SMITHSONIAN
MISCELLANEOUS COLLECTIONS

VOL. III QUARTERLY ISSUE PART 3

THE SPECIES OF MOSQUITOES IN THE GENUS MEGARHINUS

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Since the publication of our paper on the classification of the Culicidæ by larval characters[1] we have had access to the adult material brought together for Dr. L. O. Howard's forthcoming monograph of the family. The result has been not only a change in the interpretation of the forms of *Megarhinus* previously dealt with by American writers, but also the bringing to light of many discrepancies in the European literature of the group. To begin with we will correct the prevailing error regarding the structure of the female palpi of *Megarhinus*. Theobald describes two forms (*M. purpureus* Theob. and *M. trichopygus* Wied.) in which the female has four-jointed palpi, the last segment long, tapering and slightly curved like the fifth of the male palpi.[2] When there was no such terminal segment present he assumed the last segment to be broken off. Therefore in his diagnosis of the genus he says: "the female palpi are 4- or 5-jointed."[3]

A careful search through Mr. Theobald's descriptions does not reveal any female with a fifth segment on the palpi. Indeed, in two places, in the descriptions of the females of his *M. separatus* and *portoricensis* he describes the four-jointed palpus and adds "last joint missing."[4] The females of the seven species of *Megarhinus* before us have palpi of the type supposed by Theobald to be imperfect. Bred perfect specimens and close inspection show that there are only four segments present in the female. The terminal segment in these forms is rather stout, of about equal length with the

[1] The larvæ of Culicidæ classified as independent organisms. *Journ. N. Y. Entomological Soc.*, v. XIV, pp. 169–230 (1906).

[2] Monograph of the Culicidæ, v. I, pp. 230–231 (1901); v. 3, pp. 115–116 (1903).

[3] *L. c.*, v. I, p. 215.

[4] *L. c.*, v. I, p. 221 and p. 233.

second segment or slightly shorter, cylindrical, straight-sided and truncate at the tip. The apex has a surrounding crest of scales and short spines which indeed gives it, superficially, the appearance of a broken joint, but close examination shows the tip, within the surrounding crest, to be densely clothed with metallic scales—a condition which would certainly not obtain on the insertion of another segment. This error was already committed by Macquart, who credits the female *Megarhinus hæmorrhoidalis* with five-jointed palpi and explains in a foot-note: "Un individu ♀ du muséum d'histoire naturelle a le 5.e article des palpes brisé, de sorte qu'il n'est pas possible d'en déterminer la longueur."[1] In the figure of the female head on Pl. I he shows the four actual segments in heavy outline, and, dotted in, the supposed fifth segment. Dr. Lutz, in Bourroul's work, which we know only from the extracts in Blanchard,[2] seems to have recognized the true condition. He erects for the forms in which the female has the terminal segment of the palpi long, sabre shaped, the genus *Ankylorhynchus,* including *M. violaceus, M. trichopygus* (Wied.) and a new species, *A. neglectus.* In the two sexes the relative proportions of the corresponding palpal segments do not agree. These relative proportions appear to serve very well in the separation of the two forms (at least in the male) treated by Lynch-Arribálzaga[3] and subsequent authors as *M. separatus* and *M. hæmorrhoidalis* but offer no easy distinctions in the closely related forms here described.

It should be noted that all the old world Megarhini of which the structure of the female palpi has become known have been referred to *Toxorhynchites,* while all the American forms belong to *Megarhinus* and *Ankylorhynchus.* The only exception is the *Culex splendens* of Wiedemann from the East Indies, which Theobald has definitely referred to *Megarhinus*[4]; however nothing has appeared in print to throw light on the structure of the female palpi in this species. According to Theobald there are no characters to separate the males of these genera. "We will not say that these genera should be merged, for good characters may yet be found to separate the males as well, but certainly they do not deserve sub-family rank. We have already expressed our views regarding the use of the length of the palpi for primary division in the Culicidæ.[5]

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[1] Diptères exotiques, v. 1, p. 32 (1838).

[2] Les Moustiques, 1905.

[3] Revista del Museo de La Plata, v. 1, pp. 376–377; v. 2, pp. 133–134 (1891).

[4] Genera Insectorum, 26 fascicule, p. 13 (1905).

[5] *Journ. N. Y. Ent. Soc.,* v. XIV, pp. 171–172.

The canvas of the literature involved in these studies has revealed a strange condition regarding the status of the oldest species and the type of the genus, the *Culex hæmorrhoidalis* of Fabricius. Arribálzaga discovered that there were two very similar species and described one of them as new. Unfortunately the form he described as new, under the name *Megarhina separata,* is the Fabrician *hæmorrhoidalis*—or at least it comes nearest to it of the two. Arribálzaga argued that the species Macquart described[1] could not be *hæmorrhoidalis* because the females had white-ringed tarsi while the females of his (assumed) *hæmorrhoidalis* showed no trace of such markings. His *separata* was described from the male alone and as he says nothing of the female it must have been unknown to him. Macquart's specimens unquestionably represent the true *hæmorrhoidalis* for they came from the type-locality, Cayenne, and the neighboring British Guiana, and in the description he definitely states that the third and fourth segments of the palpi are of equal length in the male. The hind tarsi of his females are white-ringed. Thus the *M. hæmorrhoidalis* of Arribálzaga and subsequent authors is the new species and is characterized by the long third segment of the palpi of the male and the absence of white on the tarsi of the female. In his table of *Megarhinus*[2] Theobald attributes white-ringed tarsi to the females of both species, but as no description of the female of his *hæmorrhoidalis* follows we take this to be merely an assumption. Giles's statement, under *M. hæmorrhoidalis,*[3] that the middle and hind tarsi of the female are white-ringed seems to be an error of compilation, for his remarks do not appear to have been based upon specimens. We propose for this form the name *lynchi.* The references and synonymy of the two species should stand as follows:

MEGARHINUS HÆMORRHOIDALIS (Fabricius)

Culex hæmorrhoidalis FABRICIUS, 1794, Entomologia Systematica, v. 4, p. 401, no. 5.

