

DESCRIPTIONS AND NOTES ON NEOTROPICAL TABANIDAE

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The material here discussed has accumulated from various sources during the past four years.¹ It consists of a number of apparently undescribed forms from several parts of the Neotropics together with new information regarding some described species and new distribution records for the Republic of Panama. The eight species added to the fauna of Panama bring the total to 106 species now definitely known from this area. (For synonymy of species previously discussed by me see list of references at the end of this paper.) Types of new species will be deposited in the Museum of Comparative Zoology, Cambridge, Mass.

Fidena schildi (Hine)

As was considered probable, (Fairchild, 1941, Ann. Ent. Soc. Amer., 34 (3): 644) this species has now been taken in Panama. My colleague, Dr. Galindo, secured a single specimen, together with two of *F. pyrausta* (O.S.) at an isolated Indian village on the Rio Caña, Bocas del Toro Province, 9 July, 1949. They were attacking domestic pigs at 6 A. M. under a shed where Dr. Galindo had taken shelter from heavy rain.

Fidena pyrausta (O. S.)

Two females taken with *F. schildi* and four additional females from Palo Santo, Chiriqui Province, 15 and 22 June and 14 July, 1950. These latter were taken by Dr. Galindo's mosquito catchers while attempting to bite them. One of these specimens has the abdominal hairs pale straw colored, while in the others it is rufous orange. All but one have the fourth to last tergites clothed with orange or yellow hair. This last agrees with my original specimens in having the fourth tergite black haired. It also differs from the others in having the squamulae at the base of the wing fringed with silvery white hairs, (black in the other specimens) and in the first posterior cell being closed and petiolate (open in all the others). There are also traces of white hairs middorsally on tergites III and IV in this specimen. Structurally I can perceive no differences, and believe this to be but an extreme variant. I also have a single specimen from Ecuador, Luis Leon coll., which agrees perfectly with this last specimen.

¹Most of the Panama material discussed herein was collected by my colleagues, Dr. Pedro Galindo and Dr. Harold Trapido, or by the mosquito catchers working on a project under the direction of Drs. Galindo, Trapido and Col. S. J. Carpenter, M.S.C. Unless otherwise noted, the Panama material was collected by this group. Cost of publication is paid by the Gorgas Memorial Institute.

Fidena columbiensis Kröber

Melpia columbiensis Kröber 1930, Mitt. Zool. Mus. Hamburg, 44: 177 (♀, Upper Condosa, 22. XLI., Condota, 5).

Fidena columbiensis Kröber 1934, Rev. Ent. 4(2): 247. Bequaert and Rengifo, 1946, Psyche, 53(3-4): 61.

Five females from Palenque, near the mouth of the Rio Cuango, Colon Province, Panama, 12 Sept., 1949, R. Hartmann coll. This locality is on the Caribbean coast, about 60 miles east of Colon. As indicated by Bequaert and Rengifo, the type locality was probably the Rio Condoto, Choco, Colombia, the part of Colombia adjoining Panama on the east.

The specimens have the following characters. Length 14-17 mm., wing 13-14 mm. Frons about three times as high as wide, slightly narrowed at vertex, dark-brown pollinose, black haired. Eyes densely short brown pubescent. Face quite produced, snoutlike, brown pollinose above, shiny on the sides. A tuft of black hairs below the antennae extending to the eye margin. Beard creamy white to nearly snow white. Antennae dark brown, the third segment of eight divisions, of which the first three are largest and seemingly less freely articulated. Palpi dark brown, slender, acute, the terminal segment about equalling the last six segments of antennae. Outer surface of palpi flat, brown pollinose, with a marginal fringe and the slender apex black setose. Proboscis 7-9 mm. long, the labellae sclerotized and slender.

Mesonotum dark brown, dark-brown pollinose, sparsely black haired, without marked stripes. In some specimens there are a pair of small pale-pollinose patches before the scutellum. Scutellum concolorous, its hind margin paler. Margins of mesonotum with sparse grey hairs anteriorly, dense black hairs laterally, and mixed yellowish and black hairs between wing roots and scutellum. Pleura and sternum pale greyish white, the former densely creamy to white haired, the latter sparsely dark haired. Legs wholly orange yellow, orange haired, except the coxae, and especially the fore coxae, which bear dense long dark hairs. Wings uniformly smoky, without blackish bases. First posterior cell open but more or less coarctate in four specimens, closed at the margin in the fifth. Abdomen dark brown, densely black haired, but with small median yellowish hair tufts on second to sixth tergites, sometimes also on the first. Extreme sides of tergites creamy haired. Sternites pale, whitish pollinose and pale haired.

The species may be easily distinguished from others of the genus in Panama by its wholly pale legs, and the contrasting colors, whitish below and nearly black above. The structural characters of the head region are rather uniform in this genus, and are not very suitable for specific differentiation. *Fidena auribarba* End. and its var. *albibarba* End. (1924), also from Colombia, seems exceedingly close from the descriptions, but Kröber (1930), who has seen the types, maintains its distinctness.

Fidena bicolor Kröber

1931, Zool. Anz. 95(1-2): 36-37 (♂, Higuito, San Mateo, Costa Rica); 1934, Rev. Ent. 4(2): 246.

A single female, Quepos, Damas, Costa Rica, 4 Oct., 1950, sent to me by the collector, Mr. J. R. Koppers of the United Fruit Company.

This specimen agrees fairly well with the original description, except that the abdomen is wholly yellow haired. The male described by Kröber is stated to have had the abdominal tergites broadly margined with yellow hairs, the species being compared with *auricincta* Lutz and Neiva. I believe, however, that the differences noted are merely sexual.

The specimen at hand may be designated as *neallotype* and has the following characters: frons as in *Fidena isthmiae* Fchld. (1941), the frontoclypeus grey pollinose, antennae black. Palpi as in *isthmiae*, though relatively shorter than in most specimens of that species. Beard pale yellowish brown. Legs wholly black, short haired. Mesonotum, pleura and sternum dark brown, black haired, with a tuft of yellowish brown hairs before the wing bases, and the hairs on the squamulae yellowish brown. Wings yellowish hyaline, black at extreme base, the first posterior cell closed and petiolate. Abdomen with first segment black and black haired, the remaining segments dirty yellowish horn-colored, clothed both above and below with rather short appressed golden yellow hairs.

The species may be distinguished from all others of similar coloration known to me by the combination of wholly black legs and unusually narrow frons. It is structurally indistinguishable from *F. isthmiae*, but the strikingly colored abdomen precludes the merging of the two forms until evidence of intergradation appears. *F. isthmiae* itself is proving somewhat variable with the accumulation of more material. The hairs on the squamulae may be either blackish brown or silvery white, the antennal flagellum varies from black to reddish brown, and the shape of the palpi is hardly the same in any two specimens.

Esenbeckia mejiae Fairchild

1942, Ann. Ent. Soc. Amer., 35 (2), p. 198, pl. 1, fig. 8. James, 1950, Pan-Pac. Ent., 26 (2): 87-88, fig. 1 (♂; Agua Amarilla, Honduras).

Three specimens (1 ♀, Choluteca, Honduras, Oct. 1945; 2 ♀, Boqueron, Tegucigalpa, Honduras, 26 Oct. 1942) differ sufficiently from the type to have been considered as specifically distinct. However, considering that they come from practically the same locality and were taken at the same time of year, I hesitate to consider them more than variants. They differ from the type in being more orange in ground color, in having the coxae and bases of femora wholly orange haired, in having the palpi more slender and drawn out, and in the frontal callus being mostly covered with pollen. This last feature is hardly important, as the type may have had this area rubbed, and the three specimens at hand show various degrees of denudation. The palpi also vary somewhat, and since they are quite thin, it is possible that shrinkage may have caused the edges to curl slightly in the present specimens, thus giving them a more slender aspect. The strikingly inflated and shiny face, long terminal annulus of the antennae and other characters appear to be the same.

