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Some Bees from British Guiana.

By T. D. A. COCKERELL, University of Colorado.

THE bees of the Guianas were collected long ago, and many of the commoner or more conspicuous species described by the earlier authors. Thus it happens that a small collection from this region will usually contain a number of the species of Linnæus, Fabricius, Olivier, Lepeletier, F. Smith, &c., and one readily gets the idea that the fauna is well-known. In later years, however, collections have been few, and such authors as Vachal, Friese, Schrottky, Ducke, and others have apparently had little material from this part of South America. The collection now reported on represents those species, received by the Imperial Bureau from British Guiana, which could not be readily identified at the British Museum. I am greatly indebted to Dr. G. A. K. Marshall for the opportunity to study them, and permission to retain some duplicates, which will eventually go to the U.S. National Museum. It will be seen that there are many novelties, but they do not represent fundamentally new types, but rather representative or local species of groups well-known from other parts of South America.

Ptiloglossa ducalis lucernarum, subsp. n.

♀.—Length about 17.5 mm.

Black, with the labrum dark red (clypeus entirely black), mandibles dark red in middle except above, first abdominal segment ferruginous, with the apical margin broadly bluish green, second segment steel-blue, greenish toward the base, third similarly coloured, fourth blue-green apically and red at extreme (covered) base; flagellum, except basal joint, dusky ferruginous beneath, the oblique apical truncation

red; vertex with black hair, cheeks with long white hair, a fringe of white hair around clypeus above and laterally, a tuft of bright red hair at apex of clypeus medially, hair of front mainly black; thorax with short brownish-black hair above, beneath with pale hair (but much black on mesopleura), at sides posteriorly with red hair; tegulæ black. Wings dusky, suffused with reddish; femora with light hair, tibiæ and tarsi with dark hair on outer side and red on inner. Abdomen with pale reddish hair on red part of first segment, and black on metallic; segments 2 to 4 with linear but distinct apical yellowish bands; apex with copious sooty hair; venter with pale red hair basally and dark apically; a patch of long yellowish-white hair on each side ventrally beyond the middle; apical plate broad and black.

At lights, Hills Estate, R. Massaruni, 15 Dec., 1917 (G. E. Bodkin).

As to the occurrence of *Ptiloglossa* at light, see Schrottky (under *Megacilissa*), Smithsonian Misc. Coll. xlviii. (1907) p. 259. The ocelli are very large, as with other nocturnal Hymenoptera. The type of *Ptiloglossa ducalis*, Smith, is at Oxford, and is labelled "Chili?" Smith said the locality was unknown. Friese formerly thought it identical with the Mexican *P. eximia* (Smith), but Schrottky in 1914 showed that this was not the case, and stated that he had *ducalis* from La Rioja, Argentina. The present insect is certainly very near to *ducalis*, differing by the largely red first abdominal segment and other minor details. Smith's figure of the venation is incorrect, as his description shows. The Brazilian *P. obscura* (Schrottky) has the base of the abdomen dark red, and is evidently closely allied. Other related forms are the Brazilian *P. pretiosa* (Friese) and the Mexican *P. thoracica* (Fox), described under *Megacilissa*. It seems quite probable that all these forms are local races of one, *P. ducalis*. On the other hand, *P. ducalis*, var. *buchwaldi*, Friese, is a large red insect resembling *Xenoglossa fulva* in appearance, and must, I think, stand as a distinct species, *P. buchwaldi*.

Megalopta idalia, Smith.

1 ♀, Issororo, N.W.D., June 1916 (Bodkin).

As at present understood, this species is widely distributed, and it may be capable of subdivision when more material is available*.

* Schrottky thinks that what I described as *idalia* in Proc. Acad. Nat. Sci. Phila., 1900, p. 356, is really *ochrius* (Vachal). My insect was a ♀; Vachal described only the ♂. Ducke holds that *ochrius* is a variety of *idalia*.

Megalopta sodalis, Vachal.

4 ♀, Issororo, N.W.D., June 1915 and 1916 (*Bodkin*); attracted to light, Morawhanna, N.W.D. (*Bodkin*); N.W. District, May 1917 (*A. A. Abraham*).

These bees, like the *Ptiloglossa*, have large ocelli and are nocturnal or vespertine. Described from Brazil.

Megalopta tacarunensis, sp. n.

♂.—Length about 12.5 mm., anterior wing about 10.

