

Abra, Island of Luzon, on the Benguet Road during the construction of that road. The location is definitely inland; the camp was in a deep canyon, where Dr. Graves wrote me "the Mountains are so high we see the sun only between 9 a. m. and 3 p. m." The Benguet River runs through this canyon, and there is no sea or blackish water within many miles. These *Anophelines* were there in great numbers, the collection from which the specimens were sent to Mr. Theobald, containing about fifty specimens, *all* of them this one species.

It is also of interest to note that for a while no other species were taken, although no effort was made to that end, and during that time malarial fever was very prevalent.

This can only mean that *M. Ludlowii* may breed in fresh water, but this, by no means precludes its breeding also in salt or brackish water, for a sufficient number of other *Anophelines* are shown to breed indifferently in fresh or salt water to make it at least allowable to suppose that *ludlowii* may do the same.

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## NEW OR LITTLE-KNOWN NEOTROPICAL HEXATOMINI (*TIPULIDÆ*, *DIPTERA*.)

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The following species were included in collections received for study from the American Museum of Natural History (Mr. Grossbeck); United States National Museum (Mr. Knab); Cornell University (Dr. Bradley); and the Muzeu Rocha (Señor Rocha). I express my sincere thanks to the above-named gentlemen for this and other favors received from them. The present paper deals with the *Hexatomini*, an extensive tribe of crane-flies, which reaches its maximum of specific development in the tropics. The study of these forms was conducted as research in Systematic Entomology at Cornell University under Dr. J. Chester Bradley, to whom I am indebted now, as before, for advice and many valuable suggestions.

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## Eriocera Macquart.

1830. *Caloptera* Guerin; Voyage de la Coquille; Zoöl.; pl. 20; f. 2.  
 1838. *Eriocera* Macquart; Dipt. Exot.; vol. I, pt. 1; p. 74.  
 1838. *Evanioptera* Guerin; Voyage d' la Coquille; Zoöl.; vol. 2, pt. 2; p. 287.  
 1848. *Pterocosmus* Walker; List Dipt. Brit. Mus.; vol. I, p. 78.  
 1850. *Allarithmia* Loew.; Bernstein und Bernsteinauna, p. 38.  
 1857. *Oligomera* Doleschall; Naturk. Tijds. v. Nederl. Ind.; vol. 14, p. 11.  
 1859. *Arrhenica* Osten Sacken; Proc. Acad. Nat. Sci. Phil.; p. 242.  
 1859. *Physecrania* Bigot; Ann. Soc. Ent. Fr.; p. 123; pl. 3, fig. 1.  
 1912. *Androclosma* Enderlein; Zoöl. Jahrb; vol. 32, pt. 1, p. 34, fig. U, V.

*Eriocera* is one of the dominant genera of the crane-fly fauna in Neotropical countries. The key given below is based on a study of specimens of many of the species and a careful consideration of the original descriptions. It should, however, be supplemented by the original description wherever this is possible.

A Key to the Neotropical Species of *Eriocera*.

1. Wings dark colored with hyaline or yellowish cross-bands, or wings light colored with dark cross-bands. . . . . 2  
 Wings, whether dark colored or not, uniform, or nearly so, in color, not cross-banded. . . . . 13
2. Wings light-colored with three dark cross-bands, [small species; length, ♀, 8 mm.]. (Porto Rico.) . . . . . *trifasciata* Röder<sup>1</sup>  
 Wings dark colored with hyaline or yellowish cross-bands. . . . . 3
3. Head dark colored, not red or yellow. . . . . 4  
 Head yellowish or reddish. . . . . 5
4. Base of the wings pale; femora with the basal third and a ring at the second third yellow; first four abdominal segments bright yellow; head with a yellowish-grey bloom. (Colombia.) . . . . . *braconides* End.<sup>2</sup>  
 Base of the wings dark; legs, abdomen (with the exception of the apical segments of the ♀) and head entirely black. (Guatemala.) . . . . . *magnifica*, sp. n.
5. Tip of the wing dark colored. . . . . 6  
 Tip of the wing pale giving the wing the appearance of having an apical yellow cross-band. (North Brazil.) . . . . . *perpulchra*, sp. n.
6. Wings pale brown with a moderately narrow, hyaline band, whose distal edge is limited by the cord; a small brownish stigmal spot [antennæ bright brownish-yellow; thoracic dorsum brownish-yellow with three greyish brown stripes; femora with middle third and apical quarter brown on a ochraceous-yellow ground]. (Colombia.) . . . . . *virgulativentris* End.<sup>3</sup>  
 Wings darker brown with the cross-band usually wider; stigma not distinct . . . 7

<sup>1</sup> Roder, V. von; Stett. Entomol. Zeitung; vol. 46, p. 338; 1885.

<sup>2</sup> Enderlein, G.; Zoöl. Jahrbuch; vol. 32, pt. 1; p. 47, (f. B<sup>1</sup>); 1912.

<sup>3</sup> Enderlein, G.; l. c.; p. 47, 48; (f. c<sup>1</sup>); 1912.