Esenbeckia yepocapa sp. nov.

Female.—Length 17 mm., wing 17 mm. Eyes bare. Frons about 4 times as high as wide, orange brown pollinose, including the slightly raised ridge-like callus and vertical tubercle. Subcallus pollinose;

fronto-clypeus and genae thinly brown pollinose, the tentorial pits deep, close to eye margin, and with a fringe of long yellow hairs along eye margin. Beard whitish yellow. Antennae with first two segments brown, black haired, third segment bright orange brown, of eight visible annuli, of which the first is the largest and is partially fused to the next three, the terminal four being more slender, while the last is long and spike-like. Palpi dark mahogany brown, black haired, long and slender with attenuated tips, the middle section of the outer side being somewhat hollowed out or funnel-shaped and free of hairs. Face not snout-like, proboscis about equalling head height, the theca and labella well sclerotized, though the latter not immovably fused.

Thorax and scutellum mahogany brown, subshiny, thinly greyish brown pollinose and clothed with fine dark hairs. Pleura and sternum more densely grey pollinose and clothed with long pale grey hairs. Legs orange brown, the coxae and femora darker. Coxae clothed with long black and grey hairs, femora with shorter black hairs, the tibiae and tarsi with very short golden hairs. Wing yellowish hyaline, more intense in costal cell and along fore border. Area basal to arculus, squamae, and extreme bases of basal cells deep black. First posterior cell closed and petiolate; upper branch of third vein with a long appendix. Subepaulet bare, costa and first vein setose above, subcosta bare. Abdomen shiny mahogany brown above, black haired except the lateral angles of tergites I to VI, which bear tufts of creamy white hairs. Venter shining brown, dark haired, except a narrow row of pale hairs on the hind margins of all sternites, widened into a small tuft on the posterior angles.

Male.—Length 15–19 mm., wing 15–18 mm. Eyes bare, holoptic, the facets essentially of equal size, though those on the disk appear very slightly larger than those along the lower margin. Vertical tubercle prominent, rising above eye level, pollinose in front, hirsute behind with three well developed ocelli. Frontal triangle brownish pollinose. Antennae as in female, but more slender. Palpi slender, shorter than in female and rather blunt pointed. The hollowing evident in the female is not so pronounced, the outer surface of the palp being nearly flat and free from hairs in the middle. In all other respects the male is like the female, though somewhat more densely haired.

Holotype female, *allotype* male and 31 *paratype* males, Yepocapa, Chimaltenango, Guatemala, November 19, 22, 24 and 27, 1944. The specimens were taken hovering over the roads through coffee plantations, resting on vegetation along the roads, or on the flowers of a large species of Compositae. The single female has the beard thickly clogged with pollen grains. Although searched for, no females were seen attacking animals or man.

The species appears to be very closely related to *Esenbeckia wiedemanni* Bellardi. It differs in having a somewhat broader frons and more acutely pointed palpi in the female and in color characters. In *wiedemanni* the legs are mainly blackish, the hind tibiae especially being black and black haired, while in *yepocapa* the tibiae are bright orange yellow and orange haired. The abdomen of *wiedemanni* has the first segment pale pruinose and pale haired, while the remaining segments are without pruinosity and with sparse and short pale hairs. In

yepocapa the first segment is nearly as shiny as the rest of the abdomen and bears dark hairs. The remaining abdominal tergites are sparsely blackhaired. The single available female of *yepocapa* has been compared with a series of females of *wiedemanni* from Chiapas, Mexico. Further material may show that these characters intergrade, and that *yepocapa* is but a southern race of *wiedemanni*.

Wiedemanni is included by Enderlein (1925) and Kröber (1934) in the former's genus *Ricardoia*, based on species with palpi less than half length of proboscis. Both Bellardi's description and figure, however, show the palpi to be long. In the case of *E. saussurei* Bell., the matter is not so clear. Bellardi states that the palpi are long and falcate, though his figure shows them to be considerably less than half the length of the proboscis. Material which Dr. Bequaert and I have called *saussurei* is probably not that species, as the palpi are very short and hollowed-out or funnel-shaped on the outer aspect. Our specimens also lack the light dorsal stripes on the thorax mentioned and figured by Bellardi.

The status of *Ricardoia* Enderlein will need eventual clarification. Although I do not have before me as ample material as would be desirable, it might be well to point out that the character of the length of the female palpus, used to separate *Esenbeckia* and *Ricardoia*, is of dubious utility, first, because the proboscis, or at least the labium, is somewhat extensile, and so varies in apparent length, and second, a number of species show palpi slightly less than half as long as the proboscis. *E. incisuralis* Say has them considerably less than half as long, *E. prasiniventris* Macq. has them a little more than half as long, and *E. translucens* Macq. has them nearly two-thirds as long. A specimen which Dr. Bequaert and I believe to be *E. planiventris* Macq. 1850 has very short palpi, hardly one-fourth the length of the proboscis. It is placed by Kröber, with a query, as a synonym of *E. saussurei* Bell. in the genus *Ricardoia*. Since the original description and figure of *saussurei* both indicate rather long palpi, we believe the two are distinct species.

In regard to *Proboscoideus* Philip I have specimens of two species which belong certainly to the group. One was determined as *Esenbeckia ferruginea* var. *nigrovillosa* Kröb. by Dr. G. M. de Oliveira Castro, as previously noted by me (Fairchild, 1942, p. 197). However, Dr. C. B. Philip informs me that the type of *nigrovillosa*, examined for him by Dr. Max Beier in the Vienna Museum, has a perfectly normal proboscis. My material is very close to *Proboscoideus fairchildi* Phil., but has pale haired palpi and largely dark haired abdomen and legs. It is from Goyaz, Brasil, and may well be a race of *fairchildi*, though comparison with the types of the latter will be necessary to settle its status. *Esenbeckia inframaculata* Lutz also has the proboscis of similar structure and should be placed in this group.

Dichelacera melanosoma Hine

Figs. 4, 4a, 4b

- 1920, Ohio J. Sci. 20 (8): 316, fig. 1 (♀; Higuito, San Mateo, Costa Rica); 1925, Occ. Pap. Mus. Zool. Univ. Michigan, no. 162, p. 35 (in key only).
Catichlorops melanosoma Kröber 1931, An. Mus. Nat. Hungarici, 17: 344-345, fig. 11 (2 ♀, Higuito, San Mateo, Costa Rica); 1934, Rev. Ent., 4 (2): 273.
 Barretto, 1946, An. Fac. Med. Univ. S. Paulo, 22: 153 (in key only).

A single somewhat battered specimen from Progreso, Chiriqui Prov., Panama, 13 July, 1950, agrees perfectly with Hine's description. The nearly black wings and body led Kröber to place it in *Catachlorops*, but in my opinion it belongs in *Dichelacera* s.s. In Barretto's (1946) recent division of the genus *Dichelacera*, it would run to *Rhamphis* End., except that the antennae are long and slender, with a dorsal spine reaching the first annulus.

Dichelacera marginata Macq.

