paragraph, he did in the case of *Sauterellus*.

Sauterellus planiscutellatus Enderlein from Formosa, the basis of the genus, I am able to recognize as a species of *Leptobatopsis*, a Lissonotine genus. Of this species I have before me both sexes also from Formosa and also collected by Sauter. In his key to the genera of the Paniscini Enderlein ascribes simple claws to *Absyrtus* to distinguish it from *Sauterellus*. In this he is, of course, in error.

To *Apatagium* in Enderlein's key will run all of the species of *Parabates* known to me that have the areolet complete. Most of them, however, differ from the description of the genus in that the second recurrent is strongly curved—not straight or nearly straight. But I have before me one specimen from Java, type locality of two of Enderlein's species, in which this vein is straight in the middle and curved at each end. It appears to be neither of Enderlein's species. Variation in the form of this vein occurs in *Paniscus* and also in the present genus as recorded by its author, and I would not consider the character of generic significance. I, therefore, do not hesitate to synonymize *Apatagium* with *Parabates*.

Prosthodocis is founded on the single character of the antefurcal nervulus as distinguished from the postfurcal or interstitial nervulus of *Paniscus*. This I do not consider as of generic significance, and would synonymize *Prosthodocis* with *Paniscus*.

The foregoing eliminations and synonymizing brings us back practically to the three genera originally treated of by Holmgren (*Parabates* had not then been segregated from *Paniscus*). That *Opheltes* and *Absyrtus* are at all closely related to *Paniscus* and *Parabates* or should be grouped in tribal relation with them I do not believe. There is, in my opinion, nothing about them that should exclude them from the Mesoleptini and more especially from the subtribe Mesoleiina as defined by Schmiedeknecht. *Paniscus* and *Parabates*, on the other hand, I would place close to the Tryphonini and Cteniscini on account of their very similar habits of oviposition, with its accompanying modification of the ovipositor, and their subsequent development. These are at present very unsatisfactory characters to work with because our knowledge of this

phase of the structure and life history of the Ichneumonidae is so limited. But they are much more reliable as indicating relationship than are the superficial resemblances of general form and color, which, after all, constitute the only basis for grouping the various genera of the Paniscini together and for ranking the tribe with the Ophioninae. In respect to these biological characters *Opheltes* and *Absyrtus* are more closely allied to *Ophion* than are *Paniscus* and *Parabates*.

The egg of the true Paniscini, as is well known, is very large and is attached externally to the body of the host by a pedicel which is thrust through the skin of the host. In oviposition the egg itself is not inclosed in the ovipositor but is attached to it by the enlarged base of the pedicel exactly as is so frequently observed in specimens of *Polyblastus*. The ovipositor is attenuate at the apex beyond a more or less distinct ventral enlargement. This type of ovipositor occurs in all groups that produce stalked eggs: Cteniscini and Tryphonini, as well as the Paniscini.

The ovipositor of *Opheltes* and *Absyrtus*, on the other hand, has on the dorsal side near the apex a distinct notch; the egg, at least

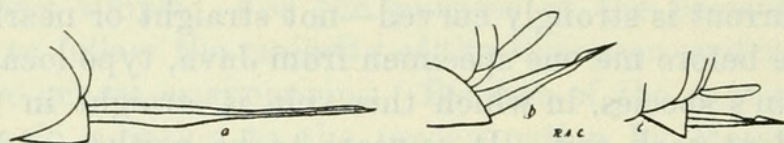


FIG. 1.—OVIPOSITORS OF a. PANISCUS; b. OPHELTES, c. ABSYRTUS

in *Opheltes* and probably in *Absyrtus*, is elongate oval without a pedicel and in oviposition is inclosed within the ovipositor; and the larva is internally parasitic. This type of ovipositor and variations of it is found in the Ophioninae, Lissonotini, Glyptini, and Mesoleptini. All of these, so far as their biology is known, are internal parasites.

Genus EARRANA Cameron.

Earrana CAMERON, Spolia Zeyl., vol. 3, pt. 10, 1905, p. 119, pl. B, fig. 3.

Parca MORLEY, Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 133; Fauna Brit. Ind., Hym., vol. 3, Ichn., pt. 1, 1913, p. 301, fig. 102.

Earrana CUSHMAN, Philippine Journ. Sci., vol. 20, 1922, p. 564, fig. 6.

An Oriental Mesostenine genus allied to *Nematopodius*.

Genus CIDAPHUS Foerster.

Cidaphus FOERSTER, Verh. Nat. Ver. Preuss. Rheinl., vol. 25, 1868, p. 149.

Plesiophthalmus FOERSTER, Verh. Nat. Ver. Preuss. Rheinl., vol. 25, 1868, p. 170.

Tetragonalys MORLEY, Rev. Ichn. Brit. Mus., vol. 2, 1913, p. 132; Fauna Brit. Ind., Hym., vol. 3, Ichn., pt. 1, 1913, p. 359, fig. 101.

Plesiophthalmidea VIERECK, Bull. 83, U. S. Nat. Mus., 1914, p. 119.

CIDAPHUS BARBARICA (Morley).

Tetragonalys barbarica MORLEY, Rev. Ichn. Brit. Mus., vol. 2, 1913, p. 132;
Fauna Brit. Ind., Hym., vol. 3, Ichn., pt. 1, 1913, p. 360, fig. 101.

The North American species of this genus may be separated by the following key:

KEY TO THE NORTH AMERICAN SPECIES OF CIDAPHUS.

1. First tergite not laterally grooved to near base, glymmae short, oblique, closer to spiracles than to base *paniscoides* Ashmead.
First tergite grooved laterally to near base, glymmae long, parallel to upper and lower surfaces of tergite, midway between spiracles and base 2.
2. Areolet twice as long as broad; antennae pale ferruginous with extreme apex infusate *occidentalis*, new species.
Arolet less than twice as long as broad; subapical fourth of antennae blackish, extreme apex pale *australis*, new species.

CIDAPHUS PANISCOIDES (Ashmead).

Plesiophthalmus paniscoides ASHMEAD, Ent. News, vol. 3, 1892, p. 107.

Plesiophthalmidea paniscoides VIERECK, Bull. 83, U. S. Nat. Mus., 1914, p. 119.

In addition to the type male which is from Massachusetts, there are in the national collection males from Bartlett, New Hampshire;

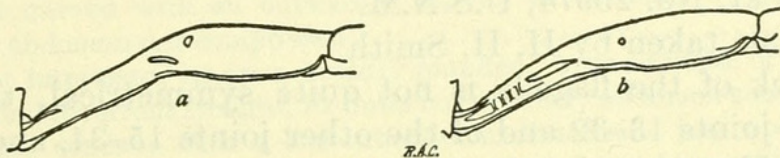


FIG. 2.—FIRST ABDOMINAL SEGMENT OF CIDAPHUS: *a.* PANISCOIDES; *b.* OCCIDENTALIS.

New York, and Pennsylvania; and a female from Plummer Island, Maryland; the last captured by H. L. Viereck on August 9, 1912.

CIDAPHUS OCCIDENTALIS, new species,

Very distinct from *paniscoides* (Ashmead) in the formation of the first tergite.

Female.—Length 13 mm.

Head punctate, rather coarsely and very densely so on face; clypeus broadly rounded at apex, medially impressed, coarsely and sparsely punctate; frons laterally transversely striate; ocelli separated from the eyes by a narrow but distinct space, postocellar line distinctly more than half the diameter of an ocellus. Thorax shining, very faintly coriaceous; notauli very faintly impressed; nervulus antefurcal and slightly reclivous; nervellus distinctly curved above break; areolet twice as long as wide; propodeum completely areolated, but with costulae and apical abscissae of median carinae weak, areola small, practically pentagonal, distinctly longer than broad. Abdomen slender, compressed from beyond third segment, shining; first segment decurved, spiracles distinctly beyond middle, petiole grooved laterally nearly to base, the groove vertically rugose basally, glymmae midway between spiracles and base, long, parallel to upper and lower surfaces of petiole; ovipositor sheath nearly as long as third tergite.

Flavo-testaceous, with head except clypeus, mouthparts and lower cheeks, black; antennae infuscated at apex; wings yellowish hyaline, stigma paler than veins.

Type-locality.—Revelstoke, British Columbia.

Type.—Cat. No. 25973, U.S.N.M.

Two females, the type taken August 14 by R. P. Currie and the paratype from Pullman, Washington, taken August 25, 1898, by C. V. Piper.

CIDAPHUS AUSTRALIS, new species,

Very closely allied to *occidentalis* differing practically only as follows:

Female.—Length 13 mm.

Face more coarsely and less densely punctate, the space between the punctures finely roughened; ocelli nearly touching the eyes; costulae and apical abscissae of median carinae practically wanting; nervulus strongly reclivous; areolet less than twice as long as broad; subapical fourth of flagellum blackish, apex almost flavous.

Type-locality.—Langdale, Chambers County, Alabama.

Type.—Cat. No. 25974, U.S.N.M.

One female taken by H. H. Smith.

The black of the flagella is not quite symmetrical, that of one embracing joints 13–32 and of the other joints 15–34, and this color may be accidental; but it has the appearance of naturalness.

ENDERLEINIA, new name.

Opheltoideus ENDERLEIN, Stett. Ent. Zeit., 1912, p. 107 (not Ashmead, 1900).

This genus is unknown to me, the name being proposed for *Opheltoideus* Enderlein, preoccupied by *Opheltoideus* Ashmead.

Its type and generic characters are those ascribed to *Opheltoideus* by Enderlein.

The three described species are Neotropical.

Genus LEPTOBATOPSIS Ashmead.

Leptobatopsis ASHMEAD, Proc. Linn. Soc. N. S. Wales, vol. 25, 1900, p. 349.

Sauterellus ENDERLEIN, Stett. Ent. Zeit., 1912, p. 112.

Leptobatopsis CUSHMAN, Philippine Journ. Sci., vol. 20, 1922, p. 591.

As indicated above this genus is Lissonotine.

LEPTOBATOPSIS PLANICUTELLATUS (Enderlein).

Sauterellus planiscutellatus ENDERLEIN, Stett. Ent. Zeit., 1912, p. 113.

Specimens from Formosa collected by Sauter agree in every respect with Enderlein's generic and specific descriptions, except that the occipital carina is developed to a greater or lesser extent below, though frequently largely concealed by the prothorax.

Subfamily TRYPHONINAE.

Tribe MESOLEPTINI.

Subtribe MESOLEIINA.

In the Mesoleiina *Opheltes* comes closest to *Protarchus* Foerster. In *Opheltes* most of the features characteristic of *Protarchus* are exaggerated, especially the glymmae of the first tergite, and the genus has many features peculiar to itself. But I believe there can be no doubt of its close relationship to *Protarchus*. Of indubitable significance in this connection is the fact that the two genera are parasitic on related tenthredinid genera, *Opheltes* on *Cimbex* and *Protarchus* on *Trichiosoma*. Furthermore, the new genus *Hypopheltes*, described below, combines many of the characters of the two genera. The following key will distinguish these three genera as well as the recently described *Protarchoides* Cushman and two other new genera, one from Japan allied to *Opheltes* and one from North America allied to *Protarchus*.

KEY TO CERTAIN GENERA OF MESOLEIINA.

1. Clypeus transversely impressed and arcuately emarginate at apex; frons not carinate or ridged laterally, at most subtuberculate just above antennae; second recurrent curved with an outwardly convex curve near the top, its bulla divided; abdomen not compressed 2.
- Clypeus not impressed, its apex broadly rounded; frons carinate or ridged laterally; second recurrent straight, its bulla not divided; abdomen compressed .. 4.
2. Frons deeply concave with a low tubercle on either side just above level of antennae; notauli deeply impressed anteriorly and reaching middle of meso-scutum **Protarchus** Foerster.
- Frons shallowly concave and without tubercles; notauli obsolete or short 3.
3. Hind tibiae and tarsi, especially the tarsi compressed; clypeus unarmed; areolet present **Protarchoides** Cushman.
- Hind tibiae and tarsi not compressed; clypeus with a small acute tooth medially at junction of basal and apical areas (see fig. 4); areolet absent.
- Neoprotarchus**, new genus.
4. Glymmae not confluent, the petiole not especially compressed; dorsal surface of propodeum much shorter than posterior, the median carinae rather weak, areola quadrate, broad and short; claws simple **Hypopheltes**, new genus.
- Glymmae confluent the petiole strongly compressed; dorsal surface of propodeum longer than the posterior, elevated medially near base, the median carinae high, areola narrow, most frequently incomplete laterally, when complete elongate triangular, claws pectinate 5.
5. First tergite with dorso-lateral carinae distinct only at extreme base, without median furrow; propodeal spiracles long oval; areola incomplete laterally; basal joint of flagellum nearly or quite twice as long as second; diameter of lateral ocellus longer than ocell-ocular line; eyes distinctly divergent below; inner orbits strongly carinately ridged; rufous, with head, thorax and abdomen black marked, antennae largely red; wings sometimes dark at apex but without a well defined maculation **Opheltes** Holmgren.
- First tergite with dorso-lateral carinae distinct to spiracles and with a distinct median furrow from near base to near apex; propodeal spiracles broad oval, areola complete, triangular; basal joint of flagellum barely a half longer than second; diameter of lateral ocellus shorter than ocell-ocular line; eyes scarcely divergent below; inner orbits weakly ridged; ferruginous with only flagellum and apex of abdomen black; wings with well defined apical cloud.
- Nephopheltes**, new genus.

Genus PROTARCHUS Foerster.

Protarchus FOERSTER, Verh. Nat. Ver. Preuss. Rheinl., vol. 25, 1868, p. 201.

Zacalles DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 283 (not Foerster).

No North American species has been referred to this genus. But *Zacalles magnus* Davis belongs here.

Head and thorax coarsely and closely punctate, especially the pleura and propodeum; head also opaque shagreened; clypeus rather small, transversely impressed before apex, the apex broadly emarginate; mandibles short and stout with short equal teeth; malar space distinct; frons concave, flanked on either side by a rounded tubercle just above the antennae; ocelli rather large, the space between the paired ones deeply impressed; temples slightly convex, sloping; eyes very slightly emarginate opposite antennae; antennae stout, tapering at apex; first flagellar joint about twice as long as second; occipital carina complete and strong, the occiput deeply concave; notauli very deep anteriorly, becoming obsolete at middle; epomia absent; prepectal carina strong to about half way up the pleura; scutellum convex, not margined; propodeum with apical carina strong, petiolar area closed at sides and frequently with a median carina, reaching nearly to middle of propodeum; other carinae obsolete, the lateral represented by strong ridges separating the pleural and lateral areas, the median areas indistinctly defined, very narrow; spiracles large, oval; wings large; stigma long with radius before middle; basal vein curved at base; nervulus strongly postfurcal and inclivous; second abscissa of radius a long sigmoid curve; areolet oblique, subtriangular, usually petiolate; disco-cubitus angulate or subangulate, frequently with ramellus distinct; second recurrent with a convex curve near the top, the bulla divided, nearly interstitial with the second intercubitus; nervellus reclivous, broken above middle; hind legs long and stout; hind tibia and tarsus not compressed; inner calcarium reaching nearly to middle of basitarsus; last tarsal joint nearly as long as third and nearly twice as long as fourth; claws simple; abdomen scarcely compressed, rather coarsely punctate basally, subpolished apically; first tergite about half as wide at base as at apex, the sides nearly straight, glymmae separated by a broad basin, median carinae distinct to beyond spiracles, latter at about the middle, the tergite ridged laterally but not carinate beyond spiracles; second tergite with distinct rounded thyridia; all tergites visible; hypopygium compressed; ovipositor briefly exerted but not extending beyond apex; sheath broad, rounded at apex.