7. Legs with the tibiæ, at least the posterior ones, with a broad white ring. . . . . 8  
 Legs without white bands. . . . . 9
8. Thorax uniformly black; [head and base of antennæ uniformly fiery reddish-yellow; wing band yellow; anal cells a little less brown than rest of the brown band]. (Brazil). . . . . *tenioptera* Wied.<sup>4</sup>  
 Thorax not uniformly black, dorsum very faintly striped, pleuræ sooty-brown; [abdomen black; a scoriaceous, bluish-black band at the base of each segment]. (Brazil). . . . . *caminaria* Wied.<sup>5</sup>
9. Femora banded with yellow rings on a darker ground; [large, ♀, length, 18 mm.; head yellowish-orange; first antennal segment brown; abdomen with segments 2, 3, 4 and the terminal ones yellowish-orange, the others black]. (Brazil). . . . . *fasciata* Guer.<sup>6</sup>  
 Femora not banded with yellow rings; legs yellow, brown or black usually darkening toward the tips of the segments. . . . . 10
10. Antennæ entirely orange; [larger; ♀, length 15 mm.; wing-bands pale yellow]. (Brazil). . . . . *ruficornis* Macq.<sup>7</sup>  
 Antennæ with only the scape orange, flagellum brown; [smaller; ♀ less than 12 mm.]. . . . . 11
11. Thoracic dorsum blackish-grey trivittate with black; [wing band and anal cells yellowish]. (Brazil). . . . . *melanacra* Wied.<sup>8</sup>  
 Thoracic dorsum neither grey, nor trivittate with black. . . . . 12
12. Abdomen black, at base of each segment a shining, scoriaceous, bluish-black band. [This species is also included in couplet 8; Wiedemann does not mention white tibial bands, but specimens which Schiner determined as being *caminaria* had white on the tibiæ]. (Brazil). . . . . *caminaria* Wied.<sup>5</sup>  
 Abdominal segments 2, 3, and sometimes 4, with at least the caudal margins whitish; bases of the segments usually reddish. (Northern S. America.) . . . . . *longistyla* Alex. (= *erythrocephala* Fabr.) preocc.<sup>9</sup>
13. Abdomen mostly yellowish or yellowish-brown, usually with a black band before the tip. . . . . 14  
 Abdomen mostly black or blackish. . . . . 26
14. Frontal tubercle black or blackish. . . . . 15  
 Frontal tubercle yellowish or reddish. . . . . 18
15. Thorax red between the pronotum and the suture, with a dark median line; [abdominal segments 6 and 7 black; wings pale brownish; ♂, length, 15 mm.]. (Mexico). . . . . *mesozantha* O. S.<sup>10</sup>  
 Thorax yellow or reddish-yellow, without a dark median line. . . . . 16

<sup>4</sup> Wiedemann, J.; Aussereur. zweifl. Insekt; vol. I, p. 28; (*Limnobia*); 1828.

<sup>5</sup> Wiedemann, J.; l. c.; vol. I, p. 31; (*Limnobia*); 1828.

<sup>6</sup> Guerin, F. C.; Voyage de la Coquille.; Zoöl.; vol. 2, pt. 2; p. 287; pl. 20, f.2; (*Eva nioptera*); 1830.

<sup>7</sup> Macquart, J.; Dipt. Exot.; vol. 1, pt. 2; p. 176, 177; (*Cylindrotoma*); 1838.

<sup>8</sup> Wiedemann, J.; Aussereur. zweifl. Insekt; vol. I, p. 548; (*Limnobia*); 1828.

<sup>9</sup> Fabricius, J.; Syst. Antliar.; p. 31; (*Tipula*); 1805.

<sup>10</sup> Osten Sacken, C. R. R.; Biologia Centr. Americana; Dipt.; vol. I; p. 10; 1886.

16. Antennæ with flagellum light yellow; thorax uniformly yellow; [abdomen with segments 3-7 with brown spots; wings brownish, lighter-colored in the interior of the cells]. (Mexico.) . . . . . *flavida* Will.<sup>11</sup>  
 Antennæ brown or black; thorax yellow with black lateral spots or stripes. . . . . 17
17. Antennæ black; a large black spot on mesonotum above each wing; abdomen black excepting segments 1-4 and 9. (Mexico.) . . . . . *brunneipes* Will.<sup>12</sup>  
 Antennæ brown; a short black stripe on each side of the mesonotum; abdominal segments 1-4 with a narrow posterior black band; remaining segments black excepting their yellowish bases. (Mexico.)  
 . . . . . *willistoni* Alex. (= *fasciata* Will.) preocc.<sup>13</sup>
18. Cell 1st  $M_2$  far out toward the wing-margin, so that  $Cu_1$  beyond this cell is shorter than  $Cu_1 + M_3$ ; that portion of  $R_1$  between cross-vein  $r$  and  $Sc_2$ , very thin, indistinct; [antennæ of the  $\sigma^7$  very long, filiform, twice as long as the body]. (Eastern Brazil.) . . . . . *macrocera*, sp. n.  
 Cell 1st  $M_2$  nearer to the wing root, so that  $Cu_1$  beyond this cell is as long or longer than  $Cu_1 + M_3$ ;  $R_1$  between  $r$  and  $Sc_2$  equal to the remainder of  $R_1$  in thickness; [antennæ of the known  $\sigma^7$ 's short]. . . . . 19, 23
19. Males with the frontal tubercle produced into slender horn-like points which are directed laterad; [abdomen with a subterminal black band]. (Bolivia.)  
 . . . . . *cornigera*, sp. n.  
 Males (as known) with the frontal tubercle normal. . . . . 20
20. No conspicuous black subapical band on the abdomen; stigmal spot conspicuous; [length about 19 mm.; wing 17 mm.]. (British Guiana—Eastern Brazil.)  
 . . . . . *kaieturensis*, sp. n.  
 A conspicuous sub-apical dark brown or black band on the abdomen . . . . . 21
21. Larger species; [length, 20 mm.; wing, 18 mm.; [ $Sc_2$  longer than  $Sc_1$ ]]. (Ecuador.)  
 . . . . . *ohausiana* End.<sup>14</sup>  
 Smaller species [length, 15 mm. or less]. . . . . 22
22. Antennæ brown; body coloration dull brownish-yellow. (Peru.)  
 . . . . . *peruviana*, sp. n.  
 Antennæ yellow; body coloration yellow and black. (Mexico—Costa Rica.)  
 . . . . . *zonata* O. S.<sup>15</sup>
23. Females (as known) without a subapical black band on the abdomen; [length 25-28 mm.; wing, 20-21 mm.]. (British Guiana—Eastern Brazil.)  
 . . . . . *kaieturensis*, sp. n.  
 Females (as known) with a subapical black or blackish band on the abdomen . . 24
24. Mesonotum uniformly reddish-yellow; [antennæ brown; wings tinged with brownish]. (Honduras.) . . . . . *obsoleta* Will.<sup>16</sup>  
 Mesonotum longitudinally striped. . . . . 25
25. Scape of the antennæ yellow; legs yellow, segments tipped with black;  $Sc_2$  longer and more conspicuous than  $Sc_1$ . (Mexico—Costa Rica.) *zonata* O. S.<sup>15</sup>