This species is proving to be very variable in color. A series of specimens from Ft. Sherman, C. Z., and Piña, Colon Province, Panama, Dec. 1948, are quite dark, the interalar dark band much wider than the prescutellar pale band and the pollinosity and vestiture of hairs tending to be greyish. A further series from Paraiso, C. Z., Nov.-Dec. 1948, and Sept.-Oct. 1950, are similar, though on the average more yellowish. Both series show the abdominal pale bands considerably less than half the width of the tergites and the wing picture quite dilute, hardly more than a faint narrow dusky band from apices of submarginal cells to apex of anal cell. A series from Candelaria Hydrographic Station, upper Rio Pequeni, Panama, is very much lighter and more yellow. The interalar dark band is narrower or about as wide as the prescutellar pale band, the abdominal pale bands are at least half as wide as the segments and may be wider. The legs are less infuscated, but the wing picture darker. A specimen from Progreso, Chiriqui, Panama, 7 Sept. 1950, appears also to belong to the yellow form, though it is rather rubbed. Finally, a specimen from El Real, Darien, Panama, 11 July 1950, is dusky brownish all over, with no trace of yellow hairs whatever. All the above are structurally alike, and I believe do not warrant names.

Dichelacera regina Fairchild 1940

With the taking of adequate series of this hitherto rare species, some puzzling variation has shown up. Twenty-five specimens from Sta. Fe, Veraguas Prov., 24 May to 11 Aug., 1950, 2 specimens from Progreso, Chiriqui Prov., 28 July, 1950, and 1 from Cerro Campana, Panama Prov., 10 Aug., 1950, agree closely with the original material from El Valle, Coclé Province. A series of 17 specimens from Cerro Campana, 12 June to 5 September, 1950, 4 specimens from Candelaria Hydrographic Station, upper Rio Pequeni, Panama Province, and 6 specimens from La Victoria, Cerro Jefe, Panama Province, June and August, 1950, average smaller in size, with broader frons, shorter antennal tooth and less even proximal border of the dark fascia of the wing. The great majority also have at least some yellow hairs on the fifth abdominal tergite and often a broad yellow-haired band.

All of the above localities are in areas of heavy forest and, with the exception of Progreso and Candelaria, at elevations of about 2000 ft. Cerro Campana is a rather isolated group of hills about 40 miles west of the Canal Zone and separated from El Valle, a similar isolated massif, by a broad valley about 10 miles across. Sta. Fe and Progreso are much further west, while La Victoria and Candelaria are about 20 miles east of the Canal Zone. The two forms might be treated as geographical races, an Eastern and Western, but the presence of both

forms on Cerro Campana and our lack of material from other localities makes a decision seem unadvisable as yet.

Dichelacera (Dichelacera) rex sp. nov.

Figs. 1, 1a, 1b, 1c

Female.—Length 10–11 mm., wing 10.5–11 mm. Eye bare, in life green or yellowish bronze with a single median transverse dark-purple band; the upper, and to a less extent, the lower margins more or less purplish also, so that in some specimens the eye may be said to be purple with two very broad green bands. Frons dark-yellow pollinose, about four times as high as wide, slightly narrowed at vertex, the frontal callus black, as high or higher than wide, and prolonged above in a slender point. Vertical tubercle with vestiges of at least the anterior ocellus. Antennae and palpi as figured, the former dirty yellowish brown on first two and base of third segments, the remainder blackish. Palpi orange yellow, mostly black haired. Subcallus, fronto-clypeus and genae golden yellow pollinose, the last with a sparse yellow beard. Proboscis black, less than head height, the labella shiny.

Mesonotum black with two narrow deep-yellow-haired cross-bands. The area before the anterior cross-band is partially yellowish pollinose, but with mainly black hairs. The posterior yellow band is less than half as wide as the preceding dark band. Scutellum black. Pleura and sternum deep yellow pollinose, sparsely yellow haired. Legs yellow, except apices of fore tibiae and tarsi, apices of hind femora, hind tibiae and tarsi. Wings as figured, the clear areas quite yellow, the dark areas black. Abdomen yellowish brown in ground color, the first tergite yellow haired, the rest black haired, with broad yellow haired triangles on the second, third and fourth tergite. There are also patches of golden hairs on the sides of these tergites. Beneath the abdomen is dusky yellowish, sparsely yellow haired.

Holotype female and 5 female *paratypes*, Candelaria Hydrographic station, upper Rio Pequeni, Panama, 15–21 August, 1950; 5 female *paratypes*, Sta. Fe, Veraguas, Panama, 24 May, 28 July (2), 3 and 11 August, 1950; 2 female *paratypes* near Almirante, Bocas del Toro Prov., Panama, 16 May, 1951. One of the Sta. Fe specimens was taken 40 feet up in a tree at a mosquito catching station, the others at ground level.

This species was first thought to be but an extreme variant of *regina* Fchld. but there are too many constant characters separating the two. The frontal callus seems to be slightly higher, the median prolongation more prominent and the frons narrower. The palpi in *regina* are wholly yellow haired, while in *rex* they are extensively black haired. The yellow vestiture of *regina* is considerably lighter in tone than in the present species, and the anterior part of the mesonotum is wholly yellow and yellow haired. The black band of the thorax is consistently broader in *rex*. The abdominal pattern in *regina* consists of complete transverse bands, reduced to triangular median patches in *rex*. The dark wing markings in *rex* are more extensive, the distal fascia extending well proximal to the fork of the third vein whereas in *regina* this never occurs. The wing markings are also more intense in *rex*. The wing markings of *rex* are just like Hine's figure of *caloptera*, but the frons of

that species is broader, the abdomen with transverse bands, and the face shiny. In *rex* the face is rather thinly pollinose, subshiny in some specimens.

Dichelacera analis Hine

A single male from Candelaria Hydrographic Station, Upper Rio Pequeni, Panama, Aug. 14, 1950. The coloration and wing pattern are as in the female, and there is no difficulty in associating the sexes. The antennae are somewhat more slender than in the female, the palpi porrect and long haired. The eyes are holoptic, the area of large facets extensive, fully two-thirds total eye area, the two types of facets strongly differentiated and demarcated from each other. The large-faceted area is dark brown, the small-faceted area purple with a single green transverse stripe in life. There are sparse, short and fine hairs scattered over the area of large facets. A small vertical tubercle is present.

Dichelacera (Catachlorops) umbratus (Hine)

Figs. 2, 2a, 2b, 2c

Tabanus umbratus Hine 1920, Ohio J. Sci., 20 (6), p. 187 (♀, Higuito, San Mateo, Costa Rica).