PROTARCHUS MAGNUS (Davis).

Zacalles magnus DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 283.

A specimen from Francona, New Hampshire, differs from Davis's description in having the vertex and thorax black, the latter with yellow markings, the coxae, trochanters, and hind femur black; and

only the third tergite entirely red, the first, second, and fourth bicolored.

This species is very closely allied to, perhaps synonymous with, the European *Protarchus rufus* (Gravenhorst).

Genus PROTARCHOIDES Cushman.

Protarchoides CUSHMAN, Proc. U. S. Nat. Mus., vol. 61, art. 8, 1922, p. 25.

At once distinguished from *Protarchus* Foerster by its compressed hind tibiae and tarsi, short hind calcaria and apical tarsal joint, shallowly concave frons without tubercles, and short, shallow notauli.

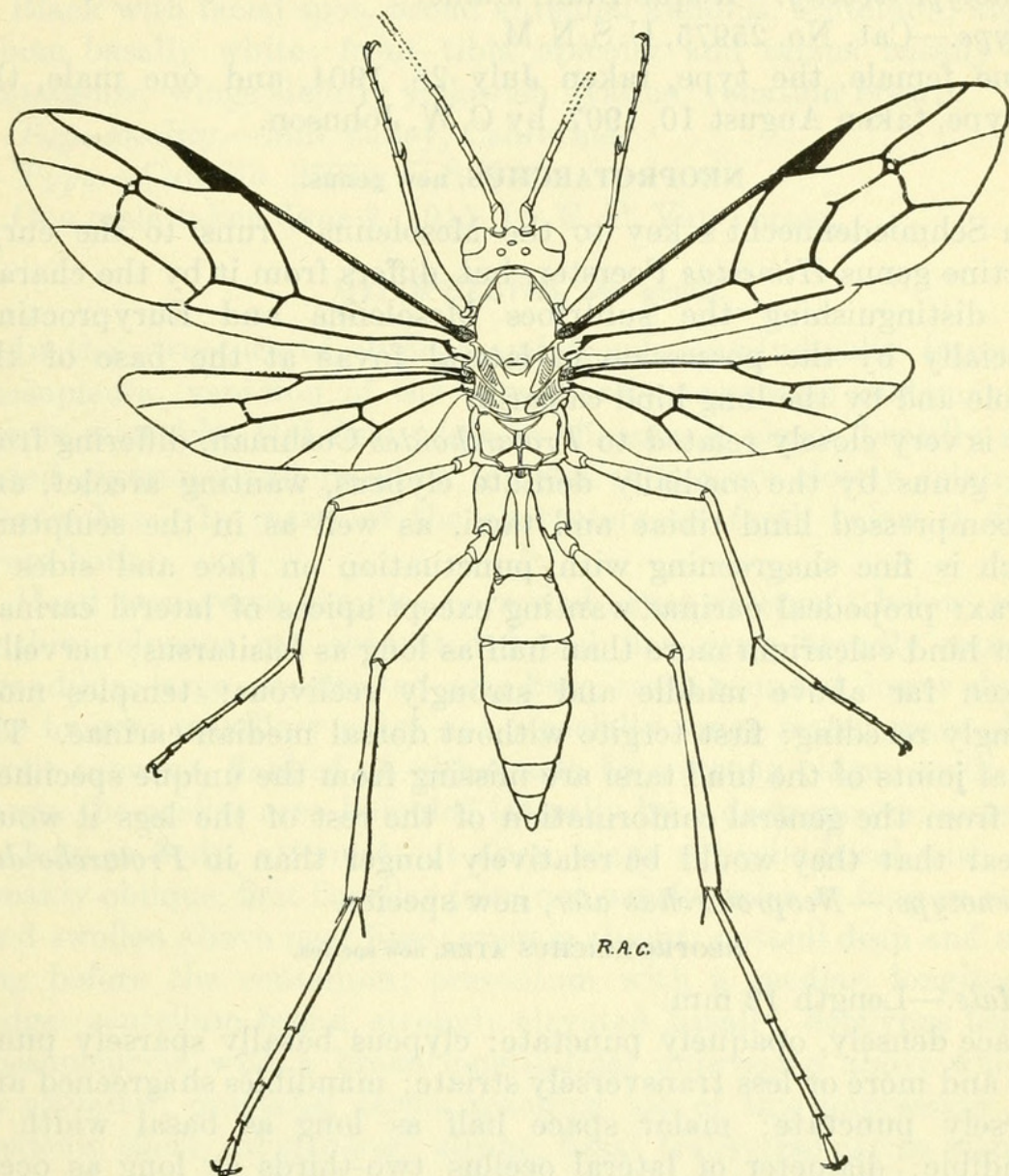


FIG. 3.—*PROTARCHOIDES MANDIBULARIS* CUSHMAN, FEMALE.

***PROTARCHOIDES MANDIBULARIS*, new species.**

Very close to, and possibly synonymous with the genotype, *longipes* Cushman, but differing as follows:

Female.—Length 17 mm.; antennae 17 mm.

Mandibles and palpi largely yellow; antennae paler; clypeus piceous; pronotum with a rather deep impression along posterior

margin which, joining the transverse one below, sets off a distinct convex area at the upper part; callose posterior margin of mesopleurum broad and densely punctate; lateral abscissa of apical propodeal carina distinct; areolet large and briefly petiolate; discocubitus distinctly angulate and with a more or less distinct ramellus; tegulae paler. Otherwise like *longipes*.

Male.—Essentially like female but with a median facial spot and tegulae yellowish.

Type-locality.—Wellington, British Columbia.

Allotype-locality.—Roque Bluff, Maine.

Type.—Cat. No. 25975, U.S.N.M.

One female, the type, taken July 28, 1904, and one male, the allotype, taken August 10, 1907, by C. W. Johnson.

NEOPROTARCHUS, new genus.

In Schmiedeknecht's key to the Mesoleiina¹⁰ runs to the euryproctine genus *Himertus* Foerster, but differs from it by the characters distinguishing the subtribes Mesoleiina and Euryproctina, especially by the possession of lateral foveae at the base of the petiole and by the long hind calcaria.

It is very closely related to *Protarchoides* Cushman, differing from that genus by the medially dentate clypeus, wanting areolet, and noncompressed hind tibiae and tarsi, as well as in the sculpture, which is fine shagreening with punctuation on face and sides of thorax; propodeal carinae wanting except apices of lateral carinae; inner hind calcarium more than half as long as basitarsus; nervellus broken far above middle and strongly reclivous; temples more strongly receding; first tergite without dorsal median carinae. The apical joints of the hind tarsi are missing from the unique specimen, but from the general conformation of the rest of the legs it would appear that they would be relatively longer than in *Protarchoides*.

Genotype.—*Neoprotarchus ater*, new species.

NEOPROTARCHUS ATER, new species.

Male.—Length 12 mm.

Face densely, opaquely punctate; clypeus basally sparsely punctate and more or less transversely striate; mandibles shagreened and sparsely punctate; malar space half as long as basal width of mandible; diameter of lateral ocellus two-thirds as long as ocellular line. Thorax practically impunctate dorsally, finely and distinctly so on pleura and sternum; notauli not defined but represented by broad shallow impressions; scutellum convexly elevated, not margined; speculum small, polished; propodeum opaque shagreened, laterally obscurely transversely striate, without carinae except apical portion of lateral carinae, petiolar area poorly defined

¹⁰ Opuscula Ichneumonologica, fasc. 35, 1913, p. 2796.

above, areola and basal areas represented by a median impression. Abdomen subopaque, very finely shagreened; first tergite broadly petiolate without dorsal carinae but medially longitudinally impressed, spiracles at middle.

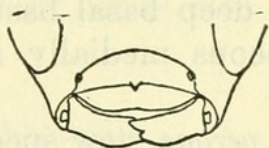


FIG. 4.—CLYPEUS OF NEOPROTARCHUS ATER CUSHMAN.

Black with facial spot, broad antennal annulus, scutellum, and all tibiae basally white; front tibia apically and tarsus basally pale testaceous; wings slightly yellowish hyaline, venation brown.

Type-locality.—Mill Valley, California.

Type.—Cat. No. 25976, U.S.N.M.

One male taken June 7, 1915, by E. P. Van Duzee.

HYPOPHELTES, new genus.

In the structure of clypeus and frons, longitudinally impressed mesopleura, venation of the wings, and compressed abdomen this genus resembles *Opheltes*; while in the simple claws, broadly separated glymmae and receding temples it is more closely related to *Protarchus*. In many of the characters set forth below it differs from both.

Head transverse, temples narrowed; eyes divergent below, entire within; clypeus not separated, broad, flat, apex broadly rounded; mandibles large, constricted near base, teeth rounded, lower slightly the longer; maxillary palpi not especially long; malar space short; frons concave, flanked on either side by a strong ridge; ocelli very large, the ocellar area bounded laterally by a deep groove; antennae as long as body, attenuate at apex, scape subcylindrical with apex weakly oblique, first flagellar joint not nearly twice as long as second and swollen above near base; epomia absent; notauli deep and meeting before the scutellum; prescutum with a median longitudinal ridge; scutellum broad, strongly elevated basally, declivous behind; mesopleurum with a broad longitudinal impression above which it is elevated; prepectal carina reaching top of this impression; propodeum short, carinae very strong, basal transverse carina wanting, petiolar area occupying two-thirds of dorsal length, spiracles very large, broadly oval, directed posteriorly; legs slender; hind basitarsus nearly as long as remaining joints combined; claws simple; inner calcarium about a fourth as long as basitarsus; wings large; stigma very narrow with radius near base; apical abscissa of radius nearly straight; areolet petiolate, quadrangular, second recurrent before middle; recurrent straight with bulla undivided; discocubitus evenly

curved, without trace of ramellus; nervulus nearly interstitial; nervellus broken nearly in the middle; abdomen strongly compressed from base of third tergite; first tergite long, rather narrow, especially before the tuberculate spiracles, latter slightly before middle; glymmae separated by a deep basal basin; thyridia very minute; seventh tergite membranous medially nearly to base; ovipositor sheath acute at apex.

Genotype.—*Hypopheltes pergae*, new species.

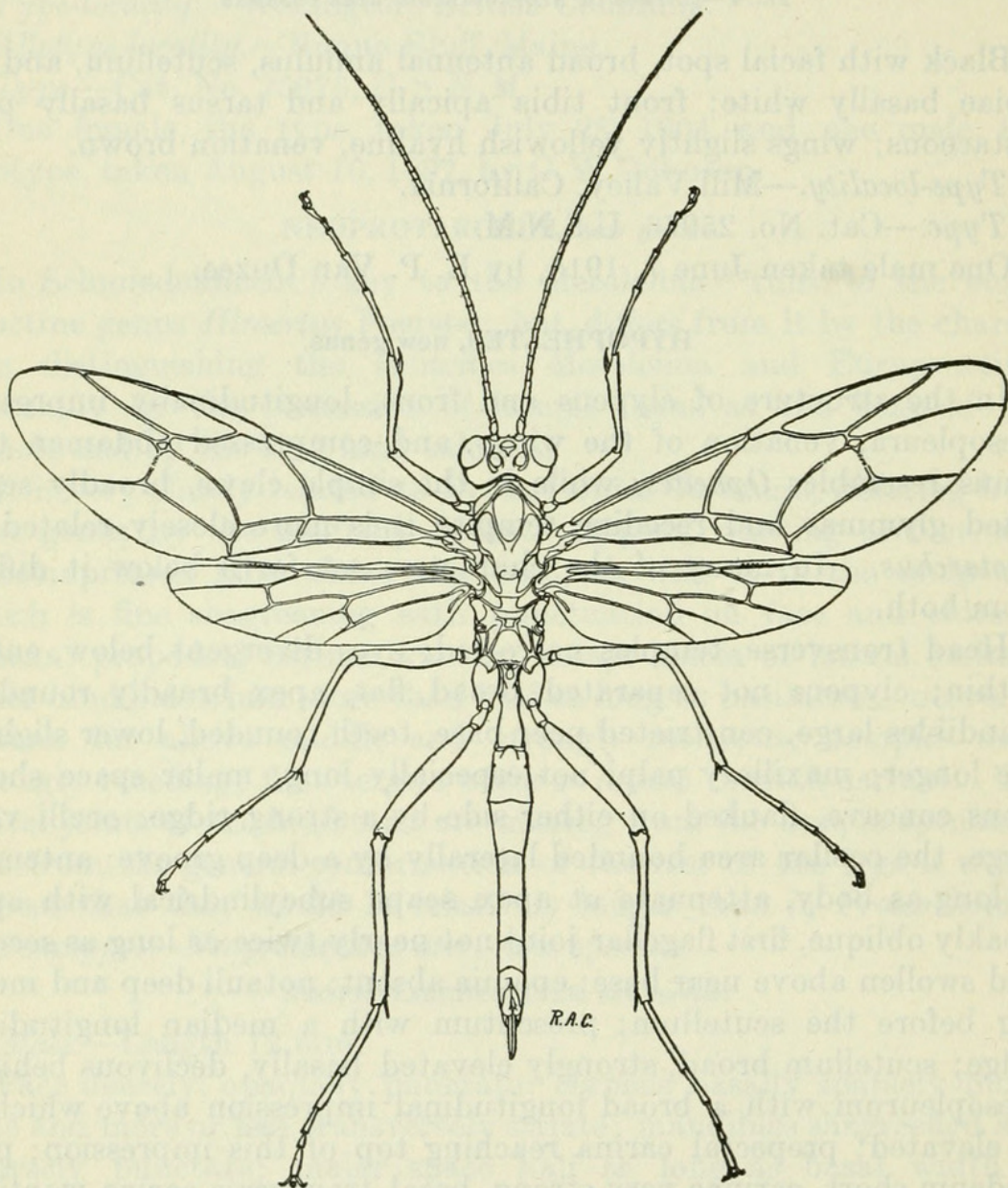


FIG. 5.—HYPOPHELTES PERGAE CUSHMAN, FEMALE.

HYPOPHELTES PERGAE, new species.

Female.—Length 20 mm.; antennae 20 mm.