Culex hæmorrhoidalis, FABRICIUS, 1805, Systema Antliatorum, p. 35, no. 8.

Megarhinus hæmorrhoidalis, ROBINEAU-DESVOIDY, 1827, Mémoires de la Soc. d'hist. nat. de Paris, v. 3, p. 412.

Culex hæmorrhoidalis, WIEDEMANN, 1828, Aussereuropäische zweiflügelige Insekten, v. 1, p. 2.

Culex hæmorrhoidalis MACQUART, 1834, Histoire naturelle des Insectes, Diptères, v. 1, p. 33.

Megarhina hæmorrhoidalis MACQUART, 1838, Diptères exotiques, v. 1, p. 32.

[1] Diptères exotiques, v. 1, p. 32 (1838).

[2] Mon. Culic., v. 1, p. 218.

[3] Gnats or Mosquitoes, 2 ed., p. 270 (1902).

Megarhina separata LYNCH-ARRIBÁLZAGA, 1891, Revista del Museo de La Plata, v. 2, pp. 133–134.

Megarhinus separatus THEOBALD, 1901, Monograph of the Culicidæ, v. 1, pp. 219–221.

Megarhina separata GILES, 1902, Handbook of the gnats or mosquitoes, 2 ed., p. 270.

Megarhinus hæmorrhoidalis (in part), *M. separatus* BLANCHARD, 1905, Les Moustiques, pp. 222–223.

Megarhinus separatus GOELDI, 1905, Os mosquitos no Pará, pp. 124–127, Pl. N & Pl. 5, fig. 19.

MEGARHINUS LYNCHI new name

Megarhina hæmorrhoidalis LYNCH-ARRIBALZAGA, 1891, Revista del Museo de La Plata, v. 1, pp. 376–377.

Megarhinus hæmorrhoidalis THEOBALD, 1901, Monograph of the Culicidæ, v. 1, pp. 222–223.

Megarhina hæmorrhoidalis (the male only) GILES, 1902, Handbook of the gnats or mosquitoes, 2 ed., p. 270.

Megarhinus hæmorrhoidalis BLANCHARD, 1905, Les Moustiques, p. 222.

A critical examination of our specimens of *Megarhinus* with white tarsal markings shows that Mr. Coquillett, in his characterization of *M. rutila* and *portoricensis*,[1] has included and confused a number of closely related species. Indeed, the entire literature on these forms is in a most unsatisfactory condition, as we shall point out in detail in the course of the following remarks. Doubtless the trouble has largely arisen through the use of scanty and damaged material, but also through a lack of discrimination in the identification of the early descriptions.

We now have before us no less than 60 specimens of *Megarhinus* with white tarsal markings, a larger number by far than has ever before been available together, and this study has brought to light the existence of a number of closely related species. Great confusion has been caused by basing the diagnosis on the tarsal markings without reference to sex. We find that when the sexual differences are taken into account the tarsal markings are a useful guide in the diagnosis of the species and are a much more constant character than has been supposed. The fact that among the material from the North American continent there were no females which would fit the diagnosis of *portoricensis* should have aroused suspicion, but the small number of female specimens available would account for this oversight. The material before us shows that no less than six distinct

[1] A classification of the mosquitoes of North and Middle America. By. D. W. Coquillett. Technical Series, No. 11, U. S. Dept. Agric., Bureau of Ent., p. 14 (1906).

forms have been included under the two specific names given above. Of these six species the only one that we can safely refer to any described species is *M. rutila* Coquillett, of which the type is before us. *M. portoricensis* was described by von Röder[1] from a single male and the description is not sufficiently detailed to warrant identification without material from the type-locality. The three specimens, from widely separated localities, which Theobald had before him in drawing up his description of *portoricensis*[2] most likely represent as many distinct species, while his supplementary remarks[3] doubtless apply to still another. Von Röder's single male had the fourth segment of the hind tarsi only white, Theobald gives in his diagnosis of the species: "Legs steel blue, golden beneath the femora, penultimate tarsal joint white," and apparently meant to include all the legs. In his concluding "observations" however, he says: "The penultimate tarsal joint of the hind legs only is white in this species." It remains to be seen if in the true *portoricensis* this is true for the female as well as the male. Of Mr. Theobald's three specimens one was Walker's *M. ferox* from Georgia.[4] This specimen, most likely a broken one, is certainly wrongly associated with *portoricensis* and in all probability is the *M. septentrionalis* described here. Certainly in the 50 specimens of *Megarhinus* from the North American continent now before us there is no specimen with only the hind tarsi marked with white. In all probability the two specimens from the island of St. Vincent, referred by Williston to *portoricensis,*[5] represent a distinct form. Of the material in our collection from three of the West Indian islands the specimens from each island represent a distinct species and it is safe to assume that specimens from other islands will likewise prove distinct.

