

egg. For this reason such a bee usually has to make repeated visits to the nest, in order to be on hand when the right time comes. If it were in the habit of wandering around until it happened to come across a host-bee's cell in the proper stage of construction, then it might not get much chance to deposit an egg within its lifetime of a few weeks duration, especially in rainy seasons. It is even possible that a parasitic bee has more than one nest under observation during the same period.

Of course I do not wish to be understood as applying the statements set forth above to parasitic bees in general, but I have good reasons for believing that in this respect the behavior of the species of *Triepeolus*, *Coelioxys* and *Stelis* known to me agrees with that of *Argyrosetis minima*.

X. 1906
(note that Brues dated this
paper 16.x.1906)

NOTES AND DESCRIPTIONS OF NORTH AMERICAN PARASITIC HYMENOPTERA. II.

By CHARLES T. BRUES.

BETHYLIDÆ.

Pristocera hyalina sp. nov.

Male. Length 7.5 mm. Black, the wings hyaline, body less coarsely sculptured than in *P. armifera* Say. Head strongly punctured, the punctures distinctly separated toward the vertex and widely so on the cheeks. Mandibles and palpi entirely black; antennæ 13-jointed setaceous, first flagellar joint one-third longer than the second, others sub-equal and gradually lengthening to tip. Collar closely and evenly punctured, pleura of prothorax punctured above, smooth medially and obliquely striate below. Mesonotum with four furrows, shining, strongly and sparsely punctured, the scutellum smoother. Coxæ and pleuræ with well separated and only moderately strong punctures. Metathorax distinctly areolated basally, irregularly rugulose elsewhere. Abdomen oval, shining. Wings hyaline, stigmal and submarginal vein black, other veins brown. Marginal cell open, not narrowed. Discal nervures not indicated; sub-median cell indistinctly longer than the median. Legs black, the tarsi piceous. Body everywhere sparsely clothed with grayish white pile.

Described from a male specimen from Austin, Texas; collected by the writer.

This species comes near to the common *P. armifera* Say, but differs by its hyaline wings and less strongly punctured body. The difference in punctuation is most marked on the cheeks, pleuræ and coxæ.

Epyris secundus n. nov.

Epyris analis Kieffer, Ann. Soc. Sci. Bruxelles. Vol. 29, pt. 2, p. 17 (1905), (nec Cresson, Trans. Am. Ent. Soc. IV, p. 193 (1872)).

Aphelopus varicornis sp. nov.

Female. Length 1.75 mm. Black, legs and first two antennal joints light yellow; face below the ocelli white. Head finely shagreened, shining black, the face white below the frontal ocellus. Clypeus trun-

cate, mandibles white with three black teeth; palpi white. Antennæ 10-jointed, the scape and pedicel yellow, flagellum black; scape and pedicel about equal, stout; second and third flagellar joints the longest. about equal; first and fourth equal but shorter, fifth, sixth and seventh shorter, the apical one one-half longer than the penultimate. Mesonotum black, shagreened, with distinct furrows on the anterior two-thirds. Metathorax rounded behind, areolated and rugulose. Abdomen small, compressed, shining back a little shorter than the thorax. Legs, including coxæ, pale yellow, the posterior femora and tibiæ infuscated. Wings hyaline; stigma rhomboidal, radial vein a little longer than the stigma, faintly curved at the tip.

Described from a female specimen collected at Woods Hole, Mass., July, 1903.

The present species resembles *A. melaleucus* Dalm., but differs in the color and configuration of the antennæ. It could hardly be the female of *A. americana* Ashm., of which only the male has been described, on account of the truncate clypeus.

CERAPHRONIDÆ.

Ceraphron Jurine.

Since the publications of Ashmead's Monograph of the North American Proctotrypidæ in 1893, four additional North American species have been described, and the two added here bring the total up to twenty-four species. As pointed out by Dalla Torre (Cat. Hym. V, p. 524) *basalis* Ashm. (nec Thomson) must be known as *tertius* D. T. I cannot adopt his change of *fusciceps* Ashm. to *secundus* D. T. as the name *fusciceps* is not identical with Ratzeburg's *fuscipes*.

Our species, exclusive of West Indian forms, may be distinguished by the following table, which is based almost entirely on females:

NORTH AMERICAN SPECIES OF CERAPHRON.