Head polished behind, coarsely punctate in front; malar space a third as long as basal width of mandible; diameter of lateral ocellus twice as long as ocell-ocular line which equals post-ocular line; first flagellar joint with apical portion very little longer than second; thorax polished, mesopleurum rugosely roughened, vertically below

the impression and horizontally above; metapleurum coarsely, irregularly roughened, subtuberculate in middle; abdomen highly polished.

Ferruginous, the legs and antennae concolorous; abdomen piceous; wings hyaline, venation brown, stigma paler especially along posterior border, costa and wing bases also paler; wing tips slightly clouded.

Host.—*Perga*, species.

Type-locality.—Sydney, Australia.

Type.—Cat. No. 25977, U.S.N.M.

One female reared October 19, 1892.

Genus *OPHELTES* Holmgren.

Head behind eyes broad; eyes usually divergent below; clypeus not separated, apex broadly rounded, not impressed; mandibles not constricted at base, teeth equal and subacute; maxillary palpi very long; malar space half as long as basal width of mandible; frons deeply concave, flanked by sharp carinae; ocelli very large, surrounded by a deep groove; antennae as long as body, attenuate at apex, scape subcylindrical, apex oblique; first flagellar joint nearly twice as long as second, cylindrical; epomia present but short; notauli deep anteriorly but becoming obsolete in middle of mesoscutum; prescutum with a weak median longitudinal ridge; scutellum rather narrow, elevated in middle; mesopleurum with a broad longitudinal impression, above which is a longitudinal welt; prepectal carina reaching top of this impression and curving backward along its dorsal margin; propodeum rather long, its posterior face short and nearly perpendicular, its dorsal face strongly acutely elevated near base, the closely approximate median carinae extending backward from this point to the apical carina, latter very strong; spiracles large oval, directed laterally; hind basitarsus much shorter than remaining joints combined; claws strongly pectinate; inner calcarium fully a third as long as basitarsus; wings large; stigma very narrow, radius near base; apical abscissa strongly curved, areolet pentagonal, recurrent near apex; recurrent straight with bulla undivided; discocubitus curved, without trace of ramellus; nervulus post-furcal; nervellus broken above middle, reclivous; abdomen compressed from base of third tergite; first tergite long, narrow, compressed at base, glymmae confluent, spiracles slightly before middle; thyridia rather large; seventh tergite not membraneous medially; ovipositor sheath rounded at apex.

In the following key are tabulated the species of the world:

KEY TO SPECIES OF *OPHELTES*.

1. Notauli lacking; propodeal spiracles oval, not elongate; stigma shorter and broader; radius nearly straight; nervulus very slightly postfurcal; nervellus broken at upper fourth (China) *chinensis* Morley.
- Notauli distinct; radius distinctly curved at both base and apex of apical abscissa 2.

2. Abdomen broader and less strongly compressed, second tergite much broader at apex than at base and hardly longer than broad at apex (Japan).

major, new species.

Abdomen more strongly compressed, second tergite much narrower (holarctic).

glaucopterus Linnaeus.

OPHELTES GLAUOPTERUS (Linnaeus).

There can, I think, be no doubt that the North American *flavipennis* (Provancher) and the typical European form are conspecific. They may, perhaps, be treated as races or varieties more or less easily distinguishable by a tendency in the American race to a darker red and more black on the abdomen and the more acutely conical scutellum in the European race. However, I have seen only two European specimens, and it may be that with a larger number of specimens these differences would be found not to hold.

The Southern European variety *fuscipennis* (Gravenhorst) has its counterpart in America in an undescribed dark-winged variety (*barberi*, new variety) from the vicinity of Washington, District of Columbia.

The species as a whole shows remarkable variation in both structure and color. The most remarkable of the structural variations is in the form of the head; the temples varying from hardly swollen and no wider than the eyes to very strongly swollen and much wider than the eyes. The new southern variety, *barberi*, described below has the temples more strongly swollen than any of the other specimens before me, there being in fact a rather distinct interval between the form of the head in this variety and in the northern form. The degree of swelling of the temples is, however, rather closely associated with size, and the two specimens of *barberi* are larger than any of the others. Associated with the form of the head is a certain amount of variation in the strength of the frontal carinae and emargination of the eyes, the wider the head in general the weaker the carinae and the emargination of the eyes.

The conical scutellum of the typical form is approached very closely in both of the American varieties, but in the majority of the specimens of *flavipennis* it is merely convex.

The form of the propodeum varies greatly, especially with respect to the length of the petiolar area and the distinctness of the costulae. The latter are very seldom actually present but are sometimes indicated by an elevation, though frequently the lateral areas are flat.

Associated apparently with size are certain variations in venation. In the smallest specimens the nervulus is interstitial or even slightly antefurcal and the second discoidal cell is very narrow at base, sometimes less than half as wide as the apex of the brachial cell; while in the largest specimens the nervulus is strongly postfurcal and

the discoidal cell nearly as wide at the base as is the brachial at apex. Less definitely associated with size are the form of the areolet, which varies from broadly sessile to almost subpetiolate; the position of the second recurrent, which may be from strongly antefurcal to slightly postfurcal with respect to the second intercubitus; and the position of the fracture of the nervellus.

The color variation is better discussed under the varieties.

OPHELTES GLAUOPTERUS, variety FLAVIPENNIS (Provancher).

Campoplex flavipennis PROVANCHER, Nat. Can., vol. 6, 1874, p. 143.

Opheltes glaucopterus PROVANCHER, Nat. Can., vol. 11, 1879, p. 145.

Opheltes glaucopterus, variety *flavipennis* MORLEY, Rev. Ichn., pt. 2, 1913, p. 134.

Through the kindness of Prof. H. C. Severin, of the South Dakota Agricultural College, who has sent me a fine series reared and collected in the early nineties by Dr. J. M. Aldrich, I have been able to make a much more satisfactory study of the variation than would otherwise have been possible. Combined with the dozen specimens in the National Collection, these show an almost complete gradation in all of the variations of both structure and color to be found within the variety.

The color difference mentioned by Morley as distinguishing this variety from typical *glaucopterus* does not hold, for many of the specimens have the propodeum more or less red. In *flavipennis*, however, the fifth tergite and usually more or less of the fourth are black, while in *glaucopterus*, according to Schmiedeknecht (Opusc. Ichn.) the change in color takes place on or beyond the fifth. This is true of the two European specimens of *glaucopterus* examined.

This variety varies in color from the phase described by Provancher, in which the thorax is black with only the scutellum and notauli and margins of the mesoscutum red, the occipital and ocellar black spots broadly confluent, and the coxae largely black to those in which the pronotum, mesoscutum, scutellum, propodeum dorsally, the upper part of mesopleura and metapleura, the vertex behind the ocelli, and the coxae, are entirely or largely red. The phase with the upper part of the mesopleurum red is represented by only a single specimen from South Dakota. It differs hardly at all in color from the new variety *barberi*.

The phase with largely black mesoscutum is also rather exceptional, the usual color of this region being red with the prescutum black anteriorly.

Occasionally the fifth tergite is red in the anterior lateral angles.

In size this variety varies from 17 to 23 mm.

Of the 34 specimens examined only one is a male. The scarcity of the males in Europe has been noted by Morley, who states that out of about 40 specimens in the British Museum only two were males.

In the above series are specimens from Canada, Connecticut, Long Island, New York, Illinois, Colorado, South Dakota, and Idaho.

OPHELTES GLAUOPTERUS, variety BARBERI, new variety.

Female.—Differs from *flavipennis* in its larger size (26–27 mm.), more strongly swollen and wider temples, darker yellow wings with the apices deeply infumate and from most individuals of *flavipennis* in having that portion of the mesopleurum above the furrow, the propodeum dorsally and the coxae almost entirely red.

Type-locality.—Plummer Island, Maryland.

Type.—Cat. No. 25978, U.S.N.M.

Two female specimens from the type-locality, both taken by H. S. Barber, the type at light on July 19, 1920, and the paratype on July 26, 1908.

OPHELTES MAJOR, new species.

Female.—Length 26 mm.; antennae 26 mm.

Closely allied to *glaucopterus* Linnaeus, but at once distinguishable by its much stouter form, this being especially obvious in the very broad and weakly compressed abdomen. The thorax is also obviously broader and deeper in proportion to its length. The propodeal areola is complete, the carinae strong from their junction to the apical carina; while the legs are slightly stouter than in *glaucopterus*.

In color it resembles typical specimens of *flavipennis* (Provancher) in having the propodeum entirely black, but the black of the abdomen extends nearly or quite to the base of the fourth tergite, the mesoscutum and scutellum are red, the former with a black median vitta and fainter lateral vittae. The wings are deeply infumate at apex.

Male.—Essentially like the female.

Type-locality.—Gifu, Nippon, Japan.

Type.—Cat. No. 25979, U.S.N.M.

Described from two females and one male, the type and allotype, from Gifu, Y. Nawa, collector, and bearing his number 58; and the paratype female labelled simply "Japan, Mitsukuri."

The species apparently varies structurally in much the same manner as does *glaucopterus*. In the type and allotype the temples are very broad and swollen and the propodeum long and dorsally without any indication of costulae; while in the paratype the temples are hardly broader than the eyes and the propodeum is shorter above and transversely elevated in the positions of the costulae.

NEPHOPHELTES, new genus.

This genus is easily recognized by the characters made use of in the key. What others of its features are of more than specific significance are embodied in the description of the type species.

Genotype.—*Nephopheltes japonicus*, new species.

NEPHOPHELTES JAPONICUS, new species.

Female.—Length 17 mm.; antennae 18 mm.

Head smooth, practically impunctate; temples slightly wider than eyes; face barely wider than frons, slightly wider than greatest diameter of eye; frons with a median pit-like impression, inner orbits not carinately ridged, but with a minute tubercle opposite upper margin of antennal foramina; diameter of lateral ocellus

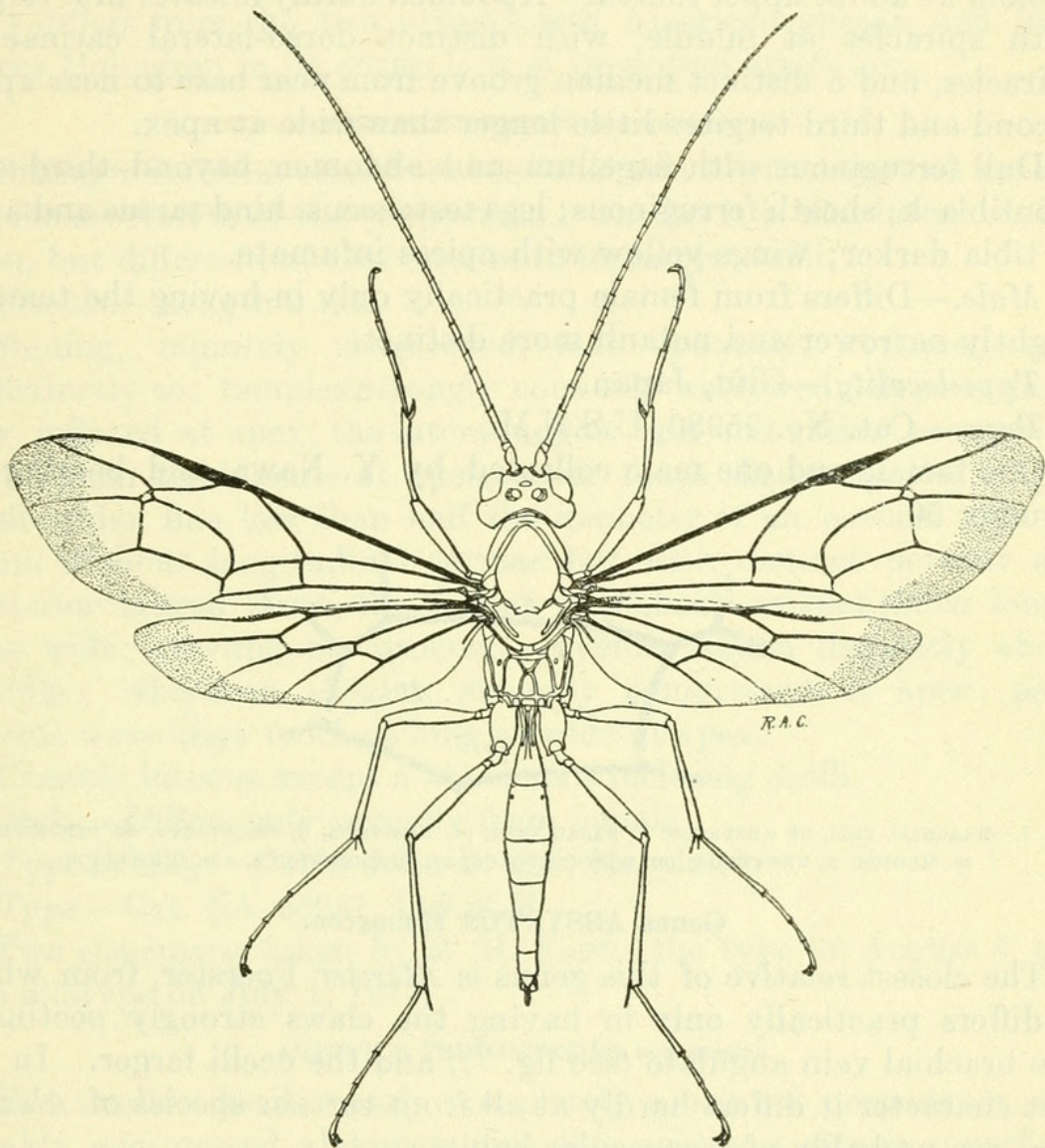


FIG. 6.—NEPHOPHELTES JAPONICUS CUSHMAN, FEMALE.

slightly longer than post-ocular line, but scarcely as long as ocellular line; malar space two-thirds as long as basal width of mandible; clypeus broadly rounded and slightly prominent at apex, not separated from face; mandibles stout not constricted; apical truncation of scape weakly oblique; first joint of flagellum little more than half longer than second. Thorax smooth, practically impunctate; notauli obsolescent; transverse impression of pronotum strong; scutellum convex, not elevated; mesopleurum with lower posterior

angle high and flange-like, longitudinal impression strong; propodeum smooth, spiracle small, broadly oval, carinae high, areola complete, triangular, much longer than wide at apex, basal area also defined, triangular, costulae and costellae entirely wanting, petiolar area divided by three longitudinal ridges; legs as in *Opheltes* except femora are a little stouter; areolet oblique trapezoidal; second discoidal cell nearly as wide at base as is brachial at apex; nervellus broken at about upper fourth. Abdomen hardly falcate; first tergite with spiracles at middle, with distinct dorso-lateral carinae to spiracles, and a distinct median groove from near base to near apex; second and third tergites little longer than wide at apex.

Dull ferruginous with flagellum and abdomen beyond third segment black; sheath ferruginous; legs testaceous, hind tarsus and apex of tibia darker; wings yellow with apices infumate.

Male.—Differs from female practically only in having the temples slightly narrower and notauli more distinct.

