

SOME BEES OF THE GENUS *AUGOCHLORA* FROM THE WEST INDIES.

By T. D. A. COCKERELL,
Of the University of Colorado, Boulder.

The most recent catalogues of West Indian bees are those by Friese, in *Zeitschrift für Hymenopterologie und Dipterologie*, 1902, and in the *Zoologische Jahrbücher* for 1908. The 1902 list covers the Greater Antilles, and includes six species of *Augochlora*, of which one (*A. parva* Cresson) has been transferred by Baker to the *Chloralictus* section of *Halictus*. The number six is nevertheless maintained, as I have added a species (1909) from Jamaica, *A. jamaicana*. The 1908 list includes the species of the Lesser Antilles, and cites five species of *Augochlora*, the information being derived from Ashmead's paper in the *Transactions of the Entomological Society of London*, 1900. By some accident *A. aleyone* Smith, from Santo Domingo, is omitted from Friese's 1902 list. Following Ashmead, three of the species of the Greater Antilles are said to extend to St. Vincent. The whole West Indian list, with type-localities, stands as follows:

- A. decorata* (Smith). Jamaica (female).
 - A. præclara* Cresson. Cuba (female).
 - A. regina* Smith. Jamaica (female).
 - A. elegans* Cresson. Cuba (male).
 - A. jamaicana* Cockerell. Jamaica (female).
 - A. magnifica* Cresson. Cuba (male).
 - A. aleyone* Smith. Santo Domingo (female).
 - A. cyaneoviridis* Ashmead. St. Vincent (female, male).
 - A. claviventris* Ashmead. St. Vincent (male).
 - A. nigromarginata* (Spinola), the *graminea* of authors, is reported by Friese from Trinidad, but this island has a South American fauna.
- I have examined Smith's types at the British Museum, and ascertained that all three belong to the group with the hind spur of the hind tibia simple, or appearing so under an ordinary lens. The same is true of *A. jamaicana*. Having some doubts about Ashmead's determination of the St. Vincent species, I asked Mr. S. A. Rohwer

to examine them. This he kindly did, and, finding my doubts apparently confirmed, sent them on, with other West Indian material, for investigation. The present paper presents the results, all the species described being in the U. S. National Museum.

1. Group VIBRISSATI.

This group, so abundantly represented on the mainland, seems to be wholly absent in the West Indies.

2. Group SERICEI.

A single species, very close to the abundant South American *A. nigromarginata*.

AUGOCHLORA PISCATORIA, new species.

Brilliant blue-green, the abdomen in the male becoming a pure purple-blue; smaller than *A. nigromarginata*, the length of the anterior wing about $6\frac{3}{4}$ mm. (in *nigromarginata* 8 to $9\frac{1}{2}$); hind spur with four stout spines (six in *nigromarginata*, according to a specimen in the British Museum, but four on one side and five on the other in a Brazilian specimen from Smith's collection); male with last antennal joint hooked, and large fish-tail process, covered with white pubescence, arising from beneath margin of third ventral abdominal segment. The female, compared with *A. nigromarginata* from Brazil, is much bluer, with much shorter and scantier hair on the head and thorax, and the abdomen is very shiny and feebly punctured, this being especially noticeable on the first segment, although in the male this is strongly punctured. The wings in both sexes are very dusky and strongly reddish; the first recurrent nervure enters the base of the third submarginal cell, or joins the second transverso-cubital a little on the outer side. The more ample wings of *A. nigromarginata* are by no means so dark. The short hair of the head (except the cheeks) and dorsum of thorax is nearly all black or dark fuscous in both sexes; in *A. nigromarginata* it is much less so. The tegulæ are considerably darker than in *A. nigromarginata*. The hind margins of the abdominal segments, as in *nigromarginata*, are black. One of the males is unusually large and blue, but evidently conspecific.

Habitat.—St. Vincent, West Indies (*H. H. Smith*); 11 females, 7 males. This is evidently an insular representative of *A. nigromarginata*, sufficiently differentiated to be considered a distinct species. It is, I suppose, the insect reported by Ashmead as *A. regina*.

According to Vachal, the Mexican *A. binghami* Cockerell (male) is the same as *A. nigromarginata*. It is certainly very closely allied, but it differs from both *nigromarginata* and *piscatoria* by having the mandibles dark, and only the upper half of the labrum pallid. The male flagellum of *binghami* is obscurely reddish beneath; in *nigro-*

marginata it is fulvous; but in *piscatoria* it is black. The tarsi of *binghami* are black, of *nigromarginata* (male) more or less testaceous, as also in *piscatoria*. The fish-tail structure of *binghami* is covered with dark brown hair.

Type-specimen.—Cat. No. 12868, U.S.N.M.

3. Group OXYSTOGLOSSI.

In this group the hind spurs appear simple under a lens; with a compound microscope they are seen, in the species before me, to be minutely serrate. This is the dominant and characteristic group of the West Indies.