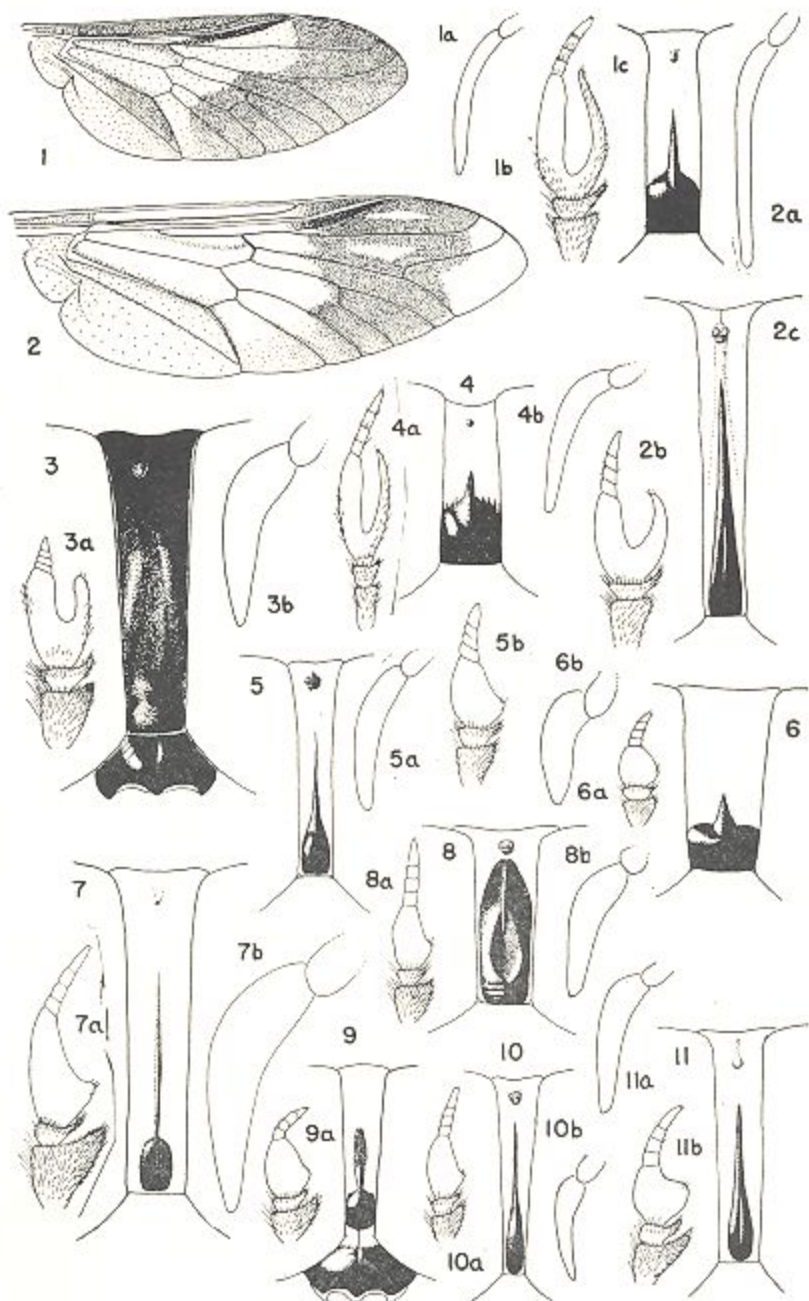
Catachlorops umbratus Kröber 1934, Rev. Ent., 4 (2), p. 274 (species incerta sedis). Fairchild, 1948, Ann. Rep. Gorgas Mem. Lab., 1947, p. 30 (Sta. Fe, Veraguas, Panama). Barretto, 1946, An. Fac. Med. Univ. S. Paulo, 22, p. 153 (in key only).

Eleven additional specimens show this species to be not uncommon at suitable localities. One specimen is from the Rio Chico Hydrographic Station on the upper Chagres river, 20 March, 1948, one from Utiwe, near Pacora, Panama Province, 27 Jan., 1949, three from Yellow Fever Station X, Chorrcha, Chiriqui Prov., Panama, Jan. 11, 1951, and six from Yellow Fever stations in the vicinity of La Victoria, Cerro Jefe, Panama Province (1 ♀, Jan. 11; 2 ♀, Jan. 31, and 3 ♀, Feb. 1, all 1950). The last 9 specimens were taken attempting to bite men who were stationed at platforms from 37 to 50 feet up in trees catching forest mosquitoes.

The whole insect is dark chocolate brown with grey pollinosity. Dorsally the hairs are black, the thorax striped with grey. The fourth tergite bears a large median triangle of silvery white hairs, while the hind margin of the seventh tergite is also white haired. Ventrally the abdomen bears two broad longitudinal bands of dark hairs, otherwise the ventral parts are white haired. The legs are uniformly dark brown, the femora pale haired, the tibiae dark haired and the tarsi nearly black. The fore tibiae are obscurely to clearly bicolored. The frontal

EXPLANATION OF PLATE I

FIGS. 1, 1a, 1b, 1c. *D. (Dichelacera) rex* sp. nov., holotype. FIGS. 2, 2a, 2b, 2c. *D. (Catachlorops) umbratus* Hine. FIGS. 3, 3a, 3b. *Stibasoma theotaenia panamensis* Curran. FIGS. 4, 4a, 4b. *D. (Dichelacera) melanosoma* Hine. FIGS. 5, 5a, 5b. *Stenotabanus frondicolus* sp. nov., paratype. FIGS. 6, 6a, 6b. *Stenotabanus ananasi* sp. nov., holotype. FIGS. 7, 7a, 7b. *T. (Lophotabanus) fumomarginatus* Hine. FIGS. 8, 8a, 8b. *Leucotabanus leucogaster* sp. nov., holotype. FIGS. 9, 9a. *T. (Taeniotabanus) picicallosus* sp. nov., holotype. FIGS. 10, 10a, 10b. *Leucotabanus pauculus* sp. nov., holotype. FIGS. 11, 11a, 11b. *Leucotabanus weyrauchi* sp. nov., holotype.



callus is ridge-like, mahogany brown. The vertical tubercle is small, pollinose, but with discernible vestiges of ocelli. The subcallus is pollinose, antennae wholly blackish brown, palpi white, sparsely black haired, thread-like. Proboscis as long as frons, the labella small and shiny. The eyes are bare, bright green in life. The subepaulet is without macrotrichiae.

This species is structurally closer to the subgenus *Psalidia* End. than to the more typical species of *Catachlorops*. The unicolorous green eyes would place the species in *Amphichlorops* were one to follow Barretto's classification. However, the color of the eyes is of dubious use when unsupported by structural characters. The species placed in these two genera by Barretto (1946, 1948) seem hardly distinguishable. In fact, I do not see how *Amphichlorops pechumani* Barr. (1948, p. 407) described from the female is to be separated from *Catachlorops zikani* Barr. (1946, p. 167) described from the male. Both were taken in the same general locality and in part at the same time of year.

Dichelacera (Psalidia) fulminea (Hine)

A series of over 50 specimens from various localities in Panama shows two rather distinct forms to be present. One of these, which agrees with Hine's *fulminea*, averages larger, (16-20 mm., aver. 18.4 mm.), is more deeply colored, the mesonotum and abdomen being deep rufous orange, almost coppery. The wings are very dark, practically black in some specimens, with subhyaline fenestrae in the marginal and first submarginal cells beyond the stigma and in the discal cell. The area below the stigma is yellowish subhyaline, and there are small paler areas in the fifth posterior cell and anal area. The eyes in life are bright green, slightly darker on the upper half, the dividing line between the two shades sharply marked. The other form is the one previously discussed by me (Fairchild, 1940, p. 693) and agrees with Hine's *festivus* and Enderlein's *ocellatus*. It averages smaller (12-16 mm., aver. 15.2 mm.) and is more yellow and lighter in tone throughout. The wings are much lighter, more yellowish hyaline basally and the apical blackish area contrasts more strongly with the basal area. The extent of the hyaline fenestrae in the marginal and first submarginal cells varies a good deal in both series, but on the average is about the same in both. The eyes of this form, in the few specimens seen alive, are uniformly bright green.

Although very different appearing, I can find no structural differences between the two. Both occur together at Santa Fe, Veraguas, at Cerro Campana, and at La Victoria, all areas of mountain forest at about 2000 ft. elevation. The types of both Hine's names were from Gatun, C. Z. The light form is the only one so far taken in other localities in Panama, and I have specimens also from San Luis, Peten, Guatemala, May, 1947, de Leon coll., and Fortin, Vera Cruz, Mexico, 20 May, 1947, W. G. Downs coll. These latter are rather paler and smaller than most Panama specimens, with the dark areas of the wing relatively reduced in area and intensity.

Between the two forms there are occasional intergrades. A single large dark specimen from Sta. Fe has wings precisely like the light form, while a small light-bodied specimen from the same locality has

wings as dark as some of the dark form specimens. Should it seem desirable to separate the forms nomenclatorially until their status is clarified, the name *ocellatus* End. is available and could be used in a varietal sense for the light specimens.

Stibasoma fulvohirtum (Wied.)