Type-locality.—Gifu, Japan.

Type.—Cat. No. 25980, U.S.N.M.

One female and one male collected by Y. Nawa, and bearing his number 59.

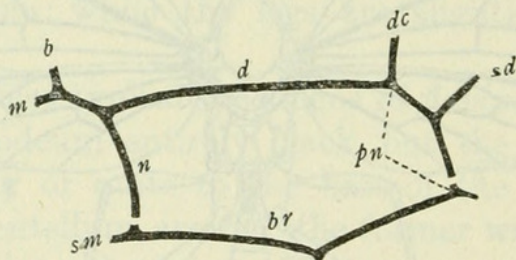


FIG. 7.—BRACHIAL CELL OF ABSYRTUS: *b*. BASAL VEIN; *br*. BRACHIUS; *d*. DISCOIDEUS; *dc*. DISCOCUBITUS; *m*. MEDIUS; *n*. NERVULUS; *pn*. POSTNERVULUS; *sd*. SUBDISCOIDEUS; *sm*. SUBMEDIUS.

Genus ABSYRTUS Holmgren.

The closest relative of this genus is *Alexeter* Foerster, from which it differs practically only in having the claws strongly pectinate, the brachial vein angulate (see fig. 7), and the ocelli larger. In the last character it differs hardly at all from certain species of *Alexeter* that are probably of crepuscular habits.

Three North American species are known to me. They may be distinguished by the following key:

KEY TO NORTH AMERICAN SPECIES OF ABSYRTUS.

1. Propodeum with all longitudinal carinae more or less distinct; temples broad and swollen; nervulus broken and frequently with a more or less distinct stump of a vein extending into the brachial cell.....*perilissoides*, new species.
- Propodeum without longitudinal carinae; temples narrow; nervulus not broken.....2.
2. Propodeum with a distinct but very short petiolar area and posterior lateral areas.....*arealis*, new species.
- Propodeum without a petiolar area or posterior lateral areas.
paniscoides (Ashmead).

ABSYRTUS PANISCOIDES (Ashmead).

Perilissus paniscoides ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, 1896, p. 187 (excluding male).

Eczetesis paniscoides DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 253.

Absyrtus paniscoides CUSHMAN, Proc. U. S. Nat. Mus., vol. 61, art. 8, No. 2429, 1922, p. 2.

As pointed out in the last reference cited Ashmead's species is composite, the male being that of *Parabates monticola* Cushman.

It differs from the two other North American species and from *luteus* Holmgren in its entire lack of propodeal areolation.

ABSYRTUS AREALIS, new species.

Distinguishable at once from the other two North American species by the areolation of the propodeum. In this it is like *luteus* Holmgren, but differs from that species in its larger ocelli.

Female.—Length 9 mm.

Shining, minutely shagreened, face opaquely, abdomen very indistinctly so; temples strongly convexly narrowed; clypeus medially inflexed at apex, the lateral angles thin and rather prominent; mandibular teeth acute at apex, lower tooth distinctly the longer; ocell-ocular line less than half the diameter of an ocellus. Propodeum without longitudinal carinae but with distinct petiolar and posterior lateral areas, the former very short; areolet much longer than wide; nervulus not broken; nervellus broken distinctly above middle. Abdomen slender, strongly compressed at apex; post-petiole more than twice as long as wide at apex.

Entirely luteous except a black spot inclosing ocelli.

Male.—Differs only sexually from female.

Type-locality.—Cabin John Bridge, Maryland.

Type.—Cat. No. 25981, U.S.N.M.

Two specimens taken by R. M. Fouts, the type on August 5, and the allotype on July 1, 1917.

ABSYRTUS PERILISSOIDES, new species.

The swollen head, nearly completely areolated propodeum, and weakly compressed abdomen give this species a strong superficial resemblance to the subgenus *Spanotecnus* of the genus *Perilissus*, but the broken brachial vein at once indicates its true affinities. The large head, strong longitudinal carinae of the propodeum, and broken nervulus distinguish it at once from any other described species.

Female.—Length 10 mm.

Subopaque shagreened, face opaque, clypeus inflexed at apex, lateral angles not prominent, shining and with a few coarse punctures; mandibular teeth rounded at apex, the lower larger but barely longer than upper; temples swollen, nearly as broad as eyes;

ocell-ocular line about two-thirds as long as ocellar diameter. Propodeum with distinct longitudinal and apical carinae; areolet much longer than wide; nervulus broken by the stump of a vein; nervellus broken slightly above middle. Abdomen rather stout, weakly compressed at apex; postpetiole less than twice as long as wide at apex.

Ferruginous with ocellar spot black and trochanters and tarsi pale.

Male.—More slender than female with postpetiole distinctly more than twice as long as wide at apex; temples broader than eyes; abdomen not at all compressed.

Type-locality.—Hartford, Connecticut.

Type.—Cat. No. 25982, U.S.N.M.

One female from the type-locality June 24, 1904, and one male taken by K. F. Chamberlain, June 15, 1919, at Durham, Connecticut.

Tribe PANISCINI.

As indicated above this tribe as here treated consists only of the genera *Paniscus* Schrank and *Parabates* Foerster, and is most closely related to the tribes Tryphonini and Cteniscini.

The two genera are separable by the following key:

KEY TO GENERA PANISCINI.

Occiput margined; nervulus usually postfurcal; ovipositor strongly exerted.

Paniscus.

Occiput immargined; nervulus interstitial or nearly; ovipositor usually not strongly exerted -----

Parabates.

The characters employed in the above key are really all comparative and the two genera are not more than subgenerically distinct. Several authors have so treated them. But since the group as here limited is so homogeneous this treatment is unnecessary and less convenient than to consider them as genera. In certain species of *Paniscus* the occipital carina is so faint as to be visible only from certain positions; the nervulus is very variable in its position and angle; while the long ovipositor is not at all unusual in *Parabates*.

Genus PANISCUS Schrank.

Paniscus SCHRANK, Fauna Boica, vol. 2, pt. 2, 1802, p. 316.

Paniscus GRAVENHORST, Ichn. Eur., pt. 3, 1829, p. 622.

Neteleia GRAY, Ann. and Mag. Nat. Hist., ser. 3, vol. 5, 1860, p. 339.

Bucheckerius SCHULZ, Spolia Hym., 1906, p. 285.

Paropheltes CAMERON, Journ. Bombay Nat. Hist. Soc., 1907, p. 111.

Prosthodocis ENDERLEIN, Stett. Ent. Zeit., 1912, p. 142.

As indicated by the above synonymy *Paniscus* was first proposed by Schrank; not by Gravenhorst, to whom it was for many years credited. Schrank mentioned only one species in connection with the genus, *Ichneumon luteus*, which he cited as an example. From the context it is evident that Schrank intended *Paniscus* as a name

for all those species of the Linnean genus *Ichneumon* that have the abdomen falcate, but in defining the genus we are obliged to consider only the one species mentioned.

The next mention of the genus was by Gravenhorst, who restricted it to the species comprising what we now know as the genera *Paniscus*, *Parabates*, and *Opheltes*, but not including *Ichneumon luteus*, which he referred to *Ophion* and which has, since its fixation as such by Curtis in 1836, been recognized as the genotype of *Ophion*.

Gray, in an article on the hooks of the hind wing in Hymenoptera, divided Gravenhorst's *Paniscus* into two genera, designating *glaucophterus* as the type of *Paniscus* and *inquinatus* Gravenhorst as the type of his new genus *Neteleia*, the latter genus being, therefore, what we now know as *Paniscus*.

Bucheckerius Schulz and *Paropheltes* Cameron are, as has been pointed out by Morley¹¹, based on species of *Paniscus*.

The fact that *Ichneumon luteus* is the only species mentioned by Schrank in connection with *Paniscus* and is also the type of the genus *Ophion* would seem to make necessary the synonymizing of *Paniscus* with *Ophion*. But if it can be shown that a genus is based on specimens rather than on a species, the type of the genus is the species represented by the specimens rather than the species named as type, in the opinion of the International Commission on Nomenclature. This, I think, can be done in the case of *Paniscus*. On an earlier page (p. 262) of the same publication in which *Paniscus* was first proposed Schrank discussed *Ichneumon luteus* and described the eggs of *Paniscus*. At this place he also referred to three earlier publications, the first his own *Enumeratio Insectorum Austriae* (No. 750); the second the German edition of DeGeer's *Memoires pour Servir a l'Histoire des Insectes* (vol. 2, pt. 2, 1771, p. 170—p. 880 in original edition—pl. 29, figs. 15–26); and the third Schaeffer's *Icones Insectorum circa Ratisbonam Indigenorum* (vol. 1, pt. 1, 1766, pl. 1, fig. 10). Between the first reference and the DeGeer reference occurs the sign of equality. In other words, Schrank's idea of *luteus* was the same as that of DeGeer. The latter author gives an excellent account of the biology of what we know as *Paniscus*, and remarkably good figures of the adult in both sexes, the egg, the larva, the egg shell with exuvia attached, the cocoons, and details of the claws, genitalia, and method of copulation. The figures of the adults were drawn, DeGeer states, from specimens reared from the bundle of cocoons figured. In short, the genus *Paniscus* of Schrank as restricted by its only included species may be interpreted as having been based on specimens studied and figured by DeGeer. The Schaeffer figure is very poor, though, perhaps, somewhat more similar in its general aspect to *Ophion* than to *Paniscus*.

¹¹ Rev. Ichn. Brit. Mus., pt. 2, 1913, pp. 117, 123.

The insect figured by DeGeer is not the *Ichneumon luteus* Linnaeus as established by long usage. It was said by him to have been parasitic on "une grosse chenille a double queue du Saule," with a marginal reference to volume one of his own work (pl. 23, fig. 6). The latter is the larva of the puss-moth, *Dicranura vinula*, the most frequently mentioned host of *Paniscus cephalotes* Holmgren, with which DeGeer's description agrees very well. I, therefore, consider [*Ichneumon luteus* DeGeer (not Linnaeus)] = *Paniscus cephalotes* Holmgren.

The type citation should be as follows:

PANISCUS Schrank.

Faun. Boica, vol. 2, pt. 2, 1802, p. 316. One species.

Type.—[*Ichneumon luteus* DeGeer (not Linnaeus)] = *Paniscus cephalotes* Holmgren; *Ichneumon luteus* Rossi (by designation of Viereck, Bull. 83, U. S. Nat. Mus., 1914, p. 109); not tenable since Schrank did not mention Rossi's work in either of his discussions of *Ichneumon luteus*; *Paniscus glaucopterus* Linnaeus (by designation of Gray, Ann. and Mag. Nat. Hist., ser. 3, vol. 5, 1860, p. 341), not originally included. (Monobasic).

No recent revision of the North American (north of Mexico) species of *Paniscus* has been published, the only keys to such species being those of Provancher¹². In the earlier article Provancher tabulated eight species, seven described for the first time, to which he later¹³ added another. In the "Faune" he transferred five of these nine to other genera and synonymized another with *geminatus* (Say), so that his second key included only three species: *P. geminatus* (Say), *albovariegatus* Provancher, and *albatarsatus* Provancher. Morley¹⁴ included six North American species, one new, in a key to American species.

Fifteen species from North America (north of Mexico) have been described in or referred to the genus: One by Say, one by Olivier, eight by Provancher, three by Ashmead, one by Viereck, and one by Morley. Five of Provancher's have properly been transferred to other genera, while the sixth is so treated on a later page of the present paper. I have been unable to recognize the species of Olivier and Morley because of insufficient description, although the latter is included in the key to species; *albovariegatus* Provancher is included in the key but without entire assurance that it is properly placed; *appendiculatus* Provancher is not included in the key because the description applies equally well to at least two of the species described as new, and I hesitate to apply Provancher's name to either, because his type is probably still in existence, though probably with the label removed and placed with his *geminatus* (Say), with which species he synonymized it.¹⁵ Provancher's

¹² Nat. Can., vol. 6, 1874, p. 105; and Faune Ent. Can. Hym., 1883, p. 360.

¹³ Nat. Can., vol. 8, 1876, p. 328.

¹⁴ Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 102.

¹⁵ Mr. A. B. Gahan, of the U. S. National Museum, searched for the type of *appendiculatus* and arrived at this conclusion.

species is not synonymous with *geminatus* as defined here nor with the new variety described. The types of all three of Ashmead's species and of Viereck's one species are in the National Collection and are part of the material studied.

I am not at all convinced that all of the species recognized in this paper are distinct, because the range of specific variation in structure, sculpture, and color is very difficult, at present apparently impossible, to determine. I have therefore made use of the most obvious available characters for the definition of species, realizing that most of these characters are subject to variation, but believing that the key will be found workable for a very large percentage of all specimens. Most of the species recognized have been confused with *geminatus* (Say).

KEY TO SPECIES OF PANISCUS FROM NORTH AMERICA NORTH OF MEXICO.

1. Scutellum not at all margined laterally; head and thorax polished; notauli evident only anteriorly; highly ornamented with yellow... *pulcher*, new species.
Scutellum margined laterally at least at base; head and thorax distinctly punctate; notauli usually strong throughout..... 2.
2. Propodeum with a median rounded elevation near base, without carinae but the apical carina represented on each side by a rounded tubercle; scutellar carinae extending only about half way to apex; metapleurum roundly elevated above at apex; a very large species..... *trituberculatus*, new species.
Propodeum not as above..... 3.
3. Propodeum coriaceous, not or barely transversely aciculate.
immaculatus Morley.
Propodeum more or less distinctly transversely aciculate..... 4.
4. Hind femur distinctly less than two-thirds as long as tibia, rather stout; face (measured from antennal foramina to clypeal foveae) distinctly broader than long; clypeus broad and broadly concavely truncate, the basal groove hardly arched above level of foveae..... 5.
Hind femur slender, at least two-thirds as long as tibia; face usually as long as broad; clypeus not broad, narrowly truncate, basal groove arched above level of foveae..... 11.
5. Antennae short, stout, the middle flagellar joints nearly quadrate..... 6.
Antennae longer and more slender, the middle flagellar joints nearly or quite twice as long as thick..... 7.
6. Occipital carina strong except medially above..... *brevicornis*, new species.
Occipital carina very weak..... *caviverticalis*, new species.
7. Temples as broad as eyes or nearly..... 8.
Temples much narrower than eyes..... 10.
8. Scutellum practically immargined; clypeus transversely elevated, margin reflexed..... *clypeatus*, new species.
Scutellum margined to apex; clypeus flat or nearly..... 9.
9. Antennae much shorter than body; temples fully as wide as eyes; eyes nearly flush with surface of head..... *temporalis*, new species.
Antennae about as long as body; temples hardly as wide as eyes; eyes somewhat bulging..... *pardalis*, new species.
10. Antennae shorter than body, joints beyond middle distinctly less than twice as long as thick; tibiae and tarsi with many conspicuous spines, those of hind basitarsus nearly as long as diameter of the joint..... *spinipes*, new species.

