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flowers of *Asclepias*. But the insect observed by Mr. V. T. Chambers, and a figure of the tarsus of which, with the attached pollinia of *Asclepias*, was published in the *American Naturalist*, vol. i, p. 105, and in the *Guide to the Study of Insects*, p. 165, was incorrectly referred to *Tachytes* by Dr. A. S. Packard, Jr. Indeed, that figure bears no resemblance to the tarsus of *Tachytes*, but represents tolerably well the tarsus of a *Spheg*, an insect of a different family.

So quick are these insects in their motions, and so watchful are they that their capture is difficult. However stealthily they are approached while resting on the flowers, their green eyes are sure to face the intruder, and the least suspicious act sends them circling in the air, or off in an exceedingly rapid flight.

NOTES ON THE PHILANTHINAE. BY W. H. PATTON.

Male Philanthinae are peculiar for having upon the apical margin of the lateral lobes of the clypeus, a fringe of hairs which may be known as the "moustache." In *Philanthus* the outer hairs of the fringe are long and silky, and are appressed to the clypeus, being directed towards the median line, or, so to speak, combed towards the parting. It may be that these hairs can be raised at the will of the insect. In *Aphilanthops*, *Eucerceris* and *Cerceris* this fringe is shorter and erect, and in many specimens of the last named genus, the hairs are so closely set that they form what appears to be a chitinous lobe slightly narrowed towards the end, and with its apical border emarginate. This appearance may be due to some operation performed by the insect, and it may be that these dandies "wax" their moustache. In none of the *Aphilanthops* or *Eucerceris* examined have I seen this waxed appearance. In some species the fringe is not so well developed as in others, but in all it is a prominent character, although in a few, as for instance the species of *Aphilanthops*, it is not very distinct because of the presence of other pubescence upon the face. When the moustache is moistened with honey it becomes darker in color. Although the moustache of *Philanthus* is figured by Savigny in Napoleon's *Egypt*, it does not appear to have been described by any author. The fringe on the clypeus of *Cerceris* has been noticed before, but by Saussure it has sometimes been described as a "lobe" of the clypeus.

In *Philanthus* the clypeus is broad, and in the middle extends upwards towards the middle of the face, producing a three-lobed form; the median portion is narrowed above, and squarely cut off from the piece which lies between the antennae. The side lobes which do not extend upwards, are bounded above by a transverse suture; and at the point at which the suture over each of the lateral lobes meets the side sutures of the extended median portion, there is present on each side a slight pit, to which the term *fovea* may be applied.

In *Philanthus* and *Aphilanthops* the side lobes of the clypeus do not touch the eyes; in some species of *Eucerceris* ♂ they almost touch the eyes, and in ♀ *Eucerceris* they do touch the eyes; in *Cerceris* ♂ and ♀ they always touch the eyes. There is here a gradual narrowing of the face and, accompanying it, we find a change in the form of the suture over the lateral lobes of the clypeus. In the females of the *fulvipes* and *canaliculatus* sections of the genus *Eucerceris*, the suture limiting the side lobes of the clypeus above is evenly arched, and there is a slight depression extending downwards from the fovea; in the females of the *zonatus* section the face is greatly widened below, and the sutures over the side lobes are nearly as in *Philanthus*; in *Eucerceris* males the suture over the side lobes is oblique, and from its inner end there extends downward for a short distance, between the side and middle lobes, a continuation of the suture. In both sexes of *Cerceris* the form of the sutures is similar to that in the males of *Eucerceris*. With the narrowing of the face the side lobes of the clypeus have pressed upwards, the limiting suture, at first straight, has become arched, and finally, its inner portion has been pressed against the sides of the median lobe, the *fovea* driven upwards, and a suture produced indicating the line in which the side lobe is pressed against the median lobe. In some species of *Cerceris* the process is carried still further; in *C. compar*, *C. mandibularis*, etc., the side lobes take an orbicular form, and in *C. venator* they become higher than broad. The suture extending downwards from the fovea in *Cerceris*, and *Eucerceris*, together with the sutures extending from the fovea to the base of the mandibles may be termed the foveal sutures. It is worthy of note that they never extend below a point corresponding to the position of the fovea in *Philanthus*.