Head and thorax brassy green, with strong coppery tints on face (especially supraclypeal area), mesothorax, and scutellum; lower margin of clypeus and labrum dull yellowish; face very narrow, broadened on front by emargination of orbits; ocelli large as usual, lateral one's distance from occipital margin about the length of an ocellus; mandibles pale basally, darkened apically; tongue long and linear; antennæ long, pale ferruginous, the flagellum blackened above and nodose beyond the middle; clypeus very sparsely and not strongly punctured; mesothorax shining, with fine punctures and widely scattered larger ones; scutellum convex, not at all bigibbous; post-scutellum considerably smaller than scutellum; base of metathorax with a rather narrow shining channel, obtusely angulate in middle, its margins and ends with indistinct traces of plicæ; tubercles and tegulæ ferruginous. Wings slightly dusky, not clouded in the marginal cell; stigma and outer nervures yellowish ferruginous, toward the base the nervures are darker; second submarginal cell small; first recurrent nervure meeting second intercubitus. Legs ferruginous, with concolorous hair. Abdomen with first two segments light ferruginous; apex of second, and the remaining segments, much darker; third ventral segment with a complete and deep median sulcus.

Cattle Trail Survey, Takaruni R. (sec. 2), June 1919 (*A. A. Abraham*).

Near to *M. athaulis* (Vachal), from Peru, but the abdomen is differently coloured. Also allied to *M. tabasana*, Ckll., from Mexico, but differing in the area of metathorax and coloration of abdomen. Possibly all three are races or subspecies of one species. It has been the history of the South American birds and mammals that many species have been described as distinct, from widely separated places. More recent, far more intensive and exhaustive studies have shown that the number of separable forms is very much greater than had been supposed, but that whole series of these are

to be regarded as local races of widespread species. How far this will be paralleled among the bees remains to be seen. The butterflies and ants certainly show analogous phenomena.

Nevertheless, when we have defined a series of subspecies and arranged them under aggregate species, the biological problem has not been solved. Experimental work has shown that objectively identical differences may be due either to heredity or environment. Among the bees, it is probable that the "little species" are in most cases the genuine units of life, having different habits and occupying different stations. It will, of course, be long before these matters have been adequately elucidated by field-observations in tropical countries, but every scrap of biological information is of value.

Charles D. Michener

Augochlora (Odontochlora) essequibensis, sp. n.

♀.—Length about 11.5 mm.

Robust, black and green; head large, with broad rounded cheeks and broad vertex, mainly black, but a bright green band along anterior orbits, and upper part of cheeks greenish; mandibles strongly bidentate, dark red in middle, with no green spot at base; clypeus broad, polished, with rather numerous large punctures, its lower middle depressed, and at each extreme side a distinct tubercle; supraclypeal area very convex, dullish; front very densely and minutely rugoso-punctate; flagellum ferruginous beneath, except at base; mesothorax very densely and finely rugoso-punctate, median depressed line distinct; mesothorax black, with green margins, and a pair of green bands converging anteriorly; scutellum sculptured like mesothorax, black in middle, green at sides, the median groove distinct; area of metathorax with about 55 delicate longitudinal striæ, irregularly connected about the middle by a transverse line; posterior truncation not defined above; postscutellum brilliant green, and metathorax mainly green; mesopleura black, faintly greenish, granular; tegulæ castaneous. Wings dusky, stigma dark reddish, nervures dark; first recurrent nervure meeting second intercubitus. Legs black, anterior tibiæ red in front, at least at base; hind spur simple; mesothorax with black hair, postscutellum, metathorax, and base of abdomen with white, inner side of tarsi with dark rufous hair. Abdomen almost impunctate, the first segment with very delicate punctures at sides; abdomen broad, black, suffused with green at sides, with delicate pruinose pubescence, shining silvery in some lights; apex with black hair; first ventral segment with a long stout spine. As in

related species, this varies to a form with rather less massive head, and head and thorax mainly Prussian green, the thorax bright green with only a blackish shade down middle of mesothorax, and the sides of the face bright green, especially close to the antennæ.

3 ♀, Suddie, Essequibo, March 1918 (*G. E. Bodkin*).

Very close to *A. nigrocyanea*, Ckll., from Mexico, but lateral ocelli not nearly as far apart as distance of either from eye, and the details of colour and sculpture differing in several particulars. In Brazil there is a very similar species, *A. francisca*, Schrottky, which lacks the tooth on the first ventral segment. This closely resembles *A. thetis*, Schrottky, from Paraguay, which has the tooth and is a true *Odontochlora*.

Augochlora (Oxystoglossa) bodkini, sp. n.

♀.—Length about 9 mm., anterior wing slightly over 6.

Head and thorax green; abdomen black, with strong green tints at sides of first three segments and a subapical green band on third; head and thorax above with hair mixed dark and light; head broad, eyes strongly emarginate and converging below; supraclypeal area dull and granular; clypeus shining, strongly but not densely punctured, its apex black, squarely truncate, strongly depressed in middle; labrum black; mandibles bidentate, obtuse, bright chestnut-red in middle; cheeks broad, shining, with sharp posterior margin; flagellum ferruginous beneath, except at base; angles of pronotum prominent, but greater than a right angle; mesothorax entirely yellowish green, very finely and densely punctured; scutellum similarly sculptured, depressed in middle; area of metathorax covered with very fine but distinct radiating striæ which reach the margin, those near the middle strongly curved; pleura dull bluish green, shining just above the middle legs; tegulæ ferruginous. Wings dusky, quite dark; stigma reddish brown, dull, nervures fuscous; first recurrent meeting second intercubitus. Legs black, with anterior and middle knees, basal third of anterior tibiæ in front, and tarsi at apex, ferruginous; hind spur simple (microscopically denticulate); scopa of hind legs pale. Abdomen with the punctures so minute as to be hardly visible under a lens; segments with fine pubescence, appearing silvery in certain lights; apex with black hair; no ventral tooth.