- Antennae about as long as body; joints beyond middle fully twice as long as thick; tibiae and tarsi not especially conspicuously spined, the spines fewer and smaller, those of hind basitarsus barely half as long as diameter of the joint..... *neomexicanus*, new species.
11. Apical tarsal joints very long and slender, that of middle leg in female at least as long as second joint, in male at least as long as third; claws very large with about twenty teeth in female, in male very closely pectinate.
..... *ungicularis*, new species.
- Apical tarsal joints shorter and stouter, if approaching above proportions the claws not conspicuously large and with fewer teeth..... 12.
12. Mesopleura, metapleura, and sides of propodeum very densely and rather coarsely punctate 13.
- Pleura with finer and well separated punctures, metapleura sometimes obliquely striate 16.
13. Propodeum dorsally coarsely punctate; not transversely striate.
..... *subfuscus* Cresson.
- Propodeum more or less distinctly transversely striate, rarely finely granular without distinct striae 14.
14. Temples rather broad and strongly convex; ocelli distant from eyes; hind femur rather stout, barely three-fourths as long as tibia..... *cockerelli*, new species.
- Temples very narrow, sloping sharply from shortly behind eyes; ocelli proximate to the eyes; hind femur slender, more than three-fourths as long as tibia 15.
15. 13 mm. or more; ocelli touching the eyes..... *ocellatus* Viereck.
- 11 mm. or less; ocelli distinctly though narrowly separated from the eyes.
..... *ocellatus*, var. *microocellatus*, new variety.
16. Metapleurum obliquely striate throughout, not at all punctate..... 17.
- Metapleurum punctate or nearly smooth, sometimes obscurely striate below.. 20.
17. Mesoscutum, mesosternum, epipleura, and venation blackish; second recurrent vein strongly antefurcal *nigripictus* Ashmead.
- Not black marked as above, stigma always pale; second recurrent vein interstitial or postfurcal 18.
18. Slender, first tergite about five times as long as wide at apex; hind femur very slender; antennae attenuate at apex, the subapical joints about three times as long as thick..... *californicus*, new species.
- Stouter, first tergite about four times as long as wide at apex; hind femur rather stout; antennae not especially slender apically, the subapical joints scarcely twice as long as thick..... 19.
19. Temples narrow, sloping; vertex yellow..... *arizonensis*, new species.
- Temples broad and strongly convex; vertex piceous..... *leo*, new species.
20. Vertex yellow or concolorous with face 21.
- Vertex black or piceous..... 24.
21. Mesothorax with distinct pale yellow markings 22.
- Mesothorax without a distinct pattern of yellow 23.
22. Abdomen brownish at apex..... *albovariegatus* Provancher.
- Abdomen not brownish at apex; scutellum margined only at base.
..... *alaskensis* Ashmead.
23. Second intercubitus sharply bent, the areolet subquadrangular; ocelli practically contiguous with the eyes; larger..... *pallens*, new species.
- Second intercubitus nearly straight, the areolet triangular; ocelli not nearly touching the eyes; 9 mm..... *pallens*, var. *barberi*, new variety.
24. Propodeum with a long, straight, gradual slope from base to apex, the apophyses practically wanting; first tergite about six times as long as wide at apex.
..... *townsendi*, new species.

- Propodeum more distinctly rounded or with distinct apophyses; first tergite less than five times as long as wide at apex.....25.
25. Spiracles of first tergite not far before middle; second tergite not much longer than wide and but little more than half as long as first.....*texanus* Ashmead.
Spiracles of first tergite far before middle; second tergite much longer than wide and distinctly more than half as long as first.....26.
26. Ocelli not nearly contiguous with the eyes (closer in male than in female); apophyses weak; small, 10 mm. or less.....*geminatus* (Say).
Ocelli practically contiguous with the eyes; apophyses strong; large.
geminatus, var. *sayi*, new variety.

PANISCUS PULCHER, new species.

Very distinct in the entire lack of scutellar carinae and the highly contrasting color pattern of the thorax.

Female.—Length 15 mm.; antennae 15 mm.

Polished throughout and practically without sculpture; temples buccate but much narrower than eyes; occipital carina very weak; face slightly wider than long, the sides slightly convergent below; frons as wide as narrowest part of face; eyes shallowly emarginate; clypeus strongly transverse, broadly and rather deeply emarginately truncate and transversely elevated; ocelli narrowly separated from eyes, postocellar line nearly as long as ocellar diameter; antennae slender, first flagellar joint much shorter than next two combined, middle joints nearly twice as long as thick. Pronotum slightly roughened in lateral groove; notauli short but deep; scutellum entirely without carinae; mesopleurum with a strong Y-shaped groove with its base near the posterior margin; prepectal carina strong and terminating abruptly at the lower branch of the groove; propodeum inconspicuously transversely striate, apical carina strong but not prominent laterally, weakly indicated medially; areolet placed nearly longitudinally, the lower side nearly continuous with rest of cubitus, second intercubitus broken; recurrent nearly straight below middle, incurved above, interstitial, lower bulla well below middle; nervulus postfurcal by more than half its length, perpendicular or nearly; postnervulus broken at its upper third; nervellus broken above its upper fourth; hind femur slender, two-thirds as long as tibia; tibia nearly as long as tarsus; tarsi very slender, apical joint of middle tarsus much shorter than third and only a little larger than fourth, claws small with about ten large teeth and a few small basal ones. Abdomen not strongly compressed; first tergite slightly more than three times as long as wide at apex, spiracle at basal third; second tergite barely longer than wide at apex, slightly less than two-thirds as long as first; sheath two-thirds as long as first tergite.

Testaceous, this color becoming almost piceous on mesoscutum; head largely yellow, this color including vertex; antennae testaceous; thorax with yellow markings as follows: Margins of mesoscutum and

two streaks in position of notauli reaching to scutellum, scutellum except medially at base, pronotum largely, fully half of mesopleurum in irregular spots, postscutellum and a spot flanking it on each side, lower side of metapleurum, and the propodeal carina; base of petiole also yellow; legs, except yellow knees, entirely testaceous; wings hyaline, venation dark, stigma luteous, costa and tegulae pale yellow.

Male.—Essentially like female; genital sheath very shortly exerted, strongly compressed and very broad at apex; tarsal claws much more densely pectinate than in female.

Type-locality.—Roswell, New Mexico.

Allotype-locality.—Las Cruces, New Mexico.

Type.—Cat. No. 25983, U.S.N.M.

Described from two females, the type taken April 15 by T. D. A. Cockerell and the paratype, from which the abdomen beyond the third tergite is missing, taken on *Larrea* at Las Cruces, New Mexico, in the spring of 1896 by Elgin Holt; and the allotype without other than the locality label.

PANISCUS TRITUBERCULATUS, new species.

Much larger than any other North American species and otherwise very distinct in the structure of the propodeum.

Female.—Length 25 mm.; antennae 22 mm.

Temples nearly flat and strongly receding; occipital carina strong and complete though obsolescent medially and approaching very closely to the ocelli; face nearly quadrate; clypeus rather long, simply convex, and weakly emarginately truncate; frons much narrower than face; ocelli very large, touching the eyes, postocellar line barely a third as long as ocellar diameter; antennae slender, first flagellar joint nearly as long as combined length of second and third, middle joints twice as long as thick. Thorax finely opaque; notauli deep and extending well back on disk of mesoscutum; scutellum carinate only basally; mesopleurum shining, inconspicuously punctate, furrows obsolete; metapleurum tuberculate above; propodeum very finely transversely opaquely aciculate, with a rounded tubercle in basal middle and the apical carina represented by lateral rounded hardly carinate tubercles; areolet petiolate, hardly as long as high, the second intercubitus strongly broken; second recurrent slightly postfurcal, nearly evenly curved, posterior bulla below middle; nervulus shortly postfurcal; postnervulus broken below upper third, inclivous; nervellus broken at about upper two-fifths; legs long and stout; hind femur three-fourths as long as tibia; tibia very nearly as long as tarsus; tarsi rather stout, very densely and finely pubescent beneath, fourth joint of middle tarsus about a third longer than broad at apex, apical joint slightly longer than second, claws very large with about eighteen large teeth and a few small

basal ones. First tergite long, nearly four times as long as wide at apex; second tergite two-thirds as long as first, nearly twice as long as wide and nearly parallel-sided; sheath slightly shorter than first tergite.

Rufo-testaceous with head, including vertex, more yellowish; wings hyaline, veins dark, stigma pale testaceous and costa stramineous.

Type-locality.—Santa Rita Mountains, Arizona.

Paratype-locality.—Mountain View, California.

Type.—Cat. No. 25984, U.S.N.M.

Described from two females, the type taken by E. A. Schwarz and the paratype in June, 1892, by E. M. Ehrborn.

The paratype is uniformly paler than the type. It lacks the antennae.

PANISCUS IMMACULATUS Morley.

Paniscus immaculatus MORLEY, Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 109.

This species is unknown to me, but its description is very suggestive of what I consider *subfuscus* Cresson from the West Indies. The latter differs from Morley's determination of the same species in its yellow vertex and very narrow temples; it is represented in the National Collection by one female specimen from Florida and eleven, including both sexes, from the West Indies.

It may, on the other hand, be a synonym of *ocellatus* Viereck, in which the transverse aciculation of the propodeum is sometimes almost entirely replaced by dense punctuation.

PANISCUS BREVICORNIS, new species.

In spite of the conspicuously short and short-jointed antennae, specimens of this species have been confused in the national collection with *geminatus* (Say).

Female.—Length 13.5 mm.; antennae 10 mm.

Stout; temples gibbous, nearly as broad as eyes; ocelli distinctly though briefly separated from eyes, postocellar line nearly as long as diameter of lateral ocellus; frons distinctly narrower than face; eyes shallowly emarginate; face parallel-sided, much broader than long, with fine but distinct, well separated punctures, the interspaces very finely shagreened; clypeus very short and broad, the basal groove deep and nearly straight, broadly arcuately truncate at apex, the margin slightly reflexed, surface coarsely and sparsely punctate; occipital carina complete except for a median interruption about as long as postocellar line; antennae short, rather stout, scape nearly as thick as long, first joint of flagellum hardly three times as long as thick at apex, very nearly as long as second and third combined, middle joints only slightly longer than thick. Thorax shining; pronotum laterally irregularly striate; mesoscutum very finely and rather sparsely punctate; notauli deep anteriorly but fading out on

the disk; scutellum sparsely punctate, carinae complete to apex, the space between more than twice as broad at base as at apex and three-fourths as broad as long; mesopleurum and metapleurum finely and rather densely punctate; propodeum strongly arched from base to apex, finely transversely striate, apically irregularly roughened, apophyses weak, spiracles elongate oval; second intercubitus broken; recurrent interstitial with second intercubitus or slightly antefurcal or postfurcal, nearly evenly curved; posterior bulla well below middle; nervulus postfurcal by more than half its length, perpendicular; postnervulus broken at its upper third; abscissula about three times as long as intercubitella; nervellus broken at a right angle at about its upper third; hind femur stout, distinctly less than two-thirds as long as tibia and hardly or barely as long as combined length of coxa and trochanter; tibia four-fifths as long as tarsus; tarsi slender, apical joint of middle tarsus about as long as third and a half longer than fourth, claws small with about ten large teeth and a few small basal ones. Abdomen weakly compressed, first tergite about a third longer than second and three and a half times as long as wide at apex, spiracles just beyond basal third; second one and a half times as long as wide at apex.

Dull brownish testaceous; face, clypeus, orbits, and vertex yellow; antennae ferruginous, slightly infusate apically; wings hyaline, veins dark, stigma and costa pale; tibiae at base and tarsi yellow.

Male.—Length 14 mm.; antennae 12 mm.

Differs from the female essentially in the relatively shorter ocellular and postocellar lines due to the slightly larger ocelli; less strongly arched propodeum; and narrower abdomen; tarsal claws scarcely more densely pectinate than in female.

Type-locality.—Wellington, Kansas.

Type.—Cat. No. 25985, U.S.N.M.

Described from thirty-nine females and twenty-two males; eighteen females and ten males taken at light at the type-locality by E. G. Kelly; one female from Baldwin, Kansas; one female from Stillwater, Oklahoma (A. N. Caudell); eight females and three males from Texas; one female and two males from Colorado (C. F. Baker); one female from the Flathead Indian Reservation, Montana (Hopkins U. S. No. 8595, Josef Brunner); one male from Brookings South Dakota; one female from Sullivan, Indiana (J. W. Spencer); one female from Wetumpka, Alabama (H. H. Smith); one female from North Carolina (T. Pergande); one female from Virginia; one female and one male from the District of Columbia; two males from Pennsylvania (C. F. Baker); one female from New York; one female and two males from New Haven, Connecticut (W. E. Britton); one female probably from Massachusetts, collected by George Dimmock and bearing his No. 1138 m; and one female and one male unlabeled.

This series shows considerable variation in most of the characters mentioned above. In size the females vary from 11 to 16 mm. and the males the same.

The color varies from bright to dull brownish testaceous. The latter color which occurs only in Kansas specimens may be due to the method of killing or preservation. A few specimens have the head entirely testaceous.

In the most weakly sculptured individuals the striae of the propodeum become obsolete and are replaced by shallow transversely arranged punctures.

PANISCUS CAVIVERTICALIS, new species,

Very closely related in its short antennae and femora to *brevicornis* Cushman, but differing as follows:

Female.—Length 10 mm.; antennae 8 mm.

Frons as broad as face; vertex rather deeply concave between ocelli; clypeus (malformed?) very deeply emarginate with a strong transverse elevation bordering the margin, more finely and densely punctate; occipital carina very nearly wanting; flagellum hardly attenuate at apex, only 38-jointed (in *brevicornis* there are from 46 to 52 joints depending largely on the size of the insect); propodeal spiracles broadly oval; second intercubitus nearly straight, second recurrent interstitial; nervellus broken at upper fourth; hind femur nearly two-thirds as long as tibia; second tergite little longer than broad at apex, less than two-thirds as long as first, first hardly three times as long as broad at apex.

Color as in *brevicornis* but brighter and with face and frons medially testaceous.

Type-locality.—Platte Canyon, Colorado.

Type.—Cat. No. 25986, U.S.N.M.

One specimen, which may be an abnormal specimen of *brevicornis*.

PANISCUS CLYPEATUS, new species.

From the other species with short femora and broad temples this species is distinct in its almost entire lack of scutellar carinae and its strongly transversely elevated clypeus.

Female.—Length 12 mm.; antennae (broken, but from the proportions of the remaining joints probably about as long as the body).