Neither can the *Culex ferox* of Wiedemann[6] be placed with certainty. The description is from a male in which the hind tarsi were absent. The third segment of the middle tarsi is white. In a supplementary note Wiedemann describes a male in the collection of Mr. von Winthem in Hamburg, which most likely was distinct from the previously described one. The fore legs were missing; the second and third segments of the middle tarsi are white, and the fourth of the hind tarsi. Theobald translates this note and wrongly credits it to

[1] *Entomologische Zeitung., entom. Vereine Stettin.*, v. 46, p. 337 (1885).
[2] Monograph of the Culicidæ, v. 1, pp. 232–233 (1901).
[3] *L. c.*, v. 3, p. 119.
[4] List of Dipterous insects in the British Museum, part 1, p. 1 (1848).
[5] *Transactions Entom. Soc., London,* 1896, p. 271.
[6] Aussereuropäische Zweiflügelige Insekten, v. 1, pp. 1, 2 (1828).

Giles.[1] As Mr. Theobald does not use the same terminology for the tarsal segments it will be seen that the species Theobald describes as *ferox* is distinct from that of Wiedemann. In Theobald's *ferox* the female has the second and third tarsal segments white on the front and middle legs, the fourth and fifth in the hind legs. In the male the fore tarsi are black, the hind tarsi with the fourth and fifth segments white, the middle tarsi missing. Although both of Wiedemann's males and the one described by Theobald, each had the tarsi of one pair of legs gone, careful comparison shows that the tarsal markings were different in all of them. There is some doubt about the fore and middle tarsi of the female of Theobald's form, for in the first diagnosis of the species the middle tarsi are omitted while in the full description which follows the front tarsi remain unmentioned. Theobald's species is obviously distinct and we propose for it the name *theobaldi. Culex ferox* Wiedemann is preoccupied by the earlier unrecognized *Culex ferox* von Humboldt[2] and we propose for Wiedemann's two forms the names (no. 2) *ambiguus* and (no. 1) *wiedemanni.*

Williston's *Megarrhina grandiosa,*[3] based upon a female from Omilteme in the state of Guerrero in Mexico, appears to have all the tarsi marked with white but the white is much more extensive than in any other species. In the fore legs the tip of the first and all of the succeeding segments are white, the middle tarsi were apparently missing, and in the hind legs the tip of the third, the fourth and the fifth segments are white.

Megarhinus longipes, Theobald,[4] from Mexico, is based on a single female. In the tarsal markings it appears to come very near *M. rutila* Coq., but the description shows that it differs in many points. The tip of the abdomen is yellow, the ventral surface apparently all golden-scaled. The predominating colors appear to be olive green and yellow shades.

None of the species mentioned so far show a pronounced caudal tuft. In the male of *septentrionalis* there is a faint approach towards it. The lateral hairs are slightly longer and coarser on the sixth and particularly on the seventh segments than on the preceding ones.

The *M. purpureus* of Theobald,[5] afterwards referred by him to the *violaceus* of Wiedemann,[6] also has at least some of the tarsi of

[1] Monogr. Culic., v. 1, pp. 237–239 (1901).
[2] Voyage aux regions équin. du nouv. Continent, VII, p. 340 (1819).
[3] Biologia Centrali Americana, Diptera, v. 1, p. 224 (1900).
[4] Mon. Culic., v. 1, pp. 241–242 (1901).
[5] Mon. Culic., v. 1, pp. 230–231.
[6] *L. c.,* v. 3, p. 117.

the female marked with white. However the structure of the female palpi at once separates this form from those considered here, a structure which Dr. Lutz has considered of generic value. Wiedemann's *violaceus*[2] was based on a male specimen from Bahia and was without any trace of white on the tarsi, as he expressly states. Of course it is quite likely that the sexes differ in this respect but it should be noted that Theobald's scanty material, all females, came from widely separated localities (Amazon, São Paulo, Santos, Rio de Janeiro), which, with the discrepancy in his remarks about the tarsi, arouses suspicion. At all events the species is to be excluded from the West Indian faunal region as the record[3] is based on a misidentified specimen from Trinidad which appears here under a new name.

Below we tabulate the species of *Megarhinus,* giving the diagnosis for the males and females separately. Although but seven species are before us we have included, as far as possible, the described species. We omit the forms treated under *ferox* by Wiedemann and Theobald, of which our knowledge is too unsatisfactory. Two other species, *M. mariæ* Bourroul and *M. solstitialis* Lutz are described in Bourroul's Mosquitos do Brasil, which we have not seen.