A series of 67 females from Progreso, Chiriqui (9, 16 and 23 June, 13, 28 July, 3, 10 and 17, August, 9, 16 and 30 November, 1950, and a single female from Cerro Campana, Panama Province, 12 June, 1950). The color of the vestiture varies somewhat, some specimens having the mesonotum wholly bright orange rufous haired, while in others there is considerable admixture of black, though none are quite as dark as the specimens from Trinidad mentioned by Knab (1913, Proc. U. S. Nat. Mus., 46: 412). The second and third tergites always bear a fringe of pale straw colored hairs, the remaining tergites have these hairs mixed with black ones to a greater or less extent, even to having practically no pale hairs.

Stibasoma theotaenia panamensis Curran

Figs. 3, 3a, 3b

A female specimen, Ft. Sherman, C. Z., 11 March, 1950, and another female, Arraijan, Panama, 4 Dec., 1950, enable me to add to the note on this species previously published (Fairchild, 1940, p. 685). Dr. C. B. Philip also reports (in litt.) a male from Barro Colorado Island, C. Z., 8 Mar., 1937, and a female from Chorrera, Panama, 19 Dec., 1944. The frons is similar to that of *apicimacula* Fchld., but a little broader and more convergent below. The frontal callus is hardly raised, and the median ridge is quite flat. There are dense black hairs on the upper part of the frons. The subcallus is quite protuberant, wholly shining black. Fronto-clypeus and genae, palpi and antennae black. The antennae are also similar to those of *apicimacula*, but thicker and heavier appearing, the dorsal spine just reaching the first annulus.

The thorax is jet black, black haired except for a small tuft of long silver white hairs just before the wing bases. The legs are jet black, black haired, except for the tarsi, which are brown and russet haired. There is also a small patch of long white hairs at the base of the hind tibiae on the outer surface. The abdomen is orange yellow in ground color, the first two tergites clothed with long lemon yellow hairs, the remainder with long copper or orange hairs. The third tergite bears also black hairs mixed with the coppery ones on the sides. Beneath the second sternite bears a patch of black hairs in the middle, coppery hairs on the hind margin and yellow hairs laterally, the remaining sternites being copper haired. The wings are deep black, with a narrow, diffuse subhyaline border from the first submarginal cell to the anal area. My specimens measure 16 and 12 mm. in length.

Stibasoma apicimacula Fairchild 1940

Three additional specimens of this species have come to hand in the last ten years (El Valle, Cocle Province, 16 June, 1946, H. Trapido coll. and Sta. Fe, Veraguas Province, 28 July and 4 August, 1950,

P. Galindo leg.). Both localities are in the mountains at an elevation of about 2000 ft. in heavy forest. The last two specimens were taken 40 feet up in a tree, at a mosquito catching station.

Triceratomyia mcintyreii Bequaert

1937, Rev. Ent., 7 (4): 350-353, 1 fig. (♀, Ecuador).

Additional material from Ecuador indicates that this species lacks spurs on the hind tibiae. Both Dr. Bequaert and I have re-examined the type, and find that it too lacks spurs, the comb on the tip of the tibiae resembling spurs as seen laterally. The species is quite similar in habitus and color to *Dasychela limbativena* End., but has bare eyes and even longer proboscis and palpi. *Triceratomyia* may also be compared with the African *Thaumastocera* Grunb. in regard to the antennae. In that genus, the antennae are also triramous in most cases, but the median prong may be reduced to a mere knob in some specimens. It is likely that the antennae of *Triceratomyia* have evolved from a biramous condition such as is found in many Neotropical Tabanids. *Thaumastocera* is placed by Enderlein in the *Dichelacerini*, I think correctly. It has bare subpaulets, and sclerotized labella much as in *Stibasoma*, although showing a number of specializations not found in any Neotropical members of the tribe.

Bolbodimyia bicolor (Bigot)

A single female taken in a horse-baited mosquito trap, Ft. Davis, C. Z., 22 Dec., 1948, C. M. Keenan leg. This specimen agrees structurally with material from Colombia and Brasil before me, and with the redescription of *B. erythrocephala* Bigot given by Kröber (1929). In color the specimen is more extensively orange red than other material I have seen, the whole frons and face, part of first and second antennal segments, palpi, whole venter, coxae and basal two-thirds to three-fourths of all femora are brilliant orange red. The hairs and pollinosity occurring on the orange areas are also orange. Elsewhere the insect is deep black. This differs from the description of *erythrocephala* in having the palpi, venter and femora red, as well as in lacking the white beard and white tarsi. Were it not for the latter two characters, I would unhesitatingly sink *erythrocephala* as a synonym of *bicolor*, as I have now seen specimens running the complete range from the present extensively orange specimen to those completely black. *B. desecta* End., *B. lateralis* Kröb. and *B. nigra* Stone will all fall as synonyms of *bicolor*, and as Bequaert and Rengifo have indicated, the same is probably true for *erythrocephala*.

Stenotabanus jaculator Fairch.

A considerable series of additional specimens of this species enables me to describe the male and make some additions and corrections to my original description (1942, p. 309), which was drawn from old and rubbed material.

The eye in life is greenish bronze, with a single narrow and often faint median dark stripe. All tarsi and apices of fore tibiae are blackish, the legs otherwise being yellowish brown. The degree of infuscation

along the fore border and apex of wing varies somewhat, being quite intense in some specimens. The ground color of thorax and abdomen is usually dark olive, darker than stated in the original description. In perfectly preserved specimens the thorax is clothed with sparse brassy hairs. The vestiture of the abdomen consists of a fine silvery grey pollinosity on the first two segments, lacking on the remaining segments, and of rather sparse hairs, black for the most part, but with pale brassy hairs forming rather broad middorsal triangles on the first to fifth tergites, and patches on the posterolateral angles of all tergites. Beneath the sternites are thinly greyish pollinose and pale haired. The vestiture is sparse and easily rubbed off.

The male is somewhat paler and more hirsute than the female, but is easily associated on color characters. The eyes are entirely bare, holoptic, rather enlarged with a well demarcated area of enlarged facets occupying about one-half the total eye area. The small facets are bronzy green, the large facets brown. There is a well developed vertical tubercle with vestiges of at least the anterior ocellus. The antennae are more slender than in the female, and the subepaulet bears fewer macrotrichiae.

Neotype and *neotype*, males, La Victoria, Cerro Jefe, Panama Province, Panama, 2200 ft. elev., 20 April, 1949. Taken in a mosquito light trap. H. Trapido and P. Galindo colls. To be deposited in M. C. Z.

This little species has proven to be exceedingly abundant at this locality. A series of 14 ♀ were taken 24 March, 1946, and over 50 on various dates during March and April, 1949; 7 ♀ were taken in the light trap with the males. Most of the females were taken at platforms built in the trees, from 23 to 71 feet above ground level. A single specimen is also at hand from El Valle, Coclé Province, 16 June, 1946.

Stenotabanus frondicolus sp. nov.

Figs. 5, 5a, 5b

Length, 9.5-11 mm., wing, 10-11 mm. Frons dark golden yellow pollinose. Frontal callus black, nearly as wide as frons, gradually narrowed above into a slender ridge nearly reaching vertex. Vertical tubercle prominent, with 3 well marked ocelli, the vertex with unusually dense stout black setae. Eyes bare, in life bright brick red, with a single narrow green transverse band, fading on death to dull bronzy. Subcallus, fronto-clypeus and genae yellow pollinose, the last with sparse whitish beard. Antennae moderately slender, brownish, black haired. Proboscis short, much less than head height, but little longer than palpi, the labella fleshy.