Botanic Garden, April 23, 1915 (*G. E. Bodkin*).

Related to *A. francisca*, Schrottky, from Brazil, but distinguished by the largely red mandibles, red tegulæ, &c.

Although this is placed in a different subgenus from the last, they are probably more nearly allied than *A. bodkini* is to the type of *Oxystoglossa*.

Augochlora maroniana, Cockerell.

1 ♀, Issororo, N.W.D., Dec. 1918 (*Bodkin*).

Previously known only by the unique type, from French Guiana. The abdomen does not show the strong coppery tints of the type, but this variation is like that found in related species.

Augochlora (Oxystoglossa) erubescens, sp. n.

♀.—Length about 7 mm., anterior wing about 5.3.

Head, thorax, and abdomen green, strongly suffused with copper-red; the face (except the broad black lower margin of clypeus) entirely red, the clypeus and supraclypeal area crimson; mesothorax and scutellum red, but mesopleura yellowish green, reddish along its posterior border. Abdomen above brilliant red, with almost lilacine tints, becoming green at sides. Legs black, with the anterior tibiæ and tarsi, middle tibiæ in front, hind knees, and middle and hind tarsi obscurely, ferruginous; flagellum dusky reddish beneath; mandibles broadly red in middle; tegulæ piceous with pallid margins. Wings dusky, stigma rather dilute reddish brown, nervures fuscous.

Head broad, orbits strongly converging below; cheeks broad, posterior orbits reddened; supraclypeal area closely punctured, but shining; clypeus closely punctured, depressed in apical middle; front dull and greenish; mesothorax shining but not polished, the microscope shows many very small punctures and scattered much larger ones; area of metathorax large, with fine radiating striæ all over, these wrinkled about the middle; posterior truncation not abrupt; first recurrent nervure meeting second intercubital; hind spur simple (microscopically denticulate). Abdomen with pale pruinose pubescence; first two segments not vibrissate, but with extremely short fringes of branched hairs.

Issororo, June 1915 (*Bodkin*).

A distinct species, for which I find no very close relative, but it may be compared with the much more brilliantly coloured *A. ignifera*, Crawford, from Dominica.

Augochlora (Augochloropsis) barticana, sp. n.

♀.—Length about 6.5 mm., anterior wing 5 or a little over. Brilliant yellowish green, with golden tints on metathorax

and abdomen; pubescence thin and pale; head broad; clypeus prominent, convex, sparsely but distinctly punctured, its lower margin black and red just above the black; labrum black, strongly bituberculate; mandibles green at base, then black, but the apical half dark red; front very broad, densely punctured, glistening; flagellum obscurely reddish beneath; ocelli in a curve; mesothorax and scutellum brilliantly shining, finely and closely punctured, but the punctures well separated; sides of pronotum expanded anteriorly, but not angulate; postscutellum with long dull white hair; area of mesothorax in the form of a lunule, hind margin shining, not sharp, surface of area with short oblique striæ not reaching base or margin; posterior truncation smooth and highly polished; tegulæ ferruginous, with a yellowish-green spot anteriorly, and pallid margins. Wings strongly suffused with reddish; stigma ferruginous, nervures fuscous; first recurrent nervure meeting second intercubitus. Legs brilliant green, with red knees; tarsi dark reddish, with much pale reddish hair; hind spurs with five long spines. Abdomen broad, convex, shining, thinly pale hairy, the second segment with a thin white apical fringe, the first with the same at sides only; venter with pale hair.

Bartica District, 14 Sept., 1918 (*Bodkin*).

This species is so weakly vibrissate on the abdomen that it might be referred to the subgenus *Pseudaugochloropsis*, falling in Vachal's tables near the Mexican *A. tonsilis* (Vachal). In Schrottky's table of Brazilian species it falls in the vicinity of the much larger *A. hecuba*, Schrott., *A. circe*, Schrott., *A. brasiliana*, Ckll., and *A. monochroa*, Ckll. The two latter are very well vibrissate. The most distinctive feature is the sculpture of the metathorax. The type of *Augochlora* seems not to have been fixed; I will herewith designate *A. pura*, Say*.

Augochlora (Augochloropsis) semilata, sp. n.

♀.—Length about 7 mm., anterior wing 5.

