

NOTES ON TABANIDAE (DIPT.) FROM PANAMA

IX. THE GENERA *STENOTABANUS* LUTZ, *LEPISELAGA* MACQUART AND RELATED GENERA^{1, 2}

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The group here treated includes five genera. Of these, *Stenotabanus*, *Lepiselaga* and *Diachlorus* appear to form a more or less related group. Such forms as *Diachlorus paradoxus* Lutz show many characters linking it with *Lepiselaga*, while *Stenotabanus calvitius* n. sp. is also quite *Lepiselaga*-like in a number of ways. *Selasoma* is much like a giant *Lepiselaga*, but there are a number of rather fundamental characters separating them, while *Bolbodimyia* still appears to have no close relatives.

Genus *Selasoma* Macquart

1838, Dipt. Exot., I, part 2, p. 187 (Type *Tabanus tibialis* Fab.). Surcouf, 1921, Gen. Insect., Fasc. 175, Dipt., Taban., p. 45. Lutz, 1913, Mem. Inst. Osw. Cruz, V, 2, p. 178. Enderlein, 1922, Mitt. Mus. Berlin, X, 2, p. 346; 1925, Op. cit., XI, 2, p. 352. Kröber, 1929, Enc. Ent., Ser. B, II, Dipt., V, pp. 104, 142. Borgmeier, 1933, Rev. Ent., III, p. 301. Kröber, 1934, Rev. Ent., IV, 2, p. 253.

Three species are placed by Kröber (1934) in this genus, *tibiale* Fab., *giganteum* Lutz and *nigrocaeruleum* Rond. Of these, *giganteum* seems only known from the types, which had no third antennal segment, and the species has not been subsequently recognized. *Nigrocaeruleum* has also not been taken since described, while the original description states that the antennae have a long dorsal spine. I suspect, therefore, that the species is very doubtfully assignable to *Selasoma*, and is more likely some species of *Di cladocera*, perhaps near *riveti* Surc.

The genus is not very clearly related to any others, but seems nearest *Lepiselaga*.

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Selasoma tibiale Fabricius

(Figs. 1, 1a, 1b)

- Tabanus tibialis* Fabricius, 1805, Syst. Antl., p. 102 (no sex; America merid.). Wiedemann, 1821, Dipt. Exot., I, p. 89; 1828, Auss. Zweifl. Insekten, I, p. 164 (♀; South America). Von Röder, 1892, Wien Ent. Zeit., XI, 8, p. 237 (♀; Brazil).
- Selasoma tibiale* Macquart, 1838, Dipt. Exot., I, 2, p. 188 (♀; au nord de la capitainerie de Goyaz). Walker, 1854, List Dipt. Brit. Mus., Part V, Suppl. 1, p. 273. Kertész, 1900, Cat. Taban., p. 28. Surcouf and Gonzalez-Rincones, 1912, Dipt. Vuln. Venezuela, II, p. 36. Lutz, 1913, Mem. Inst. Osw. Cruz, V, 2, p. 179, Pl. 13, fig. 21 (♀; Venezuela and Brazilian states of Rio de Janeiro, Sao Paulo, Minas Geraes, Goyaz, Bahia and Ceará). Ricardo, 1904, Ann. Mag. Nat. Hist., XIV, (7), p. 354. Surcouf, 1921, Gen. Insect., Fasc. 175, p. 47, Pl. 2, figs. 10a, 10b (Bresil). Kröber, 1929, Enc. Ent., Ser. B, II, Dipt., V, pp. 104, 142; Pl. 1, fig. 9; Pl. 3, figs. 48, 49, 62, 67; Pl. 4, figs. 94, 96, 97 (♂, ♀; Matto Grosso, Bolivia, Argentina, Brazil); 1934, Rev. Ent., IV, 2, p. 253.
- Hadrus chalybaeum* Perty, 1833, Del. Anim. art. Brasil, p. 183, Pl. 36, fig. 20 (Brasil).
- Hadrus cyaneum* Walker, 1848, List Dipt. Brit. Mus., V, Suppl. 1, p. 208.
- Tabanus cyaneum* Wiedemann, 1828, Auss. Zweifl. Insect., I, p. 152. Macquart, 1838, Dipt. Exot., I, 2, p. 188. Walker, 1848, List Dipt. Brit. Mus., V, Suppl. 1, p. 273.

The species is easily separated from anything found in Panama by the basally black wings, shiny blue black abdomen, swollen tibiae, and the wide, flattened nearly toothless third antennal segment. The capture of this species here represents a very considerable extension of the known range, but comparison of Brazilian material with my two specimens has not revealed any important differences.

Distribution: Northern Argentina, Bolivia, Brasil, Venezuela and Panama.

Panama records: 2 ♀, Moja Pollo, Chagres River region, Jan. 19 and 31, 1940.

Genus *Lepiselaga* Macquart

- 1838, Dipt. Exot., I, 1, p. 153. Bequaert, 1924, Psyche, XXXI, 1, p. 26. Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 342. Borgmeier, 1933, Rev. Ent., IV, 2, p. 252. (Type, *Haematopota crassipes* Fab., 1805.)
- Hadrus* Perty, 1833, Del. Anim. Artic. Brasil, p. 183 (not *Hadrus* Dejean, 1833. Coleoptera).
- Lepidoselaga* Osten Sacken, 1876, Mem. Boston Soc. Nat. Hist., II, p. 435. Lutz, 1913, Mem. Inst. Osw. Cruz, V, 2, p. 30 (uses both *Lepiselaga* and *Lepidoselaga*). Kröber, 1929, Enc. Ent., Ser. B, II, Diptera, V, p. 136.

But three species of this well marked and strictly Neotropical genus are known, and but one of these, the very widespread *L. crassipes* Fab., occurs in Panama. *Lepiselaga* does not appear to be very closely related to any other *Tabaninae*, but comes nearest *Selasoma*, *Diachlorus* and *Stenotabanus*.

The Genus may be characterized as follows: Small flies, seldom if ever reaching 10 mm. in length. Eyes bare, purplish black with green bands. Frons broad, without ocelli or vertexal tubercle. Frontal callus

well developed. Subcallus and facial area shiny and rather protuberant. Antennae with first two segments subcylindrical, the first 2 to 4 times as long as the second, the second about as long as wide. Third segment slender, the basal part subcylindrical or with a weak angle above, the terminal part of 4 annuli, which are sometimes nearly fused. Basal part at least twice length of annulate part. Palpi exceedingly broad and flattened, convex outwardly, flattened or concave inwardly, shiny. Proboscis short, shorter than head height, the labella mostly membranous, but with a small shiny plate near the base, about half length of proboscis. Thorax and abdomen, especially the latter, rather short and stout. Legs short and heavy, all tibiae markedly incrassate. Wings with subepaulet bare, costa, subcosta, and first vein with macrotrichia above, only costa and subcosta spinose beneath. All cells but anal open, no appendix on third vein. Wing black to the apex of discal cell or a little beyond, the apex and a triangular area in the region of the fifth posterior cell hyaline. Male (of *crassipes*) with palpi even larger and shinier than female, fronto-clypeus pollinose, reduced, and sunk between the greatly inflated genae. Eyes holoptic, bare, the large facets not greatly differentiated occupying about two-thirds eye area, and extending to the occipital margin. No tubercle between eyes at vertex.