Table of Species

Males

1. Abdomen without conspicuous tufts.....4.
   Abdomen red-tufted .....2.
2. Abdomen red-tufted on 7th segment only .....*superbus* n. sp.
   Abdomen red-tufted on 6th and 7th segments.....3.
3. Palpi: segments 3 and 4 equal.....*hæmorrhoidalis* F.
   Palpi: 3d segment longer than 4th.....*lynchi* n. n.
4. Some or all the tarsi white-marked.....5.
   Tarsi without white.....*guadeloupensis* n. sp.
5. All the tarsi white-marked.....*rutila* Coq.
   Middle and hind tarsi white-marked.....6.
   Hind tarsi only white-marked.....*haitiensis* n. sp.; *portoricensis* v. Röd.
6. 4th segment only of hind tarsi white.....7.
   4th and 5th segments of hind tarsi white.....*trinidadensis* n. sp.
7. Thorax with well-defined yellowish median and lateral stripes, *septentrionalis* n. sp.
   Thoracic stripes blue .....*moctezuma* n. sp.

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[1] Bourroul, Mosquitos do Brasil (1904).

[2] Aussereurop. zweiflüg. Insekten, v. 1, p. 3 (1828).

[3] Coquillett, Techn. Ser., No. 11, U. S. Dept. Agric., Bur. Ent., p. 14 (1906); Dyar and Knab, Journ. N. Y. Ent. Soc., XIV, p. 179 (1906).

Females

1. Abdomen without conspicuous lateral tufts.....3.
   Abdomen red-tufted .....2.
2. Hind tarsi ringed with white ....*hæmorrhoidalis* Fab.
   Tarsi without white .....*lynchi* n. n.
3. At least the hind tarsi white-marked.....4.
   Hind tarsi without white, abdomen mostly purple and coppery-bronze, *superbus* n. sp.
4. All the tarsi white-marked.....5.
   Middle and hind tarsi white-marked.....*guadeloupensis* n. sp.
   Hind tarsi only white-marked .....*haitiensis* n. sp.
5. Segments 2 and 3 of front and middle tarsi white.....7.
   Segments 2, 3 and 4 of front and middle tarsi white.....6.
   Segments 2, 3, 4 and 5 of front and middle tarsi white..*grandiosus* Will.
6. Abdomen beneath entirely golden.....*longipes* Theob.
   Abdomen beneath with blue median area.....*rutila* Coq.
7. Thorax marked with contrasting colors.....8.
   Thorax green-scaled on the disc.....*trinidadensis* n. sp.
8. Thorax with well-defined yellowish median and lateral stripes, *septentrionalis* n. sp.
   Thoracic stripes blue .....*moctezuma* n. sp.

In the following descriptions the legs are assumed to be in their natural positions, the front legs directed forward, the others posteriorly. The measurements are for the body exclusive of head-appendages. The locality records given are all from the specimens on which the descriptions are based.

MEGARHINUS RUTILA Coquillett

The original description was obviously drawn up from material in part belonging to the form characterized here as *M. septentrionalis.* The seven specimens of *rutila* in the collection are more or less faded, and, all but the type (a male), badly damaged. The thoracic pattern is as in *septentrionalis;* the ground color is brown with coppery lustre, the light median and lateral stripes show a trace of pale blue but it is hardly possible to say what the original colors may have been.

Male.—The abdomen is deep blue above without the change to purple towards the tip noticeable in the following species. The seventh segment has the hind angles touched with gold and the eighth shows a couple of bright mauve spots. Beneath the median area is dark blue, the lateral stripes golden—these last are broadened on the seventh segment, leaving only a narrow stripe of blue, while the eighth segment is all blue. Lateral hairs pale yellow on all but the eighth and ninth segments, where they are dark.

Legs dark, the hind femora only with a trace of gold beneath; front tibiæ with a trace of golden on the outside. Front and middle tarsi with the second and part of the third segments white; in the hind tarsi the fourth and all but the tip of the fifth segments white.

Female.—The palpi are greenish blue and in proportion hardly differ from those of the same sex in *septentrionalis.* The second antennal segment is cylindrical and of the same diameter as the succeeding ones, less than twice as long as the third; the setæ arise from its middle, instead of near the base as in the succeeding segments, and the basal half bears upon its crest a dense cluster of erect, dark scales. Abdomen more or less green above. Lateral hairs pale yellow on all the segments, quite dense and coarse on the seventh segment where they form a kind of terminal brush. The lateral golden stripes are much broader than in the male and encroach upon the blue median ventral area.

Front tibiæ golden on the outside, the middle tibiæ on the inside. On the front and middle tarsi the tip of the first segment, all of the second and third, and nearly all of the fourth are white; on the hind tarsi the tip of the third segment, all of the fourth and all but the tip of the fifth are white.

Length, 8 mm.

Type No. 903, U. S. N. M.

Localities: Florida; Georgiana in Florida (Wm. Wittfeld).

3 ♂, 4 ♀. The record of Theobald and subsequent authors of "Georgia" is based on that of the above-mentioned town in Florida. This is the only species in which the male is known to have all the tarsi marked with white, but it will be noticed that even here there is a reduction in the white markings of the male.

MEGARHINUS SEPTENTRIONALIS new species

Male.—Head behind the eyes metallic blue, at the sides and beneath yellowish silvery. Antennæ densely plumose; second segment stout, laterally compressed, nearly as long as the next three and clothed on the upper part with golden and purple scales. Palpi dark violet; the second, third and fourth segments with many golden and iridescent scales, their apices pale violet; terminal segment nearly black. Second and fourth segments of about equal length, the third longer, the fifth about twice as long as the fourth. Prothoracic lobes light metallic blue. Mesothorax deep purple on the disc, the sides and a median stripe yellow, clearly defined. A patch of blue scales over the roots of the wings. Scutellum edged with silvery yellow scales broadened to patches at the sides. Pleuræ and

coxæ clothed with pale golden scales. Abdomen above dark metallic blue, the basal segment clothed with coarser lighter-colored greenish scales. Patches of golden scales at the sides of the sixth and seventh segments. Beneath pale golden, a broad median purple stripe on segments 3–7; eighth segment purple beneath, golden at the sides. Lateral cilia pale yellow except on the eighth segment and claspers, where they are dark.