Brilliant emerald-green, including the legs except the dark reddish tarsi; head very broad; clypeus prominent, with large punctures, its lower margin broadly black; labrum black, with fine transverse lines and a pair of apical

* I wished to designate *A. pandora*, Smith, the first species in Smith's series described from the female, but in *Canad. Entom.* 1897, p. 4, I restricted *Augochlora*, s. str., to a different series, and included in it two of the species in Smith's original list—*pura*, Say, and *labrosa*, Say. I choose of these the better known. This will make *Oxytroglossa* a synonym of *Augochlora*.

tubercles; mandibles green at base, then black, then red; flagellum obscure reddish beneath; front glistening, cheeks hairy; mesothorax shining, rather bluish green, with close but distinctly separated punctures; hair of thorax light, but some dark hairs on scutellum; area of metathorax very short, with distinct short plicæ which are not appreciably oblique, the apical margin shining and obtuse; mesopleura rough; tegulæ ferruginous, with a green spot. Legs with pale yellowish hair, dense on hind tibiæ and tarsi; hind spurs with five long spines. Wings dusky hyaline, the apical field darker and somewhat reddish; stigma very pale reddish, not very large, nervures fuscous; first recurrent nervure reaching base of third discoidal cell. Abdomen brilliant, with thin hair, long at sides, the apex black; second segment briefly and thinly vibrissate with orange hairs, first obscurely vibrissate at sides.

Greenwich Park, 29 December, 1912 (*Bodkin*).

Closely allied to the last, but easily distinguished by the area of metathorax. In both, the pronotum is without distinct anterior angles. There is much resemblance to *A. lata*, Smith, from Ega, but the colour of the legs is different.

Charles D. Michener

Centris minuta, Mocsary.

1 ♀, Rupununi District, 1919 (*Rev. Fr. Robinson*).

Mocsary described the male, but I have a female from Mr. Schrottky. The species has been recorded from Venezuela.

Chalepogenus testaceus (Smith).

1 ♂, Issororo, N.W.D., Dec. 1918 (*Bodkin*).

Smith described the female as *Tetrapedia testacea*. Friese saw the male from Bogota. The present specimen has the scutellum and axillæ pale honey-colour, contrasting with the dark red mesothorax (on which are two yellow stripes), the sides of face and some distance up front cream-colour, the middle basitarsi blackened on inner side. Possibly a distinct race is indicated, but it is necessary to see the other sex.

Chalepogenus flavus (Exomalopsis flavus), Smith is closely allied.

Chalepogenus hypoleucus, sp. n.

♀.—Length about 8.5 mm., anterior wing 8 mm.

Robust, black, the small joints of tarsi obscurely brownish; scape dark reddish, with a light red spot at base; flagellum

dull ferruginous beneath; lateral inferior margins of clypeus (between eye and apical truncation) yellow; sides of labrum yellow; mandibles mainly red, but yellowish basally above; head broad; clypeus convex, with large punctures, absent from apical middle; sides of front broadly and deeply channelled; eyes dark; cheeks above smooth and polished, with a sharp posterior margin, below with erect pure white hair; mesothorax and scutellum dull, the latter with sparse weak punctures, anterior half of mesothorax with very short reddish-black tomentum; mesopleura polished, sharply keeled in front, its anterior portion with sparse strong punctures, its posterior part flattened and weakly punctured; tegulae black, marked with dark red. Wings reddish subhyaline (not fuliginous), stigma and outer nervures ferruginous, first and second intercubiti extremely pale; first recurrent nervure joining second submarginal cell not far from end; thorax with white hair beneath, but legs with mainly black hair; anterior tibiae on outer side polished and with large sparse punctures, but middle tibiae finely and closely punctured, covered with short very dark reddish hair; anterior basitarsi with very dark reddish hair, and on outer side a curved keel-like line of erect hairs; middle basitarsi with black hair; hind tibiae and tarsi with long black hair, except that there is creamy-white hair on anterior margin and posteriorly at apex of tibiae, and copiously in front of basitarsi, except at apex. Abdomen broad, shining, pure black, with long glistening white hair beneath, except subapically, where it is dark chocolate. Hind spur simple.

1 ♀, Issororo, N.W.D., June 1915 (*Bodkin*).

It was compared with the series in the British Museum and found to be different from all, but it is closely allied to *Chalepogenus amplipennis* (*Tetrapedia amplipennis*, Smith), from Brazil, differing in the face-markings and paler wings and the hair on the legs. According to Ducke, the Mexican *Chalepogenus lugubris* (*Tetrapedia lugubris*, Cresson) is identical with *amplipennis*, and, if this is correct, it has priority. Friese's "group *clypeata*" must now be divided: *clypeata* and *pyramidalis* being true *Tetrapedia*; while *amplipennis*, Sm., *bunchosia*, Fr., *glaberrima*, Fr., and *nigripes*, Fr., all go in *Chalepogenus*.

Chalepogenus leucostoma, sp. n.