It will be observed that this account of the clypeus is very different from that given by Dr. A. S. Packard, Jr., (Proc. Ent. Soc.

Phila., vi. p. 51, 52), who claims that the side lobes do not belong to the clypeus, but are "submandibular pieces," and belong to the epicranium, and who applies the term "foramina" to the foveae notwithstanding that there is no perforation. In arguing for the distinctness of the side lobes from the presence of the short suture between the lobes of the clypeus in *Cerceris*, Dr. Packard has entirely misunderstood the nature of these sutures, and overlooked the fact that the clypeus of *Philanthus* does not differ greatly from that of the *Larradae* and certain *Sphecidae*, and that *Cerceris* is the most specialized genus.

In regard to the *foveae*, it may be stated that they indicate points of attachment for the *endocranium* or inner skeleton of the head; and that their analogues exist in other families of the Hymenoptera, and also in other orders of insects. In *C. compar* ♀ this inner skeleton consists of two parallel rods attached at opposite sides of the occipital foramen, and extending to the suture over the side lobes of the clypeus. These rods are slightly flattened and twisted, and have their edges thickened. The anterior third of the rod is expanded into a curved plate, and the end of this plate is attached along the suture, from the mandible to the fovea.

The mandibles of *Cerceris*, as described, are tridentate. An examination of many of our species shows much variation. The mandibles in the males of the greater number of species (including *bicornuta*, *fumipennis*, *sexta*, *deserta*, etc., *fulvipes*, *clypeata*) are without teeth, just as is the case with the mandibles in both sexes of *Philanthus* and *Aphilanthops*, and in the males of *Eucerceris*. In *Eucerceris* ♀ the mandibles in the species examined have only one tooth on the inner side, and this tooth varies both in position and size according to the species. Most species of *Cerceris* have two or three small teeth near the middle or base of the mandibles in the female, and the arrangement and form of these teeth afford specific characters. *C. compar* Cress. and *C. mandibularis* Patton are peculiar for having a distinct tooth on the middle of the inner border of the mandibles in the *male*, and for having the mandibles of the female much expanded within, near the middle, and bearing upon this expansion the minute teeth found in other species of *Cerceris*. It appears, therefore, that the tooth on the mandible of the male of those species is a vestige of this expansion. The male of *C. insolita* Cress. resembles *C. mandibularis* in having a small tooth on the mandibles. In *C. compacta* ♀ there is a large and sharp

recurved tooth near the base, another large tooth beyond the middle, and a small tooth between them. In the male of *compacta* the tooth near the base is as in the female, but the others are absent.

In *Cerceris* and *Eucerceris* the lateral apical borders of the posterior coxae above (particularly the inner border), are produced into large rostrate carinae between which the narrowed base of the trochanters plays, the posterior trochanters are angulated within, and the apex of the posterior femora is dilated to form an irregular flange with a flattened posterior face. In *Philanthus* and *Aphilanthops* the apophyses of the coxae are small and slender, and the femora are not dilated at the apex.

In all the Philanthinae the insertion of the recurrent nervures is at or before the middle of the cells by which they are received, and *Eucerceris* does not differ from *Cerceris* in this respect, although the first recurrent is more commonly inserted nearer the base of the second submarginal cell than in *Cerceris*. Yet I have a specimen of *C. deserta* Say in which the first recurrent nervure of one wing unites with the first transverse cubital nervure, and many species show great individual variation in the insertion of the recurrents.