Head large; temples buccate, nearly as broad as eyes, sparsely punctate; face much broader than long and about a third broader than frons, parallel-sided, elevated medially, sparsely punctate, the interspaces faintly shagreened; clypeus very short and broad, strongly transversely elevated, apex reflexed and broadly but strongly arcuately truncate; frons polished, flat; ocelli rather small, distant from eyes; eyes rather shallowly emarginate; antennae slender, middle flagellar joint somewhat less than twice as long as thick,

first flagellar joint unusually short, its shorter side being little longer than second joint. Thorax shining; mesoscutum shining, minutely punctate, notauli distinct only to summit of anterior slope; scutellum sculptured like mesoscutum, ridged laterally but distinctly carinate only at extreme base, broad; mesopleurum subpolished rather densely finely punctate; metapleurum strongly convex, striato-punctate; propodeum rounded, transversely finely striate, apophyses weak, spiracles broadly oval; areolet triangular, petiolate; second recurrent interstitial, nearly evenly curved throughout; nervulus postfurcal by nearly its length; postnervulus broken at about its upper third; nervellus broken at about its upper fourth; legs stout; hind femur barely two-thirds as long as tibia; hind tarsi (broken); joints of middle tarsus relatively short and stout, apical joint about as long as third, which is barely three times as long as thick, claws small with about eight large teeth. Abdomen rather stout; first tergite only a little more than three times as long as broad at apex, spiracle at basal two-fifths; second tergite only one and one-half times as long as broad at base.

Rather pale testaceous; face, orbits, vertex, subalar tubercles, and sides and apex of scutellum yellow and faint indications of this color on margins of mesoscutum and in notauli; tarsi paler than rest of legs; antennae concolorous, blackish apically; wings hyaline, venation brown, stigma and costa pale.

Male.—Length 12 mm.; antennae 12 mm.

Essentially like female, but yellow markings of thorax more distinct and scutellum entirely yellow; tarsal claws not densely pectinate.

Type-locality.—Illinois.

Allotype-locality.—Near mouth of Four Mile Run, Virginia.

Type.—Cat. No. 25987, U.S.N.M.

Described from two females, the paratype from Ardmore, South Dakota (E. G. Holt, September 25, 1915), and one male (W. L. McAtee, September 17, 1916).

The paratype is badly stained about the head but is otherwise much like the type. In this specimen the hind tarsus is barely longer than the tibia. It and the allotype were received from the Bureau of Biological Survey, and the type from the C. F. Baker collection.

PANISCUS TEMPORALIS, new species.

Female.—Length 13 mm.; antennae 10 mm.

Temples strongly buccate, fully as wide as eyes, weakly punctate; face very broad, a third wider than frons, weakly elevated medially, rather densely punctate and faintly shagreened; clypeus very broad and short, nearly flat, very broadly arcuately truncate at apex, sparsely punctate; frons flat, weakly transversely striate; ocelli

briefly but distinctly removed from eyes; eyes only slightly elevated above general level of head, rather shallowly emarginate; antennae rather stout, attenuate at apex, middle joints scarcely twice as long as thick, basal joint of flagellum nearly as long as second and third combined. Thorax shining; mesoscutum minutely punctate, notauli distinct well on to disk; scutellum strongly margined to apex, the space inclosed by the carinae narrow and strongly convergent posteriorly; mesopleurum finely and rather densely punctate; metapleurum moderately convex but not elevated, slightly more densely punctate than mesopleurum; propodeum weakly rounded, transversely striate, apophyses moderate, area behind them irregularly roughened, spiracle long oval; areolet subsessile, second intercubitus sharply bent; second recurrent interstitial, curved above, nearly straight below; nervulus postfurcal by two-thirds its length; postnervulus broken at upper third; nervellus broken at upper third; femora stout, hind femur distinctly less than two-thirds as long as tibia; tarsi slender, hind tarsus slightly longer than tibia; apical joint of middle tarsus about as long as third, which is fully three times as long as thick, claws small with about ten large teeth. Abdomen rather slender; first tergite fully four times as long as broad at apex, spiracle at basal third; second tergite more than twice as long as broad at base, the sides weakly divergent.

Rufo-testaceous with face, frons, vertex and orbits yellow; antennae concolorous, slightly darker at apex; tarsi slightly paler than the rest of legs; wings hyaline, venation blackish, stigma and costa pale.

Type-locality.—Los Angeles County, California.

Type.—Cat. No. 25988, U.S.N.M.

One female.

PANISCUS PARDALIS, new species.

Female.—Length 13 mm.; antennae (broken, but in paratype as long as body).

Temples broad but narrower than eyes; eyes distinctly bulging, rather shallowly emarginate; face much broader than long and a third broader than frons, medially convex, sparsely punctate; clypeus very short and broad, nearly flat, very broadly and weakly arcuately truncate; frons flat, indistinctly transversely aciculate; ocelli distinctly separated from eyes; antennae slender, middle joints nearly twice as long as thick, first joint on its shortest side not much longer than second joint. Thorax shining; mesoscutum faintly coriaceous, impunctate, notauli extending onto disk; scutellum similarly sculptured, completely margined, space between carinae long, strongly convergent; mesopleurum shining, very weakly and sparsely punctate, the Y-shaped impression weak; metapleurum obliquely striate; propodeum weakly rounded from base to apex, transversely striate, apophyses very weak, spiracles long oval; areolet large, sessile,

quadrate, second intercubitus distinctly broken; second recurrent interstitial, rather weakly and evenly curved throughout; nervulus postfurcal by about two-thirds its length; postnervulus broken at upper third; nervellus broken slightly above upper third; hind femur distinctly less than two-thirds as long as tibia; tarsi slender, apical joint of middle tarsus about as long as third, claws small with about ten large teeth. Abdomen rather slender; first tergite four times as long as wide at apex, spiracle at basal third; second tergite nearly twice as long as wide at base, sides moderately divergent.

Testaceous; face and frons medially paler; clypeus, orbits, and vertex yellow; antennae fuscous except at base; wings hyaline, venation blackish, stigma and costa pale; legs concolorous, tarsi slightly paler.

Type-locality.—Ritzville, Washington.

Type.—Cat. No. 25989, U.S.N.M.

Two females taken May 13, 1921, by M. C. Lane.

The paratype is slightly larger than the type with the antennae more extensively testaceous at base and lacks the abnormal stubs of veins on the second intercubitus and second recurrent that are present in the type; but is otherwise very similar.

PANISCUS SPINIPES, new species.

Female.—Length 14 mm.; antennae 13 mm.

Temples rather broad and strongly convex but not distinctly buccate; face broader than long, sparsely punctate, medially somewhat elevated, nearly a half broader than frons; clypeus short and broad, convex, broadly truncate at apex; frons flat, subopaque, transversely aciculate; ocelli slightly removed from eyes; antennae rather slender, joints beyond middle less than twice as long as thick. Thorax shining; mesoscutum very finely and inconspicuously punctate, notauli extending well onto disk; scutellum margined throughout, space between carinae broad and rather weakly convergent; mesopleurum slightly more distinctly sculptured than mesoscutum; metapleurum very finely punctate; propodeum rather strongly rounded from base to apex, transversely striate, apophyses weak, spiracles broadly oval; areolet subpetiolate, subquadrangular; second recurrent slightly postfurcal, strongly curved above, nearly straight below middle; nervulus postfurcal by about two-thirds its length; postnervulus broken at upper third; nervellus broken at upper third; hind femur distinctly less than two-thirds as long as tibia; tarsi rather slender, apical joint of middle tarsus slightly longer than third, claws small with about ten large teeth; legs conspicuously spiny. Abdomen moderate; first tergite not quite four times as long as wide at apex, spiracles slightly beyond basal third; second tergite nearly twice as long as wide at base, subparallel-sided.

Testaceous; face, clypeus, frons, vertex, and orbits yellow; faint traces of this color in notauli, margins of mesoscutum, scutellum, and around wing bases; antennae concolorous, infusate apically; wings hyaline, venation blackish, stigma and costa pale; legs concolorous, tarsi slightly paler,

Male.—Essentially like female; but abdomen more slender, apical tarsal joints shorter, and claws somewhat more densely pectinate especially at apex.

Type-locality.—Washington, District of Columbia.

Allotype-locality.—Virginia.

Type.—Cat. No. 25990, U.S.N.M.

Described from twenty-four females and five males ranging from the vicinity of Washington and Connecticut west to Texas and Kansas, and represented from the following States and localities: District of Columbia; Virginia, Arlington, Falls Church (W. Middleton, August 21, 1914), Vienna (W. F. Turner, May 12, 1913), Cranesville (R. P. Currie, July 21, 1914), Charlottesville; Connecticut, Hartford (July 26, 1894); North Carolina, Pysiton and Langdale (H. H. Smith); Texas, Wolfe City (F. C. Bishopp, May, 1906), Tyler (F. C. Pratt, May 5, 1905), Victoria (J. D. Mitchell, April 19, 1913, and October 28, on *Helenium* species), Cotulla (F. C. Pratt, April 15, 1908), Kerrville (F. C. Pratt, April 11, 1907); Kansas, Riley County (Marlatt, September), Wellington (E. G. Kelly).

This series exhibits wide range in size, the largest being 17 mm. and the smallest 11 mm. in length. In the smaller specimens the ocelli are somewhat more distant from the eyes and the apical tarsal joints and first tergite relatively shorter.

One of the specimens from Victoria, Texas, a very small female, has the vertex piceous, possibly due to staining.

PANISCUS NEOMEXICANUS, new species.

Very close to *spinipes* Cushman and agreeing in nearly every respect with the description of that species; but the antennae are distinctly longer with more slender joints, the legs distinctly less conspicuously spiny, the ocelli nearly contiguous with eyes, the thorax nearly polished, and the first tergite more than four times as long as broad at apex.

Type-locality.—Bernalillo County, New Mexico.

Type.—Cat. No. 25991, U.S.N.M.

One female taken by B. Brown in June, 1896.

PANISCUS UNGUICULARIS, new species.

Remarkable principally for its very long, slender apical tarsal joints and very large, many-toothed claws.

Female.—Length 20 mm.; antennae 20 mm.

Temples strongly narrowed and weakly convex; face medially somewhat elevated, very finely shagreened and sparsely punctate fully a half wider than frons, slightly convergent below, about as wide as long; clypeus rather long, flat, apically broadly truncate, shagreened and with scattered coarse punctures; eyes rather deeply emarginate; frons flat, transversely aciculate; ocelli very large, contiguous with the eyes; antennae slender, middle joints more than twice as long as thick, basal flagellar joint on its shorter side about a fourth longer than second. Thorax subopaque; mesoscutum granular, notauli long; scutellum carinate to apex, the space between carinae narrow and strongly convergent posteriorly; mesopleurum finely and rather densely punctate; metapleurum indistinctly obliquely striate; propodeum rather strongly rounded from base to apex, transversely striate, apophyses strong, spiracles long oval; areolet subquadrate; second recurrent strongly and almost evenly curved throughout, interstitial; nervulus shortly postfurcal (about one-third its length); postnervulus broken at upper third; nervellus broken at a slightly acute angle at about its upper two-fifths; hind femur slender, barely a fourth shorter than tibia; tarsi very slender, apical joint of middle tarsus very slender, curved, fully as long as second joint; claws very long, nearly straight to near apex, with about seventeen large teeth. Abdomen rather slender; first tergite four and one-half times as long as wide at apex, spiracle at basal third; second tergite two and one-half times as long as wide at base, sides weakly divergent.

Flavo-testaceous; head, except occiput, yellow, vertex slightly piceous; antennae testaceous, fuscous apically; thorax paler laterally and along margins of mesoscutum and scutellum; legs concolorous, tarsi stramineous.

Male.—Essentially like female but the apical tarsal joints shorter, that of middle leg being only about as long as the third joint, and the claws very densely pectinate throughout.

Type-locality.—Plummer Island, Maryland.

Type.—Cat. No. 25992, U.S.N.M.

Described from ten females and nine males ranging from New York and Indiana to North Carolina and Alabama and distributed as follows: New York, Ithaca (July 12, 1890); Indiana (C. F. Baker); Pennsylvania, Harrisburg (P. R. Myers, September 16, 1908); Linglestown (W. S. Fisher, June 26, 1917); Maryland, Plummer Island (A. K. Fisher, August 25, 1907, W. L. McAtee, August 24 and September 29, 1907), Chevy Chase Lake (H. H. Smith); District of Columbia (T. Pergande, October 8, 1884); Virginia, Rosslyn (H. H. Smith, T. Pergande, June 27); North Carolina (T. Pergande); Alabama, Pysiton, Clay County (H. H. Smith).

Very constant in size, structure, and sculpture.

PANISCUS SUBFUSCUS Cresson.

Paniscus subfuscus CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 57.

The inclusion of this West Indian species within the scope of this paper is based on a single female specimen taken by H. S. Barber on Paradise Key, Florida, February 22, 1919.

It is paler in color than specimens from the West Indies, but is otherwise identical. The densely and rather coarsely punctate propodeum without transverse striae is very characteristic.

I suspect *immaculatus* Morley is synonymous with this species.

PANISCUS COCKERELLI, new species.

This species, *subfuscus* Cresson, and *ocellatus* Viereck form a small group characterized by having the sides of the thorax, especially the metapleurum and sides of propodeum, very densely and rather coarsely punctate. From *subfuscus* the present species differs in its transversely striate propodeum and from *ocellatus* in its broad temples, distinct ocell-ocular space and rather short and stout femora.

Female.—Length 12 mm.; antennae 12 mm.

Temples rather broad and strongly convex; ocelli distinctly separated from the eyes; face slightly broader than long, faintly shagreened laterally and sparsely punctate, parallel-sided, about a third wider than frons; clypeus weakly convex, rather short, arcuately truncate, shining, sparsely punctate; antennae slender, middle joints more than twice as long as thick. Thorax shining; pronotum obliquely striate; mesoscutum sparsely and finely punctate, notauli long; scutellum sparsely punctate, margined to apex, space between carinae long and twice as wide at base as at apex; mesopleura rather densely punctate; the interspaces obscurely shagreened; metapleurum very densely and rather coarsely punctate; propodeum laterally sculptured like metapleurum, dorsally transversely striate, apophyses obsolescent, spiracles elongate; areolet sessile, subquadrangular, second recurrent interstitial, curved throughout, more strongly so above; nervulus postfurcal by about half its length; postnervulus broken at about upper third; nervellus broken at a right angle slightly above upper third; hind femur rather stout, barely three-fourths as long as tibia; apical tarsal joint of middle leg about as long as third joint, claws moderate with about eight large teeth. Abdomen rather stout; first tergite about three and one-half times as long as wide at apex; spiracles slightly beyond basal third; second tergite barely a half longer than wide at base; ovipositor sheath distinctly shorter than first tergite.

Pale testaceous; head, including vertex, largely yellow; antennae ferruginous, infusate toward apex; wings hyaline, venation dark brownish, stigma and costa paler but brownish rather than yellowish; legs concolorous, the tarsi stramineous; ovipositor sheath pale.

Type-locality.—Santa Fe, New Mexico.

Type.—Cat. No. 25993, U.S.N.M.

Described from three females, the type taken by Prof. T. D. A. Cockerell in June; paratype *a* from the Mojave Desert, Arizona (Ehrhorn, June, 1898); paratype *b* from Utah (C. F. Baker).