♂.—Length about 6.5 mm., anterior wing 6.

Black, with the labrum, mandibles except apex, area between clypeus and eyes, and extending narrowly up orbits to level of antennae, all white; clypeus also with

a creamy-white bar on each side, between eye and apical truncation; last joint of tarsi red; spurs creamy-white, hind spur simple; antennae dusky red, the flagellum darker above; head broad, eyes dark; clypeus and supra-clypeal area with extremely large dense punctures; posterior orbits with a variable pale mark; mesothorax shining, finely punctured; mesopleura polished, without distinct punctures; tegulae piceous. Wings dilute reddish brown, stigma ferruginous, nervures fuscous; first recurrent nervure joining second submarginal cell near its end; cheeks and lower part of pleura with white hair. Legs with black hair, that on hind tibiae and basitarsi entirely black. Abdomen shining black, the base of second segment may be obscurely reddish, and the venter is reddish; apical segment ferruginous, produced to a dark spine-like point. The whole anterior margin of clypeus may be pale, and the labrum may have a dark basal spot.

2 ♂, Issororo, N.W.D., Dec. 1918 (*Bodkin*).

In Friese's table it runs to *C. maesta* (Cress.), but it is quite distinct. It appears to be closely allied to *Tetrapedia melanopus*, Schrottky, from Paraguay, but it is doubtless distinct. Schrottky's description is short, and he does not mention the hind spur. He describes the face-markings as yellow.

Trigona capitata, Smith.

Three workers; Berbice River, 12. vi. 1913 (*Edgar Beckett*).

In these specimens the axillae and lateral margins of mesothorax are yellow (reddened by cyanide). The same is true of specimens from Pará, received by the U.S. National Museum from Dr. Friese. In specimens from S. Paulo, Brazil (*Schrottky*), the axillae are pale or black, and the lateral stripes of mesothorax are very short and weak, extending forward only as far as the tegulae. Smith, in his original description, refers to the lateral stripes, but leaves us to infer that the axillae were black. The dark variety of *T. capitata* has been named *virgili*, Friese.

The U.S. National Museum has *T. capitata* from Alhajuelo, Panama, 28 May (*Busk*), and Esparta, Costa Rica, 18 Sept. (*F. Knab*).

Trigona jaty, Smith.

Three workers; Canister Falls, Nov. 1919 (*A. A. Abraham*).

These specimens have the abdomen darker than usual, and possibly constitute a separable race.

Trigona williana, Friese.

Five workers; Rockstone, R. Essequibo (*Bodkin*).

Four were taken 23 March, 1913, one at flowers. One is dated 5. viii. 1913.

Megachile stomatura, Cockerell.

One of each sex. Courantyne Coast, Berbice, Aug. 1915, constructing nest in disused borings in timber (*G. E. Bodkin*).

Described (1917) from a single male collected by Busck in Trinidad. The female runs exactly to *M. brethesi*, Schrott., from Paraguay, in Schrottky's (1913) table of species of the Brazilian region. *M. brethesi* is considerably larger and certainly different. The female of *stomatura* may be described as follows: length about or slightly over 9 mm.; head broad, eyes dark purplish brown; mandibles broad, quadridentate; clypeus densely punctured, but with a smooth shining area in middle, lower margin strongly crenulate; flagellum hardly at all reddened; hair of front, sides of face, and cheeks white; mesothorax and scutellum closely punctured; tufts of white hair above tegulae (at hind corners of mesothorax) very conspicuous; tegulae piceous. Wings dilute fuliginous, much darker in marginal cell and beyond. Legs black, hind basitarsi only moderately broadened, with pale orange hair on inner side; spurs creamy-white. Abdomen broad, cordiform, with narrow bands on hind margins of segments; ventral scopa white, black on last segment.

Megachile bodkini, sp. n.

♀.—Length about 8.5 mm., anterior wing 7.6 mm.

Robust, black, with white scopa, black on last segment. This is very near to *M. stomatura*, and, like it, goes exactly to *M. brethesi* in Schrottky's table. It is certainly distinct, differing from *stomatura* thus: third tooth of mandibles (counting from outer side) pointed instead of broadly truncate; margin of clypeus not evenly crenulate, but feebly undulate in middle, and minutely crenulate at sides; clypeus dull and extremely densely punctured, with a slender shining median line; supraclypeal area more closely punctured; hair on sides of face denser, on front and disc of clypeus largely black, but reddish and very thin on apical part of clypeus; tufts at hind corners of mesothorax, and hair on prothorax above, distinctly yellowish;

tegulae bright ferruginous, black at extreme base. Wings blackish (reddish in *stomatura*); all the knees, spines at end of anterior and middle tibiae, hind tibiae (except a blackish stain posteriorly), and base of hind basitarsi, dull red; surface of abdomen a little smoother.

1 ♀, Issororo, N.W.D., xii. 1918 (*G. E. Bodkin*).