Lepiselaga crassipes (Fabricius)

(Figs. 2, 2a, 2b)

- Haematopota crassipes* Fabricius, 1805, Syst. Antl., p. 108 (no sex; South America).
Lepiselaga crassipes J. Bequaert, 1926, Medical Rept. Harvard Exp. Amazon, p. 225 (with full synonymy). Kröber, 1934, Rev. de Entomologia, IV, p. 253. Van Volkenberg, 1939, Puerto Rico Agric. Expt. Sta., Circ. 22, p. 4. Bequaert, 1940, Rev. Ent., XI, 1-2, p. 285 (Cuba, Hispaniola, Puerto Rico); 1938, Carnegie Inst. Washington, Publ. No. 499, p. 226 (Guatemala). Fairchild, 1940, Psyche, XLVII, 1, p. 8, Pl. II, figs. 1-5 (early stages).
Tabanus lepidotus Wiedemann, 1828, Aussereurop. Zweifl. Ins., 1, p. 193 (female; Brazil).
Lepiselaga lepidota Jaenicke, 1867, Abh. Senckenberg Naturf. Ges., 6, p. 312. Hine, 1910, Ohio Naturalist, X, 6, p. 149. Lutz, 1928, Est. Zool. Parasit. Venezolanas, pp. 56, 59, Pl. 9, fig. 2. Dunn, 1934, Psyche, XLI, 3, p. 172.
Lepidoselaga lepidota Loew, 1869, Berlin. Ent. Zeitschr., XIII, p. 6. Gowdey, 1926, Dept. Agric. Jamaica, Ent. Bull. 4, pts. 1-2, p. 76. Hine, 1910, Ohio Naturalist, X, 6, p. 149. Lutz, 1928, Est. Zool. Parasit. Venezolanas, pp. 56, 59, Pl. 9, fig. 2. Dunn, 1934, Psyche, XLI, 3, p. 172.
Lepidoselaga recta Loew, 1869, Berlin. Ent. Zeitschr., XIII, p. 6 (♀; "New Granada" = Colombia).
Lepidoselaga major Szilády, 1926, Biologica Hungarica, I, pt. 7, p. 21 (♂, ♀; Santiago de las Vegas, Cuba).
Lepidoselaga crassipes Dunn, 1929, Am. Journ. Trop. Med., IX, 6, p. 502 (Colombia). Kröber, 1929, Enc. Ent., Ser. B. II, Diptera, V, p. 137, Pl. I, fig. 12; Pl. II, figs. 15, 45; Pl. III, fig. 61.

There seems no point in repeating the numerous references to this species in the literature, which have been adequately listed by Bequaert (1926). Only those subsequent to that date and the essential original citations are here included.

Freshly emerged specimens are striking insects, the frons, thorax, and most of the abdomen being covered with brilliant

iridescent golden green scales. The second abdominal tergite is black at the sides, only a broad median triangle bearing the green scales. In the male, these scales are much less abundant, nearly lacking on thorax and base of abdomen. The species is fairly abundant in Panama, but seldom sufficiently so to be very annoying. I am informed that it was much more plentiful formerly, and the reduction in numbers may be due to the great reduction in the water lettuce (*Pistia stratiotes*) in Gatun Lake which has taken place for unknown reasons in recent years, as that plant appears to be the favored larval habitat.

Distribution: Practically the whole Neotropical region, from Cuba and Southern Mexico to Ecuador, Paraguay and Northern Argentina.

Panama records: Numerous records from the Canal Zone region to Chiriqui in practically all months of the year. No records of the species from Darien Province, though it undoubtedly occurs there.

Genus *Bolbodimyia* Bigot

1892, Wien. Ent. Zeit., XI, p. 162 (Monotypic for *B. bicolor* Big., 1892, Venezuela). Kertész, 1900, Cat. Taban., p. 28. Hine, 1910, Ohio Naturalist, X, 6, p. 150. Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 341. Kröber, 1929, Enc. Ent., Ser. B, II, Diptera, V, pp. 109-112 and figs.; 1934, Rev. Ent., IV, 2, p. 257. Stone, 1934, Rev. Ent., IV, 2, p. 190; 1938, U. S. Dept. Agric. Misc. Publ. No. 305, p. 10.

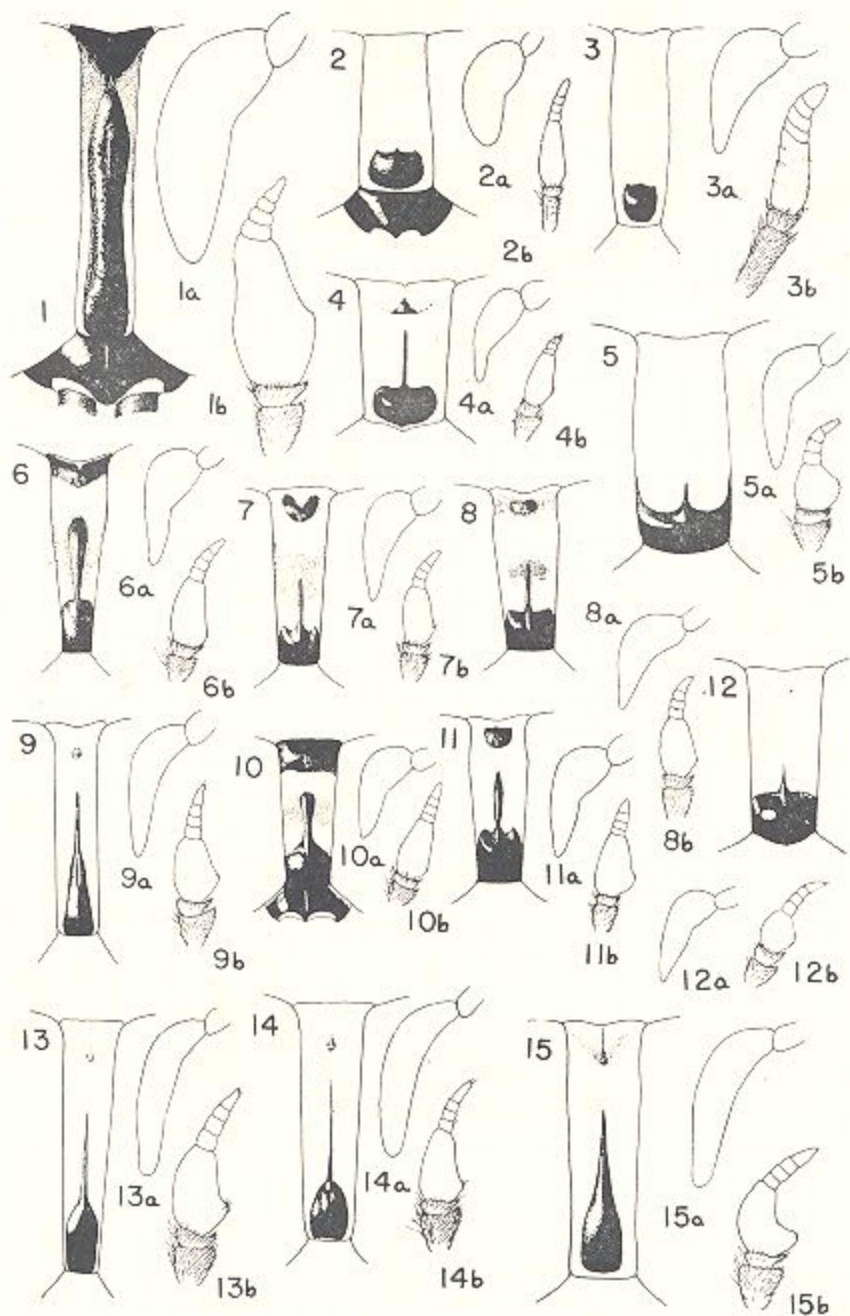
Snowiellus Hine, 1904, Ohio Naturalist, V, 2, p. 230 (Monotypic for *S. atratus* Hine); 1910, Op. cit., X, 6, p. 151, figs. 1 and 5. Williston, 1908, Manual N. Amer. Dipt., p. 181, fig. 65. Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 353, (in part).