AUGOCHLORA VINCENTANA, new species.

Female.—Length about 5½ to 6 mm., brilliant bluish-green, varying to almost entirely blue; head and thorax minutely and densely punctured, with short but rather abundant pubescence, white on cheeks and pleura, pale yellowish dorsally; sides of face with hoary white pubescence, contrasting with the convex little-hairy supraocellar region, which also is yellowish-green, the adjacent parts on each side being bluish-green; head rather large; eyes very deeply emarginate; antennæ dark, or flagellum dull red beneath; lateral ocelli tilted, so that seen from above they appear oval; clypeus rather densely punctured, its lower margin broadly blackened; mandibles ferruginous, blackened at apex and base, and with a small inner tooth; metathorax shining, the basal area with extremely fine longitudinal striæ, bordered behind by a shining rim; with a compound microscope it can be seen that these striæ are vermiform and irregular except laterally, that the shining rim has an extremely delicate reticulation, and that the much bluer posterior part of metathorax is quite closely punctured, the punctures of very different sizes; scutellum densely punctured like the mesothorax; tegulæ shining rufopiceous, pallid exteriorly in front; wings reddish-hyaline, stigma and nervures dark brown; second submarginal cell not especially narrow, receiving the first recurrent nervure very near its apex; knees, tibiæ, and tarsi clear ferruginous, with yellowish-white hair; femora variable from nearly all black or fuscous to nearly all ferruginous; hind coxæ blue-green; hind spur microscopically serrate, the teeth pale; abdomen shining, very feebly sculptured, the hind margins of the segments very narrowly blackish; no vibrissæ; at extreme base of second segment there is a minute fringe of white cilia; venter piceous, the hind margins of the segments narrowly testaceous.

Male.—Similar in most respects to the female; face very greatly narrowed below; antennæ long, flagellum crenulate, pale reddish beneath; lower edge of clypeus narrowly, and labrum, pale yellowish

or cream-color; mandibles pale ferruginous; mesothorax rather less closely sculptured; tegulae variable, pale reddish or darker; femora and tibiae red, anterior femora metallic green behind; tarsi yellowish-white at base, redder beyond; venter of abdomen normal.

Habitat.—St. Vincent, West Indies (*H. H. Smith*); 5 females, 4 males. A variable little species, but I can not divide it into two. This is what Ashmead reported as *A. decora* Smith (error for *decorata*). It differs from *A. decorata* in the dark nervures, broader second submarginal cell, and in having the thorax and abdomen of the same color. In the color of the legs, it resembles the Mexican *A. cordiae-floris* Cockerell, but that has lighter wings, a differently colored abdomen, and a smaller, rounder head. The type female of *A. vincentana* is labeled as coming from an altitude of 500 feet. One of the males is from Kingstown.

Type-specimen.—Cat. No. 12869, U.S.N.M.

AUGOCHLORA CYANEOVIRIDIS Ashmead.

I have before me two females of the original lot, from St. Vincent. The hind spur is microscopically serrate, with dark teeth; there are no vibrissae. The second submarginal cell is very narrow. Easily known from *A. vincentana* by its larger size and dark legs. Compared with *A. antillana*, it is smaller, and the area of the meta-thorax has fine longitudinal striae, quite different from the transverse curved striae of *antillana*.

The three following are superficially much alike, and might be taken for the same species without close examination. They may be separated as follows:

Area of metathorax with transverse curved striae.....	<i>antillana</i>
Area of metathorax with longitudinal striae.....	1
1. Longitudinal striae extending to, or almost to, the margin of the area; wings very dark	<i>buscki</i>
Longitudinal striae in the middle extending less than halfway to margin of area; wings not dark	<i>cubana</i>

AUGOCHLORA ANTILLANA, new species.

Female.—Length nearly 9 mm., rather robust, deep blue-green, the abdomen shining with purple reflections, and even some magenta patches on the middle of the first two segments; head and thorax granular-punctate, the vertex and mesothorax dullish, the latter under the compound microscope appears as if densely, deeply, and confluent malleate; head rather large, oblong, the face evidently longer than in *A. piscatoria*; clypeus purple-tinted, with scattered very strong punctures, the anterior margin somewhat depressed and very narrowly black; labrum black, shining, with two low bosses, its lower part striato-punctate; mandibles very broad, swollen below,

strongly dentate, obscurely reddish; scape black; flagellum more or less dull reddish beneath; eyes deeply emarginate; keel between antennæ strong; hair of head and thorax short and inconspicuous, scanty and white on cheeks and pleura, short and black on face, vertex, mesothorax, and scutellum; tubercles conspicuously fringed with short white hair; *area of metathorax with peculiar sculpture, consisting of semicircular grooves on each side, giving way to short oblique striæ posteriorly*; scutellum minutely rugosopunctate like mesothorax; tegulæ rufopiceous, green basally; wings strongly dusky, reddish, nervures and stigma dark brown; first recurrent nervure joining second transverso-cubital, but toward the inner side; legs piceous; the coxæ and anterior femora blue-green; hind spur microscopically serrate, the teeth light; abdomen broad, without vibrissæ, hind margins of segments very narrowly blackened; venter piceous, with pale hair.