Marked, "very near *simillima*, Sm.; not in B.M." It will be known from *simillima* by the scopa, the extremely dark marginal cell and beyond, etc.

Megachile botanicorum, sp. n.

♀.—Length about 11 mm., anterior wing not quite 7 mm.

Black, with mandibles broadly bright chestnut-red apically, flagellum red above and below (black at extreme tip), tegulae pale orange-ferruginous, anterior and middle femora red above, anterior tibiae red in front, spurs and small joints of tarsi red; head broad; mandibles very broad, quadridentate; clypeus extremely densely punctured, shining above in middle, but without any distinct smooth line; lower margin of clypeus finely crenulate; sides of face with thin greyish-white hair; a curved band of pale fulvous hair on upper part of head, passing between the ocelli; thorax with light fulvous hair (bright in region before wings) above and at sides, but white beneath, the disc of mesothorax almost without hair; mesothorax and scutellum well punctured, moderately shining. Wings flavo-hyaline, nervures light ferruginous, stigma poorly developed; hind basitarsi moderately broad, with black hair on outer side and bright red on inner; black hair also on outer side of hind femora. Abdomen broad, shining, hind margin of first segment reddened; segments 3 to 5 with broad pale yellow hair-bands, second with traces of a similar band, abraded in the specimen studied; when the abdomen is seen from above, there is conspicuous black hair at sides; last dorsal segment with fine dense appressed white hair; ventral scopa mainly white, but on penultimate segment and the sides of the two before black; it is white on the last segment.

1 ♀, Botanic Gardens, 23 April, 1915 (*Bodkin*).

In Schrottky's table runs exactly to *M. paraguayensis*, Schrott., but is larger, with flagellum red above and below. It is also very like *M. curvipes*, Sm., of which only the male is known. Schrottky found *paraguayensis* ♀ and *curvipes* ♂ in Paraguay, and I suspect that they may be sexes of one species. In that case, it may well be that *botanicorum* represents a race or subspecies of the same. It is, however, equally close to *M. leucocentra*, Schrottky (?=*fossoris*, Smith),

and Friese believes that *M. fossoris* is the true female of *M. curvipes*.

Megachile pulchriventris, sp. n.

♀.—Length about 8 mm., anterior wing 6.7 mm.

Short and broad, black, including the legs, mandibles, and antennæ, but tegulæ bright ferruginous, blackened in front; mandibles quadridentate; clypeus closely punctured laterally, but the convex disc highly polished and sparsely punctured, the lower margin very broadly angularly emarginate; cheeks narrow, sharply keeled behind, with long white hair below; sides of face with spreading fulvous hair, but a patch of black hair immediately laterad of each antenna; front with appressed pale fulvous hair; mesothorax minutely punctured, covered with appressed fulvous hair, conspicuous when viewed from certain angles; scutellum abbreviated, truncate posteriorly, anteriorly with fulvous hair; base of metathorax depressed in middle; mesopleura shining, distinctly and rather coarsely punctured. Wings dusky, deep fuliginous in the marginal cell and apically; first recurrent nervure joining second submarginal cell at a distance from base greater than half length of first intercubitus; hair on outer side of anterior and middle tarsi shining silvery, on middle tarsi with a patch of purplish brown; hind spurs brown; hind basitarsi broad and almost as long as the tibiæ, with red hair on inner side. Abdomen very broad, the segments with fringes of fulvous hair, most conspicuous on segments 4 and 5, but these are not entirely covered with such hair; apical segment with appressed fulvous tomentum; ventral scopa shining golden, not at all black at apex, but toward the base is a very large triangular area of woolly-looking white hair, very different from the rest of the scopa; the thorax beneath and bases of legs are also densely clothed with this woolly white hair.

2 ♀, Issororo, N.W.D., xii, 1918 (*G. E. Bodkin*).

Marked "Not in B.M." An elegant little species, running in Schrottky's table to *M. beroni*, Schrott., which it does not resemble, and going nowhere in Friese's table. It is actually close to *M. xanthura*, Spinola, differing by the abdominal segments 4 and 5 not entirely yellow-haired, the yellow scopa, and the dark marginal cell and apex of wing. In the colour of the wings it resembles *M. bertonii*, Schrott., in the pubescence of thorax and character of the ventral scopa it is like *M. aurantipennis*, Ckll., from Guatemala.

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Megachile hamatipes, sp. n.

♂.—Length about 11 mm., anterior wing 9 mm.