Five species are included by Kröber (1934) in his catalogue, and Stone (1938) transfers *Snowiellus atratus* Hine, a North American species, to the genus. The Neotropical species seem to be distinguished mainly on the relative amounts of orange and black coloration. I lack material for any definite conclusion, but it seems very possible that most, if not all, of these

EXPLANATION OF PLATE I

All figures are of the frons, palpus, and antenna of female specimens, and are all drawn to the same scale. All figured specimens are from Panamá.

Figs. 1, 1a, 1b, *Selasoma tibiale* (Fab.). Figs. 2, 2a, 2b, *Lepiseloga crassipes* (Fab.). Figs. 3, 3a, 3b, *Diachlorus curvipes* (Fab.). Figs. 4, 4a, 4b, *Stenotabanus longipennis* Kröb. Figs. 5, 5a, 5b, *St. changuinolae* sp. nov. Holotype. Figs. 6, 6a, 6b, *St. constabulorum* sp. nov. Holotype. Figs. 7, 7a, 7b, *St. minusculus* (Kröb.). Figs. 8, 8a, 8b, *St. maculifrons* (Hine). Figs. 9, 9a, 9b, *St. jaculator* sp. nov. Holotype. Figs. 10, 10a, 10b, *St. calvitiis* sp. nov. Holotype. Figs. 11, 11a, 11b, *St. fulvistratus* (Hine). Figs. 12, 12a, 12b, *St. paitillensis* sp. nov. Holotype. Figs. 13, 13a, 13b, *St. pequeniensis* sp. nov. Holotype. Figs. 14, 14a, 14b, *St. lerida* sp. nov. Holotype. Figs. 15, 15a, 15b, *St. plenus* (Hine).



forms are color variants of one and the same species. Six female specimens before me, from Aurá, Pará, Brasil, and Isla de Marajo, Pará, Brasil (R. Damasceno) have the palpi black, the fronto clypeus and genae orange, the thoracic pleura and sternum orange, and a faint orange ventral middorsal stripe on the abdomen. Otherwise the whole insect is black, including the legs. Another specimen, from Restrepo, Dept. Meta, Colombia (J. Bequaert coll.) has only the lower margins of genae and upper half of pleura orange.

The genus, based upon the material cited above, may be defined as follows: Eyes bare, dark purplish black, the lower two-thirds apparently rather finely and irregularly reticulated with green. Frons broad, narrowest at vertex, with basal and median calli, but no vertexal tubercle or vestiges of ocelli. Subcallus greatly inflated, shiny. Face and cheeks pollinose. First antennal segment greatly inflated, either subspherical or only inflated below; second segment short, not inflated, with or without a small dorsal tooth; third segment elongate, slender, the basal part as long or longer than the annulate part, with a dorsal angle very near the base; four annuli present. Palpi moderately slender, shorter than proboscis, the latter shorter than head height, the labium and labella mainly membranous, but with distinct shiny chitinized plates. Fronto-clypeus and genae pollinose, not inflated.

Wings with subepaulet bare, costa and first vein above, and costa and subcosta beneath with macrotrichia. All cells but anal open, no appendix on third vein, but the upper branch turned rather abruptly forward. Wing largely black or smoky. Legs with the tibiae, especially the fore pair, rather inflated. Small species, 12-14 mm. long, generally largely black in color, or with more or less orange or greyish pubescence on sides of body.

Only one species has been reported from Panama, and it is so far known only from the type specimen in the British Museum.

Bolbodimyia erythrocephala (Bigot)

Atylotus erythrocephalus Bigot, 1892, Mem. Soc. Zool. France, V, p. 668 (♀, Panama).

Tabanus erythrocephalus Kertész, 1900, Cat. Taban., p. 49; 1908, Cat. Dipt., III, p. 240. Sarcouf, 1921, Gen. Insect., Taban., p. 67.

Bolbodimyia erythrocephala Kröber, 1929, Enc. Ent., Ser. B, II, Diptera, V, p. 112; 1930, Zool. Anzeiger, XC, p. 77, fig. 19 (♀; type); 1934, Rev. Ent. IV, 2, p. 258.

Kröber (1930) has redescribed and figured the type specimen, which has a yellow subcallus and antennae, white beard, and wholly black body with basally white mid and hind tarsi. So far as I know, the species has not since been taken.

Distribution: Panama.

Panama records: Only the original specimen.

Genus *Diachlorus* Osten Sacken

- 1876, Mem. Boston Soc. Nat. Hist., II, Pt. 4, No. 4, p. 47. Kertész, 1900, Cat. Taban., p. 29. Ricardo, 1904, Ann. Mag. Nat. Hist., (7) XIV, p. 356. Coquillett, 1910, Proc. U. S. Nat. Mus., XXXVII, No. 1719, p. 532 (Type, *Tabanus bicinctus* Fab., 1805). Lutz, 1913, Mem. Inst. Osw. Cruz., V, 2, 144. Surcouf, 1921, Gen. Insect., Taban., p. 49. Bequaert, 1924, Psyche, XXXI, 1, p. 38. Enderlein, 1922, Mitt. Mus. Berlin, X, 2, p. 349 (Type, *Chrysops ferrugatus* Fab., 1805); 1925, Op. cit., XI, 2, p. 336. Kröber, 1928, Beihefte z. Arch. f. Schiffs- u. Tropen-Hyg., XXXII, Beih. 2, p. 97. Borgmeier, 1933, Rev. Ent., III, 3, p. 290. Kröber, 1934, Rev. Ent., IV, 2, p. 255. Stone, 1938, U. S. Dept. Agric., Misc. Publ. No. 305, p. 13.
- Dibasis* Macquart, 1834, Hist. Nat. Dipt., V, 1, p. 207. (Type, *Tabanus bicinctus* Fab.). (Not *Diabasis* Hoffmannsegg, 1819, Coleoptera.)

According to Kröber's catalogue (1934), this genus contains 23 species and one variety, of which all but three are confined to South America. *D. curvipes* Fab. extends into Central America, while *D. ferrugatus* Fab. ranges from Central America north into the southern United States. *D. badia* Kröb. is described as coming from "Georgia," but Kröber himself expressed skepticism as to the locality label. The same author has listed (1934, p. 263), *Stibasoma fulvohirtum*, a strictly Neotropical form, from "Georgia" also. In the material from Panama before me, there appear to be two species, *D. curvipes* Fab. and another, which Major Dunn had labelled *D. conspicuus* Lutz. It does not entirely agree with that species, of which I have specimens compared with the types, nor with any other described species, and is herein described as new.

The genus may be characterized as follows, based largely on Panama material:

Eyes bare, purple with a variable and often complicated pattern of green lines or spots. Frons broad to narrow, no ocelli or vertexal tubercle. Fronto-clypeus often more or less inflated and shiny. Antennae with the first segment always at least twice as long as the second, generally longer, often somewhat inflated. Second segment as long as wide, the two together at least half the length of the third segment. Third segment of a basal part and four annuli, the basal part is generally equal to or longer than the annulate part, obscurely annulated, and frequently with a blunt dorsal angle. Palpi markedly inflated, as long as proboscis. Proboscis shorter than head height, the fleshy labella more than half total length of proboscis.

Thorax and abdomen unremarkable, much as in *Tabanus*. Legs rather short and stout, the fore tibiae generally more or less inflated and often darker than the other legs. Wings with subepaulet bare, costa, first longitudinal (R1) and at least basal part of fifth vein (Cu) with macrotrichia above; beneath, both costa and subcosta bear macrotrichia. Wings hyaline, with or without costal apical or subapical dark markings. Size small, seldom if ever exceeding 12 mm.