Mesonotum blackish with four somewhat grey pollinose stripes, whose intensity varies with the light incidence. Hairs black on dark parts, brassy on the pale stripes. Scutellum pale pollinose, with dark hairs in the middle and brassy hairs around the margin. Pleura steel-grey pollinose, mostly pale haired, except a tuft of black hairs in the middle. Legs wholly black and black haired. Wings with subepaulet pointed and with fairly abundant macrotrichiae. Wings greyish hyaline with small but distinct clouds on fork of third vein and end of

discal cell. Abdomen above black in ground color, rather thickly overlaid with somewhat iridescent bluish pollinosity. This is very pronounced on the first tergite, less so on succeeding segments, where it is more or less confined to the posterior two-thirds of the tergites. The tergites are mainly black haired, except the first, which is wholly silvery haired at the sides. There is also a series of median silvery haired triangles on the second to sixth tergites and lateral patches of silvery hairs on the sides of the same tergites. Beneath the abdomen is black, mostly bluish pollinose and with all sternites with complete transverse bands of silver hairs. The insect in life bears a remarkable resemblance to a scarophagid fly.

This species belongs to a group including *tantulus* Hine, *muscoideus* Hine, *plenus* Hine and *modicus* Hine, differing from *tantulus* in the spotted wings and more slender antennae, from *muscoideus* in yellow antennae and slender palpi, and from *plenus* in more slender antennae and differently marked wings. From *modicus*, of which I have a specimen from French Guiana for comparison through the kindness of Dr. C. B. Philip, it differs structurally very little, the antennae being slightly broader, the frontal callus shorter. It lacks the white on the bases of the front tibiae found in *modicus*, while the latter lacks thoracic stripes and any abdominal ornamentation. It may well prove to be a race of *modicus*. *St. maruccii* Fehld. 1946 is also close, but may be separated from the present species on the thoracic ornamentation, the broader, more parallel-sided frons, and larger frontal callus.

Holotype female, Progreso, Chiriqui Prov., Panama, 20 July, 1950; 9 female *paratypes*, same locality, 16 June (1), 28 July (1), 3 August (3), 17 August (1), 31 August (1), 9 Nov. (1), 16 Nov. (1); 7 female *paratypes*, Sta. Fe, Veraguas Prov., Panama, 18-23 May (1), 29 May (1), 31 May (3), July (1), 10 Aug. (1).

With a few exceptions, all the specimens were taken at platforms built in the tree tops in heavy forest, from 36 to 83 feet above ground level.

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

Figs. 6, 6a, 6b

Female.—Length 10.5-11.5 mm., wing 8.5-9.5 mm. Eyes bare, in life dull blackish with three dull greenish-bronze transverse bands. Frons greyish-brown pollinose. Frontal callus black or dark brown, quite protuberant and shiny, irregularly trilobulate above, wider than high and as wide as frons. No median callus or vertical tubercle, though in some specimens a small denuded area is discernible at the vertex. Subcallus, face and genae dull greyish brown pollinose, the genae with sparse pale hairs. Antennae yellowish brown, the first two segments with scattered black hairs, not produced above. Basal plate of third segment nearly round, the dorsal angle hardly evident. Annulate portion nearly as long as basal plate, the annuli stout. Palpi white, black and white haired, rather inflated. Proboscis short, hardly exceeding palpi, blackish, the labella membranous.

Mesonotum and scutellum light greyish brown, faintly striped, thinly clothed with short whitish hairs. Pleura and sternum pale greyish brown, sparsely white haired. Wings with subepaulet bare, costa and first vein with macrotrichiae above, but subcosta bare.

Wings hyaline including costal cell, but with a barely perceptible darkening around cross-vein and fork of third vein, which bears an appendix. Veins blackish, stigma pale yellowish. Legs wholly pale brown, mostly pale haired, though the tips of fore tibiae and all tarsi dark haired. Abdomen pale greyish brown, concolorous with thorax, the pollinosity paler along the hind margins of all tergites and with a paler middorsal pollinose stripe covering second to sixth tergite inclusive. The paler areas are covered with short silvery white hairs, the darker areas with blackish hairs. Venter similarly pale brownish, unmarked with sparse pale hairs.

Holotype female and four female *paratypes* taken attempting to bite the author along the beach between Old Fort San Lorenzo at the mouth of the Chagres river and the village of Pina, Colon Province, Panama, 23 May, 1948. Four female *paratypes*, Nuevo Chagres, Colon Province, Panama, 5 Feb., 1951, biting man on beach. The name is taken from the generic name of the Pineapple, *Ananas*, as Pina, the type locality, means pineapple in Spanish.

The species is quite close to *St. changuinolae* Fchld., and like it is related to *St. laevicallus* Szilady and *St. jamaicensis* Newst. From the first it may be separated by the more convergent frons, higher callus and more inflated palpi, and from the last two by unicolorous and differently shaped antennae, unicolorous legs and less obviously spotted wings. The eye pattern is rather different from *St. laevicallus*, more like that found in *St. psammophilus* O. S. from Florida.

Tabanus (Philopotabanus) keenani Fchld. 1946

A second specimen of this species (La Victoria, Cerro Jefe, Panama Province, Panama, 1 Sept. 1950, P. Galindo coll., taken at light in a Shannon trap) shows that the fourth tergite bears a broad silvery haired mid-dorsal triangle, and the sides of the second to fourth tergites also bear silvery hairs. The type is not now before me, but may have been rubbed, which would account for the absence of these easily lost hairs.

Tabanus (Philopotabanus) inauratus Fchld. 1946

Two additional females of this species (La Victoria, Cerro Jefe, 15 March, 1949, and Sta. Fe, Veraguas, 18 July, 1950) enable me to make some corrections and additions to the original description. The eyes are bright emerald green in life, not blackish green as stated. The former observation was made on a specimen dead several days. In addition to the patches of golden hairs on the mesonotum at the transverse suture, there are scattered golden hairs on the anterior part of the mesonotum. In addition to the white hairs on sides of first and second tergites, this patch is extended onto the anterior part of the third tergite. The venter is slate grey rather than black, black haired, but with scattered white hairs on middle of tergites I to IV.

Tabanus (Lophotabanus) fumomarginatus Hine

Figs. 7, 7a, 7b

Tabanus fumomarginatus Hine, 1920, Ohio J. Science, 20 (8): 315-316 (3 ♀; Rio Caiary, Vaupes, Amazonas, Brasil); 1925, Occ. Pap. Univ. Michigan, no. 162 p. 28 (in key only). Fairchild, 1942, Psyche, 49 (1-2): 16 (type seen).

Two ♀, La Victoria, Cerro Jefe, Panama Province, R. P., 6 and 16 May, 1950. These specimens agree well with Hine's description and with the notes I made on the type in 1940. The species is close to *pseudoculus* Fchld., but with a broader frons and more slender antennae. The face, frons and subcallus are golden yellow pollinose, the beard orange yellow and the palpi and legs orange haired, rather than black and white haired. The fore tibiae are not bicolored. The widening of the fore tarsi described by Hine is present, but other species of the group, as well as unrelated tabanids, also possess this character. The wings are quite fumose, especially the basal cells, costal area and along all veins. There is no appendix to the fork of the third vein and the first posterior cell (R_5) is hardly narrowed. The abdomen is dark orange brown, black haired dorsally except for small golden haired triangles on all tergites and copper haired lateral margins. Beneath the abdomen is wholly copper haired, except the extreme tip, which has upstanding black hairs.

Leucotabanus pauculus sp. nov.

Figs. 10, 10a, 10b

Female.—Length 8.5–9.5 mm., wing 7.5–9 mm. Frons about eight times as high as wide at base, broader at vertex, brownish grey pollinose. Callus club-shaped, black, narrower than frons and prolonged above in a slender line nearly to vertex. Vertical tubercle prominent, with prominent vestiges of ocelli. Subcallus yellowish grey, fronto-clypeus and genae silvery grey pollinose, the latter with sparse white beard. Eyes bare, probably unicolorous blackish in life. Antennae wholly black, as figured. Palpi rather slender, pale with greyish pollinosity and mostly white hairs, though there may be some black hairs intermixed, especially towards the tip. Proboscis about length of palpi, black, the labella large and without shiny sclerotized plates.

