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T. D. A. Cockerell
New Mexico Agricultural College

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Descriptions of New Bees Collected
by Mr. H. H. Smith in Brazil.—I.

BY
T. D. A. COCKERELL.

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DESCRIPTIONS OF NEW BEES COLLECTED BY MR. H. H. SMITH
IN BRAZIL.—I.

BY T. D. A. COCKERELL.

Genus **AUGOCHLORA** Smith, 1853 (sens. lat.).Series I. Hind spur of hind tibia of ♀ pectinate (subg. **AUGOCHLO-**
ROPSIS Ckll., etc.).

A. Larger species, length over 8 mm.

I. Teeth of hind spur of hind tibiæ three, large, more or less broad even to the tips.

(i) Femora and tibiæ ferruginous.

Megalopta idalia Smith, 1853.

♀. Length 12 mm. Head and thorax shining brassy or yellowish green, with faint coppery tints; metathorax, abdomen and legs ferruginous, the apical half of the abdomen above fuscous. Antennæ ferruginous, scape long; ocelli large; face narrow, eyes large, subreniform, *space between the orbital margin and lateral ocellus much less than the diameter of the ocellus*; front with dense, more or less confluent, small punctures; clypeus and supraclypeal area (which is quite convex) with large scattered punctures; lower margin of clypeus and sides of face broadly, and the labrum, pale ferruginous; process of labrum large but low and rounded, a little depressed in the middle; *mandibles dark ferruginous, blackish at their bidentate tips*. Pubescence of thorax wholly pale, scanty and short, like a fine mould; mesothorax with numerous but very shallow punctures of two sizes; scutellum with very minute punctures, and a few larger ones interspersed; basal area of metathorax feebly enclosed, finely roughened, with a few longitudinal ridges at the extreme sides; pubescence of legs wholly pale, tinged with golden; tegulæ pale ferruginous; wings hyaline, slightly yellowish, nervures and stigma pale ferruginous, subcostal nervure black; second submarginal cell very small; second recurrent nervure joining third submarginal cell near the beginning of its apical fourth; abdomen broad and convex, sericeous with scattered indistinct punctures on its apical half; dorsal surface bare, apex and ventral surface with abundant pale golden hair.

Hab.—Chapada, October. One specimen. Differs from typical *Megalopta* in the much longer third submarginal cell, with the second recurrent nervure entering it considerably before its end also by the first recurrent joining the second submarginal cell at its end.

(ii) Femora and tibiæ green.

Augochlora spinolæ n. sp.

♀. Length 11 mm., stoutly built, bright green; head and thorax yellowish green, with coppery tints, abdomen a bluer green, with bluish tints in certain lights; legs green, the tarsi, and hind tibiæ behind, very dark brown. Antennæ black, flagellum less than twice the length of the long scape; eyes rather small, subreniform; face broad, ocelli ordinary, *distance between lateral ocelli and eyes equal to at least four times the diameter of an ocellus*; vertex strongly coppery; front roughened with small, very close punctures; a short, low keel between the antennæ; clypeus with rather numerous punctures, its anterior part blue-black edged with pink, these colors extending as a narrow tongue upwards in the middle line; *mandibles black, scimitar-shaped, the blunt inner tooth a considerable distance from the end*; mesothorax strongly suffused with coppery red, microscopically tessellate and closely punctured with punctures of two sizes; scutellum shining, with punctures of two sizes; basal area of metathorax minutely roughened, not enclosed; tubercles with a dense short fringe of white hair; pubescence of legs all pale, more or less yellowish; tegulæ green at base, otherwise ferruginous; wings rather dusky, nervures and stigma dark ferruginous; compared with *M. idalia* the marginal cell is much shorter, the second submarginal larger, and the third higher in proportion to its length; abdomen with moderately dense small punctures, marking the insertion of the hairs; second and following segments with some inconspicuous short black hairs; hind margins of third and fourth segments white-pruinose; apex with short black hair, slightly mixed with pale; extreme sides of abdomen with shining pale hair.

Hab.—Chapada, April. One specimen.

Augochlora berenice Smith, 1879.

Hab.—Corumbá, April. One ♀. Uruguay (Smith).

The Corumbá specimen is about 9 mm. long, and the basal area

of the metathorax is not enclosed by a ridge; still, it accords so well with the description of *berenice* that it must be assumed to be identical until a comparison with the type proves otherwise. The punctures of the mesothorax are extremely strong and dense. The distance between the lateral ocelli and the eyes is equal to about $2\frac{1}{2}$ times the diameter of an ocellus. The process of the labrum is deeply bifid.

II. Teeth of hind spur of hind tibia four or more, pointed.

(i) Scutellum with large punctures, sparse at sides of middle.

a. Abdomen black.

Augochlora polychroa n. sp.

♀. Length about 11 mm., general build of an *Andrena*. Face brilliant coppery red, vertex green; mesothorax dull green, with a slight coppery-red lustre; scutellum, postscutellum and base of metathorax shining brassy green, with a coppery lustre; pleura greenish black; abdomen dull black; legs black. Antennae black, flagellum about twice the length of scape; ocelli ordinary, distance between lateral ocellus and eye about three times the diameter of an ocellus; front very closely and strongly punctured; clypeus strongly punctured, a broad black triangle on its anterior margin; mandibles piceous, the tooth on inner margin very short; mesothorax and pleura very strongly and closely punctured; base of metathorax microscopically tessellate, shining, with a beautiful purple iridescence in certain lights, not enclosed; sides of metathorax white-hoary; pubescence of legs shining grayish; tegulae piceous, a little green in front; wings smoky, nervures and stigma piceous, stigma quite small; abdomen microscopically tessellate, well punctured, but the punctures shallow, very slightly hairy, hair at apex black, at sides beneath white.