The two Panama species of *Diachlorus* may be separated as follows:

1. Frons parallel sided, the frontal callus slender, considerably higher than wide. Last two abdominal segments black and wholly black haired. *jobbinsi*
2. Frons widest in the middle, the frontal callus nearly square. Last two abdominal segments with yellow hairs in the middle. *curvipes*

***Diachlorus jobbinsi* sp. nov.**

Female—Length 8–10 mm., of wing, 7.5–9 mm.

Frons yellow-pollinose, 5.5 to 6 times as high as basal width, parallel sided. Frontal callus brown, narrower than frons, twice as high as wide and with a slender prolongation above. Fronto-clypeus black, shiny. Genae yellowish grey pollinose. Antennae yellow, the terminal annuli dusky. Palpi yellow, moderately inflated. Thorax mostly yellow pollinose. Mesonotum with a thick, dark trident-shaped figure in the middle, the prongs pointing anteriorly, and a pair of dark isolated shoulder spots. Pleura and sternum between fore and mid legs pearly, otherwise yellow pollinose. Scutellum dark at base, the apex yellow. Legs with all coxae and femora yellow, fore tibiae and tarsi black and black haired, mid tibiae and tarsi yellow, whitish at bases, hind tibiae yellow with some dark hairs, the tarsi whitish at base. Wings hyaline, tinged with yellow in the costal area, and with a black apical spot which includes the whole apex beyond the fork of the third vein, from the costa to the fourth vein (M_1), with sometimes a faint infuscation in the apex of the second posterior cell. Abdomen yellow, first tergite and a broad median stripe from second to fifth tergites yellow haired, otherwise black haired; the two terminal tergites black and black haired. Beneath, the vestiture is wholly yellow, except for the two terminal sternites.

Holotype ♀ and 2 ♀ Paratypes, El Real, Darien Province, Panama, March 20, 1941; 1 ♀ Paratype, El Real, Darien, Feb. 7, 1940 (D. M. Jobbins coll.); 3 ♀ Paratypes, Yape, Darien Province, Panama, Jan. 25, 1940 (D. M. Jobbins coll.).

This species is very close to *curvipes*, but may be distinguished from it by slightly narrower and parallel sided frons, more slender callus, slenderer palpi, black terminal segments of the abdomen, and the presence of dark shoulder spots and absence of median yellow stripe on the mesonotum. From *conspicuous* Lutz it may be distinguished by the yellow margined scutellum, paler legs, and less extensive dark apex to the wing. The species flies in company with *curvipes*, but appears to be less abundant.

***Diachlorus curvipes* (Fabricius)**

(Figs. 3, 3a, 3b)

- Haematopota curvipes* Fabricius, 1805, Syst. Antl., p. 107 (South America).
Tabanus curvipes Wiedemann, 1821, Dipt. Exot., I, p. 90; 1828, Aussereurop. Zweifl. Ins., I, p. 176 (♀).
Diabasis curvipes Macquart, 1834, Hist. Nat. Ins. Dipt., I, p. 208 (♀). Walker, 1854, List Dipt. Brit. Mus., V, p. 271.

- Diachlorus curvipes* Williston, 1895, Kansas Univ. Quart., III, 3, p. 193 (♀). Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 138. Ricardo, 1904, Ann. Mag. Nat. Hist. (7) XIV, pp. 358 and 359 (♀). Bréthes, 1907, An. Mus. Nac. Buenos Aires, XVI, p. 284. Kertész, 1908, Cat. Dipt., III, p. 211. Ad. Lutz, 1907, Centralbl. Bakt. Parasitenk., Abt. I, XLIV, p. 142; 1913, Mem. Inst. Osw. Cruz, V, pp. 145 and 189, Pl. XII, fig. 1 (♀). Neiva and Penna, 1916, Op. cit., VIII, p. 94. Bodkin and Cleare, 1916, Bull. Ent. Research, VII, p. 185. Surcouf, 1921, Gen. Insect., Taban., p. 51.
- Chrysops afflicus* Wiedemann, 1828, Aussereurop. Zweifl. Ins., I, p. 204 (♀; Brazil). Walker, 1854, List Dipt. Brit. Mus., V, p. 288. Hunter, 1900, Trans. Amer. Ent. Soc., XXVII, p. 135. Ricardo, 1904, Ann. Mag. Nat. Hist. (7) VIII, pp. 310 and 313. Kertész, 1908, Cat. Dipt., III, p. 181. Surcouf, 1921, Gen. Insect., Taban., p. 150.
- Diachlorus* (?) *afflicus* Ad. Lutz, Mem. Inst. Osw. Cruz, V, pp. 163 and 189.
- ?*Diabasis atoenia* Macquart, 1838, Dipt. Exot., I, p. 152 (in part; specimens from Pará). Walker, 1854, List Dipt. Brit. Mus., V, p. 271.
- Chrysops varipes* Walker, 1854, List Dipt. Brit. Mus., V, p. 289 (♀; Pará). Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 145.
- Diabasis varipes* Rondani, 1848, in Baudi and Truqui, Studi Entom., I, p. 105 (no sex; Brazil), (p. 45 of reprint).
- Diachlorus varipes* Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 138. Ricardo, 1904, Ann. Mag. Nat. Hist. (7) XIV, p. 359. Kertész, 1908, Cat. Dipt., III, p. 213. Surcouf, 1921, Gen. Insect., Taban., p. 51. Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 336. Bequaert, 1926, Med. Rep. Harvard Exp. Amazons, Pt. II, p. 223 (Pará; Panama). Kröber, 1928, Beih. z. Arch. f. Schiffs-u. Trop.-Hyg., XXII, 2, pp. 8, 43, fig. 19 (♀; French Guiana; Pará; Iquitos); 1934, Rev. Ent., IV, 2, p. 256.

This species does not appear to be very abundant in Panama, except about the Rio Tuira in Darien Province, where most of my material has come from. It attacks man readily, like other species of the genus.

Distribution: Recorded in the literature from Panama, Venezuela, British and French Guiana, Brazil (States of Pará, Amazonas, Bahia, Sao Paulo), and Paraguay. Dr. Bequaert took the species at Muzo, Dept. Boyaca, Colombia.

Panama records: El Real, Darien Prov., Aug. 11 to 30, 1930 (H. C. Clark coll.; det. Kröber); Jan. 24 and Feb. 7, 8, and 10, 1940 (D. M. Jobbins coll.). Chepigana, Darien Prov., July 22, 1931 (L. H. Dunn coll.). Pihuila, Darien Prov., March 27, 1933 (L. H. Dunn coll.). Margarita Is., near Ft. Randolph, C. Z., June 30 (J. B. Shropshire coll.). Pacora, March 26, 1939. Moja Pollo, Chagres River region, July 23, 1940. Mt. Hope, C. Z., Oct. 30, 1939.

Genus *Stenotabanus* Lutz

- 1913, Brasil Medico, No. 45, p. 6 (reprint), Dec. 1. (Defined in key, no species); 1914, Mem. Inst. Osw. Cruz, VI, 3, p. 167 (reprinting of 1913 paper); 1922, Zoologia Medica, Publ. Sep. da "Folha Medica," Rio de Janeiro, pp. 9 and 11 (in key, no species). Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz, VI, 2, pp. 73, 74 (*St. taeniotes* Wied. in list of species). Bequaert, 1924, Psyche, XXXI, 1, p. 30 (Type, *Tabanus taeniotes* Wied.). Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 354 (Type *T. taeniotes* (!) Wied., equals Lutz' genus only in that it includes *taeniotes*). Kröber, 1929, Enc. Ent., Dipt., V, p. 113; 1934,

Rev. Ent., IV, 2, p. 258 (with 20 Neotropical species). Borgmeier, 1933, Rev. Ent., III, 3, p. 301 (with *Styposelaga* End. as synonym). Stone, 1938, U. S. Dept. Agric., Misc. Pub. No. 305, p. 31 (7 Nearctic species). Bequaert, 1940, Rev. Ent., XI, 1-2, p. 289 (Subgenus of *Tabanus*, 15 Antillean species). Philip, 1941, Can. Ent., LXXIII, pp. 10, 11, 14.