<sup>11</sup> Williston, S.; Biologia Centr. Americana; (suppl.; Dipt.; vol. I); p. 227; 1900.

<sup>12</sup> Williston, S.; l. c., p. 227; pl. 4, fig. 5; 1900.

<sup>13</sup> Williston, S.; l. c., p. 226; pl. 4, fig. 10; 1900.

<sup>14</sup> Enderlein, G.; Zoöl. Jahrbuch.; vol. 32, pt. 1; p. 45, 46; fig. A<sup>1</sup>; 1912.

<sup>15</sup> Osten Sacken, C. R. R.; Biologia Cent. Amer.; Dipt., vol. I, p. 10; 1886.

<sup>16</sup> Williston, S.; Biologia Cent. Amer.; Dipt.; vol. I (suppl.); p. 227; 1900.

- Scape of the antennæ brownish-black; legs blackish-brown except base of fore femur;  $Sc_2$  shorter than  $Sc_1$ . (Mexico.) . . . . . *townsendi*, sp. n.
26. Color metallic blue with head orange-red. (Panama.) . . . . . *lessepsi* O. S.<sup>17</sup>  
Color not metallic blue. . . . . 27
27. Thoracic præscutum red. . . . . 28  
Thoracic præscutum black. . . . . 29
28. Frontal tubercle red; scutellum black. (Mexico.) . . . . . *hæmorrhœa* O. S.<sup>18</sup>  
Frontal tubercle black; scutellum red. (Guatemala.) . . . . . *erythræa* O. S.<sup>19</sup>
29. Frontal tubercle orange. . . . . 30  
Frontal tubercle black. . . . . 31
30. Abdominal segments 3–5 with bases red dish. (Mexico.) . . . . . *gracilis* O. S.<sup>20</sup>  
Abdominal segments altogether black. (Colombia.) . . . . . *macquarti* Fnd<sup>21</sup>
31. Wings luteous, blackish toward the tips. (South America.) *chrysoptera* Walk<sup>22</sup>  
Wings mostly blackish. . . . . 32
32. Wings brown, darker along costa; cells uniform; wings not reddish-yellow at basis. (Mexico.) . . . . . *pretiosa* O. S.<sup>23</sup>  
Wings brown, either reddish-yellow at base or else with hyaline in some of the cells. . . . . 33
33. Wings a little reddish-yellow at base. (Brazil.) . . . . . *nigra* Wied.<sup>24</sup>  
Wings blackish, some of the cells with nearly hyaline streaks. (South America.) . . . . . *tenebrosa* Walk.<sup>25</sup>

The following species are not included in the above key:

*Penthoptera fuliginosa* Schiner;<sup>26</sup> (Colombia) shining pitch-black; femora with a broad yellowish-red ring immediately beyond the base; head, antennæ and palpi black; wings tinged with brown, more saturated on costal margin. Osten Sacken, (Studies on Tipulidæ, pt. 2, p. 224), suggests that this is an *Eriocera*.

*Limnobia flaviceps* Wied.;<sup>27</sup> (Brazil) thorax and abdomen black, forehead fiery yellow; antennæ black. Venation (Pl. 6 b; fig. 10) like *Eriocera* but cell  $R_2$  very short.

#### *Eriocera magnifica* sp. nov.

Dark brownish-black including the head; wings dark with a broad pale yellow postmedian band.

<sup>17</sup> Osten Sacken, C. R.; *Biologia Cent. Amer.*; Dipt.; vol. I, p. 13; 1886.

<sup>18</sup> Osten Sacken, C. R.; *ibid.*; p. 11.

<sup>19</sup> Osten Sacken, C. R.; *l. c.*

<sup>20</sup> Osten Sacken, C. R.; *l. c.*; p. 12.

<sup>21</sup> Enderlein, G.; *Zoöl. Jahrb.*; vol. 32, pt. I; p. 45; 1912.

<sup>22</sup> Walker, F.; *Insecta Saundersiana*; vol. I; p. 438; (*Limnobia*); 1856.

<sup>23</sup> Osten Sacken, C. R. R.; *Biol. Cent.-Amer.*; Dipt.; vol. I, p. 12; 1886.

<sup>24</sup> Wiedemann, J.; *Aussereur. zweifl. Insekt.*; vol. I, p. 27; (*Limnobia*); 1828.

<sup>25</sup> Walker, F.; *Insecta Saundersiana*; vol. I, p. 439, 440; (*Limnobia*); 1856.

<sup>26</sup> Schiner; *Reise Novara*; p. 42. (*Penthoptera*); 1868.

<sup>27</sup> Wiedemann, *Aussereur. zweifl. Insekt.*; vol. I, p. 550; (*Limnobia*); 1828.