Legs dark with purple lustre. The femora pale golden on the lower surface. Front tibiæ dull golden on the outside, the middle tibiæ on the inside. Middle legs with the third and part of the fourth segments of the tarsi silvery on the outer side. Hind legs with the fourth tarsal segment white.

Female.—Antennæ: second segment twice as long as the third and but slightly thicker, the basal half with a crest of erect scales. Palpi about two-thirds the length of the proboscis, four-jointed, stout, more or less laterally compressed, the third segment much thickened at the apex. Color violet-blue and purple with many pale golden scales, particularly on the sides of the second and third segments; apices of the segments pale mauve. Third segment much the longest, fourth shorter and stouter than the second, nearly cylindrical.

The abdomen is more or less greenish, passing into steel blue towards the tip. Segments 4–7 show golden spots at the sides and the sixth and seventh are finely margined behind with gold; eighth segment purplish spotted with gold. Femora and tibiæ as in the male. All the tarsi marked with white. On the first and second pair of legs the tarsi have the tip of the first, the second and the third, and part of the fourth segments white. On the hind legs the fourth and all but the tip of the fifth tarsal segments are white.

Length, 6–10 mm.

Type No. 9952, U. S. N. M.

Localities: Woodstock, Va. (F. C. Pratt), Morgantown, W. Va. (A. D. Hopkins), Washington, D. C. (J. Kotinsky), Plummer's Island, Md. (A. K. Fisher, W. V. Warner), River Township, Henderson Co., N. C. (J. L. Coker, Jr.), St. Louis, Mo. (A. Busck), Baton Rouge, La. (J. W. Dupree), Benoit, Miss. (H. S. Barber), Ringo, Indian Territory (A. N. Caudell), Skyland, Va. (Miss W. Pollock), Grandfather Mt., N. C. (F. Sherman).

13 ♂, 11 ♀. It should be noted that the markings on all the tarsi are clear white in the female. In the male the silvery markings of the middle tarsi are less distinct than the white on the hind tarsi and sometimes have to be carefully looked for. These markings are

uniform for either sex in all the specimens examined. We have seen no specimens of *Megarhinus* from North America with the front and middle tarsi entirely dark.

MEGARHINUS MOCTEZUMA new species

Male.—Head behind the eyes clothed with iridescent scales, at the sides and beneath silvery. Antennæ densely plumose; second segment longer than in *septentrionalis,* stout, laterally compressed, about as long as the three succeeding ones; heavily scaled along the crest. Palpi deep violet, on segments 2–4 scatteringly golden-scaled above and at the sides, entirely golden beneath, the apices pale lilac. Second and fourth segments of about equal length, the third longer, the fifth as long as the third and fourth together. Prothoracic lobes deep blue. Mesothorax dark brown on the disc with coppery scales; the median and lateral stripes of greenish blue scales; hind margin, scutellum and patches over the roots of the wings metallic blue. Pleuræ and coxæ silver-scaled with a tinge of yellow. Abdomen deep violet-blue, segments 6, 7 and 8 brilliant purple. First segment bright blue, more shining. Segments 2–7 with marginal golden spots, very narrow on the second segment and broadening to sixth and seventh where they become conspicuous patches. Segments 6, 7 and 8 margined behind with gold. Beneath pale golden, a narrow median blue line on segments 3–7; eighth segment entirely purple beneath. Lateral hairs pale yellow on segments 1–7, dark on the eighth and the genitalia. Legs dark with blue and purple lustre. Femora golden beneath. Front tibiæ on the outside, middle tibiæ on the inside, dull golden. Middle legs with the third tarsal segment white on the outside, a dash of silver at the base of the fourth segment. In the hind legs the fourth tarsal segment is white-ringed, black at its tip.

Female.—Antennæ: second segment somewhat longer than the third, slightly swollen basally, the basal two-thirds heavily clothed with purple scales. Palpi deep blue and purple, the segments pale at the apex; second and third segments with golden scales at the sides and beneath; second and third segments laterally compressed, the third slender at base, much thickened at apex; fourth segment stout and cylindrical, shorter than the second, the third twice as long as the fourth.

Abdomen greenish-blue merging into steel blue posteriorly, the eighth segment violet. Seventh segment finely margined with gold, eighth with terminal brush of bright yellow hairs. The hind angles

of segments 2–8 marked with gold. Beneath golden, a dark median line ends before the eighth segment.

Fore and middle legs with the second and part of the third tarsal segments silvery white; hind legs with the fourth and upper half of the fifth tarsal segments white. The white on the front tarsi is not so brilliant as in the two preceding species and in *trinidadensis*.

Length, 6–9 mm.

Type No. 9953, U. S. N. M.

Localities: Sonsonate and Izalco in Salvador, Rio Aranjuez near Puntarenas in Costa Rica (F. Knab), Antigua in Guatemala (D. G. Eisen).