The characters which I find to separate *Cerceris* and *Eucerceris* are: the form of the marginal and submarginal cells; the sexual differences in the venation of *Eucerceris*; the presence of a space between the eyes and side lobes of the clypeus in *Eucerceris* ♂ which is absent in *Cerceris*; the absence of lateral sinuations on the anterior border of the labrum in *Eucerceris* ♀ which are present in *Cerceris*; the mandibles of the female, which in *Eucerceris* have one tooth on the inner margin, and in *Cerceris* have two or three; the presence of transverse median depressions on the abdominal segments in *Eucerceris* which are absent in *Cerceris*; the teeth terminating the carinae which bound the area on the dorsal valve of *Eucerceris* ♂ which are absent in *Cerceris*; and the narrowed eighth ventral segment of *Eucerceris* ♂ extending beyond the dorsal valve, while in *Cerceris* the ventral valve is broad and not produced beyond the dorsal valve.

But in *Eucerceris cingulatus* Cress. ♂ the transverse depressions on the abdominal segment are very indistinct, and in *Cerceris bicornuta* Guer. ♂ the eighth ventral segment resembles that of *Eucerceris*. In many species of *Cerceris* also, the male mandibles are unarmed; and in *C. fumipennis* Say the labrum of the female is as in *Eucerceris*.

The area on the dorsal valve of the males has deep scattered punctures in both *Cerceris* and *Eucerceris*; but in the females the punctures are shallow and confluent. *Eucerceris* used as a generic name is a misnomer. The name could properly apply only to the typical section of *Cerceris*, which this genus is not.

APHILANTHOPS ¹n. g.

Type: *Aphilanthops frigidus*; (*Philanthus frigidus* Smith, Cat. Hym. Brit. Mus., IV, 475, ♂).

♂. Front above the antennae not prominent; antennae inserted above the middle of the face, and distant from the clypeus, approximate; sides of the clypeus limited above by a transverse suture, and with no suture separating them from the median lobe, not attaining the eyes laterally; edge of the clypeus laterally with a loose fringe of erect hairs, the face pubescent, edge of clypeus three-toothed; labrum concealed, its breadth twice as great as its length, slightly sinuated in the middle of the anterior margin; mandibles slender, without teeth; eyes entire. Venation of anterior wings as in *Philanthus*, but the second submarginal cell shorter, and the third submarginal cell more narrowed towards the marginal than is usual in that genus; the submedial cell of posterior wings falling far short of the medial cell on the externo-medial nervure. Anterior tarsi with a short fringe of bristles; posterior coxae with the apophyses minute and slender; the tibiae not sharply serrate, and the posterior femora not terminating in a flange. Segments of the abdomen slightly constricted, first segment not nodose; apical segment with no enclosed area or disk, depressed; the eighth ventral segment extending beyond the seventh dorsal.

♀. Agrees with the male in all except sexual characters, and the following: edge of the clypeus with five prominent teeth; anterior edge of labrum straight, not sinuate; anterior tarsi fringed with long spines; a flattened and very broad enclosure on the sixth dorsal segment.

To this genus it is probable that *P. laticinctus* Cress., and *P. albopilosus* Cress. also belong.

From *Nectanebus* Spin. which this genus resembles in many respects, *Aphilanthops* differs in the pointed marginal cell, in the approximate antennae, in the absence of an enclosure on the apical segment of the abdomen in the male, in the enclosure present in the

¹ ἄ, φίλος, ἄνθος, ἄψ.

female being unlike that of *Cerceris*, in the shorter ciliation of the anterior tarsi of the male and the simple posterior tarsi of the male.

In the entire eyes, the approximate antennae inserted high above the clypeus, the flat front of the male, the erect fringe on the clypeus of the male, and the short submedial cell of the posterior wings, this genus differs from *Philanthus* and agrees with *Cerceris* and *Eucerceris*. In the other characters the male agrees with *Philanthus* (or, rather, with the American section of that genus which has been named *Cheilopogonus* by Westwood and *Anthophilus* by Dahlbom); but the female differs from *Philanthus* in the 5-dentate clypeus, the straight edge of the labrum, and the presence of an enclosure on the sixth segment of the abdomen.