- ♂, Length, 14 mm.; wing, 12.4 mm.; antennæ about 3.8 mm.  
 Fore leg, fem. 7.6 mm.; tibia, 9.7 mm.; tarsus 1, 4.9; 2-5, 4.1 mm.  
 Middle leg, fem. 9 mm.; tibia, 9.6 mm.  
 Hind leg, fem. 9.8 mm.; tibia, 11.8 mm.
- ♀, Length, 21 mm.; wing, 16.3 mm.; antennæ about 5 mm.  
 Fore leg, fem. 9.9 mm.; tibia, 10.6 mm.; tarsus, 8.4 mm.  
 Middle leg, fem. 11.4 mm.; tibia, 10.9 mm.  
 Hind leg, fem. 12.8 mm.; tibia, 13 mm.

♂, Rostrum and palpi dark brown; antennæ, two basal segments brown; flagellum very dark brownish-black. Front, vertex and occiput deep brown. Frontal tubercle moderately broad, deeply notched.

Thoracic dorsum dark brownish-black without distinct stripes; pleuræ more brownish. Legs and halteres dark brownish-black.

Wings (fig. 7) brown with a broad light yellow band slightly beyond the middle, its outer margin just distad of the cord.

Abdominal tergum, basal half shiny, apical half dull black. ♀, similar to ♂ but larger and the genital segment reddish. Paratype paler and evidently newly-emerged; same place and date as the allotype.

Holotype, ♂. Trece Años, Cacao, Alta Vera Paz, Guatemala. April 5. (Schwarz and Barber.) Allotype, ♀ same locality and collector as the ♂, April 9. Paratype, ♀ with the allotype. Types in the U. S. Nat. Mus. Coll. Paratype in the author's collection.

In its blackish head, *magnifica* agrees most closely with *braconides* Enderlein (Zoöl. Jahrb., vol. 32, pt. I; p. 47; fig. B<sup>1</sup>; 1912) of Colombia; the remaining species with banded wings have the head conspicuously orange or yellow. *Braconides* differs very notably in its pale wing-basis, light bloom on the head, different leg-pattern, etc.

*Eriocera perpulchra* sp. nov.

Head reddish; frontal tubercle notched; wings yellow with two brown bands.

- ♂, Length, 20.8 mm.; wing, 16.6 mm.; abdomen about 16 mm.;  
 Antennæ 3.2 mm.  
 Middle leg, femora, 10.4 mm.; tibia 11 mm.; tarsus 8.3 mm.  
 Hind leg, femora, 11.8 mm.; tibia 13.6 mm.; tarsus about 8 mm.

♂, Rostrum and palpi dark brown. Antennæ, segments 1-2, orange-yellow; segment 3, yellow basally, passing into dark brown at the tip; remaining segments dark brownish-black. Front, vertex and occiput bright orange, rather obscured posteriorly. Frontal tubercle very broad, truncated in front and broadly notched.

Pronotum very dark brown. Mesonotum, præscutum, medially broadly dull chocolate-brown with three narrow darker lines, one median, the other two on the sides of the broad median band, these dark vittæ becoming indistinct behind; sides of the sclerite anterior to the pseudosuture brighter, orange; sides of the præscutum behind, dark colored; scutum, scutellum and postnotum dark brownish-black. Pleuræ dark brown, rather lighter colored on the ventral sclerites. Halteres, stem

brown, basally, darkening to brownish-black on the knob. Legs: coxæ and trochanters dark brown; femora dull brownish-yellow, tip broadly dark brown, an indistinct broad darker median band; tibiæ and tarsi brown, the former lighter colored basally.

Wings: pale light yellow; a broad brown basal band filling in the space from slightly beyond cross-vein *b* to beyond the origin of  $R_2$ ; a second brown band filling in the space from the cord to the tip of  $R_1$ , down to the end of  $Cu_1$ . Venation (see fig. 8): *Sc* rather short, ending opposite cross-vein *r-m* before the middle of  $R_{2+3}$ ; cross-vein *r* about eqt a' to that portion of  $R_2$  proximad of it;  $R_3$  long.

Abdominal tergites reddish-brown, segments 6-7 rather darker, brown; segments 8-9, reddish. Sternites reddish-brown.

Holotype, Savannah, North Brazil. August 22, 1911. (Crampton.) Type in American Museum of Natural History.

#### *Eriocera longistyla* Alex.

1805. *Tipula erythrocephala* Fabricius; Syst. Antliar.; p. 31 (non *T. erythrocephala* DeGeer. 1776).

1821. *Limnobia erythrocephala* Wiedemann; Dipt. Exot.; vol. 1, p. 17.

1828. *Limnobia erythrocephala* Wiedemann; Aussereur. zweifl. Ins.; vol. I, p. 30.

1838. *Cylindrotoma erythrocephala* Macquart; Dipt. Exot.; vol. I, pt. I., p. 67.

1866. *Eriocera erythrocephala* Schiner; Verh. Zoöl. bot. Ges. Wien.; vol. 16, p. 929.

1868. *Eriocera erythrocephala* Schiner; Novara Reise; Dipt.; p. 41.

1869. *Eriocera erythrocephala* Osten Sacken; Monographs Dipt. N. Am.; vol. 4; p. 248.

As I have shown elsewhere, the *Tipula erythrocephala* of Fabricius is homonymous with DeGeer's species and I have renamed it as above.

I have before me five specimens of this handsome little form, as follows:

(1) ♂, Waratuk, Upper Potaro R.; July 15, 1911. (Crampton.)

(2) ♂, Upper Potaro R.; July 17, 1911. (Crampton.)

(3) ♂ ♀, Tukeit, Upper Potaro R.; July 24, 1911. (Lutz.) (in cop.)

(5) ♀, Tukeit, Upper Potaro R.; July 24, 1911. (Lutz.)

I am including a few additional details in regard to measurements and coloration:

♂, Length, 9.1-10.3 mm.; wing, 9.9-10.4 mm.

♀, Length, 10.8-11 mm.; wing, 10.3-10.9 mm.

First and second antennal segments of the same bright orange color as the dorsum of the head; flagellum of antennæ and the palpi dark brown.