Hab.—Santarem; one specimen. The coloration is partly as in *A. hebesceus*, but the present species is easily separated by the black abdomen, color of pubescence of legs, etc.

b. Abdomen green, or cupreous-green.

a. Vertex and mesothorax green.

§. Abdomen with a coppery lustre.

Augochlora smithiana n. sp.

♀. Length $12\frac{1}{2}$ mm., stoutly built. Brilliant yellowish-green, the abdomen with a strong coppery lustre. Pubescence short and

scanty, pale mixed with black on face, vertex, mesothorax and abdomen except the first segment. Face broad; clypeus and extreme sides of face coppery; front extremely closely punctured; clypeus and supraclypeal area sparsely punctured; antennæ black, scape punctured; sides of anterior margin of prothorax strongly angulate; mesothorax very strongly and closely punctured, it and the scutellum often tinged with coppery red; base of metathorax granular, the extreme base with short and vague longitudinal ridges; femora and tibiæ green, tibiæ tufted with black hair apically; tarsi piceous, with pale hair; tegulæ fulvotestaceous, green at extreme base; wings smoky, nervures and stigma dark testaceous; abdomen green with a coppery lustre, punctured, the hind margins of the segments with a very narrow and even fulvous fringe; fifth segment and apex covered with black hair, sides of apical segment with little silvery patches; ventral surface with pale hair.

For the ♂, see below.

Hab.—Chapada, March and April; 12 specimens. The species is named after its discoverer.

Var. *a*. Basal portion of metathorax longitudinally plicate, the plicæ distinct and covering its surface.

Hab.—Chapada, September. One specimen.

♀♀. Abdomen with a purple-blue lustre.

Augochlora heterochroa n. sp.

♀. Length 10 mm.; blue-green, with beautiful purple reflections on the metathorax and abdomen; extreme sides of face, and edge of the black anterior margin of clypeus, coppery. Femora and tibiæ olive green, tarsi dark reddish brown. Antennæ black; face broad, front extremely closely punctured, clypeus sparsely punctured in the middle; maxillary palpi with the last joint slender, longer than the penultimate one; thorax with fairly abundant woolly-looking white hair; mesothorax extremely closely punctured; scutellum, between the punctures, microscopically tessellate; base of metathorax with numerous longitudinal ridges; pubescence of legs pale with a brownish tinge; tegulæ rufotestaceous, with a green patch at base in front; wings faintly smoky toward the apex; nervures and stigma dark testaceous; abdomen white-hoary, with small punctures at the insertion of the hairs; the middle (purple) portions of the segments after the first with more or less short black hair, the apical (green) margins with very short white

hair; apex with black hair, sides beneath with white hair. For the ♂, see below.

Hab.—Chapada, March, October. Two specimens.

Var. *a.* Longitudinal plicæ of base of metathorax feeble or absent.

Hab.—Chapada, April, September, October. Four specimens.

The sculpture of the base of the metathorax is usually considered of specific value, but in this and the last species it is certainly variable.

β. Vertex and mesothorax cupreous.

Augochlora goeldii n. sp.

♀. Length $10\frac{1}{2}$ mm. Differs from *A. smithiana* by the smaller thorax, the angles of the prothorax in front much less prominent and less acute; the face, vertex and mesothorax coppery red, the other parts of the head and thorax yellowish-green with coppery tints, nowhere blue-green; middle tibiæ more slender; abdomen blue-green, hind margin of second segment, and of third more or less, steel-blue; narrow hair-fringes white instead of fulvous. Hair of apical segment black; base of metathorax granular; antennæ black; punctures of mesothorax of two sizes.

Hab.—Chapada, one specimen. I thought at first this might be an extreme variety of *A. smithiana*, but there are so many differences that I can only treat it as a distinct species.

(ii) Scutellum with punctures of two sizes, the small ones the more numerous.

a. Abdomen crimson.

Augochlora wallacei n. sp.

♀. Length nearly 9 mm. Head and thorax bluish-green, abdomen shining crimson. To the naked eye this is exactly like *A. subignita* from Mexico, except that the wings are a little more smoky. The lens reveals the following differences: Lateral angles of prothorax more produced; scutellum shiny, with the punctures conspicuously of two sizes (in *subignita* the scutellum is granular and closely punctured all over); punctures of second abdominal segment very distinct, resembling those of the first, but not quite so strong. Antennæ black, flagellum pruinose with very short yellowish-gray pubescence. *Process of labrum bifid.* Basal enclosure of metathorax plicate, surrounded by an obtuse but conspicuous microscopically tessellate rim.

Hab.—Chapada, March, April, December. Five specimens. Dedicated to A. R. Wallace.

b. Abdomen green.

a. A transverse groove behind the ocelli; margins of abdominal segments black.¹

Augochlora chapadæ n. sp.