Myiotabanus Lutz, 1928, Est. Zool. Parasit. Venezolanas, p. 58, Pl. 8, fig. 4. (Monotypic for *M. sarcophagoides* n. sp.). Kröber, 1934, Rev. Ent., IV, 2, p. 275 = *Leucotabanus*).

Styposelaga Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 342 (Monotypic for *St. sexannulata* End.).

This genus as here understood includes a considerable number of mostly small flies with the general facies of *Tabanus*. Structurally the genus is quite heterogeneous, and it will eventually be necessary to divide it into more homogeneous groups, but for the present only two of the more obvious forms will be tentatively assigned sub-generic standing.

The genus in the broad sense may be defined as follows: Eyes bare, at least in the female, with or without green or purple bands. Frons medium to very broad, frontal callus present, median and vertexal calli present or absent. Antennae *Tabanus*-like, the tooth on the third segment usually short, rarely prominent, often absent. Annulate portion of third segment usually with 4 annuli, but with a tendency to reduction to 3 or rarely 2 annuli. Proboscis generally short, the labella large and membranous. Wings with all cells but anal open, with or without an appendix on the third vein. Subepaulet typically without macrotrichia but in a few species discussed below, hairs are present to a variable extent. Legs as in *Tabanus*. Thorax as in *Tabanus*, sometimes with iridescent scale-like hairs. Abdomen very variously ornamented.

KEY TO SUBGENERA

1. Frons broad, not more than three and one-half times as high as wide, frontal callus variable, generally wider than high and as wide as frons. Vertexal tubercle absent, rarely a small denuded vertexal area present. Antennae with four well marked annuli. subg. *Aegialomyia* Philip
 Frons narrow or very broad, frontal callus variable. Vertexal tubercle present, or at least a denuded shiny area at vertex. Antennae variable. 2
2. Frons relatively narrow, generally at least five times as high as wide. Vertexal tubercle well marked, often with vestiges of ocelli. Antennae with four well marked annuli. subg. *Stenotabanus* Lutz
 Frons very broad, hardly twice as high as wide, callus transverse, narrower than frons. Vertexal area with a small shiny spot. Fronto-clypeus with a deep, denuded, pit on each side. Antennae with but three well marked annuli, the terminal annulus a small button, or fused with the preceding annulus. subg. (nov.) *Brachytabanus*

Subgenus *Aegialomyia* Philip

1941, Can. Ent., LXXIII, p. 10. (Type *T. psammophilus* O. S.).

Although Philip established the present group as a full genus, I prefer to treat it subgenerically until the Neotropical forms become better known.

The group as here understood includes a number of very

broad fronted species which for the most part seem confined to a sea beach or coastal marsh environment.

In addition to the characters given in the key, these species are distinguished by the generally pale coloration, pale legs, often spotted wings, multiple banded eyes, short to very short proboscis, short, stubby antennae, with disproportionately thickened terminal annuli, and abdominal pattern, when present, of a median and lateral row of pale spots on darker ground.

I consider the following described species to belong to this group: *T. psammophilus* O. S., *T. atlanticus* Johns., *T. nervosus* Curran, *T. caribaeorum* Bequaert, *T. laevicallus* Szilády, *T. jamaicensis* Newstead, and *T. magnicallus* Stone. The males, known for *psammophilus*, *caribaeorum*, *atlanticus*, *nervosus* and *magnicallus* have the eyes bare, the large facets very extensive and sharply differentiated and demarkated from the small facets, and there is no vertexal tubercle. Two species of the group occur in Panama, both apparently undescribed, and each represented by but a single female specimen.

***Stenotabanus (Aegialomyia) paitillensis* sp. nov.**

(Figs. 12, 12a, 12b)

Female—Length 8 mm., of wing 7 mm. Eyes bare, in life with the upper and lower margins broadly purple, the broad green median area crossed by two narrow purple bands set close together, or the eye may be said to be purple with two broad and one narrow green band. Prona as figured, brownish grey pollinose, the frontal callus mahogany brown, markedly protuberant, vertexal area a little denuded, but without a definite callus or tubercle. Subcallus and facial area brownish above, grey beneath, the beard white. Antennae as figured, yellowish throughout. Palpi as figured, white with dark and light hairs mixed.

Mesonotum and scutellum pale brown, the former with two very faint stripes. Pleura grey, whitish haired. Legs uniformly pale brown, the fore tibiae faintly dusky at apex. Wings hyaline, upper branch of third vein with a rather long appendix. Abdomen pale brown, the tergites broadly grey behind, and with a mid-dorsal row of grey triangles. There is also a dorsolateral row of rounded grey spots broadly joined to the hind marginal band.

Holotype ♀, Paitilla Airport, Panama, March 19, 1941, to be deposited in the M. C. Z., Harvard Univ., Cambridge, Mass.

This little species appears to be related to *littoreus* Hine, and *campechianus* Towns. From the first of these it may be distinguished by smaller size, differently marked eyes and abdomen, broader antennae, and wholly pale legs, and from the latter by abdominal pattern.

Stenotabanus (Aegialomyia) changuinolae sp. nov.

(Figs. 5, 5a, 5b)

Female—Length 12 mm., of wing 11 mm. Eyes bare, the pattern not revivable. Frons as figured, brownish grey, the callus mahogany brown. Antennae as figured, brown, the hairs on first two segments black. Subcallus and face pale brown; beard sparse, whitish. Palpi as figured, pale brown, mostly pale haired. Proboscis hardly longer than palpi, brownish.

Mesonotum and scutellum cocoa brown, with four fairly prominent paler stripes. Pleura concolorous. Legs wholly brown, mostly white haired. Wings very dirty, but apparently hyaline with very small clouds on at least the distal cross veins. Fork of third vein with a short appendix. Abdomen somewhat crushed, but apparently uniformly pale brown.

Holotype ♀, Changuinola Dist., Bocas del Toro Prov., Panama (L. L. Pechuman leg.). The species seems quite closely related to *laevicallus* Szil. and *jamaicensis* Newst., but the frons is even broader, the third antennal segment considerably wider, and the size larger. The specimen is not in the best condition, so that fresh material will be necessary to define its relationships with the West Indian species more clearly.

Subgenus **Brachytabanus** subg. nov.

I am creating this name for the reception of *Stenotabanus longipennis* Kröber, which seems to me to be sufficiently distinct from other *Stenotabanus* known to warrant separation.

The subgenus may be defined as follows: Female eyes bare, green with three narrow purple bands in life. Frons very broad, less than twice as high as wide. Frontal callus wider than high, very convex. Vertexal tubercle represented by a broadly crescentic transverse ridge, with a small bare area above it. Subcallus pollinose, without hairs. Anterior tentorial pits greatly enlarged, black and shiny within. Third antennal segment with basal part longer than wide, dorsal angle very obtuse. Annulate portion with a tendency to reduction, so that there are often but three visible annuli, the fourth being very small and more or less fused with the third. Wings rather long and narrow, with macrotrichia on the costa, subcosta and first vein above, and with a very short appendix or none.

Stenotabanus (Brachytabanus) longipennis Kröber

(Figs. 4, 4a, 4b)

Stenotabanus longipennis Kröber, 1929, Enc. Ent., Ser. B, Dipt., V, p. 125, Pl. I, fig. 23; Pl. II, figs. 7, 37; Pl. III, fig. 55 (♀; Venezuela); 1934, Rev. Ent., IV, 2, p. 258.

This peculiar little species does not seem to be very closely related to any species with which I am familiar. The antennae

are reminiscent of *Microtabanus pygmaeus* Will., but there the similarity stops. Kröber's description and figures are excellent, but omit one character which seems peculiar to this species.