Black, robust, with short parallel-sided abdomen; head large; eyes dark brown; face and front densely covered with long silky golden hair; mandibles dark, with a broad flat dull and delicately pruinose-pubescent base, beyond which is a tuft of fulvous hair; cheeks broad, with white hair; antennæ black, the flagellum obscurely reddish beneath; vertex with erect black hair; mesothorax dullish, closely and finely punctured, with erect black hair on disc, but the thorax anteriorly is covered with pale yellowish hair, there is a conspicuous band in the scutello-mesothoracic suture, and a large yellowish tuft at each posterior corner of mesothorax; scutellum shining anteriorly, covered with erect black hair; thorax posteriorly with yellowish hair; sternal region with white hair; tegulæ black. Wings dilute fuliginous, upper half of marginal cell distinctly darker; first recurrent nervure joining second submarginal cell at a distance from base equal to not quite half length of intercubitus. Legs mainly black, anterior coxæ with long spines; anterior femora pale reddish, with a curved brown line on inner face, apex and nearly apical half of outer side black, lower margin beyond middle sharply and prominently keeled, outer surface (especially basally) with long cream-coloured hair; anterior tibiæ red on inner side and black on outer, except apex, which is yellow; anterior tarsi dilated, pale yellow, the broadest part at apex of basitarsus, which does not extend nearly to end of second joint; tarsal fringe long, fulvous at base, otherwise white, broadly black apically; beneath, the small joints are red, and the black spot does not show through above; middle tibiæ thick, red passing into pale yellow apically, with a stout pale apical hook-like spine; their tarsi dark red, the basitarsi black behind, and outer face of tarsi largely pale yellow; hind femora not especially swollen, their tibiæ black, with pale reddish spurs, their tarsi pale yellow on outer side. Abdomen with deep sulci at bases of second and third segments; all the segments with fringes of fulvous hair, the first very slender except at sides; disc of second segment with erect fulvous hair, passing into black laterally; discs of third and fourth with erect black hair, of fifth with deep red hair; sixth segment densely covered with pale yellow tomentum, its apical keel prominent, broadly and deeply emarginate, the lateral portions not dentate or crevulate; no ventral spines or teeth.

1 ♂, Bel Air, Lamaha, E. Coast, 1. vi. 1913 (*Bodkin*).
 "Not in B.M."

In Schrottky's key it runs exactly to *M. chamacoco*, Schrott., which it resembles in the hook-like spine on middle tibia, but otherwise it is very distinct. In Vachal's table it falls in the vicinity of *M. rectipalma*, Vach., but is not very similar. In Friese's table it falls nearest *M. lobitarsis*, Sm., a quite different species. There is a general resemblance to *M. aricensis*, Friese, which has a very large hook-like process at end of middle tibia; but the head and thorax of *aricensis* are covered with fulvous hair dorsally, and there are many other differences.

Megachile melanopoda, sp. n.

♂.—Length about 8.5 mm., anterior wing 6 mm.

Black, the abdomen rather narrow but parallel-sided; mandibles black with a red subapical mark; antennæ black; tegulæ rather dark red. Wings dusky, the marginal cell and apical field dark fuliginous, shining purple; nervures black; femora and tibiæ bright red, tarsi black. Head broad, orbits converging below; face and front densely covered with pale golden hair; cheeks with white hair; vertex with sparse long black hair; antennæ simple at end, not enlarged or flattened; mesothorax and scutellum shining, with strong rather close punctures, and beset with long black hair; a slender band of light hair in scutello-mesothoracic suture; a small patch of light hair above each wing-base; prothorax, pleura, and metathorax with white hair; first recurrent nervure joining second submarginal cell very near its base; anterior coxæ broad and lens-like, shining, not spined; anterior tarsi simple. Abdomen shining, with conspicuous white hair-bands or patches at sides of segments, but lacking in middle; there is, however, light hair in the basal sulci; disc of fifth segment with erect black hair, and a very small amount (hardly visible) of pale; sixth segment not conspicuously hairy, the weak keel entire, a little depressed in middle; venter black, with three very conspicuous pure white hair-bands.

1 ♂, Issororo, N.W.D., 15 June, 1915 (*Bodkin*).

In Schrottky's table it runs exactly to *M. giraffa*, Schrott., differing by the black apex and venter of abdomen, and the simple apex of antennæ. Also related to *M. orba*, Schrott. The nearest relatives, however, are *M. exaltata*, Smith (*incongrua*, Smith), and *M. lamnula*, Vachal, both Brazilian. The fringe of the anterior basitarsus is white, not black as in *lamnula*, nor are the fifth and sixth abdominal segments

evidently pale-haired as in Vachal's species. In Friese's table our species runs exactly to *exaltata*, but that has ferruginous nervures, and the dorsal hair of thorax is not black. Nevertheless, the affinity is close. The venation shows that this cannot be the male of *M. bodkini*.

Megachile muticeps, sp. n.

♀.—Length 11 mm., anterior wing 7.4.

In Schrottky's table runs exactly to *M. brethesi*, differing by the dark tegulæ, &c. It is extremely close to *M. stomatura*, Ckll., agreeing in most of its characters, but larger, with the clypeus conspicuously different, as follows:—

M. muticeps: clypeus shorter, densely rugoso-punctate all over, with no smooth median space; lower margin very broadly but shallowly excavated, the excavated part undulate instead of crenulate; disc of clypeus with much long erect black hair, sides with creamy-white hair (like that of sides of face), directed downward.