♀. Length 10 to 11 mm.; blue-green with purple tints, some specimens much bluer than others. Face broad only just above the antennæ, the eyes being deeply emarginate; antennæ black,

¹ It will be useful to give a separate table of the species of *Augochlora* having the hind margins of the abdominal segments black. The new species will be found described in detail further on. *A. labrosa* Say, from Mexico, cannot be included because of the inadequate description, though it probably may be recognized when specimens come to hand (see *Canad. Entom.*, 1897, p. 68). There is only one species (*A. chapadæ*) in the following table known to belong to *Augochloropsis*:

Punctures of mesothorax extremely large (Chapada), *foxiana*, Ckll., ♀, ♂.
Punctures of mesothorax small and close, 1

1. Margin of clypeus, labrum and mandibles yellow

graminea (Fabr.) Smith, ♂
Mandibles dark; clypeus usually without yellow (apically margined with yellow in *binghami*), 2

2. Small, 6 mm. long, wings rufohyaline, base of metathorax with radiating plicæ, and surrounded by a shining ridge; head and thorax brassy green, *urania*, Smith, ♀

Larger, 7 mm. long at least, and of these the smaller species (*iheringi*, *cerulior* and *feronia*) with the enclosure of the metathorax not bounded by a shining ridge, 3

3. Punctures of scutellum large; blue-green species with purple tints, 4
Punctures of scutellum of two sizes, small and large (not described in *feronia*); ventral surface of abdomen without a tooth, 6

Punctures of scutellum extremely dense, not of two sizes; abdomen with a sub-basal ventral tooth (Corumbá), *mulleri*, Ckll., ♀

4. Abdomen black, tinged with green and blue; apical joint of antenna normal (Mexico), *townsendi*, Ckll., ♂

Abdomen brilliantly colored, green to purple, 5

5. Base of metathorax with regular radiating plicæ; apical joint of antenna normal (Pedra Branca, Bolivia), *belti*, Ckll., ♂; *perangusta*, Ckll., ♂

Base of metathorax labyrinthine with irregular vermiform ridges; apical joint of antenna hooked (Mexico), *binghami*, Ckll., ♂

6. Larger, about 10 mm. long; base of metathorax with fine vermiform ridges, *chapadæ*, Ckll., ♀

Smaller, 7 to 8 mm. long; base of metathorax with longitudinal plicæ; hind spur of hind tibia in ♀ simple or merely ciliate (not pectinate), 7

7. Punctures of mesothorax extremely close; greener species; wings strongly smoky; legs with green only on hind coxæ (Santarem),

iheringi, Ckll., ♀
Punctures of mesothorax not nearly so close; bluer species; wings almost clear; green of legs confined to coxæ and anterior femora (Corumbá)

cerulior, Ckll., ♀
Differs from *cerulior* by the pubescence of the legs being black; from *iheringi* by the wings being only faintly clouded at apex,

feronia, Smith.

scape dull, with short black bristles; front extremely densely punctured; clypeus with large shallow punctures, its anterior edge broadly black; mandibles only faintly rufescent at the ends; *process of labrum entire*; pubescence of cheeks white, of lower parts of face white with a little black intermixed, of front and vertex black, of mesothorax and scutellum black, of postscutellum black in front and white behind, of metathorax white, of legs pale (a dense white floccus on hind femora), of hind tarsi fuscous, of hind tibiæ fuscous in front and white behind, of abdomen pale, with some black on the second and following dorsal segments, of apex of abdomen dirty grayish; mesothorax dullish, densely punctured, rather sparsely on disc; scutellum with well-separated punctures, conspicuously of two sizes; base of metathorax with oblique wavy ridges; tegulæ dark reddish-brown, green at extreme base; wings slightly smoky, with a yellowish tinge; nervures and stigma dark brown, the latter rather reddish; legs dark brown, the femora and tibiæ in front green; abdomen with very close strong punctures, green with purple tints, apical margins of segments broadly black.

Hab.—Chapada, March, April, December; Corumbá, April (with label h. l.); Maruru, April. Five specimens.

β. No transverse groove behind the ocelli; margins of abdominal segments green.

Augochlora brasiliana n. sp.

♀. Length $8\frac{1}{4}$ to $10\frac{1}{2}$ mm.; bluish-green, the abdomen with tints of purple-blue; occasionally the head and thorax are yellowish-green, with coppery tints. Face rather broad, emargination of eyes shallow; antennæ black; front closely punctured; clypeus with semilunar punctures, a dark purple or purple-black triangular area on its anterior margin; *process of labrum deeply bifid*; pubescence of cheeks white, of face yellowish-white, some black hairs on front and vertex, of mesothorax and scutellum black with a little pale intermixed, of pleura, postscutellum and metathorax dull white with a brownish tint, of legs brownish-white and rather abundant, of abdomen brownish-white, with inconspicuous black hairs on the second and following dorsal segments; of apex of abdomen brownish-gray to blackish, but never altogether black; mesothorax minutely granular, the punctures extremely dense at the sides, but in the middle well separated, some larger than others;

scutellum with punctures of two sizes, but the smaller ones not very small; base of metathorax microscopically tessellate, not plicate nor enclosed; legs dark brown, femora, and tarsi in front, green; tegulae reddish-testaceous, green at base; wings yellowish-hyaline, nervures and stigma dull testaceous; abdomen with only small punctures marking the insertion of the hairs, dorsal segments shot with brilliant purple, hind margins of first two segments very shortly and regularly ciliate with yellowish-white hair, apical margins of third and fourth segments broadly pruinose; ventral surface more or less tinged with green.

Hab.—Corumbá, February, April, two marked “lowland;” Chapada, December; Pedra Branca (Bolivia), April. Fifteen specimens. This differs from the description of *A. paphia* Smith, by its somewhat larger size, flagellum not testaceous beneath, margins of abdominal segments green instead of purple, the purple color being on the middle and anterior portions of the segments. It is just possible that *paphia* is one of the forms of this variable species, but the probabilities are against it.

There is also a specimen of *brasiliانا* marked Uacarizal, February.

(iii) Scutellum with large close punctures all over.

a. Abdomen coppery, clothed with short fulvous hair, the segments also with narrow even fulvous fringes.

Augochlora vesta Smith, var. *cupreola* n. var.