1. Winged	2
Wingless, or with abbreviated wings	21
2. Head, thorax, and abdomen black	3
Body, or at least the abdomen in part pale or brownish	17

3. Antennæ unicolorous, entirely black or fuscous (at least in the female)	4
Antennæ bicolored, at least the scape pale or yellow	9
4. Legs entirely black	5
Legs in part yellow or pale	6
5. First flagellar joint 2½ times as long as thick, penultimate 1½ times as long as thick (male)	<i>glabricornis</i> Kieffer
First flagellar joint 4 times as long as thick, penultimate 2½ times as long as thick (female)	<i>unicolor</i> Ashmead
6. Pedicel not longer than the first flagellar joint	7
Pedicel as long as the first and second flagellar joints together	<i>salicicola</i> Ashmead
7. Second abdominal segment a little longer than the rest united, second flagellar joint half the length of the first.	<i>melanocerus</i> Ashmead
Second abdominal segment twice as long as the rest united	8
8. Female. Second flagellar joint ¾ the length of the first.	<i>carinatus</i> Ashmead
Male. Flagellum longer than the body, scape brownish yellow.	<i>carinatus</i> Ashmead
Male. Flagellum considerably shorter than the body, scape black	<i>brevicornis</i> sp. nov.
9. Head and thorax closely, distinctly punctate	10
Head and thorax smooth, or at least finely shagreened	11
10. Pluræ aciculated, flagellar joints 2-5 transverse.	<i>punctatus</i> Ashmead
Pluræ smooth, flagellar joints 2-5 longer than thick.	<i>quissetensis</i> sp. nov.
11. Legs uniformly yellow or pale brown	12
Legs with the femora and tibiæ infuscated, wings subfuscous, first flagellar joint as long as the pedicel, flagellum subelavate.	<i>amplus</i> Ashmead
12. Thorax black, collar sometimes pale	13
Collar black, maculate with yellow on each side, post-scutellum not spined, first flagellar joint ¾ as long as the pedicel	<i>croceipes</i> Brues
13. Wings clear hyaline	14
Wings subfuscous or tinged with yellowish	16

coarsely striate on its basal two-fifths. Legs, including coxæ pallid yellow, the posterior coxæ rugose.

Aside from its punctate body, this species may be distinguished from *C. melanocerus* Ashm. by its acute metathoracic angles; from *C. pedalis* Ashm. by its dark wings, and from *C. glaber* by the length of the antennal joints.

SCELIONIDÆ.

Telenomus heracleicola sp. nov.

Female. Length 1.25 mm. Black; legs yellowish red, with black coxæ; antennal scape yellowish at base; mandibles except tip and palpi, yellow. Head two and one-half times as wide as long, the front highly polished medially, on the sides shagreened; hollowed out just above the antennæ, the depression divided by a short median carina; vertex shagreened. Eyes very faintly pubescent. Antennæ rather slender, the flagellum almost two times the length of the scape. Pedicel narrowed at base, at the tip wider than the first flagellar joint; first flagellar one and one-third times the length of the pedicel and one and one-half times as long as the second; third and fourth moniliform. Club five-jointed, the three middle joints largest, quadrate, last joint scarcely longer than the penultimate. Thorax oval, the mesonotum finely punctate, dull, sparsely pruinose. Abdomen as long as the thorax, first segment coarsely fluted; second striate at the base, about one and one-half times as long as wide, following segments very small. Legs yellowish red, the coxæ black. Wings hyaline, marginal vein about two-thirds the length of the stigmal, post-marginal somewhat less than two times the length of the stigmal.

Male. Similar, but the antennæ are filiform, the flagellum two and one-half times the length of the scape, the pedicel two-thirds the length of the first flagellar joint, the second flagellar about one-third longer than the first; fourth and following decreasing, the last equal to the pedicel.

Described from four females and one male sent me by my friend Professor A. L. Melander. He tells me that they were reared from butterfly eggs collected on a species of *Heracleum*, at Pullman, Washington.

Macroteleia kiefferi n. nov.

Macroteleia rufipes Kieffer, Berliner Entom. Zeit. Vol. 50, p. 264 (1905), nec Cameron, Invertebrata Pacifica, Vol. 1, p. 52 (1904).

By a queer coincidence Kieffer described this species from Nicaragua as *rufipes*, overlooking Cameron's description of *rufipes*, which is also from Nicaragua, both species having been collected by Professor Baker.