Habitat.—St. Vincent, West Indies (*H. H. Smith*). The label bears the number 2.

Type-specimen.—Cat. No. 12870, U.S.N.M.

AUGOCHLORA BUSCKI, new species.

Female.—Length about 10 mm.; head and thorax brilliant blue-green; abdomen yellowish-green, with purple tints laterally, the hind margins of the segments being very broadly black, the black largely suffused with purple; head and thorax very densely and quite strongly punctured, the punctures of the mesothorax separately visible under a lens; pubescence scanty, and poorly preserved in the specimen, but evidently short and black or mainly so on face and head and thorax above, pallid on ventral surface; head ordinary, not elongate, *checks broad, and with a small but evident tubercle beneath*; eyes deeply emarginate; clypeus shining, with scattered punctures, its disk purple-tinted, but its upper margin narrowly golden-green; mandibles black, with a blue spot at base; antennæ dark; *scutellum closely and minutely punctured, bigibbous, with a median sulcus*; *area of metathorax with numerous strong longitudinal striæ*, which curve outwards a little just before reaching its outer edge; posterior face of metathorax dullish, without any sharp rim; tegulæ piceous with a rufous spot, the anterior base metallic; *wings very dark reddish*; stigma and nervures dark red-brown; first recurrent nervure joining second transverso-cubital, but toward outer side; legs brown-black, anterior femora blue-green behind; hind spur microscopically serrate, the teeth dark; abdomen only moderately shining; venter with long hair, partly black and partly dull white. The claw-joints are ferruginous.

Habitat.—Aguadilla, Porto Rico, Jan., 1899 (*Aug. Busck*). A distinct species, easily known by the characters italicized.

Type-specimen.—Cat. No. 12871, U.S.N.M.

AUGOCHLORA CUBANA, new species.

Female.—Length about 10 mm.; brilliant shining blue-green, with strong purple tints, especially on head and abdomen; head and thorax densely punctured, the punctures on mesothorax strong; pubescence short and thin, white on pleura, cheeks, and face (a little black on supraclypeal area), black on vertex, mesathorax, and scutellum, white on metathorax; head rather long, the clypeus prominent, with large well-separated punctures, its apical margin depressed in middle; mandibles black, strongly dentate, and with a blue basal spot; labrum roughened, obscurely bituberculate; antennæ dark, scape not metallic; mesothorax a yellower green than the rest of the insect, very brilliant; scutellum finely and closely punctured, not bigibbous; *area of metathorax with strong longitudinal striæ, but these are complete only laterally; in the median area they extend less than halfway to the posterior edge*, the nonstriate part being minutely roughened; posterior face of metathorax shining; tegulæ with the anterior half strongly metallic, the posterior rufopiceous; wings hyaline, slightly dusky, but not dark, stigma dark ferruginous, nervures dark fuscous; second submarginal cell large; first recurrent nervure joining second transverso-cubital, but toward the inner side, or just entering second submarginal; all the femora metallic, but the tibiæ and tarsi black; claws ferruginous; hind spur microscopically serrate as in *A. buscki*; abdomen broad, little hairy above, *hind margins of segments not black*, or at most a linear hardly noticeable edge; ventral surface with long, yellowish-white hair, not mixed with black.

Habitat.—Baracoa, Cuba, Aug., 1902 (*Aug. Busck*). The following table separates the species of *Augochlora* known from Cuba:—

Area of metathorax with the median third striate only at base; tibiæ and tarsi not metallic; insect with strong purple tints.....	<i>cubana</i> Cockerell
Area of metathorax striate practically all over	1
1. Tibiæ and tarsi not metallic; their pubescence black.....	<i>regina</i> Smith
Tibiæ metallic, with pale or hoary pubescence	2
2. Abdominal segments "beautifully margined with violaceous," the margins also depressed and impunctate (male).....	<i>magnifica</i> Cresson
Abdomen ordinary	3
3. Scape purplish-blue; head golden-green (female).....	<i>præclara</i> Cresson
Scape black (male)	<i>elegans</i> Cresson

I have never seen *A. magnifica* or *præclara*. *A. elegans* I have examined in the British Museum, the specimen being from Santo Domingo.

I have not seen *A. claviventris* Ashmead, from St. Vincent; Mr. Rohwer tells me that it is not represented in the U. S. National Museum. It will be readily known from the other West Indian species by the claviform piceous-black abdomen of the male.

Type-specimen.—Cat. No. 12872, U.S.N.M.