♀. Length 8 to 9 mm.; yellowish-green, abdomen brassy green, tinged with coppery-red, or even entirely coppery-red except the extreme base. Differs from the description of *vesta* by the rather larger size, flagellum hardly or not testaceous beneath toward the apex, pubescence of legs very pale fulvous, instead of “dark fuscous,” abdomen usually more or less green, and with only small, though distinct, punctures marking the insertion of the hairs. Apex of abdomen black; base of metathorax not enclosed by a shining rim, variably roughened, but without distinct plicæ; punctures of mesothorax and front strong and as dense as is possible; anterior margin of clypeus with a semilunar black area, usually narrowly edged with crimson; *process of labrum bipartite*. For the ♂, see below.

Hab.—Chapada, February, March, April, September, October, December; Corumbá, April, one only; Maruru, April, two; San

tares, three. Twenty-three specimens in all. *A. vesta* was described from Columbia, and it is quite likely that it is a distinct species from *cupreola*, though closely allied. The specimens of *cupreola* from the basins of the Amazon (Santarem) and the Paraguay (Corumbá, etc.) do not seem to differ.

A. pandora differs from *cupreola* by having the metathoracic enclosure bounded by a distinct elevated margin, and the flagellum fulvous beneath. *A. acidalia* differs in the same respects.

b. Abdomen green.

Augochlora calypso Smith, 1879.

♀. Process of labrum bipartite; base of metathorax longitudinally plicate, with a raised rim.

Hab.—Two from Santarem, the type locality. Also two closely allied species, or subspecies, separable as follows:

Wings strongly smoky; ridge of metathoracic enclosure not marked by a groove; hair-fringe at apex of first abdominal segment entire; extreme sides of face deep blue varying to bluish-green. (Santarem) . . . *calypso*, s. str.

Wings clear or almost.

Ridge of metathoracic enclosure marked by a groove; extreme sides of face coppery; hair-fringe at apex of first abdominal segment broadly interrupted in the middle. (Chapada, February).

calypso subsp. *cupreotincta*, n. subsp.

Ridge of metathoracic enclosure not marked by a groove; extreme sides of face coppery; hair-fringe at apex of first abdominal segment entire; head smaller, and face more narrowed below than in the other two forms. (Rio de Janeiro, November).

calypso subsp. *eucalypso*, n. subsp.

All three agree in having the pubescence of the abdomen light fulvous, the mandibles with a green spot near base, the flagellum testaceous beneath at apex, and the ventral surface of the abdomen green, or mostly so.

Augochlora monochroa n. sp.

♀. Length 8 to 9 mm. Brilliant bluish-green, the abdomen varying from green to almost entirely purple, always very shiny. No coppery tints, except sometimes on the margin of the large

black clypeal patch. Coxæ, femora and tibiæ green, hind tarsi more or less green at base; tarsi otherwise piceous, the small joints deep ferruginous; pubescence of legs pale fulvous, becoming golden on tarsi, of face and cheeks pale, some black on vertex, of mesothorax black and pale mixed, of postscutellum and sides of metathorax pale and rather long, of apex of abdomen brown-black with a coppery lustre. Base of metathorax rugose, with vague plicæ. Process of labrum bifid. This is very similar indeed to *A. heterochroa*, but differs as follows: It is smaller, with the abdomen shorter and more convex, shining and without distinct pruinose bands; the even fringe at the apical margins of the first two segments is somewhat shorter, and the apical portions of these segments are not pruinose; the apical portions of the third and fourth segments are white-pruinose, but the fact is not conspicuous except in certain lights; most of the ventral surface of the abdomen is metallic green; the hind tibiæ are green on both sides; *the sides of the metathorax near the truncation are smooth and shining* (in *heterochroa* they are covered with punctures); the scutellum is much more densely punctured; the mesothorax is also much more densely punctured, and the punctures are stronger; the stigma usually has a more ferruginous tint.

Hab.—Corumbá, April, one is marked “h. l.”; Pedra Branca, April. Ten specimens. Four from Chapada, March and August, and one from Uacarizal, February, represent a slight variety, averaging a yellower green, with the fringe at apex of first two abdominal segments usually a trifle longer, and pale fulvous.

Augochlora monochroa subsp. nov. *moreiræ*.

♀. Brassy green with coppery tints; abdomen rather longer and less shiny than in *monochroa*, decidedly less globose; anterior lateral edges of prothorax prominent but rounded (in *monochroa* they are distinctly angulate); fringe at apex of first and second abdominal segments pale and short; a smooth punctureless area on each side of metathorax just below the basal area (in *heterochroa* and *brasiliانا* this place is covered with punctures). Process of labrum bipartite; hairs at apex of clypeus orange-fulvous; mandibles with a green spot; wings rather strongly suffused with brownish.

Hab.—Rio de Janeiro, November. One specimen. Named after Carlos Moreira.

Both *monochroa* and *moreira* are easily distinguished from the *calypso* forms by the rugulose base of the metathorax; in *calypso* and its subspecies this is plicate, with a shining rim.

Augochlora janeirensis n. sp.

♀. Length 8 to 10 mm.; blue-green, with purple tints on the abdomen in certain lights. Process of labrum bipartite; wings rather smoky, especially toward the apex; base of metathorax finely rugulose, not plicate; sides of metathorax just below the basal area punctured.

This is so very close to *monochroa*, *heterochroa* and *brasiliiana* that it is only necessary to mention the comparative differences. *A. janeirensis* differs at once from all these three by the comparatively long and quite fuscous hair-fringes of the first and second abdominal segments, and by the stronger punctuation of the abdomen, although the punctures are still only those at the bases of the hairs. It agrees with *heterochroa* and *brasiliiana*, and differs from *monochroa*, in having the sides of the metathorax just below the basal area punctured; it differs from *heterochroa* and *brasiliiana* in the punctuation of the scutellum, which is very strong, the punctures large and close, and not of two sizes.