On each side of the clypeus are two grooves, the anterior tentorial pits of Snodgrass, which in many Tabanids have a tendency to form rounded pits at their lower ends, but in this species these pits are greatly enlarged and shiny black within, so that they appear as round, black spots or holes on each side of the otherwise greyish pollinose face. The whole insect is light brown, the legs yellowish, the abdomen with a broad creamy haired mid-dorsal stripe, on each side of which the abdomen is blackish haired to about the same width as the stripe, the sides of the tergites being again broadly light haired. The wings seem unusually long and narrow.

Distribution: Venezuela, Colombia and Panama. A specimen before me labelled Venezuela, Nov., 1936 (Anduze), agrees perfectly with Panama material, while there is a series of 14 ♀ from Muzo and Villavicencio, Colombia, in Dr. J. Bequaert's collection.

Panama records: 1 ♀, Gamboa, C. Z., July 9, 1924 (N. Banks); 2 ♀, Utevey, near Pacora, Aug. 6, 1941, on horse.

Subgenus *Stenotabanus*

This group includes a large number of small species with relatively narrow frons, usually well developed vertexal tubercle, and often a dark hair patch in the position of the median callus. The group includes *T. taeniotes* Wied. (the Genotype), *T. fulvistriatus* Hine, *T. maculifrons* Hine, *T. flavidus* Hine and probably a considerable number of other species, though further study of actual material will be necessary before placing most of them.

St. plenus Hine belongs to a group of species including *St. tantulus* Hine, *muscoideus* Hine and *sarcophagoides* Lutz. They are characterized by a narrow club-shaped callus, wholly dark legs, and eyes with a single green band or none. The species all bear a striking superficial resemblance to Muscoid or Sarcophagid flies. If further study of the group shows the advisability of separation, the name *Myiotabanus* Lutz is available, though as only one species occurs in Panama, it seems best to leave it in *Stenotabanus* for the time being.

The eight remaining species before me from Panama fall into two rather distinct groups. *Fulvistriatus*, *minusculus*, *maculifrons*, *constabulorum* and *calvitius* are all small species with a more or less extensive shiny vertexal area surrounding

the tubercle, a callus as wide as the frons, usually with a dark hair patch in the middle of the frons, and with unmarked wings.

Lerida, *jaculator* and *pequeniensis* are without the shiny vertexal area or mid-frontal hair patch, the callus is narrower than frons, and the wings are spotted. This last group is rather anomalous, as all three species may have hairs on the subepaulet. *Lerida* usually has this structure bare, but may have from one to three strong macrotrichia, *pequeniensis* nearly always has a few macrotrichia, up to 12 on a side, while in *jaculator* macrotrichia are abundant, though more sparse than on the adjoining costa. It is with some trepidation that these species are retained in *Stenotabanus*. They might with almost equal justification be considered an aberrant group of *Tabanus*. The characteristic wing pattern, the well marked vertexal tubercle bearing vestiges of ocelli, and the general habitus seem to me to place them somewhat closer to such species as *St. parvulus* Will. and *St. brunetti* Beq., which have bare subepaulets, than to *lucidulus* Walk. which Bequaert places in *Macrocormus*. The latter has a very similar wing pattern, but lacks a vertexal tubercle and the subepaulets bear macrotrichia. The use of the subepaulet in Tabanid classification has proven very useful, but this is one case where it seems to confuse rather than clarify. It would be quite impossible to place these species correctly in Philip's (1941) key to Nearctic Tribes and Genera, as any placement would allocate the obviously closely related species into different Tribes, and even in some cases necessitate the placing of different specimens of the same species in different categories. Although it is important to call attention to such cases, it seems foolish to abandon the subepaulet character on the grounds that it will not always work. The fact that intermediate forms exist is in reality a valuable clue to phylogenetic relationships.

KEY TO FEMALES

- | | |
|--|---------------|
| 1. Frontal callus narrower than frons. A vertexal tubercle, but no denuded patch at vertex. Palpi rather slender, not markedly inflated basally. | 2 |
| Frontal callus as wide as frons. A shiny area of variable extent surrounding vertexal tubercle. Palpi markedly inflated basally. | 5 |
| 2. Stout thickset species. The thorax black with four prominent grey stripes, abdomen black with the first two tergites with whitish bloom, 2nd to 6th tergites with whitish hind margins and yellow haired median triangles. Legs black. Wings hyaline and with a small dark area from stigma to apex of second basal cell. Basal part of third antennal segment broad, and with a strong dorsal angle. | plenus |
| Slender species, the thorax unstriped, wings with cross veins clouded, and antennae without a strong dorsal angle. | 3 |

3. Abdomen light brown, a black median tegumentary spot on second tergite, and all tergites prominently pale margined behind. Wing faintly smoky, all veins narrowly brown margined and strong clouds on all cross veins and fork of third vein. Appendix long. *lerida*
 Abdomen immaculate, or with faint pale hind marginal bands. Wings smoky mainly apically and along fore border. Veins not brown margined. 4
4. Frons distinctly convergent below. Wings heavily fumose apically. Third vein with a moderate to long appendix. *pequeniensis*
 Frons parallel sided. Wings lightly fumose along fore border. Third vein without an appendix. *jaculator*
5. Wings markedly fumose along fore border. Abdomen light brown with a broad creamy mid-dorsal stripe from scutellum to apex. Frons without median dark hair patch. Legs largely yellow. *fulvistriatus*
 Wings entirely hyaline. Abdomen black or dark brown, without a median stripe. Frons always with at least a small median black hair patch. Legs largely black. 6
6. Thorax prominently striped. Scutellum dark with a wide pale border. All tergites prominently pale margined behind. *minusculus*
 Thorax unicolorous or with golden or greenish hairs, not striped. At least the first tergite dark. 7
7. Thorax and abdomen entirely blackish above. Tergites narrowly and faintly pale behind, but without pale hairs. Frons narrow and convergent, the callus nearly twice as high as wide. *constabulorum*
 Thorax and abdomen with pale hairs. Tergites prominently pale and pale-haired behind. Frons broader, the callus as wide as high. 8
8. Subcallus denuded and shiny. Whole vertex black, denuded and shiny. Scutellum and third to sixth tergites densely golden haired behind. *calvitus*
 Subcallus pollinose. Vertex with but a small denuded area surrounding tubercle. Scutellum without dense golden pilosity. Tergites two to six with narrow whitish hind marginal bands. *maculifrons*

Stenotabanus (Stenotabanus) fulvistriatus (Hine)

(Figs. 11, 11a, 11b)

Tabanus fulvistriatus Hine, 1912, Ohio Naturalist, XII, 7, p. 515 (♀; Chiapas, Mexico). Surcouf, 1921, Gen. Insect., Taban., p. 69. Kröber, 1934, Rev. Ent., IV, 3, p. 309 (not seen).

Tabanus unistriatus Dunn, 1934 Psyche, XLX, 3, p. 174 (in part).

There are two specimens in the Hine collection, one labelled "Dona Maria, Chiapas (Crawford)" and "Type," the other from Higuito, San Mateo, Costa Rica. The type has slightly broader antennae and a slightly narrower frons. Material from Panama which I compared with these specimens agrees best with the Costa Rica specimen. The species is exceedingly close to *taeniotes* Wied., of which I have specimens from Southern Brazil. The only differences I can discover are the more brownish wings of *fulvistriatus*, the more slender antennae of *taeniotes* and the presence in the latter of very narrow light hind margins to the tergite. *St. peruviensis* Kröb. and *St. pallidicornis* Kröb. from Peru and Bolivia also seem very close.

Distribution: Southern Mexico, Costa Rica, Panama.

