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## On Some Bornean Species of Trigona (Apidae)

Peter Cameron

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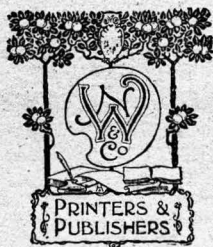
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June in Assington Thicks and the Isle of Wight, as well as at Bungay, where Mr. Tuck has captured it; the latter extends to August, and has occurred to me on the banks of the Gipping above Ipswich in two or three places, and in the New Forest. *B. tenuicornis* I have only found at the beginning of June at Barton Mills, and twice at Foxhall, in the marshes by sweeping reeds, &c.; and *B. assimilis* is found in both East and West Suffolk quite by the beginning of May by general sweeping. I have all but three of the remaining species of this subfamily, which is strange, since most of them are but singly represented, and they must all be uncommon. *Scolioneura nana* occurs in the Bentley Woods in May and June, where it is accompanied in the former month by *S. betuleti*; but *S. vicina* has only once been found at Dodnash Woods, and then on September 16th. The single *Entodecta pumila* I have seen is a female swept in Rookley Wilderness, in the Isle of Wight, on June 27th, 1907, but *Monophadnus albipes* is not uncommon from April to June in Norfolk and Suffolk; where *M. geniculatus* has sparingly turned up in the Bentley Woods, and at Brockenhurst and Wilverley, in the New Forest, in May and June. My only *Kaliosphinga ulmi* was swept at the end of last May in a lane at Foxhall, and I have but twice met with *K. melanopoda*, once in Barnby Broad (cf. Ent. Mo. Mag. 1899, p. 209), and once at Diss, in Norfolk, in June. My single *Fenusa pygmæa* was taken during my "Day in Kirby's Country," June 10th, 1897 (cf. Ent. Mo. Mag. 1897, p. 265), and my only *F. nigricans* swept in a very boggy spot, among osiers, at Barton Mills, on June 12th, 1899. Of *Fenella nigrita* I also have but one example, which was taken by quite casual sweeping along the roadside where I have frequently swept before, and since at Belstead, in Suffolk, on May 29th, 1902.

The next subfamily is the Selandriades.

(To be continued.)

## ON SOME BORNEAN SPECIES OF *TRIGONA* (APIDÆ).

By P. CAMERON.

THE species of *Trigona* I have in my collection from Sarawak, Borneo, may be separated by means of the following table:—

- |   |      |  |                        |
|---|------|--|------------------------|
| 1 | (6). | Entirely black species.  |                        |
| 2 | (3). | Base of wings blackish, the apex with<br>white . . . . .                 | <i>collina</i> , Sm.   |
| 3 | (2). | Wings hyaline.   |                        |
| 4 | (5). | Apex of clypeus, mandibles, antennal<br>scape, and tarsi black . . . . . | <i>canifrons</i> , Sm. |

- 5 (4). Apex of clypeus, mandibles, antennal  
scape testaceous, apical joints of tarsi  
rufous . . . . . *erythrostoma*, Cam.
- 6 (1). Body not all black.
- 7 (17). Head black.
- 8 (14). Thorax black.
- 9 (12). Abdomen dark rufous.
- 10 (11). Thorax densely covered with fulvous  
pubescence; base of cubitus straight,  
oblique . . . . . *fulvopilosella*, Cam.
- 11 (10). Thorax covered sparsely with short  
black pubescence; the base of cubi-  
tus roundly curved . . . . . *erythrogaster*, Cam.
- 12 (13). Abdomen black in the middle, the base  
and apex pale yellow; the femora  
testaceous . . . . . *latibalteata*, Cam.
- 13 (12). Abdomen pallid yellow, with pale fus-  
cous bands; legs black . . . . . *fusco-balteata*, Cam.
- 14 (8). Thorax testaceous.
- 15 (16). Apex of wings lacteous, legs for the  
greater part black; the thorax densely  
covered with fulvous pubescence . . . *lacteifasciata*, Cam.
- 16 (15). Wings clear hyaline, legs testaceous,  
thorax with pale pubescence . . . *testaceinerva*, Cam.
- 17 (7). Head testaceous.
- 18 (19). Large; hind tibiæ and tarsi black;  
wings yellow in front; stigma yellow *flavistigma*, Cam.
- 19 (18). Small; legs pale yellow; stigma pale *pallidistigma*, Cam.

*Trigona erythrostoma*, sp. nov.