Mesonotal præscutum dark brown covered with a thick yellowish bloom which is less intense on the cephalic margin of the sclerite; three broad dorsal stripes, very indistinct. The thoracic dorsum, viewed with the naked eye, appears pearly-yellow; scutum and scutellum similar to the præscutum; postnotum darker brown, less pruinose. Wing shown in fig. 6.

Abdominal tergites, segment 1 very dark brown, only the extreme margin orange; segment 2 light orange-yellow, with a dark brown postmedian band; segment 3 orange, more yellowish on the anterior and posterior margins; segment 4, dark brownish-black, anterior quarter orange; segments 5-7 deep black, 8 and hypopygium orange. Sternites about as in the tergites; the lateral line dark on 2nd and

3rd segments. The last specimen listed above (♀) is similar but the abdominal tergum has the basal three-fourths of segments 1-3 almost black, the apical quarter yellowish. The ♀, in cop, has the first abdominal tergite black.

The specimens are in the American Museum of Natural History with the exception of specimen No. 2, in the author's collection.

***Eriocera macrocera* sp. nov.**

Head reddish-yellow; antennæ of the ♂ twice as long as the body; the section of  $Cu_1$  beyond the outer end of cell 1st  $M_2$  is shorter than the fused portion of  $Cu_1$  and  $M_3$ .

♂, Wing, length, 8.3 mm.; breadth at widest point, 2.5 mm. Front, vertex and occiput bright orange-yellow; antennæ very long, brown.

Thorax and abdomen, brown. Wings with a slight brownish tinge; stigma darker brown, large but ill-defined; veins  $C$ ,  $Sc$  and  $R$  rather yellowish; remaining veins brown. Venation (see fig. 4). Costa incrossated between ends of  $Sc_1$  and  $R_1$ ;  $Sc_2$  near the tip of  $Sc_1$ ; the portion of  $R_1$  between  $Sc_2$  and cross-vein  $r$ , delicate, indistinct;  $R_s$  strongly arcuated at origin;  $R_{2+3}$  nearly twice as long as that portion of  $R_2$  before cross-vein  $r$ ; the portion of  $Cu_1$  beyond the outer end of cell 1st  $M_2$  is shorter than the fused portion of  $Cu_1$  and  $M_3$ ; instead of distinctly longer as in all short-antennæd forms known to me; in other words, cell 1st  $M_2$  (discal) is very far out toward the wing margin.

Holotype, ♂, Igarapé-assú, Pará, Brazil. January 30, 1912. (H. S. Parish.) Type in Cornell University Collection.

The only South American *Eriocera*, so far described, with elongate antennæ in the male. From the related Northern species, *E. longicornis* Walk., it differs in its reddish head and body-color. The type-specimen is not at hand and a more detailed description will be given later.

***Eriocera cornigera* sp. nov.**

Frontal tubercle of the male produced into long, slender points; abdomen with a subterminal black band; general color yellow.

♂, Length, 12.8 mm.; wing 11.6 mm.; antennæ nearly 4 mm.

Middle leg, femora, 8.2 mm.; tibia, 8.8 mm.

Hind leg, femora, 9.4 mm.; tibia, 10.,7 mm.

Rostrum and palpi dark, blackish; antennæ, first two segments brownish-yellow; third bright yellow; remaining segments dark brownish-black. Front brownish-yellow; vertex and occiput brownish-yellow, greyish near the eyes; frontal tubercle brighter, orange-yellow. Frontal tubercle extended into two elongate, pointed tubercles.

Pronotum prolonged into rather long obtuse points at the antero-lateral angles, brown. Mesonotum, præscutum, median line tawny; a large, dark brown stripe beginning near the cephalic margin, narrowing behind and gradually converging to near the suture. To either side of this, near the middle of the sclerite, begins a broad stripe which runs to the suture; ground color of the sclerite yellow. Scutum

largely brown, tawny in the middle; scutellum and post-scutum tawny; postnotum tawny. Pleuræ yellowish-tawny; sternum light yellow. Halteres tawny, knobs rather darker. Legs brownish-yellow, scarcely darker at the apices of the segments.

Wings: cells *C* and *Sc* tinged with yellow, rest of wing greyish; stigma very indistinct, rounded. Venation (see fig. 3.). *Sc* rather long, ending just beyond the level of cross-vein *r-m*; *Sc*<sub>2</sub> longer and much stronger than *Sc*<sub>1</sub> which is reduced in size and simulates a cross-vein (as in *zonata* O. S.); *R*<sub>3</sub> very long, nearly straight; *R*<sub>2+3</sub> long; cross-vein *r* oblique, inserted on *R*<sub>2</sub> just beyond the fork.

Abdominal segments 1-5, light yellow; 6-7 deep brownish black; hypopygium broken.

Holotype ♂. Songo, Bolivia. (Received from Staudinger-Bang-Haas). Type in author's collection.

#### *Eriocera kaieturensis* sp. nov.

Large species (wing 17-21 mm.); head yellow; thoracic dorsum striped; legs with a broad subapical yellow band; wings with an indistinct yellowish band before the cord, stigma distinct.

♂, Length, about 19 mm.; wing, 17 mm.; antennæ about 4 mm.

Hind leg, femur, 11.4 mm.; tibia, 11.5 mm.; tarsus, 7.4 mm.

♀, Length, about 25 mm.; wing, 20.8 mm.

Middle leg, femur, 11 mm.; tibia, 10.9 mm.; tarsus, 8.9 mm.

Hind leg, femur, 14.3 mm.; tibia, 14.8 mm.; tarsus, 8.3 mm.

♂, Rostrum and palpi brown; antennæ short, segments 1 and 2 bright orange, remaining segments brown. Front, vertex and occiput bright orange-yellow.