Panama records: 3 ♀, Puerto Armuelles, Chiriqui Prov., July 27, 1929 (L. H. Dunn; det. as *unistriatus* Hine).

Stenotabanus (Stenotabanus) maculifrons (Hine)

(Figs. 8, 8a, 8b)

Tabanus maculifrons Hine, 1907, Ohio Naturalist, VIII, 2, p. 222 (♀; Puerto Barrios, Guatemala). Surcouf, 1921, Gen. Insect., Taban., p. 74. Kröber, 1934, Rev. Ent., IV, 3, p. 311 (not recognized).

The types in the Hine collection consist of 2 ♀, Puerto Barrios, Guatemala, March 4 and 7, 1905. My material consists of 1 ♀ from Chilibre, Madden Highway, Panama, Jan. 1, 1940, and 1 ♀, Restrepo, Dept. Meta, Colombia (Antunes coll.), and differs in no way from the types. The Colombian specimen was determined for me in 1936 as *St. sexannulatus* End. by Dr. G. M. de Oliveira Castro. The species are certainly exceedingly close, but Kröber's figures (Op. cit., 1934, p. 122 and figs.) show a rather narrower and more convergent frons for *sexannulatus*. Since I have seen no specimens from anywhere near the type locality (Bolivia) it seems best to keep the two separate for the present.

Distribution: Guatemala, Panama and Colombia.

Panama records: Only the single female referred to, which was taken on the screens of a house.

Stenotabanus (Stenotabanus) constabulorum sp. nov.

(Figs. 6, 6a, 6b)

Female—Length 8.5 mm., of wing 8 mm. Eyes bare, purple with two narrow green bands in life. Frons as figured, yellowish grey pollinose, with a large black haired median area. Subcallus and face yellowish grey, beard greyish. Antennae as figured, dark reddish, the apical half of third segment blackish. Palpi as figured, brownish, mostly black haired. Proboscis short, hardly longer than palpi, dark brown.

Mesonotum and scutellum black, unstriped, sparsely grey pollinose, and with sparse brassy scale-like hairs. Pleura yellowish grey and creamy haired above, steel grey below. Legs with coxae and femora black, fore tibiae half, posterior tibiae three-fourths white basally, otherwise black. Tarsi black. Wings hyaline, the costal cell and basal area faintly yellowish. There is a short appendix on the third vein. Abdomen black, the tergites very narrowly reddish behind, and bearing a small tuft of yellowish hairs in the middle and extreme sides. Venter greyish pollinose, all sternites whitish, and white haired behind.

Holotype ♀, Police Station, Pequeni River, Madden Lake, C. Z., May 11, 1940.

This species agrees quite well with Kröber's description of his *St. obscurus*, except that the frons is entirely different, being 8 instead of 3½ times as high as wide, and definitely convergent.

Named in honor of the Canal Zone Police force, whose hospitality has afforded me the opportunity for much valuable collecting.

Stenotabanus (Stenotabanus) minusculus (Kröber)

(Figs. 7, 7a, 7b)

Pseudocanthocera (?) *minuscula* Kröber, 1930, Zool. Anz., XC, 3-4, pp. 80-81, fig. 21 (♀; Vulcan Colima, Mexico); 1934, Rev. Ent., IV, 2, p. 260.

A series of specimens before me from Panama agree in most respects with Kröber's description and figure. My material differs, however, in the white or partly white tibiae, a character not mentioned by Kröber. The species has little or nothing in common with *Ps. sylveirii* Macq., the genotype. I give below a description of the Panama material for comparison with Kröber.

Female—Length 7-8 mm., of wing 7 mm. Eyes bare, purple with two narrow green bands in life. Frons as figured, yellowish grey with an extensive median dark patch. Callus and bare vertexal area black. Subcallus and face yellowish grey, beard yellowish. Antennae as figured, dull yellowish brown, the annulate portion darker. Palpi as figured, yellowish brown, mostly white haired. Proboscis but little longer than palpi, blackish.

Mesonotum blackish brown, with two wide dorsal stripes and the lateral margins yellowish pollinose, the whole with scattered dark and brassy hairs. Scutellum black, broadly yellowish grey margined behind. Pleura yellowish grey, darker below, yellow haired and with a brown dark haired stripe extending forward from the wing bases. Legs variable, the femora black to yellowish brown, black haired, the fore tibiae bicolored, white basally, black apically; posterior tibiae largely white and pale haired. Tarsi dark. Wings hyaline, with or without a short appendix. Abdomen black, or with the anterior tergites partly or wholly cinnamon brown. First, and to some extent the second, tergites with a grey bloom; all tergites conspicuously yellowish or whitish on hind margins, and with pale hairs. These transverse bands may be slightly wider in the middle, but do not form distinct triangles. The band on the first tergite is narrower than the others. Sternites grey pollinose, the hind margins whitish. The striped thorax of this species will distinguish it from *maculifrons* Hine. Kröber's *obscurus* also appears to be close, but the thorax is unicolorous.

Panama records: 2 ♀, Juan Mina Station, Chagres River region, C. Z., Feb. 8 and March 9, 1939; 2 ♀, Moja Pollo, Chagres River region, Feb. 16, 1940; 1 ♀, Pacora, March 26, 1939; 1 ♀, El Real, Darien Province, Feb. 8, 1940; 1 ♀, Darien (Dunn).

Stenotabanus (Stenotabanus) plenus (Hine)

(Figs. 15, 15a, 15b)

Tabanus plenus Hine, 1907, Ohio Naturalist, VIII, 2, p. 225 (♀; Izabal, Guatemala).
Surcouf, 1921, Gen. Insect., p. 79. Kröber, 1934, Rev. Ent., IV, 3, p. 313.

The types in the Hine Collection consist of 6 ♀ from Izabal, March 7, 1907, in fair condition. The abdomens are somewhat reddish at base. There are also 5 ♀ from Higuito, San Mateo, Costa Rica (Schild coll.) in the Hine collection. Hine's description is good, but may be supplemented in a few details. A small though definite tubercle is situated in a small bare area on the vertex. The abdomen bears median dorsal triangles of light hairs, and the tergal hind marginal fringes mentioned by Hine may be continuous or interrupted on each side of the median triangles. I have also seen 1 ♀, Guatemala City and 1 ♀, El Rancho, both Guatemala, in Coll. Bequaert.

Distribution: Guatemala, Costa Rica, Panama.

Panama records: Porto Bello, Feb. 24, 1911 (Busck), El Valle, Coclé Prov., April 13, 1941. Moja Pollo, Chagres River region, Jan. 11, 1941.

Stenotabanus (Stenotabanus) calvitiuus sp. nov.

(Figs. 10, 10a, 10b)

Female—Length 8 mm., of wing 6.5 mm. Frons about three and one-half times as high as basal width, rather convergent, grey pollinose with a wide transverse band of black pollinosity in the region of the median callus. The frons is also rather well covered by long decumbent hairs. Basal callus black, as wide as frons, about as wide as high, broadly joined to the inverted club-shaped median callus. Vertexal tubercle well marked with vestiges of three yellowish ocelli. Whole vertex to below tubercle denuded, shiny black. Subcallus denuded, black and shiny, with but a narrow grey pollinose strip along eye margins. Eyes bare under a hand lens, but showing sparse and scattered hairs under higher power. Eyes in life purple, the upper and lower margins dark green, and with two fairly broad golden-green median transverse bands. Fronto-clypeus and genae grey pollinose, the latter with a pale straw colored beard. Antennae dark reddish throughout, the first two segments with black hairs. Palpi blackish, thinly grey pollinose, and with abundant and long pale yellow hairs, and shorter black hairs. Proboscis about one-half longer than palpi, black, the labella more than half its length, fleshy.