Black; the apex of clypeus, the apex of mandibles broadly, and the apical four joints of the tarsi rufous; wings hyaline, slightly suffused with fuscous, the nervures and stigma black; the sides of front, apex of mesonotum, scutellum, mesopleuræ, mesosternum, metapleuræ, and the metanotum covered with white pubescence; the rest of the head, thorax, and abdomen with longer, stiffer black pubescence; the pubescence on the coxæ and trochanters white, on the femora and tibiæ black, on the tarsi white mixed with black; the four front trochanters and the basal joint of the anterior tarsi are rufous; the fore spurs of a paler rufous colour. Tegulæ black. ♂ or ♀. Length, 4 mm.

Kuching, Borneo (John Hewitt).

Smooth and shining. Basal abscissa of cubitus very little bent or angled; beyond the recurrent nervure (which is also very faint) it is almost obliterated. The scutellum rises obliquely from the base to the apex; the apical slope is oblique, projecting at the top over the lower part. The hind tibiæ become gradually dilated from the base to the apex. The under side of the antennal flagellum is brownish. The stump of the cubitus issues from the middle of the cubital abscissa.



Allied to *T. canifrons*, Sm., which is a larger species, and has the oral region, mandibles, and tarsi black.

*Trigona fulvopilosella*, sp. nov.

Black; the extreme base of antennal scape, the coxæ, trochanters, the greater part of the four anterior femora, the base of the posterior, tegulæ, and the abdomen, brownish red; the apical abdominal segments more or less black; the thorax densely covered with fulvous pubescence; wings hyaline, distinctly tinged with fulvous, the nervures and stigma pale fulvous, the posterior nervures paler than the anterior. ♀. Length, 7 mm.

Kuching, May and October (John Hewitt).

The centre of the mesonotum and metanotum are bare of pubescence, probably, however, through the hair having been rubbed off. The hair on the legs is black and stiff. The head has a white sericeous pile. The stump of the transverse cubital nervure is placed shortly below the middle of the first abscissa of the cubitus; the recurrent nervure is reaping-hook-shaped, *i. e.* the anterior half is roundly curved towards the apex of the wing, the posterior part being straight and oblique. The base of the hind tibiæ is distinctly narrowed, the latter not becoming gradually widened from the base towards the apex; the apical joint of the tarsi and the claws are rufo-testaceous.

This species comes nearest to *T. erythrogaster*, Cam.; the latter may be known from it by the thorax not being covered with fulvous pubescence, by the hind tibiæ becoming gradually narrowed from the base to the apex, the base not being distinctly narrowed, by the stump of the recurrent nervure being received above the middle of the basal abscissa of the cubitus, and by the recurrent nervure not being hook-shaped but straight.

*Trigona fusco-balteata*, sp. nov.

Black, smooth, shining; the antennal scape, apex of clypeus, labrum, mandibles, except at base, and more or less of the coxæ and trochanters, rufo-testaceous; the under side of flagellum of a darker rufous colour; abdomen pallid testaceous, the base of the segments broadly banded with fuscous; wings hyaline, the nervures and stigma dark testaceous; the basal abscissa of cubitus straight, oblique, unbroken. The head anteriorly from the lower half of the front densely covered with depressed white pubescence; the thorax with longer white pubescence, which is longer and denser on the pleuræ and sternum, especially on the latter; the sides and apex of the scutellum are fringed above with long pale hair. ♂. Length, 3 mm.

Medang, Sarawak (Hewitt).

The knees and apex of tibiæ may be testaceous, as may be also the base of the legs. The pubescence on the mesonotum is thicker round the edges, and it may appear as longitudinal stripes down the centre. The fuscous bands on the back of the abdomen are more distinct—darker—in some specimens than in others.

*Trigona testaceinerva*, sp. nov.

Rufo-testaceous; the head black, except the clypeus, labrum, centre of face broadly, and a triangular mark (the narrowed end above) between and above the antennæ; the base of mesonotum suffused with fuscous; wings clear hyaline, the stigma and nervures testaceous; the basal abscissa of cubitus straight, oblique, broken by the stump of the recurrent nervure shortly below the middle; the cubitus obliterated beyond the recurrent nervure. Antennal scape rufo-testaceous; the under side of the flagellum of a darker rufo-testaceous colour. The pubescence on the mesonotum and top of scutellum fuscous, on the rest of the thorax it is denser and white; the hair on the legs white. ♀. Length, 4 mm.