PANISCUS OCELLATUS Viereck.

Paniscus ocellatus VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1909, p. 211.

Similar to *cockerelli* Cushman but distinctly darker in color with only the orbits yellow in the female; more slender with the femora very slender and longer, the ocelli approximate to the eyes, the last tarsal joint shorter, the veins and stigma paler, and the propodeal apophyses more distinct.

There are about fifty specimens mostly from Kansas, Texas, and Colorado, with a few from Alberta, South Dakota, Arizona, Indiana, Alabama, and the District of Columbia.

As frequently occurs in this genus there is a distinctly smaller form of this species, which is described below.

PANISCUS OCELLATUS, variety MICROOCELLATUS, new variety,

Differs from the typical form practically only in its smaller size (11 mm. or less) and in having the ocelli distinctly separated from the eyes.

Type-locality.—Texas.

Type.—Cat. No. 25994, U.S.N.M.

Seven females and four males, the type, allotype, and two other females from Texas (Belfrage), one female from Kerrville and one female from Sabinal, Texas (F. C. Pratt), three males from Plano, Texas (E. S. Tucker), one female from Victoria, Texas, and one female from Wellington, Kansas (E. G. Kelly).

PANISCUS NIGRIPECTUS Ashmead.

Paniscus nigripectus ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, 1890, p. 425.

This species is still known only from the unique type female. Its dark mesoscutum, mesosternum, lower portions of tergites, and stigma render it easily recognizable among North American species.

Morley considers it "obviously synonymous" with *melanostigma* Cameron, and it is apparently closely related to that species, differing so far as Cameron's description goes only in its dark mesosternum and lower half of abdomen and its distinctly ferruginous antennae.

In its obliquely striated metapleurum it is allied to the three following species.

PANISCUS CALIFORNICUS, new species.

The very slender first tergite, femora, and subapical flagellar joints distinguish this species from its closest relatives.

Female.—Length 16 mm.; antennae 15 mm.

Temples very narrow but rather strongly convex; ocelli very large, touching the eyes; face nearly a half wider than frons, about as long as wide, subopaquely shagreened and sparsely punctate; clypeus weakly convex about half as long as wide, weakly arcuate at apex; antennae very slender, attenuate toward apex, middle flagellar joint distinctly more than twice, those near apex nearly three times as long as thick. Thorax subopaque; mesoscutum shining, minutely coriaceous, notauli long; scutellum margined to apex, space between carinae long, about twice as wide at base as at apex; pronotum obliquely striate, mesopleurum closely minutely punctate; meta-pleurum obliquely striate; propodeum finely transversely striate, apophyses distinct; areolet petiolate, narrow, subquadrangular; second recurrent curved throughout, postfurcal; nervulus only slightly postfurcal; postnervulus broken slightly below upper third; nervellus broken at a slightly acute angle at about upper third; legs very slender, hind femur of uniform thickness; apical joint of middle tarsus as long as third joint, claws rather large with about twelve large teeth. Abdomen very slender at base, the first tergite about five times as long as wide at apex, second much more than twice as long as basal width, sides only slightly divergent; ovipositor sheath distinctly shorter than first tergite.

Rufo-testaceous; orbits, vertex, and clypeus yellow, face medially slightly reddish; antennae concolorous, apical half somewhat fuscous; wings hyaline, stigma pale; legs concolorous, tibiae and tarsi paler; ovipositor sheath fuscous.

Type-locality.—Berkeley, California.

Type.—Cat. No. 25995, U.S.N.M.

Two practically identical females taken by E. O. Essig.

PANISCUS ARIZONENSIS, new species.

Differs from *californicus* Cushman principally as follows:

Female.—Length 12.5 mm.; antennae 11 mm.

Ocelli distinctly but narrowly separated from eyes; face more densely and distinctly shagreened, as is also the clypeus; antennae not attenuate at apex, the subapical joints thick and about two-thirds as thick as long; mesoscutum subopaque and distinctly shagreened; propodeum coarsely transversely striate; areolet subpetiolate, recurrent interstitial; nervellus broken at a right angle at upper third; hind femur rather stout; claws small with about eight large teeth; first tergite little more than four times as long as wide at apex; second little more than twice as long as wide at base; ovipositor sheath fully as long as first tergite.

Similar in color to *californicus*, but the antennae fuscous only at apex.

Type-locality.—Chiricahua Mountains, Arizona.

Type.—Cat. No. 25996, U.S.N.M.

Three females from Arizona, the type taken by H. G. Hubbard; and two taken by E. A. Schwarz in the Santa Rita Mountains.

These three specimens show almost no variation.

PANISCUS LEO, new species.

Very close to *arizonensis* Cushman, but with the head distinctly broader and more strongly convex behind the eyes; antennae with subapical joints about twice as long as thick; nervulus more strongly postfurcal (about half its length); claws larger with about ten large teeth; ovipositor sheath hardly as long as first tergite.

Face entirely yellow; vertex piceous.

Female.—Length 12 mm.; antennae 11 mm.

Type-locality.—Oswego, New York.

Type.—Cat. No. 25997, U.S.N.M.

Two females, the type taken by Doctor Ludlow, and the paratype from Plummer Island, Maryland (W. L. McAtee). They are practically identical.

PANISCUS ALBOVARIEGATUS Provancher.

Paniscus albovariegatus PROVANCHER, Nat. Can., vol. 6, 1874, p. 106, male; vol. 11, 1879, p. 146; Faun. Ent. Can. Hym., 1883, p. 360, female.

The only way in which *Paniscus alaskensis* Ashmead differs from the description of this species is in having the abdomen uniformly colored not "brunâtre dans sa moitié postérieure," and but for the widely separated sources of the specimens I would be inclined to synonymize the two species. It should be noted that the species was described in the male, not, as indicated in Faune Entomologique du Canada, in the female.

Provancher does not mention the scutellum, which in *alaskensis* is margined only at base; nor did Mr. A. B. Gahan note anything concerning this sclerite when he examined the type.

PANISCUS ALASKENSIS Ashmead.

Paniscus alaskensis ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 237.

Described only in the male from Kukak Bay, Alaska, this species is represented by four of the five males of the type series, one from Cordova, Alaska (J. A. Kusche); one from Kaslo, British Columbia (R. P. Currie); and one from Lake Tahoe, California (H. G. Dyar); as well as one female from each of the following localities: Hoquiam, Washington (H. E. Burke); Pullman, Washington (C. V. Piper); Santa Barbara, California (L. O. Howard); Cusack Ranch, Colorado; and one labeled simply "Mullan" (probably Idaho).

I strongly suspect this species of being synonymous with *albovariegatus* Provancher.

Very characteristic are the only basally margined scutellum and the usually distinct yellow color pattern of the thorax. Aside from

these two characters, the more briefly postfurcal nervulus, and the yellow vertex, the species is very similar to *geminatus* (Say).

PANISCUS PALLENS new species.

Female.—Length 16 mm; antennae (broken but in another female of the same size 14 mm.).

Temples very narrow and weakly convex; ocelli large, practically contiguous with the eyes; face fully a half wider than frons, fully as long as wide, minutely subopaquely shagreened and sparsely punctate; clypeus weakly convex, weakly arcuately truncate, sculptured like face but with coarser punctures; antennae (broken but in another female with the middle and subapical joints hardly twice as long as thick, tapering toward apex). Thorax shining, weakly sculptured; notauli long; scutellum margined to apex, the space between the carinae long, about twice as wide at base as at apex; metapleurum rather densely but weakly punctate; propodeum very finely transversely striate, apophyses rather weak; areolet subpetiolate, subquadrangular; second recurrent interstitial, straight below, strongly curved above; nervulus postfurcal by less than half its length; postnervulus broken at about upper third; nervellus broken at a right angle at upper third; legs moderate, apical joint of middle tarsus nearly or quite as long as second, claws rather large with about twelve large teeth. Abdomen moderate; first tergite four and one-half times as long as wide at apex; second tergite more than twice as long as wide at base, nearly parallel-sided; ovipositor sheath much shorter than first tergite.

Pallid testaceous; head except occiput, scutellum, sutures between pleura, and anterior margin of pronotum stramineous; antennae bright ferruginous; legs concolorous, tibiae and tarsi stramineous; wings hyaline, venation dark, stigma and costa pale; sheath pale at base, fuscous at apex.

Male.—Essentially like female; apical tarsal joint shorter; claw smaller with teeth much denser especially at base and apex. The pale color of thorax more extensive.

Type-locality.—Rosslyn, Virginia.

Allotype-locality.—Plummer Island, Maryland.

Type.—Cat. No. 25998, U.S.N.M.

Nine females and five males as follows: Type (H. H. Smith); allotype and two other males from same locality (H. S. Barber, at light); Virginia, near Plummer Island (H. L. Viereck); Falls Church and Vienna, Virginia (R. A. Cushman); District of Columbia; Coleta, Alabama (H. H. Smith); Thomson's Mills, Georgia (H. A. Allard); Nueces, Texas (C. L. Marlatt); Las Cruces, New Mexico (T. D. A. Cockerell); Denver, Colorado.

In size the typical form varies from 14 mm. (the smallest male) to 18 mm. (the largest female). Certain conspicuously smaller speci-

mens that differ somewhat otherwise from the typical form are described below as a variety.

The specimen on which the present writer's notes on *Paniscus geminatus* (Say), published in the Proceedings of the Entomological Society of Washington (vol. 15, 1913, pp. 155-157), were based is the Vienna, Virginia, specimen listed above.

PANISCUS PALLENS, variety BARBERI, new variety.

Differs from the typical form in its conspicuously smaller size (9-12 mm.) and in having the ocelli distinctly though usually only slightly removed from the eyes. The type is a female.

Type-locality.—Cranmoor, Wisconsin.

Allotype-locality.—Plummer Island, Maryland.

Type.—Cat. No. 25999, U.S.N.M.

Three females, the type taken by C. W. Hooker, one from Greenville, Texas (F. C. Bishopp), and one from Santa Fe, New Mexico (T. D. A. Cockerell); and two males, the allotype taken at light by H. S. Barber and the other on the Virginia shore of the Potomac River opposite Plummer Island by H. L. Viereck.

PANISCUS TOWNSENDI, new species.

Female.—Length 15 mm.; antennae 13 mm.

Temples rather broad, convex; ocelli slightly removed from eyes; face distinctly broader than long and hardly a half broader than frons, subopaque shagreened, sparsely punctate; clypeus nearly flat, hardly half as long as broad, broadly truncate, more shining and more coarsely punctate than face; antennae slender, attenuate at apex, middle joints fully twice as long as thick, subapical joints about a half longer than thick. Thorax shining, weakly punctate, almost without shagreening; notauli long; scutellum margined to apex, the intercarinal space long, hardly twice as broad at base as at apex; propodeum long, nearly straight above in profile, transversely finely striate, apophyses subobsolete; areolet subquadrangular, subsessile; recurrent interstitial, strongly curved throughout; nervulus postfurcal by about half its length; postnervulus broken at upper third; nervellus broken at a right angle at its upper third; legs slender; apical joint of middle tarsus hardly as long as third, claws small, with about eight large teeth. Abdomen slender; first tergite more than five times as long as wide at apex, spiracle at basal third; second tergite two and one-half times as long as wide at base, sides slightly divergent; sheath about two-thirds as long as first tergite.

Bright rufo-testaceous; orbits yellow; vertex black; face paler testaceous; antennae concolorous, fuscous apically; scutellum paler; wings hyaline, venation brownish, stigma and costa pale; legs concolorous, tibiae and tarsi paler; sheath pale fuscous.

Male.—Essentially like female but abdomen even more slender.

Type-locality.—South Fork of Eagle Creek, White Mountains, New Mexico.

Type.—Cat. No. 26000, U.S.N.M.

One female and four males all taken at the type-locality by C. H. T. Townsend.

PANISCUS GEMINATUS (Say).

? *Ophion chloris* OLIVIER, Encyc. Method. Ins., vol. 8, 1811, p. 509.

Ophion geminatus SAY, Contrib. Maclur. Lyc. Phila., vol. 1, 1828, p. 76 (LeConte ed., vol. 1, p. 379).

Paniscus geminatus NORTON, Proc. Ent. Soc. Phila., vol. 1, 1863, p. 364.—CUSHMAN and GAHAN, Proc. Ent. Soc. Wash., vol. 23, 1921, p. 169.

The identity of this species is discussed in the last mentioned reference above. It is the most abundant species in the East. With it in the National Collection have been confused many of the new species described above as well as *ocellatus* Viereck.

In its typical form this is a small species not exceeding 10 mm. in length, of uniform testaceous color with the vertex black, the ocelli distinctly separated from the eyes, the clypeus rather long and narrowly truncate, the propodeum finely transversely striate with apophyses weak, the antennae and legs slender with the apical tarsal joints and claws moderate, the latter with about eight large teeth in the female and somewhat more densely pectinate at the apex in the male than in the female.

It is represented in the National Collection by about sixty specimens of both sexes from New Hampshire to South Dakota, south to Florida and Texas. It probably is generally distributed throughout the United States and Canada east of the Rocky Mountains. Records of its occurrence outside of this region are probably due to mis-determination.

As with several of the species this species occurs in two forms, a majority of the specimens being conspicuously larger than the typical form. This large form, which is the one usually referred to in literature as *geminatus*, is described below.

PANISCUS GEMINATUS, variety SAYI, new variety.

Much larger than the typical form, ranging in size from 13 to 19 mm. in length and differing otherwise in having the ocelli contiguous with the eyes and the propodeal apophyses stronger.

Type-locality.—Falls Church, Virginia.

Type.—Cat. No. 26001, U.S.N.M.

The type series consists of five specimens of each sex, all from the vicinity of Washington, District of Columbia, selected from a series of about seventy-five. This variety has the same distribution as the typical form.

PANISCUS TEXANUS Ashmead.

Paniscus texanus ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, 1890, p. 425.

The description of this species consists of a statement of a few characters by which it is said to differ from *geminatus* (Say). It is apparent that Ashmead's conception of *geminatus* was of a large insect, for he says of *texanus* that it is much smaller. As a matter of fact, it is slightly larger than the insect described by Say. In comparing the first and second flagellar joints Ashmead apparently looked at the upper or inner side in *texanus* and at the outer side in "*geminatus*," for, as a matter of fact, there is very little if any difference in the relative length of these two joints in the two species. The strength of the notauli is somewhat variable within a species, as are also the position of the nervulus in relation to the basal vein and the length of the ramulus.

Unfortunately the unique type of *texanus* lacks the abdomen and portions of many of the appendages. What is left has a somewhat different aspect from *geminatus*: the thorax is stouter, being nearly as high as long, with the dorsal sclerites, especially mesoscutum and scutellum relatively broader than in *geminatus*. This, together with the abdominal characters assigned to it by Ashmead and used in the above key should serve to distinguish it if it is actually specifically distinct. Certainly among the many specimens available for study there is none exactly like it in thoracic structure.