16 ♂, 2 ♀. In the male the white of the middle tarsi has a tendency to become silvery and less distinct; sometimes the silver at the base of the fourth segment is absent. In three specimens the white of the third segment extends entirely around it. Although the tarsal markings are the same as those of the preceding species it can be easily separated by the coloration of the thorax and other details. Preparations of the male genitalia of the two species reveal specific differences.

MEGARHINUS TRINIDADENSIS new species

Male.—Head behind the eyes light blue with pearly lustre, at the sides and beneath silvery. Antennæ densely plumose, the second segment long and stout (stouter than in *moctezuma* and longer than in *septentrionalis*), its crest densely clothed with nearly flat purple scales. Palpi blue and purple, segments 2, 3 and 4 in certain lights largely silvery and iridescent and pale at the apices. Second segment slightly shorter than fourth, third longer; fifth as long as third and fourth together. Prothoracic lobes bright metallic blue. Mesothorax clothed with light green scales on the disc, light blue along the sides. Scutellum, ridge of scales over the root of wing and first abdominal segment brilliant greenish blue. Pleuræ and coxæ silvery.

Abdomen deep blue, purple on segments 6, 7 and 8. Beneath golden, a narrow black median line on segments 3–7, eighth segment violet. Lateral hairs pale, dark on eighth segment and genitalia.

Legs dark with blue and purple lustre; femora golden beneath; front tibiæ golden on the outside. Second segment of middle tarsi bluish-silvery on the outer side. In the hind tarsi the fourth and most of the fifth segments silver-scaled.

Female.—Antennal segments more elongate than in the preceding species. Second segment hardly stouter than the succeeding ones, slightly thickened basally, more than twice as long as the third, the basal ⅔ with a crest of dark erect scales. Palpi blue and purple with many golden scales, particularly at the sides and beneath; apices of the segments pale violet. Second and third segments laterally compressed, third enlarged at the apex, fourth nearly cylindrical and slightly shorter than second; third segment longest, not twice the length of second.

Abdomen greenish towards base, then steel blue, the eighth segment violet. Pale lateral spots, most conspicuous on segments 5, 6 and 7. Sixth and seventh segments finely margined behind with gold, eighth segment marked with gold. Abdomen golden at the sides and beneath, a narrow blue median line on segments 2–7.

Legs dark; the femora golden beneath; the middle and hind tibiæ dull golden upon the inside, the front tibiæ on the outside and passing over onto the first tarsal segment. Front and middle legs with the second and most of the third tarsal segments white; hind legs with the fourth and all but the tip of the fifth tarsal segment white.

Length, 6–10 mm.

Type No. 9954, U. S. N. M.

Locality: Trinidad (A. Busck, F. W. Urich).

3 ♀, 2 ♂. In the second male the markings of the middle tarsi are obsolete.

MEGARHINUS HAITIENSIS new species

Female.—Head above pearly blue, at the sides and beneath silvery. Antennæ: second segment twice as long as the third, hardly stouter, swollen basally, a crest of scales on the basal half. Palpi deep blue and violet with a few silvery scales, segments pale at the apex. Fourth segment cylindrical, slightly shorter than the second; third longest, nearly twice as long as the fourth. Prothoracic lobes bright blue. Mesothorax very dark blue on the disc, a median lighter blue stripe bounded at the sides by a patch of dull brown scales, the sides pale bluish. Scutellum, roots of the wings and first abdominal segment silvery blue and green-scaled. Pleuræ and coxæ silvery. Abdomen deep blue, the seventh and eighth segments violet. Sides silvery. Venter pale golden with a broad median blue area. Eighth segment with terminal bristles.

Legs dark blue and violet. Femora pale golden beneath. Hind tarsi only marked with white—the fourth segment, all but its tip.

Male.—Antennæ densely plumose; second segment stout, as long as the next three; its crest densely clothed with semi-erect scales.

Palpi blue and violet, segments 2, 3 and 4 with scattered golden scales and pale mauve apices. Second segment slightly shorter than fourth, third slightly longer; the fifth longer than the third and fourth together. Mesothorax with blue median line becoming green posteriorly and merging into the color of the scutellum. On each side of the blue median line a dull brown stripe from the front to the basal third. Well forward and close to the pale lateral stripe is a patch of very dark blue scales; behind this, along the basal half, is another stripe of dull brown. All these markings are obscured by a sprinkling of bright green scales. Over the roots of the wings are patches of brilliant blue scales. Abdomen blue, violet on the seventh and eighth segments. Light spots at the sides of some of the segments. Under side silvery with a median blue stripe, the eighth segment violet, the ninth with a silvery spot. Lateral hairs pale yellow, dark on the eighth and ninth segments.

Legs deep blue and violet. Under side of femora silvery or pale golden. Hind tarsi with the fourth segment mostly white.

Length, 7–9 mm.

Type No. 9955, U. S. N. M.

Locality: San Francisco Mts., Santo Domingo, West Indies (A. Busck).

3 ♂, 1 ♀. Bred from larvæ found in tree-holes. The male and female agree in tarsal markings and our specimens show no variation. The difference in the marking of the thorax of the female are due to abrasion, the description of the male shows the appearance in perfect specimens. This is the only species we have seen in which the tarsal markings are identical in the two sexes.