Hab.—Rio de Janeiro, November; two specimens. For the ♂, see below.

In *calypso*, *monochroa*, *janeirensis*, and the various subspecies, the distance between the lateral ocelli and the orbital margin is not (usually not nearly) so great as that between the outermost margins of the ocelli. In the next species (*bucephala*) the ocelli are small and close together, and the distance between the lateral ocelli and the orbital margin is as great as the distance between the outermost margins of the lateral ocelli. *A. bucephala* will also be recognized by its relatively large size, and very broad face.

Augochlora bucephala Smith, 1853.

♀. Length about 11 mm.; process of labrum bipartite; base of metathorax minutely roughened, not plicate. In our specimens the flagellum is not "testaceous beneath," though pruinose, and the tarsi are much darker than I should call "ferruginous." The mesothorax has punctures distinctly of two sizes, as described by Smith.

Hab.—Rio de Janeiro, November. Seven specimens. For the ♂, see below.

Series II. Hind spur of hind tibia of ♀ simple or not pectinate. Here also will be found males which belong to *AUGOCHLOROPSIS*.

1. Abdomen with a subbasal ventral tooth.

Augochlora mulleri n. sp.

♀. Length 9 to 12 mm., rather narrow, dark shining peacock blue or blue-green; hind margin of first abdominal segment very narrowly black, of second broadly black, of the third and fourth deep purple with the extreme edge black; a tooth, directed obliquely backwards, on the first ventral segment. Punctuation of face, front, vertex, mesothorax, scutellum and sides of metathorax excessively close; punctures of clypeus large, on a shining surface, clypeus only very narrowly edged in front with black; front with a strong if low median keel; flagellum fulvous beneath; lower part of face with sparse short white pubescence; mandibles with a dark purple spot at base, only seen in certain lights; *process of labrum truncate, not bifid, but the truncation nodulose*; base of metathorax longitudinally plicate; the truncation, and the area between the truncation and the basal portion, coarsely roughened, this roughening gradually changes at the sides of the metathorax into dense strong punctures; tegulae piceous with a blue and green patch on the anterior portion; wings rather smoky, especially toward the ends; nervures and stigma dark; legs piceous with white pubescence, tarsi dark ferruginous, front and hind coxae tinged with blue; *middle coxae very small, their trochanters broad and flattened, with the hind edge sharp*; abdomen with the first and second segments strongly punctured, the punctures not connected with the pubescence, which is lacking on these parts.

Hab.—Corumbá, April (two are marked h. l.); Chapada, December, January; Pedra Branca (Bolivia), April. Sixty-four specimens. Dedicated to the memory of Fritz Müller.

2. Abdomen without a subbasal ventral tooth.

(i) Femora and tibiae green, tarsi yellow: males with anterior margin of clypeus not at all yellow. These appear to be all males of *Augochloropsis*.

a. First joint of flagellum swollen in front, honey-color, contrasting with the rest of the antenna, which is black; antennae rather short for a male.

Augochlora callichroa n. sp.

♂. Length $8\frac{1}{2}$ mm.; brilliant yellowish-green, the abdomen slightly brassy. Head rather densely covered with very pale yellowish hair, becoming white on cheeks; front very densely punctured; clypeus with large punctures; mesothorax shining, with large, strong and well-separated punctures, except at the sides, where they become confluent; scutellum with very large punctures, a round impunctate space on each side of the middle; base of metathorax enclosed by a rim, and covered with strong wavy plicæ; sides below the enclosure with very strong punctures; wings perfectly hyaline; nervures and stigma rather dark testaceous; abdomen very shiny, punctures of first segment strong, of second much more minute; hind margins of first two segments with a narrow even pale fulvous band, the surface generally on the apical half thinly covered with pale fulvous hair.

Hab.—Chapada, December, one. This may be the ♂ of *A. calypso* subsp. *cupreotincta*. The rather peculiar sculpture of the base of the metathorax is quite of the same type, but the punctures of the scutellum are larger and much less dense in the present insect than in *cupreotincta*.

β. First joint of flagellum normal in color and form. Hind coxæ furnished above with an apical tooth.

§. Small, not over 8 mm. long; abdomen strongly tinged with coppery red.

Augochlora vesta var. *cupreola*, Ckll., ♂ (♀ supra).

Hab.—Chapada, December.

§§. Larger, at least 9 mm.; abdomen at most slightly coppery.

x. Blue-green species, the abdomen shining purple in certain lights.

Augochlora janeirensis Ckll., ♂ (♀ supra).

Hab.—Rio de Janeiro, November. Variable in size, like the ♀.

xx. Yellowish-green, the abdomen often more or less brassy, or even slightly coppery.

y. Enclosure at base of metathorax smooth and shining; abdomen narrow, parallel-sided.

Augochlora bucephala Smith ♂ (♀ supra).

Hab.—Rio de Janeiro, November. The head is only of the ordinary size, not large as in the ♀.

yy. Enclosure at base of metathorax covered with vermiform plicæ, more or less longitudinal.

Augochlora smithiana Ckll., ♂ (♀ *supra*).

Hab.—Chapada, April, October. Less bulky than the ♀, with the punctures of the mesothorax and scutellum more dense.

(ii) Tarsi dark.

a. Base of metathorax longitudinally plicate.

§. Scutellum with very small close punctures.

Augochlora iheringi n. sp.