NORTH AMERICAN SPECIES OF PANISCUS NOT INCLUDED IN THE
ABOVE KEY.

PANISCUS APPENDICULATUS Provancher.

Paniscus appendiculatus PROVANCHER, Nat. Can., vol. 6, 1874, p. 105.

Provancher himself reduced this to synonymy with *geminatus* (Say), but its yellow vertex excludes it from that species as here restricted. I am unable to recognize it definitely. It is probably either *spinipes* Cushman or *pallens* Cushman, but the characters by which those species are distinguished are not mentioned by Provancher.

NORTH AMERICAN SPECIES ERRONEOUSLY REFERRED TO PANISCUS.

The following species have been referred to *Paniscus* erroneously.

(PANISCUS) **ALEXETER ALBOTARSATUS** (Provancher).

This species has stood in *Paniscus* until very recently, when it was transferred by the present writer to *Alexeter*.

In his last mention of this species Provancher describes it as having the ocelli contiguous with each other, but A. B. Gahan, who has examined the type, notes that they are their own diameter from the eyes, which would indicate that they are small and not contiguous. This is the case with a specimen compared by Mr. Gahan with the

type. It is probable that Provancher's observation on this feature was taken on a specimen erroneously determined as *albotarsatus*.

(PANISCUS) ALEXETER CANALICULATUS (Provancher).

This species was transferred by its author to *Mesoleptus* and later by Davis to *Alexeter*.

S. A. Rohwer has examined the type and was of the opinion that Davis was correct in placing it in *Alexeter*. He also was of the opinion that it is the male of *Mesoleptus uniformis* Provancher, the type of which he also examined, despite its possession of the areolet which *uniformis* lacks. If the two are synonymous *canaliculatus* is the name to use as it has precedence.

(PANISCUS) MESOLEPTUS INTERRUPTUS (Provancher).

According to notes on the type of this species, made by S. A. Rohwer, it will run in Davis's key to *Gausocentrus*, or, if the sculpture of the cheeks is ignored, to *Zemiodes*. In the latter genus it agrees fairly well with *Zemiodes coloradensis* Davis. Mr. Rohwer makes the further statement that it looks like *Hadrodactylus*. He notes that the three median areas of the propodeum are confluent, the bounding carinae nearly parallel, the costulae present, the propodeum shining, the notauli obsolete, the gastrocoeli large, and the carinae of the first tergite not reaching the apex. I have been unable to find any specimen in the National Collection that agrees entirely with Provancher's description and Mr. Rohwer's notes.

(PANISCUS QUEBECENSIS Provancher) = EXETASTES SUAVEOLENS Walsh.

Provancher himself reduced his species to synonymy. Mr. Rohwer was unable to find the type of *quebecensis*, but notes that all the specimens in the Provancher collection under *suaveolens* are the same.

(PANISCUS RUFULUS Provancher) = ASTIPHROMMA UNIFORMIS (Cresson).

Provancher transferred this species to *Mesochorus*. Comparison of specimens of *uniformis* with Provancher's description together with A. B. Gahan's notes on the type of *rufulus* leaves no doubt that it is synonymous with *uniformis*.

(PANISCUS)? CLEPSIORTHUS SEMINIGER (Provancher).

Provancher transferred this species to *Mesoleptus* and Davis, without seeing the type, referred it to *Alexeter*. Mr. Rohwer ran the type, in Davis's key, to *Clepsiorthus*, where the presence of the areolet distinguishes it from *rubiginosus* (Cresson). I have seen no specimen that agrees exactly with the description, the nearest thing to it being an undetermined specimen that I would refer to *Alexeter*. This specimen differs only in having the head largely black instead of red.

Genus PARABATES Foerster.

Parabates FOERSTER, Verh. nat. Ver. preuss Rheinl., vol. 25, 1868, p. 150.

Parabatus THOMSON, Opusc. Ent., fasc. 12, 1888, p. 1194.

Opheltoideus ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 95.

Apatagium ENDERLEIN, Stett. Ent. Zeit. 1912, p. 115.

Bradley has recognized both *Parabates* and *Parabatus* as subgenera of *Paniscus*, restricting the former to those species that have the areolet incomplete.

That the bases of *Parabates* and *Opheltoideus*, that is the specimens on which their authors based these genera, really belong to the genus as at present recognized I do not believe; for in his manuscript, so frequently referred to by Schmiedeknecht and recently become the property of the Bureau of Entomology, Foerster indicated as the type of his genus an undescribed species the specific name of which indicates that it was tricolored, a character quite foreign to the present genus; and the fact that Ashmead called his genus *Opheltoideus* would seem to indicate that it had greater similarity to *Opheltes* than to *Paniscus*. But so far as their published descriptions go there is no way to distinguish them from the present conception of *Parabates*, and the only course left open is to treat them as they are here treated.

This genus differs constantly from *Paniscus* only in lacking the occipital carina, though its species usually have the ovipositor short, and in *Paniscus* the nervulus is usually distinctly postfurcal.

The species of *Parabates* divide naturally into two groups on the length of the ovipositor, some having it very short while others have it approaching in length that of *Paniscus*. In the North American species at least this is accompanied by a difference in the comparative length of the apical tarsal joint. The latter character can be used for separating the males of the two groups.

The North American species may be distinguished by the following key:

KEY TO THE NORTH AMERICAN SPECIES OF PARABATES.

1. Ovipositor very short, the sheath not extending above top of apical truncature of abdomen; apical joint of hind tarsus in female nearly or quite as long as third, in male longer than fourth 2.
 Ovipositor long, sheath linear; apical joint of hind tarsus in female much shorter than third, in male not longer than fourth..... 5.
2. Lateral portions of apical carina represented at most by weak noncarinate elevations..... 3.
 Lateral portions of apical carina more or less distinct..... 4.
3. First tergite without sculpture; 13 mm.....*deceptor* (Morley) Bradley.
 First tergite minutely shagreened; less than 10 mm.....*smithi*, new species.
4. Postscutellum margined to apex and usually with a more or less distinct transverse sharp ridge or carina, abdomen slender, first tergite more than three times as long as wide at apex, second nearly twice as long as wide at base.
 *cristatoides*, new species.
 Postscutellum not margined to apex and without a transverse sharp ridge or carina; abdomen stout, first tergite less than three times as long as broad at apex, second not nearly twice as long as wide at base.....*crassus*, new species.
5. Apical carina of propodeum strong laterally, represented in male by distinct transverse elevations; areolet large, distinct; nervellus broken at or below upper third*exsertus*, new species.
 Apical carina of propodeum wanting; areolet small, frequently incomplete; nervellus broken at or above upper fourth.....*monticola* Cushman.

PARABATES DECEPTOR Morley.

Parabatus deceptor MORLEY, Rev. Ichn. Brit. Mus., p. 2, 1913, p. 129, male.

Paniscus (Parabatus) latungula, subspecies *deceptor*, BRADLEY, Bull. Brooklyn Ent. Soc., vol. 13, 1918, p. 105, female.

Morley's original description based on a unique male from Nova Scotia and including both key characters and those of the formal description is very brief as follows: Stout; 13 mm.; antennae shorter and stouter than in *cristatus* Thomson; scutellum not margined; propodeal carina wanting, with apophyses obsolete; stigma broad, flavescent; gastrocoeli deep.

Bradley professed to recognize it in a female from Ithaca, New York, and reduced Morley's species to subspecific rank under *latungula* Thomson.

I am unable to identify it among the species in the National Museum.

PARABATES SMITHI, new species.

Female.—Length 9 mm.

Minutely shagreened, subopaque; temples sharply convexly narrowed; face about as long as broad, medially elevated; clypeus short, broadly concavely arcuate at apex; malar space obliterated; ocelli very narrowly separated from eyes, ocell-ocular line two-thirds the diameter of an ocellus; antennae slightly longer than body, very slender, middle joints more than twice as long as thick. Thorax minutely sparsely punctate, especially on mesoscutum and mesopleura; scutellum sharply margined to apex; postscutellum margined but not transversely cristate; propodeum very finely and obscurely transversely striate, apical carina indicated laterally by faint rounded elevations; legs slender, apical joint of hind tarsus subequal to third; areolet small, petiolate; nervellus broken at about upper third. First tergite slightly more than three times as long as broad at apex, second less than twice as long as broad at base; ovipositor short, sheath narrow lanceolate, not extending above apical truncature of abdomen.

Pale testaceous, thorax nearly stramineous laterally; face, frons, vertex, posterior orbits, and clypeus yellow; antennae concolorous; hind tarsi stramineous; wings hyaline, venation pale.

Male.—Like female except that ocelli touch the eyes, the abdomen is barely compressed at apex, and the apical joint of hind tarsus is relatively shorter though still distinctly longer than the fourth joint.

Type-locality.—Coleta, Alabama.

Type.—Cat. No. 26002, U.S.N.M.

Described from the following specimens: All in the National Museum; the type and allotype taken by H. H. Smith; one female from Coosa River, Chilton County, Alabama (H. H. Smith); one

female from North Carolina (collection of T. Pergande); one female from Falls Church, Virginia (R. C. Shannon); three females and one male from Rosslyn, Virginia (H. H. Smith); one female from Plummer Island, Maryland (H. S. Barber); two females from Georgetown, District of Columbia (H. H. Smith); one male from Philadelphia, Pennsylvania, (collection of W. J. Fox). These thirteen specimens exhibit but little variation, the greatest being in the comparative length and width of the face and of the second tergite.

PARABATES CRISTATOIDES, new species.

At once distinguishable from the foregoing species by its strong lateral traces of the propodeal carina and transversely cristate post-scutellum, as well as its larger size.

Very closely related to *cristatus* Thomson but differing constantly in the longer apical tarsal joint, which in *cristatus* is distinctly shorter than the third and in the present species almost exactly as long; in *cristatus* also the abdomen is distinctly stouter, the second tergite being much less than twice as long as wide at base.

Female.—Length 15 mm.

Shining, very faintly shagreened, only the mesoscutum and propodeum subopaque; temples strongly convex but narrow; ocelli touching eyes; face hardly as long as broad, laterally impressed, medially, elevated; clypeus rather flat, arcuately truncate at apex; antennae about as long as body, slender, middle joints twice as long as thick. Scutellum carinately margined to middle, thence ridged to apex; postscutellum laterally carinate and medially transversely cristate; propodeum transversely striate, lateral portions of apical carina strong, the area behind it concave on each side and polished; legs slender; apical joint of hind tarsus almost as long as third; areolet large, briefly petiolate; nervellus broken at about upper third. Abdomen rather slender, the first tergite more than three times as long as broad at apex and the second nearly twice as long as broad at base; ovipositor short, the sheath narrow lanceolate not reaching above top of apical truncature of abdomen.

Ferruginous with antennae and legs concolorous, head largely yellow, hind tarsi stramineous, venation pale.

Male.—Differs practically only in being more slender with abdomen only weakly compressed at apex, and having the apical tarsal joint relatively shorter though still much longer than fourth joint.

Type-locality.—Kaslo, British Columbia.

Type.—Cat. No. 26003, U.S.N.M.

Four females and two males taken at the type-locality by R. P. Currie; two females from Washington; and one male from Fort Wrangle, Alaska.

The size is uniform except for one female which is only 9 mm. long.

PARABATES CRASSUS, new species.

Female.—Length 11 mm.

Subopaque shagreened; temples sharply convexly narrowed; ocelli touching the eyes; face broader than long, medially convex, sparsely punctate, clypeus short, broadly truncate; malar space practically obliterated; antennae (broken) with middle joints less than twice as long as thick. Thorax stout; mesoscutum minutely punctate, notauli sharply impressed nearly to middle; scutellum broad, margined to somewhat beyond middle, closely punctate; mesopleurum shining, especially above, sparsely punctate below; metapleurum and propodeum obscurely, finely, transversely striate, propodeum behind apical carina shining and obscurely roughened, lateral portions of carina fine but distinct; apical joint of hind tarsus as long as third; areolet distinctly petiolate; nervellus broken at about upper fourth. Abdomen stout, first tergite distinctly less than three times as long as broad at apex, second hardly a half longer than broad at base; ovipositor short, sheath narrow lanceolate, not extending above apical truncature of abdomen.

Pale ferruginous with antennae and legs concolorous; head largely yellow; tarsi and tibiae somewhat paler; wings hyaline, venation pale.

Type-locality.—Oswego, New York.

Type.—Cat. No. 26004, U.S.N.M.

One female taken May 25, 1895.

PARABATES EXSERTUS, new species.

Female.—Length 13 mm.

Temples strongly convexly narrowed; ocelli large, touching the eyes; face as long as wide, medially elevated, laterally concave, minutely subopaquely shagreened, with scattered weak punctures; clypeus sculptured like the face, concavely truncate at apex; antennae slender, middle joints about twice as long as thick. Thorax very finely subopaquely shagreened; pronotum weakly obliquely striate in the impression; mesoscutum impunctate, notauli finely impressed to middle; scutellum margined only at extreme base; postscutellum neither margined nor transversely carinate; mesopleurum finely and rather closely punctate; propodeum finely transversely striated above, with sharp lateral portions of apical carina, the area behind the carina distinctly concave on each side; legs slender, apical joint of hind tarsus about three-fourths as long as third joint; areolet large, barely petiolate, nervulus subinterstitial and reclivous; nervellus broken at about upper third. Abdomen slender, strongly compressed, first tergite more than three times as long as broad at apex, second twice as long as broad at base; sheath nearly as long as first tergite.

Flavo-ferruginous; head including vertex largely, thorax laterally, lateral margins of mesoscutum, notauli, and scutellum flavous; antennae ferruginous; legs concolorous; wings hyaline, stigma pale, veins dark.

Male.—Much like female, but propodeal carina replaced by strong noncarinate ridges and abdomen not compressed.

Type-locality.—Rosslyn, Virginia.

Type.—Cat. No. 26005, U.S.N.M.

Described from one female and one male (the type and allotype) collected by T. Pergande, one female from Georgetown, District of Columbia, and two from Pysiton, Clay County, Alabama, the last three collected by H. H. Smith.

PARABATES MONTICOLA Cushman.

Perilissus paniscoides ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, 1896, p. 187 (excluding female).

Paniscus albotarsatus Provancher, DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 253 (not Provancher).

"*Ctenacme monticola* Ashm. MS.," SLOSSON, Ent. News, vol. 11, 1900, p. 320.

Parabates monticola CUSHMAN, Proc. U. S. Nat. Mus., vol. 61, Art. 8, 1922, p. 20.

Much smaller than *exsertus* and easily distinguishable by the key characters.

The areolet is very variable, the second intercubitus being sometimes entirely wanting and sometimes normally developed, that is, distinct above and hyaline below.



Cushman, R. A. 1924. "On the genera of Ichneumon-flies of the tribe Paniscini Ashmead, with description and discussion of related genera and species." *Proceedings of the United States National Museum* 64, 1–48.
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