The description of *portoricensis,* as far as it goes, agrees with our species. The species is founded on a single male. Until we can compare specimens of both sexes from Portorico we assume the Santo Domingan form to be a distinct species.

MEGARHINUS GUADELOUPENSIS new species

Female.—Head pearly green and blue above, silvery at the sides and beneath. Antennæ very slender; the second segment not stouter and more than twice as long as the third, without crest of erect scales. Palpi slender, cylindrical, violet, the apices of the segments mauve; third segment laterally compressed, thickened at the apex, nearly twice as long as the fourth; fourth segment shorter than second. Prothoracic lobes bright blue. Mesothorax metallic green and blue, the two colors of about equal strength, the blue in a median line and at the sides. At the roots of the wings and on

the scutellum patches of bright, almost brassy, scales. Pleuræ and coxæ silvery with a yellowish tinge. Abdomen passing from dull greenish through blue and violet on the seventh segment to golden purple on the eighth. Eighth segment with dark bristles. Ventral surface entirely golden.

Legs deep violet, the femora golden beneath. Front tarsi unicolorous; middle tarsi with the second segment white on the outside (3–5 missing); hind tarsi with the fourth segment partly white.

Male.—Antennæ slender, sparsely plumose; the second segment but little stouter than the following ones, slightly longer than the third and fourth together, without crest of scales. Palpi long and slender; the second segment is a trifle shorter than the third, the third and fourth are of nearly equal length, the fifth longer than these two together. The coloration of the body is similar to that of the female. The legs are entirely dark without a trace of white on any of the tarsi.

Length, 5–7 mm.

Type No. 9956, U. S. N. M.

Locality: Guadeloupe, West Indies (A. Busck).

1 ♀, 1 ♂. Bred from larvæ found together in Bromelia water. The male is much denuded. Mr. Coquillet's characterization of the male *M. violaceus* is based on this specimen. The palpi are remarkably slender in this species, a particularly noticeable feature in the female. Another unique feature is the absence of erect scales on the second antennal segment in both sexes.

MEGARHINUS SUPERBUS new species

Megarrhina hæmorrhoidalis WILLISTON (not Fabricius), Biologia Centrali Americana, Diptera, v. 1, p. 224 (1901).

Megarhinus violaceus DYAR and KNAB (not Wiedemann), Journ. N. Y. Entomological Soc., v. XIV, pp. 178, 179 (1906).

Megarhinus violaceus (female) COQUILLETT (not Wiedemann), Technical Series No. 11, U. S. Dept. Agric., Bureau of Entomology, p. 14 (1906).

Male.—Head metallic blue and green with scattered coppery scales. Antennæ densely plumose; second segment as long as the following three and slightly thicker, its crest densely clothed with coarse, erect blue and golden scales. Palpi metallic—part violet-blue and coppery red, all but the last golden beneath. Third and fourth segments of equal length, the second slightly shorter, the fifth as long as the third and fourth together.

Prothoracic lobes bright blue. Mesothorax denuded on the disc, the remaining scales, particularly towards the sides and behind,

golden-green and olivaceous, the extreme lateral margins bright blue; hind margin bright green. Patches over the roots of the wings brilliant blue. Scutellum silvery blue. Pleuræ and coxæ silvery white. Abdomen: first segment silvery, a patch of blue in the middle; second segment green, the following ones steel blue and purple to deep golden; the gold begins on the fourth segment and is diffused over the entire surface of the much dilated sixth and seventh segments; eighth segment violet; genitalia covered with deep blue scales. Sixth segment with a few reddish hairs at the hind angles; seventh and eighth segments with lateral fringes of brilliant red hairs, particularly ample on the seventh segment; the preceding segments with the usual scattered, pale yellow, lateral hairs. Beneath golden along the sides, the median area steel blue; eighth segment entirely blue. Legs steel blue and reddish purple. Femora and hind tibiæ golden beneath.

Female.—Coloration of head and thorax as in the male. Antennæ: second segment 1½ times as long as the third, hardly stouter, a small crest of erect scales on the basal half. Palpi violet blue and coppery red, golden beneath; fourth segment longer than second, third much longer than fourth.

Abdomen: first segment bright silvery at the sides, pale blue in the middle; second segment green, the third blue and purple, the succeeding ones purplish red and bright coppery—the latter shade predominating on the sixth, seventh and eighth segments; front angles of segments 2–8 bright blue; hind angles of segments 2–6 broadly golden. No lateral tufts—a few red hairs at the sides of the seventh segment. Beneath entirely pale golden.

Legs steel blue and coppery red. Femora and hind tibiæ golden beneath. On the middle pair of legs the second tarsal segment is marked with silvery blue on the inside, visible only in certain positions.

Length, 4–6 mm.

Type No. 9957, U. S. N. M.

Localities: Trinidad (F. W. Urich), Frontera, State of Tabasco, Mexico (Townsend).