Kuching, Borneo (John Hewitt). A broad, ovate species.

*Trigona pallidistigma*, sp. nov.

Testaceous; the head above the antennæ and the occiput fuscous, the face and clypeus paler, the front more rufous in tint; the legs pallid yellow; the scape of antennæ rufo-testaceous, the flagellum black; wings hyaline, iridescent, the stigma and nervures pale testaceous. ♂. Length, 3 mm.

Sarawak, Borneo (R. Shelford).

Smooth and shining; the hair on the head, body, and legs short and white. The hind tibiæ become gradually widened from the base to the apex, which is roundly curved; the top closely fringed with white hair. Hinder metatarsus wide, becoming gradually but not very much wider towards the apex, which is rounded.

Is allied to *T. fusco-balteata*, Cam., which may be known by the black head and legs, and by the fuscous bands on the abdomen.

## THE ATHALIA GROUP OF THE GENUS MELITÆA.

BY GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 182.)

*Aurelia*\* was first definitely separated from *athalia*, and the name given, by Nickerl in his 'Synopsis der Lepidopteren-fauna Böhmens,' published in 1850. He does not, however, give any concise description of it, but contents himself with mentioning

\* My argument that we apply the name *athalia* correctly is in no way influenced by Mr. Rowland-Brown's criticism that *aurelia* is found at Fontainebleau and Lardy, since Geoffroy distinctly asserts in his preface that he confines his remarks to insects taken within a walk of two or three leagues of Paris, and in this sense of the word neighbourhood *aurelia* is, as I contended, absent from the neighbourhood of Paris. I may here also remark in passing that the paragraph on *dictynna* should obviously have preceded that on *parthenie*.

its points of difference from *athalia* as follows:—" *Aurelia*\* ist um  $\frac{1}{3}$  in Ausmass kleiner als *athalia*, die Flugelform ist länger gestreckt, und in der Färbung herrscht ein dunkleres Braun vor. Die Unterseite ähnelt mehr der von *dictynna*, obgleich der Silberschimmer der Flecken an den Unterflügeln mangelt." (This last peculiarity, by the way, is very far from being constant in *dictynna*.) Nickerl also insists very rightly on the fact that the two species do not fly at the same time as a reason for their being distinct, and though his actual statements as to the times of appearance show that he was under a misapprehension, still the fact itself is conclusive. He speaks of *aurelia* as flying in the second half of June, when the "first brood" of *athalia* was worn out, and says that it did not occur again in his neighbourhood at the end of July and in August when *athalia* (obviously implying a second brood) was again very common. Now in point of fact *athalia* is never regularly double-brooded, though in very hot seasons a very partial and very stunted second brood does occasionally occur. On referring back to Nickerl's account of *athalia*, it is seen that he speaks of it as being very common from May to August, and as he ignores *parthenie* altogether, except for mentioning incidentally that it is not identical with his *aurelia*, I think there can be little doubt that under the name *athalia* he included not only the one brood of that species, but the two regular broods of *parthenie* which precede and follow it. This would correspond to the order of appearance in the Rhone Valley, where the first brood of *parthenie* is followed shortly by *aurelia*, then by *athalia*, which again is succeeded by the second brood of *parthenie*. In the mountains, for instance at Bérisal, at about 5000 ft., *aurelia* flies at the end of June and the beginning of July, but *athalia* again succeeds it; I have also taken one specimen above Zinal at an altitude of about 6500 ft. as late as mid-August, but I have never found *athalia* at so high an elevation, though if it occurred it would there probably be contemporary with *aurelia*. It is quite certain, moreover, that Nickerl was a little "shaky" on this group, for he refers his species both to Borkhausen's *parthenie*, which he afterwards says is not the same, and to Hubner's *athalia*, tab. 4, figs. 19, 20, which certainly represents *aurelia*, as well as to Esper's *athalia minor*, tab. 89, which, so far as it can be said to represent anything definite, approaches nearest to *varia*, though the letterpress would seem to point to *parthenie*.† North of the Alps this species seems to be single-brooded even in the plains, except in the

\* *Aurelia* is a third smaller in size than *athalia*, the shape of the wings is longer, and in colour they are of a darker brown. The under side shows more resemblance to *dictynna*, though the silvery shine of the spots on the hind wing is wanting.

† Borkhausen, in 1788, when he first mentions *parthenie*, a year before he published his Latin description of it, distinctly states that he is speaking of the insect here depicted by Esper.



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