Mesonotum black, thinly dark grey pollinose, fairly well covered with greenish golden iridescent hairs. Scutellum densely clothed with long bright golden hairs. Pleura dark grey, with sparsely grey hairs. Wings hyaline, the stigma black, no appendix on fork of third vein. Legs black, the basal half of fore tibiae white and white haired, the mid and hind tibiae wholly white, except extreme apices, and the

mid and hind basitarsus also white, or yellowish. First two tergites black and black haired, except at extreme postero lateral angles, which are yellow haired. Tergites 3 to 5 with pale pollinose and yellow haired hind marginal bands, widened in the middle and at the sides. Sternites dark grey pollinose, all with pale haired hind marginal bands.

Holotype ♀, Panama City, Republic of Panama, Jan. 10, 1942. Taken on windows of automobile. To be deposited in the Museum of Comparative Zoology.

This little species seems closest to *maculifrons* Hine and *sexannulatus* End. It differs from the former in its more brilliant coloring and lack of a pale hind marginal band on the second tergite and from the latter by its heavily golden haired scutellum and lack of anything approaching a series of connected mid-dorsal triangles on the abdomen. From both species it differs in having a bare subcallus and the whole vertex bare and shiny.

***Stenotabanus (Stenotabanus) lerida* sp. nov.**

(Figs. 14, 14a, 14b)

Female—Length 10–11.5 mm., of wing 10.5–11 mm. Eyes bare, apparently green with a single purple band in life. Frons a little over five times as high as basal width, slightly narrowed below, yellowish brown pollinose. Frontal callus dark brown, higher than wide, narrower than frons, and prolonged in a slender line two-thirds the distance to the vertex. Vertexal tubercle present, and with traces of three ocelli. Subcallus yellowish pollinose, with sparse long whitish hairs. Frontoclypeus and genae grey, sparsely greyish haired. First two antennal segments yellowish, black and pale haired. Basal part of third segment orange, longer than wide, the dorsal tooth small and near base. Annulate portion black, shorter than basal portion. Palpi pale brownish, slender, mostly black haired. Proboscis brown, but little longer than palpi; the labella membranous, large, over half length of proboscis.

Mesonotum and scutellum brown, indistinctly greyish striped and with sparse golden hairs. Pleura, sternum and coxae grey pollinose, rather abundantly grey haired. Legs light brown, the tarsi and apices of fore tibiae darker. Femora pale haired, tibiae and tarsi mostly dark haired. Wings with subepaulet bare, but with macrotrichia upon costa, subcosta and first and fifth veins above, costa and subcosta beneath. Wings faintly smoky, darker along costa and hind margin, and with prominent clouds on all cross veins. Upper branch of third vein long appendiculate, costal cell yellow. Abdomen orange brown, darker towards apex, the hind margins of all tergites paler and yellow haired, rest of tergites dark haired. The second tergite, and rarely the third, bears a median black integumental spot. Venter pale reddish brown, mostly pale haired.

Holotype ♀ and 7 ♀ Paratypes, Boquete, Chiriqui Province, Panama, March-April, 1941 (Mrs. T. B. Monniche coll.); 9 ♀

Paratypes, same locality, April, 1940 (Mrs. T. B. Monniche coll.); 1 ♀ Paratype, Cerro Punta, Chiriqui Province, Feb.-March, 1940, 6,000 ft. (T. T. Howard coll.).

This little species belongs to a rather widespread tropical American group including the West Indian *St. brunetti* Bequaert and *St. batesi* Bequaert and a considerable number of as yet unnamed continental species.

***Stenotabanus (Stenotabanus) pequeniensis* sp. nov.**

(Figs. 13, 13a, 13b)

Female—Length 10–12 mm., of wing 9–10.5 mm. Eyes bare, uniformly green in life. Frons narrow, about six and one-half times as high as basal width, yellowish brown pollinose. Basal callus black, about twice as high as wide, nearly as wide as frons, and prolonged above in a slender line two-thirds the distance to the vertex. Vertexal tubercle present, small, but often with vestiges of ocelli. Subcallus orange brown pollinose. Fronto-clypeus and genae greyish pollinose, the latter with a sparse grey beard. Antennae yellowish brown, the terminal annuli darker. First and second segments not swollen, black haired. Basal part of third segment a little longer than annulate portion, and somewhat longer than broad. Dorsal angle moderate, with a tuft of black hairs. Palpi brownish, black haired, slender, nearly as long as antennae. Proboscis a little longer than palpi, brown, the labella about half length of proboscis, fleshy.

Mesonotum dark brown, dark haired, unstriped. Pleura and sternum greyish. Legs dark brown, the coxae greyish pollinose and grey haired. Subepaulet with macrotrichia, but much less densely hairy than costa. Costa, subcosta, first and basal part of fifth veins with macrotrichia above, costa and subcosta also hairy beneath. Upper fork of third vein with a short appendix. Whole wing fumose, but definitely darker along costa and at apex. Cross veins with small dark clouds. Abdomen yellowish brown, darker towards apex, black haired, rarely with faint indications of yellowish mid-dorsal triangles. Venter paler, with pale hairs.

Holotype ♀, Rio Pequeni, Madden Lake, Panama, Aug. 21, 1941; 2 ♀ Paratypes, same data; 1 Paratype, Rio Pequeni, May 11, 1940; 1 ♀ Paratype, Moja Pollo, Chagres River region, C. Z., May 15, 1940; 4 ♀ Paratypes, Cerro Azul, near Pacora, Panama, May 17, 1940; 3 ♀ Paratypes, Meta, Colombia (in coll. J. Bequaert). Holotype and 3 Paratypes to be deposited in the M. C. Z., Harvard University, Cambridge, Mass.

This little species appears to be related to *T. lucidulus* Walker of Jamaica, for which Bequaert (1940) uses the sub-generic name *Macrocornus*, and from which it differs in

unmarked abdomen and more slender palpi. *T. modicus* Hine, from British Guiana, appears also to be close, but is considerably darker and with slightly different frons and antennae. I have seen Hine's unique type.

***Stenotabanus (Stenotabanus) jaculator* sp. nov.**

(Figs. 9, 9a, 9b)

Female—Length 8–10 mm., of wing 9–9.5 mm. Eyes bare, the color pattern not revivable in the material at hand. Frons medium, about five times as high as basal width, parallel sided, steel grey pollinose. Frontal callus black, slightly narrower than frons, square below, about twice as high as wide and merging gradually into a slender line which reaches two-thirds of the distance to the vertex. Vertexal tubercle small, but distinct, with vestiges of ocelli. Subcallus, fronto-clypeus and genae pale grey pollinose, only the last two with sparse pale hairs. First two antennal segments pale yellowish, slightly inflated, black haired. Basal part of third segment orange, longer than wide, longer than annulate portion, and with an obtuse non-salient dorsal angle. Annulate portion somewhat dusky. Palpi pale brown, black haired, rather slender and not acutely pointed. Proboscis brownish, the fleshy labella over one-half its length.

Mesonotum pale reddish brown, grey pollinose. Pleura, sternum and coxae grey pollinose. Legs rather uniformly pale brown. Wings above with subepaulet, costa and first vein with macrotrichia, subcosta with a few hairs in the middle section, fifth vein wholly bare. Wings smoky, especially along the costa, and all cross veins with small clouds. Abdomen pale reddish brown, without apparent markings.

Holotype ♀ and 1 ♀ Paratype, Bohio, C. Z. (A. H. Jennings); 2 ♀ Paratypes, Las Cascadas, C. Z. (A. H. Jennings).

All of the types are old and somewhat rubbed, but the species is quite distinct on frontal characters. It comes nearest *pequeniensis*, but is smaller, paler throughout, and has a broader, more parallel sided frons. Some of these specimens were labelled *parallelus* Wlk., but although the resemblance is great, that species has a bare subepaulet, and a quite different frons.