2 ♂, 1 ♀. The Mexican specimen, a male, shows none of the golden scales on the abdomen which is mostly blue and purple. In the other specimen the golden scales have the appearance of being loosely attached and easily rubbed off. Mr. Urich's two specimens were bred from Bromelias, where the larvæ prey on those of *Wyeomyia*. The male was but recently received. The female

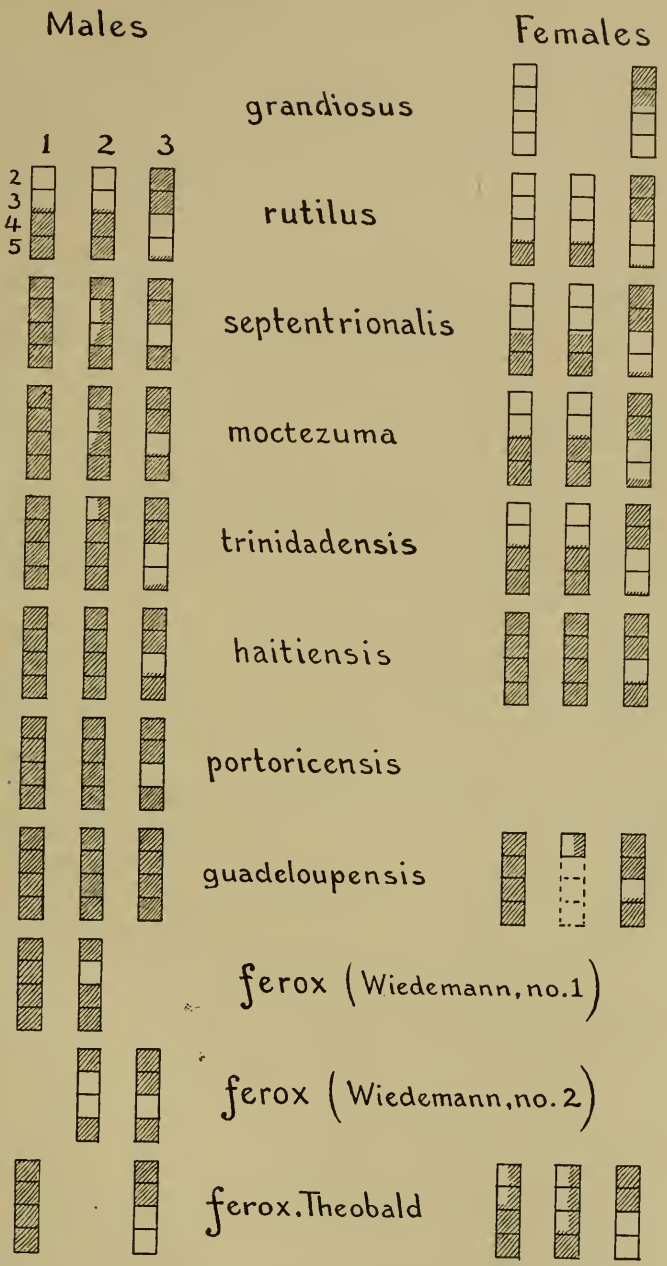

FIG. 28. Megarhinus—diagram of tarsal markings.

formed the basis for Mr. Coquillett's diagnosis of *M. violaceus* and we have characterized the larva under that name.

It is evident that the three male specimens reported from Atoyac in the state of Vera Cruz (Mexico) by Williston, and doubtfully referred by him to *hæmorrhoidalis,* belong to the present species. His criticism of Wiedemann's description of *hæmorrhoidalis* and his statement that the red hairs of the tuft "are confined to the tip of the sixth and the sides of the seventh segments" proves this beyond a doubt.

The following list comprises the American species of Megarhininæ described up to the present:

Genus ANKYLORHYNCHUS Lutz

violaceus Wiedemann ..... Brazil.
?purpureus Theobald.
trichopygus Wiedmann ..... Brazil.
neglectus Lutz ..... Brazil.

Genus MEGARHINUS Robineau-Desvoidy

septentrionalis Dyar and Knab ..... Atlantic States.
ferox Walker (not Wiedemann).
rutila Coquillett (in part).
portoricensis Coquillett (not von Röder).
rutila Coquillett ..... Florida.
haitiensis Dyar and Knab ..... Santo Domingo.
portoricensis von Röder ..... Porto Rico.
guadeloupensis Dyar and Knab ..... Guadeloupe.
violaceus ♂ Coquillett (not Wiedemann).
Species ..... St. Vincent.
portoricensis Williston (not von Röder).
trinidadensis Dyar and Knab ..... Trinidad
longipes Theobald ..... Mexico.
grandiosa Williston ..... Mexico.
moctezuma Dyar and Knab ..... Central America.
?species Osten Sacken.[1]
superbus Dyar and Knab ..... Mexico, Trinidad.
hæmorrhoidalis Williston (not Fabricius).
violaceus Dyar and Knab (not Wiedemann).
violaceus ♀ Coquillett (not Wiedemann).
hæmorrhoidalis Fabricius ..... Guiana.
separata Lynch-Arribálzaga.
theobaldi Dyar and Knab ..... Brazil.
ferox Theobald (not Wiedemann).
wiedemanni Dyar and Knab ..... Brazil.
ferox Wiedemann (not von Humboldt).
ambiguus Dyar and Knab ..... Brazil.
ferox Wiedemann (not Wiedemann).
mariæ Bourroul ..... Brazil.
solstitialis Lutz ..... Brazil.
lynchi Dyar and Knab ..... Argentine.
hæmorrhoidalis Lynch-Arribálzaga (not Fabricius).

[1] Biologia Centrali-Americana, Diptera, VI, p. 6 (1886).