Mesonotum blackish, sparsely black haired on disk. Sides from the prothoracic lobes to and including the scutellum, pale greyish pollinose, white haired. Pleura and sternum pale greyish, sparsely white haired. A black-haired band extends forward from the wing bases to the anterior spiracle. Coxae, femora and tarsi all black, black haired. All tibiae with the basal two-thirds to three-fourths white and white haired. Wings hyaline or faintly fumose, the costal cell yellowish, stigma black. Subepaulet, costa, subcosta and first vein with macrotrichiae above; no appendix on third vein.

Abdomen above black and black haired. All tergites narrowly pale behind, but only the first, second and fourth with white hairs. On the first these are limited to the sides, on the second and fourth they form complete but narrow bands. First and second sternites largely greyish and white haired, the rest black with white haired hind marginal bands.

Holotype female, Currealinho, Para, Brasil, 1936, H. W. Kumm Coll.; 1 ♀ *paratype*, Tabatinga, Amazonas, Brasil; 1 ♀ *paratype*, Vaupes region, Colombia, April, 1942, Gast Galvis coll.

This little species keys out with *L. ambiguus* Stone and *canithorax* Fchld. in my key to the genus (1941). It differs from both in much

smaller size, unstriped mesonotum and in structures of the head. It superficially resembles *leucaspis*, but is smaller and with pale palpi and different frons and antennae.

***Leucotabanus weyrauchi* sp. nov.**

Figs. 11, 11a, 11b

Female.—Length 11–13 mm., wing 10.5–11 mm. Frons about six times as high as basal width, pale-grey pollinose. Callus orange brown, drop-shaped, extended above in a narrow line nearly to vertex. (Through an oversight the figure shows the callus as black.) Vertical tubercle prominent, with hardly discernible traces of ocelli. Eyes bare, probably unicolorous blackish in life. Subcallus, fronto-clypeus and genae whitish pollinose, the last with a white beard. Antennae as figured, the first two segments reddish brown, black haired, the third segment wholly black. The prominently produced dorsal angle of the first segment and the wide and deeply excised third segment are characteristic. Palpi slender, yellowish white, white haired basally, black haired on about the apical half. Proboscis black, about as long as palpi, the labella large and without shiny sclerotized plates.

Mesonotum rather denuded in both specimens, light chestnut brown in ground color, apparently with four pale stripes, the median pair narrowly separated from each other. Sides of mesonotum and scutellum whitish pollinose, apparently with long white hairs, of which only vestiges remain. A few black hairs before the wing bases, hardly abundant enough to form a stripe. Pleura and sternum pale pollinose, white haired. All coxae, fore femora, tips of tibiae and tarsi blackish and black haired. Mid and hind femora, basal half of fore tibiae, and basal three-fourths or more of mid and hind tibiae orange yellow, white haired. Wings, including costal cell, hyaline; stigma slender, yellowish; subpaulet, costa, subcosta and first vein with macrotrichiae.

Abdomen light chestnut brown in ground color. First tergite dark haired dorsally, white haired at the sides. Second tergite with a broad mid-dorsal white triangle which barely fails to join the lateral white hind-marginal patches of the segment. Third, fifth and sixth tergites with smaller mid-dorsal white triangles and extreme lateral margins white haired. Fourth tergite with a white-haired transverse band three-fourths the width of the segment and wider at the middle and sides. Otherwise the tergites are black haired. The pollinosity appears to be pale brownish throughout, but it may be darker or sparser beneath the black haired areas. Beneath the abdomen is pale tan pollinose, wholly white haired. Terminal segment not laterally compressed as in *leuconotum* Fchld.

Holotype female, Zamora, Ecuador, Nov., 1941, D. B. Laddey coll.; 1 female *paratype*, Tingo Maria (Rio Huallaga), Peru, 700 M. alt., 7 Oct., 1946, Weyrauch coll. To be deposited in the M. C. Z.

This species seems most closely related to *leuconotum* Fchld., from which it may be distinguished by the much more prominent angle on the third antennal segment, which is black instead of orange brown, the more slender palpi, and somewhat different frons. In color they are very similar, but the present species seems to be paler and has even less black on the legs.

Leucotabanus leucogaster sp. nov.

Figs. 8, 8a, 8b

Female.—Length 11.5 mm., wing 11.5 mm. Frons about three and one-half times as high as basal width, yellowish grey pollinose. Callus black, as wide as frons, covering most of frons nearly to vertical tubercle. Vertical tubercle prominent with three well marked ocelli. Eyes bare, probably unicolorous blackish in life. Subcallus, frontoclypeus and genae white pollinose the last two with long white hairs. Antennae blackish brown, the third segment rather slender. Palpi whitish, white haired at base, black haired at apex, the hairs rather long and outstanding. Proboscis black, the large labella fleshy.

Mesonotum pale brownish with darker streaks in ground color, completely covered with white pollinosity and apparently with white hairs, though most of these are now lost. Pleura, sternum, scutellum and coxae white and white haired. Femora dusky, black haired at apex and on upper surface, white haired at base and on under surface, the relative amount of black hairing greater on the fore femora. Tibiae white and white haired on basal half to three-fourths, black and black haired apically, as are all tarsi. Wings with subepaulet rather sparsely setose, the macrotrichiae mostly white. Costa, subcosta and first vein with macrotrichiae above. Wings hyaline including the costal cell, but with very faint clouding about the cross-veins and fork of the third vein, which bears a minute vestige of an appendix. Stigma broad, yellowish.

Abdomen blackish in ground color, covered with whitish pollinosity. All tergites are black haired basally and bear broad, complete, transverse hind-marginal bands, wider in the middle and at the sides, of long silvery white hairs. Venter dark grey, dark haired except for narrow white haired margins to all sternites.

Holotype female, Itatiaya, Est. Biologica, 22 Jan., 1927, 1100 M. Alt. Sao Paulo, Brasil.

This species is close to *albibasis* Brethes, being practically identical in size and color. The frons is rather broader, however, and the callus, although of the same type, is much more extensive, while the third antennal segment is considerably more slender. It is possible that this is but a mountain form of *albibasis*, but more material would be needed to decide the point.

Tabanus (Taeniotabanus) picicallosus sp. nov.

Figs. 9, 9a

Female.—Length 10 mm., wing 8.5 mm. Eyes (relaxed) bluish green with two narrow, median, transverse bands and the margins dark purple, bare. Frons yellowish grey pollinose, the pollinosity more brownish in the area of the median callus, black haired.

Frontal callus black, rather flattened and wrinkled, (though this character not well shown in the figure) more or less quadrangular; median callus spindle-shaped, connected to the basal by a slender line in one specimen, more broadly in the other. No vertical tubercle. Subcallus black, shiny, greatly inflated, separated from the basal callus by a pollinose area about half the height of the latter. Face

and cheeks grey pollinose, white haired. First antennal segment yellow, black haired, triangular and quite strongly inflated. Second not as wide as first, with a blunt tooth above. Third wholly orange yellow, the basal plate quite broad, the dorsal angle obtuse. Annuli together about half length of basal plate. Palpi not as long as proboscis, moderately inflated, light grey pollinose and black haired. Proboscis less than head height, brownish, the labella large and membranous.