Mesonotal præscutum light yellowish-brown pollinose with a broad darker brown median stripe, broadest in front, narrowed to a point near the suture, this broad band including a narrow, dark brown, median line; two broad lateral stripes of the same brown color on either side, beginning behind the pseudo-suture, continuing back across the suture onto the scutal lobes; scutum light yellowish-brown, each lobe brown medially, a continuation of the lateral præscutal stripes; scutellum light brownish-yellow. Pleuræ darker brown dorsally, beneath much paler, yellowish. Halteres, stem dull yellow, knob brown. Legs: coxæ and trochanters orange-yellow, the latter with a narrow black line; femora yellow, darkened at the tip and indistinctly and broadly darker beyond the middle producing a yellow subapical band; tibiæ dull yellow; tarsi dull yellow, each segment tipped with brown. Wings: of a pale yellow color, this color rather darker, more greyish, beyond the cord and near the base of the wing; stigma conspicuous, but not dark, brown, occupying the end of cell *1st R*<sub>1</sub>; veins brownish-yellow. Venation as in figure 1.

Abdominal tergum, segments rich yellowish-brown, darker apically; segments 5 and 6 darker; lateral margin of the tergites dark brownish-black, producing a dark lateral abdominal line; sternum yellow.

♀, Quite as in the ♂, but larger.

Holotype, ♂. Kaietur Falls, Potaro R.; British Guiana. August 8, 1911. (F. E. Lutz.) Allotype, ♀. Savanna, North Brazil. August 20, 1911. (Cramp-ton.) Paratype, ♀. Ceara, East Brazil. (Senor D. Rocha.) Holotype and Allotype in American Museum of Natural History. Paratype in Museu Rocha, Ceara, Brazil.

The paratype differs from the type ♂ and ♀ in having the first flagellar segment of the antennæ tipped with black, the wings more unicolorous; and femora without the broad indistinct yellow band. I believe that the specimen is merely a variant of the typical species. (Length, almost 28 mm.; wing, 21 mm.)

*Eriocera peruviana* sp. nov.

General color dull brown; frontal tubercle orange.

♂, Length, 11.8 mm.; wing, 11.2 mm.; antennæ about 2 mm.

Middle leg, fem., 8 mm.; tibia, 8.8 mm.

Hind leg, fem., 8.9 mm.; tibia, 10.2 mm.

Rostrum and palpi yellowish, the latter rather more brownish. Antennæ very short, brown; basal segments lighter colored. Frontal tubercle and region immediately behind it rich orange-yellow; frontal tubercle deeply furrowed. Remainder of front, vertex and occiput rich brown.

Pronotum dark brown. Mesonotum, præscutum, ground color light brownish-yellow; cephalic margin dark brown, continued backward as a stripe on either side of the narrow median line; a short brownish stripe on sides; scutum, scutellum and postnotum brownish-yellow. Pleuræ yellowish-white, a broad darker band extending from the root of the wings to the cervical sclerites. Halteres light brown. Legs: light brown, uniform. Wings: cells *C* and *Sc* brownish-grey, remainder of wings clearer grey. Venation (see fig. 5): *Sc* strong, *Sc*<sub>2</sub> remote from tip of *Sc*<sub>1</sub>; *R*<sub>2+3</sub> more or less on a level with *R*<sub>3</sub>.

Abdomen dull yellowish brown; sub-terminal three segments darker; hypopygium reddish-brown.

Holotype, ♂. Callanga, Peru. (Received from Staudinger-Bang-Haas). Type in author's collection.

*Eriocera townsendi* sp. nov.

Frontal tubercle orange-yellow; scape of antennæ dark brown; legs black.

♀, Length, 18 mm.; wing, 13.6 mm.

Fore leg, femora, 6.3 mm.; tibia, 7.3 mm.

Middle leg, femora, 7.8 mm.; tibia, 7.2 mm.

Hind leg, femora, 9.1 mm.; tibia, 9.5 mm.

Rostrum and palpi dark brown; scape of the antennæ dark brown, apice of segment one pale, silvery; segments 3 to 5, yellowish-orange; remaining antennal segments darkening to brown. Frontal tubercle moderately prominent and rather deeply notched, rich orange-yellow; sides of the vertex behind the eyes brown.

Mesonotal præscutum with a broad deep brown median stripe, margined with a narrow deep black line and divided by a narrow median line of the same black color; the lateral black stripe is forked near the pseudo-suture, the caudal branch ending at the pseudosutural fovea; sides of the sclerite somewhat brighter brown; scutum, lobes brown, blacker on the cephalic margin; scutellum and middle line of the scutum orange; postnotum dark brown laterally, broadly dull yellow medially. Pleuræ dark brown. Halteres deep brown, base of the stem a little paler. Legs: coxæ and trochanters deep brown except the fore trochanter which is dull yellow;

fore leg with basal quarter of femur conspicuously yellow, abruptly darkening to brownish-black; tibiæ and tarsi dark brownish black; middle and hind legs uniformly very dark brown. Wings almost uniformly brown; cells *C* and *Sc* a little darker colored. Venation: *Sc* long, *Sc*<sub>1</sub> much longer and more distinct than *Sc*<sub>2</sub>; *R*<sub>2+3</sub> rather long, a little longer than *R*<sub>2</sub> beyond cross vein *r* and about three times as long as *R*<sub>2</sub> between the fork of *R*<sub>2+3</sub> and *r*.

Abdominal tergum, segments 1-4, orange-yellow; 5, extreme base orange-yellow; remainder of 5th and 6 and 7, deep velvety-black; genital segment orange. Sternum similarly colored but duller.

Holotype, ♀. Sierra Madre, Chihuahua, Mexico. Hd. R. Piedras Verdes. Alt. about 7,300 ft. (Coll. C. H. T. Townsend.) Type in U. S. Nat. Mus. Coll.