The two are apparently distinct, *kiefferi* differing by the quadrate joints of the antennal club, which are plainly transverse in *rufipes*. The latter species also has a longer abdomen.

Sparaisson graenicheri sp. nov.

Female. Length 4.5 mm. Black, coarsely rugose, but still rather shining; tibiae and tarsi reddish. Head seen from above as wide as long, the frontal ledge on the same plane as the vertex with a broad sulcus along its anterior margin. Surface of head very coarsely rugose-punctate, the under side of the ledge transversely arcuately striated. Mandibles and palpi black. Antennæ black, scape much swollen at the tip below, slender at the base, about four times as long as the pedicel, the latter two-thirds the length of the first flagellar joint; second to seventh flagellar joints about equal, quadrate, or slightly transverse, the second narrower at the base; eighth, ninth and apical joints of equal length but growing narrower. Collar and mesonotum sparsely and deeply punctate, shining, parapsidal furrows indicated only by a series of more or less separated punctures, the scapulae with a slight, weakly defined groove. Scutellum about two times as wide as long, coarsely confluent punctate, except for a median smooth space. Post-scutellum longitudinally spined. Metathorax emarginate behind, the posterior angles distinct but not much produced; its upper face with a series of six longitudinal carinae. Abdomen elongate oval, almost as long as the head and thorax together; strongly longitudinally striate, the tip punctate. Venter shining, coarsely and sparsely punctate, the sutures crenulate. First segment wider than long; second to sixth decreasing in length; seventh rounded at the tip. Legs black, whitish hairy; anterior tarsi and tibiae reddish, the latter strongly spinous; posterior tibiae and tarsi fuscous or piceous. Wings strongly infuscated, the submarginal vein not united with the stigma; postmarginal ill-defined, as long as the thin, curved and knobbed stigmal; radial nervure indicated except at the tip.

This species is characterized by its short, broad frontal ledge, punctate scapulæ, short flagellar joints, metathoracic sculpture and rugose head.

I have a single specimen from Milwaukee, Wis., July 27, 1906. It was collected by my friend Dr. S. Graenicher, after whom I take great pleasure in dedicating the species.

Pantoclis nicaraguana n. nov.

Pantoclis rufipes, Kieffer, Berliner Entom. Zeit., Vol. 50, p. 278, (1905), nec Szepligetii, Zichn. Ergebn., II, p. 157.

DIAPRIIDÆ.

Galesus Curtis.

Ten species of this genus have been recognized as occurring in North America, including the one described here as new. They may be recognized by the following table.

NORTH AMERICAN SPECIES OF GALESUS.

- | | |
|---|----------------------------|
| 1. Sides of the vertex cornuted, or furnished with angled prominences | 2 |
| Head not cornuted above the antennæ, head only a little longer than wide | <i>floridanus</i> Ashmead |
| 2. Antennal prominence emarginated medially between the antennæ | 3 |
| Antennal prominence rounded, not emarginate..... | 3 |
| 3. Coxæ black | 4 |
| Coxæ pale or reddish; antennal scape black, flagellum more or less reddish, middle lobe of thorax with a fovea posteriorly. | |
| | <i>politus</i> Say |
| 4. Abdominal petiole longitudinally grooved or fluted above..... | 5 |
| Abdominal petiole rugose above with a median carina, antennæ of female rufous, legs ferruginous, wings not emarginate at apex | <i>autumnalis</i> sp. nov. |
| 5. Antennæ in part reddish or rufous, wings not or scarcely emarginate at the tip..... | 6 |
| Antennæ entirely black, wings deeply emarginate at apex | |
| | <i>atricornis</i> Ashmead |

- | | |
|--|-------------------------------|
| 6. Head but little longer than wide, legs rufous, middle flagellar joints not longer than wide..... | <i>pilosus</i> Ashmead |
| Head much longer than wide, legs honey-yellow or reddish.... | 7 |
| 7. First flagellar joint longer than the second, median sulcus on second abdominal segment much longer than the lateral ones | <i>texanus</i> Ashmead |
| First flagellar joint much shorter than the second, second abdominal segment with three short sulci at the base | |
| | <i>viereckii</i> Brues |
| 8. Antennæ black | 9 |
| Antennæ brown, frontal prominence with a broad diamond-shaped fovea above scapulæ sulcate near the tegulæ..... | |
| | <i>quebecensis</i> Provancher |
| 9. First flagellar joint of male only ½ as long as the pedicel or the second flagellar joint..... | <i>microtomus</i> Kieffer |
| First flagellar joint at least as long as the pedicel or the second flagellar joint | <i>clarimontis</i> Kieffer |

Galesus autumnalis sp. nov.