Mesonotum blackish, thinly greyish pollinose, paler anteriorly and with sparse golden and blackish hairs forming indistinct stripes. There are also scattered iridescent scale-like hairs. Scutellum concolorous. Pleura and sternum grey pollinose, sparsely white haired. Legs wholly yellowish; all coxae white haired; fore femora wholly black haired, mid and hind femora black haired above, pale haired below. Fore tibiae silvery white haired on basal half, black haired on apical half, mid and hind tibiae black haired above, pale haired below; all tarsi brownish, black haired. Wings dilute smoky, more intense beyond stigma along fore border. No appendix on fork of third vein. Abdomen black, the first and second segments very dark reddish brown, all black haired except for a narrow continuous mid-dorsal white stripe from first to sixth tergites, slightly widened on the hind margins of the tergites, and broken, narrow, white dorsolateral stripes on the first to third tergites. Sides of tergites narrowly white. Venter slate grey, mostly white haired.

Holotype female, Tingo Maria, Peru, 670 M. alt., April, 1947, Weyrauch coll.; 1 ♀ *paratype*, same locality, January, 1947.

This species differs from all others of the *callosus* group known to me in the broader frons and combination of pale legs, black abdomen and fumose wings. It will run in my key (1942, p. 155) to *fumatipennis* Kröb., from which it can be separated by the wholly pale legs and much broader frons.

Tabanus pruinosus Bigot

1892, Mem. Soc. Zool. France, 5: 683 (♂, Mexico). Philip, 1947, Amer. Mid. Nat., 37 (2): 312 (synonymy, type seen); 1950, Ann. Ent. Soc. Amer., 43 (1): 116, fig. 2c (antenna and palp).

Tabanus vivax Townsend 1892, Trans. Kansas Acad. Sci., 13: 135. Not *T. vivax* O. S., 1876.

Tabanus limpidipennis Hine 1907, Ohio Nat., 8: 223 (♂, ♀; Guatemala).

? *Tabanus schmidti* Kröber, 1931, Konowia, 10 (4): 292 (♀; nr. San Jose, Costa Rica); 1934, Rev. Ent., 4 (3): 314.

A single female (Bambito, Chiriqui Volcano, Chiriqui Prov., Panama, Jan., 1948) has the following characters. Eyes entirely bare, in life purple with two parallel transverse green bands. Frons moderately broad, about three and one-half times as high as wide, with a rounded brown callus. Vertical tubercle represented by a shiny area showing sunken vestiges of three ocelli. Subcallus pollinose, without hairs. Antennae black, the first segment rather inflated. Palpi inflated basally, slender tipped, pale brownish, clothed with mixed white and black hairs. Proboscis black, a little longer than palps, the labella large and fleshy. Wings with subepaulet, costa, subcosta and first vein setose, no appendix on fork of third vein, entirely hyaline with a yellowish

stigma. Legs pale brown, white haired, except the apices of fore and hind tibiae and all tarsi, which are darker and black haired. Pleura, sternum and venter of abdomen brownish, thickly pale grey pollinose, the pleura and sternum densely whitish haired. Mesonotum brownish grey, obscurely striped, with long black and short sparse coppery red hairs mixed, the latter following the light stripes. Scutellum blackish. Abdomen blackish brown, with faint narrow middorsal triangles, and the hind margins of tergites 2-5 pale grey pollinose. There is also a series of rounded grey pollinose dorsolateral spots on tergites II-VI, larger on the second. The mid-dorsal triangles bear a few yellow hairs, the dorsolateral spots are white haired, otherwise the abdomen is black haired above.

This species is rather unlike any other in Panama, being closest structurally to *Hybomitra 4-punctatus* Fab., from which it differs mainly in the entirely bare eyes. The relationship lies with a group of Nearctic species recently discussed by Philip (1950). The vertical tubercle, although hardly raised, shows better definition of the vestiges of ocelli than do many species of *Hybomitra*, so that it could be placed here without question were it not for the entirely bare eyes. I had determined the specimen as *T. schmidti* Kröber from the description, but Dr. Philip after examining it writes me that it is *pruinus* Bigot. The two names are probably synonymous. I have also seen another specimen, also determined by Dr. Philip, from the West Coast of Nicaragua, erroneously reported by me as *T. dunni* Fchld. (1942, p. 472). *Pruinosus* thus ranges from Mexico south to western Panama.

Tabanus lucidulus Walker

1848, List Dipt. Ins. Brit. Mus., 1: 188. Bequaert, 1940, Rev. Ent., 11 (1-2): 347-349, fig. 28 (synonymy).

While in Jamaica in the spring of 1949, I had the opportunity, through the kindness of Mr. C. B. Lewis, the Curator, to examine the Tabanidae in the collections of the Institute of Jamaica in Kingston. There was a pair of what I take to be *T. lucidulus* Walk. as well as a considerable series of *T. townsendi* Johns. The female *lucidulus* (Morces Gap, St. Andrews, 22 Aug., 1942, L. Perkins Coll.) measured 13 mm. in length, hence larger than any measurements for this species given by Bequaert (1940, l.c.). It agreed, however, with his description and figures, except for having an orange brown beard. A considerable series of the same species taken attacking a horse at Cornpuess Gap, St. Thomas, 27 May, 1949, by Dr. Trapido and myself are all small, 11 mm. or less, and have sparse whitish beards. The male specimen in the Institute's collection (Cinchona, St. Andrew, 29 Aug., 1942, J. C. Jury coll.) is even larger, 14 mm., in this agreeing with *obumbratus* Bequaert. It agrees in coloration, however, with the female from Morce's Gap, including the orange brown beard. The subepaulet bears macrotrichiae, the eyes are entirely bare, the area of enlarged facets a little over one-half the eye area and fairly well demarcated from the small facets. There is no vertical tubercle. The wings are paler than in the female, hardly infuscate, the spotting weak, and there is no appendix on the upper fork of the third vein.

The collection of fresh material of *lucidulus* shows the eyes to be bronzy in life with a single quite broad median black band. The abdomen, even in the freshest specimens, is quite thinly clothed, subshiny, dull yellowish brown, paler on the anterior segments, clothed with sparse dark hairs, and with broad whitish haired median triangles on the first to sixth tergites. These triangles do not appear to reach the anterior border of the segment except on the second tergite. The wings are rather variable in my series, some being quite yellow with clearer fenestrac in some of the cells, others paler and without fenestrac. The spotting of the cross veins is weak in all, barely perceptible in a few specimens.

***Stenotabanus (Aegialomyia) jamaicensis* (Newstead)**

Atylotus jamaicensis Newstead, 1909, Ann. Trop. Med. Parasit., 3: 465.

Three specimens of what appear to be this species, hitherto known only from the types, were taken on Palisadoes beach, Kingston Harbor, Jamaica, 23 May, 1949. The day was windy and the flies scarce and hard to net. They rested on the grey sand of the beach at high tide mark, flying up like Cicindelidae on one's approach. They made no attempt to bite. Mr. Lewis informed me that they had been quite abundant there earlier in the year. Subsequently Mr. Lewis sent me a specimen taken on North East Morant Cay, 20 June, 1949. This is a small island lying about 45 miles South East of the eastern tip of Jamaica.

All these specimens agree among themselves. Compared to the descriptions of *laevicallus* and *jamaicensis* given by Bequaert (1940) they agree best with the former. My smallest specimen is 11 mm., the largest 14 mm. The eye in life is pale glaucous green, almost pearly, crossed in the middle by two narrow bands of reddish purple which coalesce near the outer margin of the eye. The upper and lower margins are also largely reddish purple, somewhat intermixed with greenish. The specimens are wholly steel grey in color, thickly pale grey pollinose and wholly pale haired. They appear quite brownish when greasy, a condition developing quite frequently in species of this group, especially when stored in the tropics. My notes were made on the fresh material.

The only marked distinctions between the two species seem to be the eye color and the size. Newstead may have drawn his description from a relaxed or not freshly caught specimen. Port Royal is on the tip of Palisadoes beach, so my material is practically topotypical. More extensive material of this group of Antillean beach-inhabiting species may well show that all belong to a single species with more or less well marked insular races.

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