This species is closest to *zonata* O. S. but I cannot make the two descriptions agree. The basal segments of the antennæ in *townsendi* are very dark brown; there is more black on the abdomen; the legs are not yellow (except base of fore femora) but dark brown. The peculiar course of *Sc*<sub>1</sub> in *zonata*, apparently ending in radius rather than in costa does not obtain in the new species, where *Sc*<sub>1</sub> ends in costa, *Sc*<sub>1</sub> being about twice as long as *Sc*<sub>2</sub>.

#### *Eriocera erythræa* Osten Sacken.

1886. *Eriocera erythræa* Osten Sacken; Biol. Cent. Amer.; Dipt. vol. I, p. 11.

One ♀ from Cacao, Alta Vera Paz. April 12, 1906. (Schwarz and Barber).

The mesonotal præscutum shows indications of darker brownish stripes of which the median is more double. Venation: *Sc* long, *Sc*<sub>1</sub> strong, ending about opposite the fork of *R*<sub>2+3</sub>; *Sc*<sub>2</sub> weak, much shorter than *Sc*<sub>1</sub>. *Rs* almost in a line with *R*<sub>2+3</sub>; *R*<sub>2</sub> before cross-vein *r* a little less than one-half of *R*<sub>2+3</sub>; cross-vein *r* a little more than one-half of *R*<sub>2</sub> before it; basal deflection of *Cu*<sub>1</sub> under the middle of cell 1st *M*<sub>2</sub>. The specimen is in the U. S. Nat. Mus. Coll.

#### *Eriocera gracilis* Osten Sacken.

1886. *Eriocera gracilis* Osten Sacken; Biol. Cent. Amer.; Dipt. vol. I, p. 12.

One ♂, Sierra Madre, Chihuahua, Mexico. Hacienda R. Piedras Verdes. Alt. about 7,300 ft. Coll. C. H. T. Townsend. Specimen in U. S. Nat. Mus. Coll.

The mesonotal præscutal greyish on dorsum, with three black stripes of which the median one is broadest in front, narrowed to a point near the suture; the lateral stripes which lie on the sides of the dorsal triangle are connected on the anterior margin of the sclerite with the median stripe; the sides of the præscutum are more yellowish than the grey dorsal triangle; scutum and scutellum, as well as the postnotum deep, rich brown. Venation: *Sc* rather short, ending far before the

fork of  $R_{2+3}$ ;  $Sc_2$  much shorter than  $Sc_1$  but strong, in a line with the cord of the wing;  $R_{2+3}$  long, as long as  $R_2$  alone; cross-vein  $r$  about as long as that portion of  $R_2$  between it and the fork of  $R_{2+3}$ ; basal deflection of  $Cu_1$  as near to the fork of  $M$  as to the middle of cell 1st  $M_2$ .

#### Pentoptera Schiner.

1863. *Pentoptera* Schiner; Wiener Entomol. Monatsschr.; vol. 7, p. 220.

1869. *Pentoptera* Osten Sacken; Monographs Dipt. N. Am.; vol. 4, p. 256.

##### *A Key to the American Species of Pentoptera.*

1. Small (wing less than 8 mm.); mesothoracic præscutum with the ground color obscured by a greyish or bluish pruinosity, dorsal stripes not distinct; metatarsi of the legs white; cell  $M_1$  of the wings present, i. e.,  $M_1$  and  $M_2$  separate at the wing-margin. (Eastern U. S.) . . . . . *albitarsis* O. S.<sup>1</sup>
- Large (wing more than 9 mm.); mesothoracic præscutum yellowish with four shining blackish marks; metatarsi of fore and middle legs more or less brown; cell  $M_1$  of the wings lacking, i. e.,  $M_1$  and  $M_2$  fused to the wing-margin. (Guatemala.) . . . . . *conjuncta*, sp. n.

The new species described below is a typical member of the genus *Pentoptera* as defined by Osten Sacken (Monographs, l. c., p. 256, 257). It agrees with *albitarsis* O. S. of Eastern North America, and *chirothecata* Scop. of Central and Southern Europe, in its snowy-white tarsi, a character not yet found in *Eriocera*, so far as I can discover. It differs from these two species, and comes closest to *cimicoides* Scop. of Central and Southern Europe in the lack of cell  $M_1$  of the wings; from the last-mentioned species, it differs in tarsal and body-coloration, etc.

Mr. F. W. Edwards<sup>2</sup>, in his recent comprehensive paper on the Seychelles Tipulidæ, has questioned the generic validity of *Pentoptera*. The group is, indeed, founded on rather trivial characters, but these, as defined by Osten Sacken, are numerous and apply very well to the typical group of species. *Pentoptera fuliginosa* Schiner, the only form ever described by the founder of the genus was considered by Osten Sacken to be a species of *Eriocera*. In case *Pentoptera* is reduced in rank, Schiners *fuliginosa* will require renaming.

#### *Pentoptera conjuncta* sp. nov.

Thoracic dorsum yellowish with four dark marks; tarsi white; cell  $M_1$  absent.

♂, Length, 9.5 mm.; wing, 9.8 mm.

♀, Length, 10.6 mm.; wing, 10 mm.

<sup>1</sup>Osten Sacken, Monographs, vol. 4, p. 257, 258. See Needham, 23rd Rept, N. Y. State Entomologist for 1907, plate 12, figure I, for photo of wing.

<sup>2</sup>Edwards, Trans. Linn. Soc. Lond.; 2nd series, Zcölogy; vol. 15, pt. 2; Sept. 1912. The Percy Sladen Trust Expedition to the Indian Ocean in 1905—No. 14—Diptera, Tipulidæ; p. 195-214; pl. 10-11.