♀. Length about 8 mm.; rather dull blue-green, the middle of the face yellowish-green, the clypeus marked with peacock blue, the middle of the basal area of the metathorax purple, the legs very dark brown, only the hind coxæ with some green; abdomen black dorsally, blue-green at the sides, the hind margins of the segments broadly black; wings grayish-fulvous. Punctures of front, mesothorax and scutellum small and very dense, the front may be said to be minutely rugose; base of metathorax longitudinally plicate, the plicæ numerous, strong and distinct; sides below the basal area minutely roughened, with no shining rim; truncation of metathorax dull, its lower part striate; abdomen impunctate dorsally, sides of first segment with very small punctures; flagellum obscurely ferruginous beneath; mandibles ferruginous in the middle; *process of labrum truncate, not bifid*; ventral surface of abdomen piceous, with long pale hair; scutellum and postscutellum with sparse black hairs, the latter with also pale hairs.

Hab.—Santarem. One specimen.

Augochlora cærulior n. sp.

♀. Length 8 mm.; shining prussian green, the hind margins of the abdominal segments black. Legs piceous, tarsi and anterior tibiæ dark ferruginous, front and hind coxæ green; *process of labrum entire, broadly truncate*, longitudinally plicatulate; antennæ piceous, flagellum ferruginous beneath; punctures of front extremely dense, of clypeus large; mesothorax minutely granular, punctures very distinct, in the middle well separated; punctures of scutellum extremely small, with a few larger ones interspersed, but even these not so large as those of the mesothorax; base of metathorax strongly longitudinally plicate, no shining rim; tegulæ dark ferruginous; wings slightly dusky, nervures and stigma dark brown;

abdomen with minute punctures; ventral surface very dark brown. Hair of legs all pale.

Hab.—Corumbá, April. Two specimens.

§§. Scutellum with large punctures.

Augochlora batesi n. sp.

♂. Length 9 to $10\frac{1}{2}$ mm.; brilliant green, more or less golden about the middle of the face, abdomen with purple shades in certain lights; head ordinary, antennæ very dark brown, not very long; punctuation of front and vertex extremely close; lower sides of face and clypeus, and cheeks, conspicuously bearded with white hair; mandibles with a green spot at base; *process of labrum bifid*; mesothorax microscopically tessellate, with close large punctures; scutellum the same; base of metathorax irregularly longitudinally plicate, no shining rim, sides below base very densely and strongly punctured; truncation of metathorax quite densely punctured; tegulæ green and punctured at base; wings hyaline, nervures and stigma dull pale reddish-brown; coxæ, femora and tibiæ green, tarsi very dark brown, pubescence of legs wholly pale and quite dense; abdomen strongly punctured, even the depressed margins of the segments punctured; hind margins of the first two segments with a narrow even fulvous hair-band; hind margins of third and fourth segments broadly white pruinose; sides and base of abdomen quite hairy; *on each side, from beneath the margin of the fourth segment, projects a little brush of hair, slightly fulvous in color*; first three ventral segments green, the others dark-brown.

Hab.—Chapada, September, October. Several specimens. Evidently a male *Augochloropsis*. It greatly resembles *A. heterochroa*, but differs in several particulars, such as the more prominent lateral angles of the prothorax. It is also very similar to *A. acis* Smith, but that is smaller.

Augochlora belti n. sp.

♂. Length 10 mm.; blue-green, with strong purple tints, especially on the abdomen, strongly punctured, and little hairy. Eyes deeply emarginate; face considerably narrowed below; clypeus with large close strong punctures, its apical margin narrowly black; front and vertex extremely densely punctured; *mandibles slender, pointed, with no inner tooth*; *process of labrum a broad crenulate ridge, not at all bifid*; tongue long and slender; flagellum

clear ferruginous beneath; anterior lateral angles of prothorax prominent; mesothorax and scutellum with dense strong punctures; base of metathorax with strong longitudinal plicæ, the intervals between them shining; truncation of metathorax ill-defined and densely punctured; punctures of sides of metathorax conspicuously larger than those on and near the truncation; a small minutely granular area, free from punctures, on each side below the enclosure; tegulæ shining piceous, convex, punctured and green at the extreme base; wings rather dusky toward the tips, nervures and stigma dark-brown; legs piceous; coxæ, anterior femora and the other femora more or less, green; tarsi becoming ferruginous at the ends; abdomen with subparallel sides, strongly punctured, the punctures on the first segment largest; hind margin of first segment very narrowly, of second segment broadly, of the other segments rather broadly, black; first, third, fourth and fifth ventral segments tinged with blue; apex with two pale orange fimbriate processes.

Hab.—Pedra Branca, April. One.

Var. *perangusta* n. var.

♂. Length $8\frac{1}{2}$ to $9\frac{1}{2}$ mm.; narrower; second submarginal cell narrow, higher than its breadth at base, whereas in *belti* it is much broader.

Hab.—Corumbá, April, several; Pedra Branca, April, one. This looks as if it might be a distinct species, but the characters mentioned are the only ones I can find to separate it. The punctureless space at the sides of the metathorax just behind the enclosure is wanting in the Corumbá examples.

Angochlora foxiana n. sp.

♀. Length 9 to 10 mm.; head ordinary, front rough with large and extremely close punctures; face and front greenish golden to golden green, strongly tinged with coppery-red, especially on the supraclypeal area; vertex and cheeks green; antennæ dark, flagellum faintly tinged with ferruginous beneath; mandibles bidentate at apex, ferruginous in the middle, with no green spot at base; *process of labrum bifid, consisting of two little nodules*; anterior lateral angles of prothorax approximately right angles; thorax except the middle of the mesothorax (which is dull black) bluish-green, verdigris color; mesothorax with extremely large and more or less confluent punctures, the area between them dull because

microscopically tessellate; scutellum with large not very numerous punctures, and numerous minute ones between; basal area of metathorax narrow in a longitudinal direction, delicately longitudinally plicate, with no shining rim; sides and truncation of metathorax rough with large punctures; tegulæ very dark brown, without any green; wings smoky, nervures and stigma very dark brown; second submarginal cell about as broad as long; legs very dark brown, anterior coxæ tinged with greenish; pubescence of legs pale fulvous; abdomen black, with the segments (especially the first) showing a variable amount of green, the margins, however, always black, that of the first only very narrowly so; where the segments are green, they are punctured (the first segment strongly so), where they are black, impunctate; apex with short sooty hair; ventral surface without any green.