M. stomatura: clypeus longer, with a smooth and polished median line; lower margin not excavated, but strongly crenulate; disc without the long erect black hair, and lateral pale hairs directed antero-mesad.

The basal area of metathorax is entirely dull in *muticeps*, distinctly shining in both sexes of *stomatura*.

The ventral scopa of *muticeps* is creamy-white, black on last segment except basally.

1 ♀, Courantyne Coast, Berbice, Aug. 1915, constructing nest in disused borings in timber (*Bodkin*).

This is a most interesting bee, clearly distinct from *M. stomatura* by the very different clypeus, yet found nesting in the same manner, at the same time and place.

Thus, so far as the evidence shows, we appear to have a new species arising by mutation, without any change in the mode of life or locality.

While on South American *Megachile*, it may be worth while to add a note on the two species, *M. squalens* and *M. susurrans*, described by Haliday from Sao Paulo as early as 1836. *M. squalens* is placed by Friese as one of the indeterminate species, but the type is in the British Museum, and there is a specimen at Oxford. *M. susurrans* is also in both these collections, 9 in the former, 4 in the latter. Haliday described only the ♀ of *susurrans*, but at Oxford I noted the male, with red tegulæ and tarsi much modified. Schrottky, in dealing with the Brazilian species (1913) was

unable to recognise *susurrans* from Haliday's description. With regard to *M. squalens*, I have a note that the ventral scopa is pale orange in a specimen in British Museum from Rio Grande do Sul (*R. von Ihering*). Schrottky cannot definitely decide what *squalens* is, but indicates *M. apicipennis*, Schrott., and *M. pleuralis*, Vachal, as possible synonyms. New descriptions of both Haliday's species should be made by someone who has access to the specimens.

Cælixys rostrata, Friese.

1 ♀, Courantyne Coast, Berbice, Aug. 1915, inhabiting disused borings in timber (*Bodkin*). "Not in B.M."

A remarkable species, on account of the snout-like clypeus. The specimen is a little smaller than Friese's type, and the antennæ are nearly pure black, but the identification seems certain. It is doubtless parasitic on *Megachile stomatura*.

Cælixys issororensis, sp. n.

♀ (type).—Length about 10.5 mm.

Robust, black, with the bidentate mandibles dark red, the teeth black, tegulæ bright chestnut-red. Legs dusky red; first abdominal segment laterally with large well-defined highly polished areas which are dark red; first three ventral segments very obscurely reddish; face with white hair, faintly ochreous-tinted around antennæ; clypeus normal; antennæ entirely black; eyes dark brown, with short hair; cheeks narrow, densely hairy, with a depression but no naked area below; mesothorax and scutellum with very large punctures, the former with a line of pale ochreous hair in front and behind, and a spot behind each tegula; scutellum with an elevated median keel, ending in a short tubercle; axillary spines moderately long, little curved; postscutellum with dense yellowish-white hair; extreme base of metathorax with a series of little pits or spaces separated by very short plicæ; mesopleura very coarsely rugoso-punctate, with a strong band of white hair anteriorly and posteriorly. Wings fuliginous, darkest in upper part of marginal cell and beyond; nervures black; anterior coxæ with short angular projections; spurs dark red. Abdomen highly polished, rather weakly punctured, with six narrow white hair-bands; sixth dorsal segment finely punctured all over, keeled except basally, narrow and beak-like apically, slightly turned up at end; fifth ventral angulate apically; sixth narrow, not notched, sharply pointed, thinly fringed with black hair, not extending far beyond last dorsal.

♂.—Similar in most respects; mandibles redder; hair of face all pale yellowish; cheeks with a bare space below. Legs bright chestnut-red; anterior coxæ with well-developed, but blunt spines; venter of abdomen red; fifth abdominal segment without lateral spines, sixth with six, the lateral and lower apical ones very slender and sharp, the upper apical shorter and thicker.

1 ♀, 2 ♂, Issororo (*Bodkin*), the ♀ 18th Dec., the males June, 1915.

The female is marked "near *ignava*, Sm., not in B.M." The males, "no name B.M." In Friese's table (1921) of Brazilian species this runs (♀) to *C. leopoldensis*, Fr., but the last ventral is much less produced, and the legs are much darker. It also resembles the Brazilian *C. nigrofimbriata*, Ckll., but is easily distinguished by the end of the abdomen. In Holmberg's table (1903) it falls with *C. remissa*, Holmbg., from the Argentine. It goes in Holmberg's group *Melanobasis*, and in the subgroup (1917) with densely punctured scutellum, which includes seven of Holmberg's Argentine species. Unfortunately I possess none of these seven species, but I believe the present insect is distinct from all.

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