Rostrum and palpi brown; scape of antenna light yellowish-brown, the basal segment slightly darker than the second segment; flagellum broken. Front, vertex and occiput dark-colored, thickly bluish-grey pruinose. Frontal tubercle prominent, not notched.

Mesonotum yellowish-brown, shiny, a narrow deep brown line on either side of the broad dorsal median portion, beginning above the pseudosutural region, narrowing behind and ending before the transverse suture; a large rounded brown spot on the sides of the sclerite before the transverse suture; scutum, scutellum and postnotum yellowish-brown with a faint greyish bloom; a rounded darker brown spot on the lateral lobes of the latter. Pleuræ very light yellow, a large rounded brown spot on the mesopleuræ underneath the wing-root and less distinct spots on the propleuræ and cervical sclerites forming an interrupted dorso-pleural band. Halteres deep brown. Legs: coxæ and trochanters light yellow; femora yellowish-brown, extreme tip darker brown; tibiæ brown; fore metatarsus brown on basal two-fifths, remaining portions of fore tarsi pure white except the last segment which is brownish; middle leg, with the basal third of the metatarsus brown; metatarsus of the hind legs entirely white. Wings: subhyaline or slightly tinged with darker, especially toward the tip; veins dark brown. Venation, see figure 2.

Abdominal tergum with the segments dark brown; segment 1 pallid at base, darker apically; extreme margin of segments 2-6 pallid; 7-8, not pale at tip; ♂ hypopygium reddish-brown; sternites dull yellow.

Holotype, ♂. Patalue, Guatemala, Central America. 700 ft. (Dr. G. Eisen.) Allotype, ♀, with the type. Received at the National Museum, January 6, 1903. Type in U. S. Nat. Mus. Coll.; allotype in author's collection.

#### EXPLANATION OF PLATE IV.

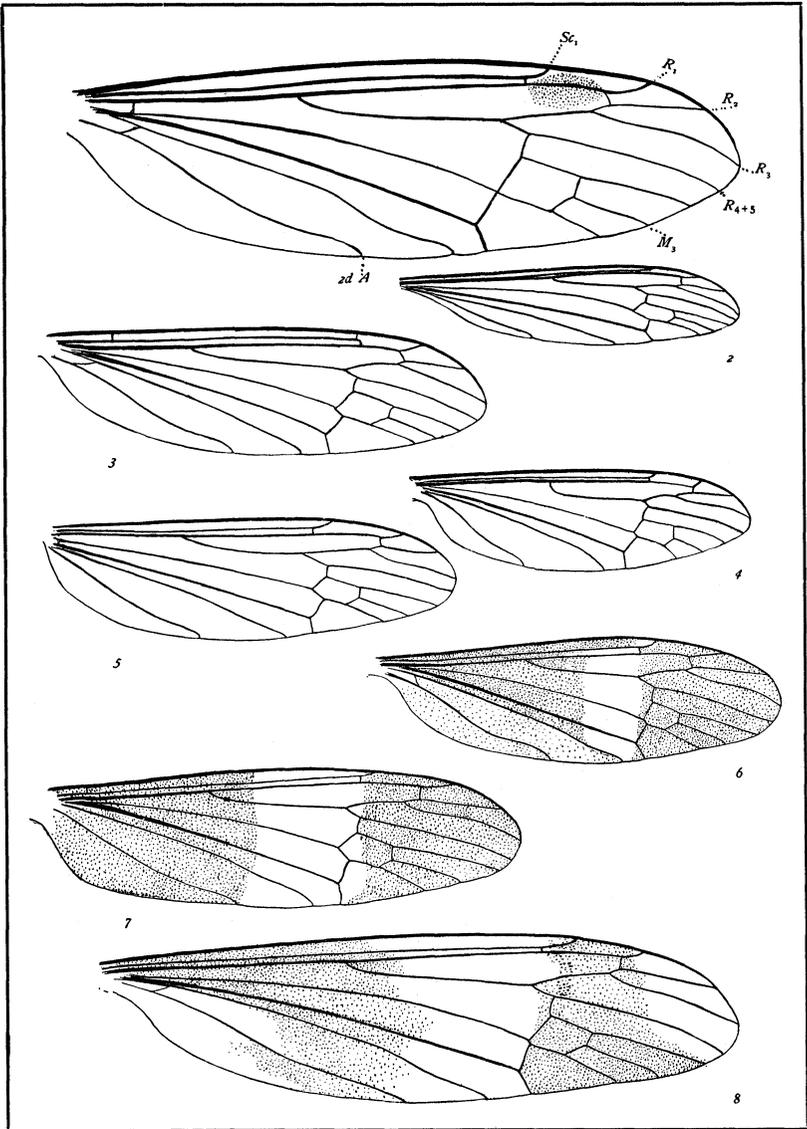
The figures are all drawn to scale by means of a projection microscope.

- Fig. 1. *Eriocera kaieturensis* sp. nov.; wing.
- Fig. 2. *Penthoptera conjuncta* sp. nov.; wing.
- Fig. 3. *Eriocera cornigera* sp. nov.; wing.
- Fig. 4. *Eriocera macrocera* sp. nov.; wing.
- Fig. 5. *Eriocera peruviana* sp. nov.; wing.
- Fig. 6. *Eriocera longistyla* Alex; wing.
- Fig. 7. *Eriocera magnifica* sp. nov.; wing.
- Fig. 8. *Eriocera perpulchra* sp. nov.; wing.

#### THERMAL CONDUCTIVITY OF COCOONS.

BY HARRY B. WEISS,  
New Brunswick, N. J.

With a view toward determining the value of cocoons as a protection against extremes of temperature, thermometric tests of those of quite a number of species were made in the following manner: Normal empty cocoons were selected and the bulbs of ther-



Alexander—Neotropical Hexatomini



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