♂. About 8 mm. long, in most respects similar to the female, but more slender, with somewhat longer antennæ; face greener, mesothorax with less black; anterior margin of clypeus, labrum, and mandibles except their ferruginous ends, dull yellow; anterior and middle femora green; anterior tibiæ and middle and hind tibiæ in front, lively ferruginous, or orange-ferruginous.

Hab.—Chapada, January, March, April, September, November, December. Fifty specimens (♂ in November).

Var. perimelas n. var.

♀. Perhaps a trifle larger; face and vertex coppery-red; flagellum distinctly ferruginous beneath; mesothorax with the punctures a trifle smaller, black, with only the extreme lateral and hind margins greenish; scutellum black; postscutellum black tinged with blue or green in the middle; basal enclosure of metathorax deep blue, varying to green; pleura black, or faintly tinged with blue; abdomen black, with only a little blue or green at the sides of the first, and sometimes second and third segments. Process of labrum binodulose or entire, really a fair intermediate between the two types (bifid and entire), varying in both directions.

Hab.—Corumbá, April, two; Rio de Janeiro, November, one. Perhaps a distinct species.

The species is named after Mr. William J. Fox, who has contributed so much to the knowledge of Brazilian Hymenoptera.

β. Base of metathorax granular.

§. Green species.

Angochlora heterochroa Ckll., var. *a* (♀ supra).

Hab.—Corumbá, April, several; Chapada, December. Very similar to the ♀; no yellow on clypeus, labrum or mandibles. The anterior lateral angles of the prothorax are not prominent as in *batesi*.

§§. Black species. (*Megaloptidia*, subg. n.)

Megalopta contradieta n. sp.

♂. Length 9 to 11 mm., brown-black with sometimes the faintest suggestion of blue about the face and pleura. Ocelli very large, their distance apart and the distance of the lateral ocelli from the eyes considerably less than the diameter of an ocellus; these ocelli resemble those of *Sphecodogastra*; eyes very large, emarginate, strongly converging below, so that the lower part of the face is very narrow; sides of face with short white plumose pubescence; vertex with a few dark hairs; scape rather dark ferruginous; flagellum delicately pruinose, dark reddish-brown, inclined to be compressed basally; face and front dull, minutely granular; labrum ferruginous, convex, not at all bifid; maxillary palpi light ferruginous, with slender joints, the last two longer than the two before; mandibles short and simple, without any inner tooth; mesothorax and scutellum rather shining, subsericeous, with shallow indistinct punctures and scattered inconspicuous erect hairs; basal area of metathorax shining, minutely granular, with a few very small indistinct plicæ at its extreme base; truncation and sides of metathorax hoary-pubescent; lower parts of thorax white-hoary; tegulæ shining red-brown; wings yellowish-hyaline, hairy, nervures and stigma dark ferruginous, second submarginal cell narrow; legs very dark brown, small joints of tarsi ferruginous; pubescence of legs pale, more or less black on the hind surfaces of the hind tibiæ and tarsi, and pale ferruginous on the small joints of the tarsi; all the claws deeply cleft; abdomen very sparingly pubescent, subsericeous, impunctate; two brushes of hair projecting from the middle of the apical margin of the fourth ventral segment; apical segments strongly retractile within the others, so as to make the abdomen appear truncate.

Hab.—Santarem, two; Benevides, July, one. A very singular species. The first recurrent nervure in one specimen joins the second transverse-cubital, but in another enters the third submarginal cell at its extreme base. The second recurrent nervure joins the third submarginal cell well before its apex.

DIVISIONS OF AUGOCHLORA.

The arrangement of the species given above is artificial, intended merely to make easy their identification. It is by no means so simple to construct a natural classification, and the present attempt must be regarded as more or less provisional.

It will be observed that the first and last species are assigned to *Megalopta* Smith (not *Megaloptera*, as Ashmead has it in *Tr. Am. Ent. Soc.*, XXVI, 92). They do not agree in detail with the type of that genus, but they have the large ocelli, whereby *Megalopta* differs from *Augochlora* as *Speecodogastra* does from *Halictus*. Smith figures the second recurrent nervure of *Megalopta* as interstitial with the third transverso-cubital, and Ashmead so has it in his tables; but Smith's *description* says that the second recurrent enters the second (error for third) submarginal cell *near* its apex. In both our species this nervure enters the third submarginal cell a very appreciable distance before the apex. Smith *figures* the first recurrent as entering the second submarginal cell near its middle, but he *describes* it as entering near or at its apex, as it does in *M. idalia*, one of the species he had before him.

M. bituberculata Smith is to be regarded as the type of *Megalopta*. *M. idalia* may prove not to be truly congeneric, when the mouth-parts are properly examined: I have not been able to determine the characters sufficiently from the single example seen.

M. contradicta is certainly subgenerically distinct, at least. It may be regarded as the type of a new subgenus *Megaloptidia*, distinguished by the first recurrent nervure being interstitial with the second transverso-cubital, or even entering the third submarginal cell, the conspicuously hairy wings, the scutellum convex but not bituberculate, and doubtless other characters which would be apparent on a comparison of specimens.