The anterior tarsi of *Philanthus* are armed externally with a fringe of long spines, and the male to some extent shares this character with the female, the spine at the apex of the third joint extending well beyond the tip of the fourth joint. In both sexes of *Cerceris* these spines are short, and the tarsal joints are more robust than in *Philanthus*. In these characters *Aphilanthops* ♂ is intermediate, the tarsal joints not being so robust as in *Cerceris*, and the spine at the tip of the third tarsal joint, extending only to the tip of the fourth joint; but the female of *Aphilanthops* agrees with *Philanthus*.

The antennae of *Aphilanthops* are not so closely approximate at their insertion as in *Cerceris*, and some species of *Eucerceris*, but are as close as in *Euc. canaliculatus* (Say), and *Euc. superbus* Cress.

The labrum of *Aphilanthops* ♂ is smaller than is usual in *Philanthus* ♂, but is not, as in the ♂ of *Eucerceris* and *Cerceris*, a mere transverse border of the membranous lobe which lines the under side of the clypeus. In *Philanthus* ♂ the labrum has a median notch or sinuation. In the female of *Philanthus* the labrum has three slight sinuations on the anterior margin, that in the middle being narrow and sharp. In *Cerceris* ♀ the margin of the labrum is tri-sinuate or tri-emarginate. The median sinuation is commonly broad and shallow (as in *bicornuta*, *nigrescens*, *clypeata* and *dentifrons*); the lateral sinuations may be slight (as in *nigrescens*, *clypeata*, etc.), or as large as the median sinuation (as in *bicornuta*) and angular.

In *C. compar* the labrum of the female is much produced, the median portion produced the most, and the median sinuation replaced by an angular notch; and the labrum of the male is almost as large as is the labrum in the female of other species. The labrum

of *C. compacta* Cress. ♀ is similar to that of *compacta* ♀ in outline, but the lateral sinuations are much deeper, and the side lobes of the labrum are separated from the median portion by a distinct angle which places them upon a lower plane; the median lobe is dark testaceous, the side lobes semi-transparent. In the male of *compacta*, the labrum is not enlarged; the median lobe of the clypeus is greatly narrowed, almost pointed, at the tip. In *Cerceris fumipennis*, the labrum is unusually large in the ♂; in the ♀ it differs from all others examined, in having only one broad sinuation as in *Eucerceris* ♀. Of *fumipennis*, *C. uncinata* Tasch., Giebel's Zeit. XLV, 397, ♀ (1875), is a synonym.

Cerceris mandibularis n. sp.

♀. Length 9 mm., expanse 15 mm. Slender, the wings long. Black, base of mandibles, sides of face, two dots on clypeal process, spot below insertion of antennae, and spot on scape beneath, two dots on scutellum, tips of femora, tibiae and tarsi, of four anterior legs, stripe on tibiae of posterior legs, and narrow fasciae on the second, third, fourth and fifth segments of the abdomen (that on the second segment broadest, and that on the fifth segment slightly interrupted, and all the fasciae narrowed on disk), yellow. Tips of mandibles, basal joints of flagellum beneath, tip of the apical joint of antennae, the tegulae and tip of posterior femora, testaceous. Wings subhyaline, the anterior margin beyond stigma clouded, violaceous. The mandibles expanded on the middle of the inner edge, the expansion broadest in the middle, and bearing three slight teeth. Side lobes of clypeus silvery pubescent, margin of median lobe armed with two blunt teeth between which is a broad expansion; base of clypeus bearing a broad truncated process, the face of the truncation flanged beneath, and forming an arched, slightly excavated and highly polished surface. Body strongly punctured; a sharp ridge between antennae, enclosure of metathorax puncto-striate; first segment of abdomen longer than broad, with the appearance of a slight sinus in the middle of the lateral margin when viewed from above, the segment only half the width of the following segments; the sinus in the sixth ventral segment no deeper than it is broad at the apex. Waterbury, Conn., Aug. 14th.