Female. Length 2.5 mm. Shining black, impunctate. Antennæ rufous, darker at the tips; legs ferruginous, the coxæ black. Head polished, about two times as long as wide. Vertex anteriorly deeply sulcate, with two tuberculous teeth on each side. Antennal prominence deeply emarginated so that it appears bilobed; its margin translucent brown. Face on each side of a median raised portion concave; mandibles ferruginous, black at the tips; posterior margin of cheeks arcuately concave. Antennæ reaching to the base of the metathorax; 12-jointed, moderately clavate, rufous except the club, which is piceous. Scape very strongly angulated below just beyond the middle. Pedicel thick, not quite twice as wide as long; first flagellar joint nearly as long as the pedicel, but more slender; second, third, and fourth moniliform; fifth to ninth widening, the fifth quadrate moniliform; sixth transverse moniliform; seventh one-half wider than long; eighth transverse moniliform; ninth quadrate moniliform; tenth ovate, as long as the two preceding taken together; these last three of equal thickness. Mesonotum with the furrows wide apart behind and divergent, not reaching the anterior margin; scapulæ not grooved. Scutellum as wide as long, with two large, oblique, almost confluent foveæ at the base; with a punctate margin. Metathorax short, rugose, with a Λ -shaped

carina above. Abdomen not quite as long as the head and thorax together, the petiole twice as long as the hind coxæ; irregularly striate on the sides; above with an enclosed rugose space traversed by a delicate median longitudinal carina. Second segment at the base with a median sulcus as long as the petiole and a short lateral one on each side; following segments smooth, impunctate, scarcely projecting beyond the second. Wings yellowish-hyaline, not emarginated at the tip. Legs ferruginous, stout, the coxæ black.

Described from a female collected by the writer at Fox Point, Milwaukee Co., Wis., October 27, 1906.

The sculpture of the petiole will serve to distinguish the species. It seems to be more closely related to the European *G. rufipes* Thoms. than to any North American species.

Public Museum, Milwaukee, October 16, 1906.

ON THE HABITS AND LIFE-HISTORY OF LEUCOSPIS AFFINIS (SAY). A PARASITE OF BEES.

BY S. GRAENICHER.

J. H. Fabre (1) has presented us with a very detailed account of the habits of the European *Leucospis gigas*, a parasite of two species of mason-bees of the genus *Chalicodoma*, and farther on I shall compare his results with those obtained from a study of our species, *L. affinis*.

My first acquaintance with the larva of *Leucospis affinis*, a Chalcidid parasite of bees of the genus *Osmia* was made from a nest of *Osmia pumila* Cr., collected at Cedar Lake, Washington Co., Wis., September 27, 1903. The nest was situated in a dead branch of an elder, and contained two cells placed longitudinally. One of the cells contained a male specimen of the bee ready to leave the nest, but still enclosed within its cocoon. It may be stated in this respect that in this, as well as in the two additional species of *Osmia* to be considered in this paper (*O. atriventris* Rob. and *O. simillima* Sm.) the bees reach the imago-stage in the fall, but pass the winter inside of their cocoons, and leave the nest in the spring. The same has been reported for several species of *Osmia* of Europe, the habits of which are known.

The second cell of the nest of *Osmia pumila* under consideration harbored a full-grown larva of the parasite *Leucospis affinis* inside of a cocoon (spun by the *Osmia*-larva), and this pupated on May 28th of the following year, and made its appearance as an imago on June 27th.

In an additional nest of the same species from the same locality found in the dead stem of a sumac, altogether four cells were present, and three of these were infested by *Leucospis affinis*. At the time the nest was opened (July 31, 1905,) the parasitic larvæ were already fully developed, but they too passed the winter in the larval stage.

From a nest of *Osmia atriventris* in a piece of dry bark (Cedar Lake, July 31, 1905,) two larvæ of this same parasite were obtained.

1. J. H. Fabre, Souvenirs entomologiques, Vol. III, pp. 154-177, pp. 212-218.