The remaining species, with normal ocelli, are assigned to *Augochlora*.

Augochlora s. str. may be held to include those species in which the hind spur of hind tibia is not pectinate in the ♀, and the process of the labrum is not bifid.

Augochloropsis Ckll. contains species in which the hind spur of the hind tibia is pectinate in the ♀, and the process of the labrum is bifid.

Each of these groups is numerous in species, and they differ appreciably in general appearance, *Augochloropsis* being usually broader and less parallel-sided, with more brassy or even coppery colors, while *Augochlora* s. str. tends to be longer, more blue-green tending to purple, with the hind margins of the abdominal segments commonly black. These characters of form and color, however, are by no means absolute.

An argument against the separation of these groups as distinct genera is found in the existence of certain intermediate types.

A. chapade Ckll. has the colors of an *Augochlora* s. str., and also the labrum; but the tibial spurs of *Augochloropsis*. It may be regarded as an aberrant *Augochlora* s. str.

A. foxiana Ckll. has the spurs of *Augochlora* s. str., but the process of the labrum is of an intermediate type, and quite variable.

A. mulleri Ckll. is peculiar for the subbasal ventral tooth of the abdomen, recalling *Acanthosmia* and *Acanthosmioides*.² This could be regarded as a subgeneric character. In *mulleri* ♀ the labrum is triangular, produced to a point at an angle of about 50°, the sides ciliate with long stout bristles, from 120 to almost 200 μ long. The shape is much as in *Megalopta*.

The palpi throughout the series have not yet been examined. The following measurements (in μ) relate to two species:

<i>A. (Augochlora</i> s. str.) <i>mulleri</i> , Ckll. ♀.		Joint 1.	2.	3.	4.
		Labial palpi,	200.	100.	100.
<i>A. (Augochloropsis)</i> <i>vesta</i> var. <i>cupreola</i> , Ckll. ♀.					
		Labial palpi,	150.	100.	100.

The first joint is long and slender in *mulleri*; shorter and stout in *cupreola*.

		Joint 1.	2.	3.	4.	5.	6.
<i>A. mulleri</i> , ♀.	Maxillary palpi,	100.	140.	130.	120.	120.	115.
<i>A. v. cupreola</i> , ♀.	“ “	130.	100.	110.	115.	110.	150.

Thus, while the total lengths of the palpi are so near together as 725 and 715 μ , the proportions of the joints are very different.

Augochlora titania Smith, 1853, is not an *Augochlora*, and must be called *Corynura titania*.

² Ashmead, *Tr. Am. Ent. Soc.*, XXVI, 76, describes *Acanthosmioides* under the head of species having the body black, which is incorrect; it is brassy green.

Genus **AGAPOSTEMON** Smith, 1853.**Agapostemon semimelleus** n. sp.

♀. Length 10 mm.; head and thorax brilliant yellowish-green; apical margin of clypeus yellow, the yellow edged with blackish; mandibles with the basal half yellow, the apical portion dark ferruginous; flagellum ferruginous beneath, its second joint ferruginous, shorter than the third; tegulæ shining rufotestaceous; wings dullish hyaline, apical margin smoky; nervures and stigma dark-brown; apical half of anterior femora in front, and anterior tibiæ in front, yellow; hind tibiæ with a patch of black hair above at base; *abdomen honey-color*, bases of segments 2 to 4 with a broad band of yellowish-white pubescence; immediate sides of anal rims with pale hair, but the segment on each side covered with sooty hair; second to fourth segments with a dark spot at extreme side at base, the first has also a more or less defined dark spot. Anterior lateral angles of prothorax very prominent, acute. Similar in appearance to *A. melliventris* Cresson; besides the differences which may be learned from the above description, it differs from *melliventris* by its scape not being yellow in front, the mesothorax and scutellum having scattered dark hairs, the triangle at the base of the metathorax less defined, the first abdominal segment not white-hoary, and the darker legs. The stigma is very dark-brown in *semimelleus*, clear yellow in *melliventris*.

♂. Head and thorax green like the ♀; clypeus broadly margined with yellow, the yellow coming to a point above in the middle line; scape yellow in front, flagellum ferruginous beneath; legs yellow, hind coxæ green above; hind femora swollen, dark-brown above at apex; hind tibiæ with a broad stripe of dark-brown behind on the basal half; abdomen strongly punctured, yellow, with broad black bands on the apical portions of the first to sixth segments.

Hab.—Chapada, January, both sexes.

Agapostemon chapadensis n. sp.

♀. Length 10 mm.; head and thorax brilliant green; *abdomen black*. Yellow markings of clypeus and mandibles, sculpture and pubescence of thorax (except that the scutellum is sparsely punctured at the sides of the middle) as in *A. semimelleus*. Wings dusky hyaline. Legs dark; hind coxæ green above; anterior

legs, from the second third of the femora down, orange-fulvous in front. Flagellum ferruginous beneath.

Closely related to *A. viridula* (Fabr.), but differs by its smaller size, yellower green, clypeus margined with yellow, stigma dark-brown (honey-yellow in *viridula*), base of metathorax more coarsely sculptured, abdomen more strongly punctured, and the anterior lateral angles of prothorax much more acute.

♂. Resembles that of *semimelleus*, but differs by having the first abdominal segment black at the base, the bands on the other segments very broad, toward the apex practically covering the segments; the anterior femora with a broad, the middle femora with a narrow, greenish stripe behind; the hind femora mostly dark-brown within, a little yellow blotch on the brown near the hind margin; all the tibiæ, and the hind tarsi, marked with brown.

Hab.—Chapada, March, both sexes; a ♀ also in January.