♂. Face below antennae, dot on tegulae, spot on posterior coxae, the four posterior trochanters, posterior femora beneath, and the pos-

terior tibiae yellow. Tips of posterior tibiae above the posterior tarsi, and dot on each side of ventral segments two to five, sometimes testaceous; in one specimen all the femora, except at base, reddish yellow. Tip of antennae and the scutellum black. The fascia on second abdominal segment broader than in the female, and a broad fascia on the sixth segment. More coarsely punctured than the female, the punctures almost confluent on thorax beneath and behind. A sharp tooth on the inner margin of the mandibles; sides of the clypeus with a long silvery pubescence, that at the apex forming the "moustache"; side lobes small, a black dot at the junction of the foveal suture with the median lobe, this dot in one specimen connected by a line with the broad black margin of the clypeus; in the other specimen the black margin narrower; median lobe much produced and narrowed at apex, the tip slightly bisinuate. Eighth ventral segment slightly emarginate at tip, its angles not extending beyond the seventh dorsal segment. Waterbury, Conn., July 14, and Southington, Conn., July.

Resembles *C. deserta* Say, but is not allied. In the expansion of the mandibles it resembles *C. compar*, but the expansion is not so great as in that species; the labrum of the male is small as is usual in *Cerceris*, and the labrum of the female is not apparently enlarged. In form and appearance the species is very unlike *C. compar*.

***Cerceris compar* Cress.**

In coloration, the male of this species (which is common in Connecticut) varies from the typical form in having a continuous yellow line on the scutellum, in having the pectoral spines tipped with yellow, in the fasciae on the abdomen being broader (that on the first segment being of even width and those on the other segments being considerably dilated at the sides), and in having a narrow twice-interrupted fascia on the second and third ventral segments. The anterior coxae entirely, the four posterior coxae at the base, and a spot on the four anterior tibiae beneath, are black. The foveal suture is delicately marked with black.

The female, hitherto undescribed, closely resembles the male. The coxae and trochanters are black, the posterior tibiae are yellow, with a black stripe on the apical third within, and the fasciae on the fifth, fourth, and sometimes the third abdominal segment, are whitish. The foveal suture is broadly black, and the angular depression beneath the insertion of each antenna is black.

The species presents many structural peculiarities, and constitutes a distinct section in the genus. The basal segment of the abdomen is not nodose, but is short and broad, gradually increasing in size from the base to near the apex. In the male there is a stout recurved tooth on each side of the breast, and in the female the median lobe of the clypeus is not produced, but is more convex than in the male, and the side lobes are clothed with a silvery pubescence, which forms a fringe on the margin corresponding to the "moustache" of the male. The side lobes of the clypeus are small, sub-orbicular, separated from the median lobe by a short suture, and having a slightly oblique suture above. In the male the margin of the clypeus is narrowly and slightly produced, the apex slightly bisinuate; in the female the margin is more broadly and less suddenly produced, and the apex is less distinctly bisinuate. The labrum is black, its form is described above. The mandibles of the female are expanded on the middle of the inner border, the distal portion of the expansion the greatest and separated from the apex of the mandible by a large triangular notch, the inner face of the expansion armed with three short teeth. In the male the mandibles have on the inner margin a broad sharp tooth corresponding to the expansion of the female. The eighth ventral segment of the male is broadly emarginate at the tip and sometimes advanced beyond the dorsal area. The sixth ventral segment of the female has a deep and broad sinus at the tip. The marginal cell and the wings as a whole are often shorter than is usual in the genus.

With regard to the preceding paper, page 368, by Mr. Crosby, Dr. Wadsworth remarked that Mr. Crosby had evidently misunderstood certain of his objections raised in the former discussion, and further, that in his view nothing shown or advanced concerning the Brighton locality calls for any modification of his former statements.

The Secretary announced the award by the Council of the Walker Grand Honorary Prize for 1879 to Dr. Joseph Leidy, of Philadelphia, for his prolonged investigations and discoveries in Zoology and Palaeontology. The amount awarded was \$1000.