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Descriptions and Records of Bees.— XIV.

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1797. *Lampas columbina*, Humphreys, Mus. Caloneanum, p. 45.
 1798. *Terebratula vitrea*; Cuvier.
 1799. *Terebratula terebratula*; Lamarek.
 1819. *Terebratula Kleinii*, Lamarek.
 1856. *Terebratula perovalis*; Hanley, *vide* Dall.
 1880. *Terebratula terebratula*; Douville.
 1894. *Terebratula simplex*; Hall & Clarke.

EXPLANATION OF PLATE XII.


Terebratula terebratula (Linné).

a, drawn as seen; *b*, *c*, restored outlines.

LXIV.—*Descriptions and Records of Bees.*—XIV.
 By T. D. A. COCKERELL, University of Colorado.

Crocisa Wellmani, sp. n.

♀.—Length 14 mm. or slightly more.

Black with bluish-white hair-markings. Anterior wings very dark fuliginous, with a pair of suffused hyaline spots just beyond the third submarginal cell. Face densely white-haired; clypeus very densely finely punctured; antennæ dark; pleura with the upper half covered with bluish-white hair, the lower half apparently nude, but with scanty black hair, and with very strong well-separated punctures; pattern of thorax above simulating a face, with a median nose-like band, a pair of spots for eyes, and a transverse mark on each side anteriorly like a moustache, all strongly defined, the appearance being further aided by a stripe on each side, curving inwards posteriorly, which outlines the head and suggests hair; margin of scutellum of the -type, with a conspicuous round spot of hair on each extreme side, but no median spot; a white fringe from underneath the middle; anterior tibiæ white-haired on outer side, middle and hind tibiæ with somewhat more than the basal half white-haired on outer side; basitarsi with a good deal of white hair; first abdominal segment with a pair of large U-like lateral marks, placed laterally and not joined basally; the broad bands on the other segments also broadly interrupted, that on the second with a pointed projection anteriorly near the side of the segment; apical plate narrow; last ventral segment produced; fifth ventral not keeled.

In Friese's table (Verh. zool.-bot. Gesell. Wien, 1905, p. 174) this runs to *C. arcuata*, Vachal, but that species is

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somewhat larger, and has the basal band of the abdomen entire. The scutellum brownish-haired (which is not at all the case in ours), with its spots decidedly blue.

Hab. Portuguese West Africa. Long. E. $15^{\circ} 05'$, lat. S. $12^{\circ} 44'$, alt. 1360 metres above sea-level, at flowers of *Æolanthus*, Dec. 1906 (middle of rainy season); collected by Dr. F. Creighton Wellman. At the same flowers Dr. Wellman also took a small (hardly over 8 mm. long) ♀ of *C. meripes*, Vachal.

Anthophora quadrifasciata (Villers), ♀.

Same locality as *Crocisa Wellmani*. Dr. Wellman notes: "Stands motionless in the air like a bot-fly. Taken near a flowering *Convolvulus* but not actually seen in the flowers. Its hum suggests a bot'le fly."

Anthophora convolvuli, sp. n.

♀.—Length about 12 mm.

With mainly fulvous hair; superficially looking exactly like *A. vestita*, Smith, but differing as follows:—labrum yellow (as in *A. capensis*, Friese), with a dark spot at each basal corner; mandibles yellow with the apex dark; clypeus with narrow anterior margin and a narrow median band yellow; a small supraclypeal mark; hair of thorax yellower; hair on middle and hind basitarsi, except a tuft posteriorly, black. The tegulæ are clear red, and the hind margins of the fulvous-haired abdominal segments, as in *vestita*, appear pallid.

Collected by Dr. Wellman in the same locality as *Crocisa Wellmani*, in Dec. 1906, at flowers of *Convolvulus*.

Apis nigritarum, Lepel.

Dr. Wellman sent numerous workers from the same locality as the *Crocisa*, &c., taken at various flowers, chiefly Leguminosæ.

Agapostemon coloradensis, Crawford.

The male, not hitherto described, was found by Mr. S. A. Rohwer on the campus of the University of Colorado, at Boulder, Oct. 3, 1906. It has the head and mesothorax above blue, exactly as in *A. californicus*, but it is a larger insect, and the yellow band on the clypeus sends upwards a little projection in the middle. Abdomen with five yellow bands, the first with a pair of black spots in the middle:

last ventral segment not keeled; trochanters black, the hind ones with a yellow spot; hind tibiae yellow, with a small black mark in front and a larger one behind.

Augochlora viridula, Smith.

This insect has two forms, one golden-green, the other blue-green. Mr. N. Banks has taken females of both at Falls Church, Virginia: the golden-green at flowers of *Ceanothus* in June; the blue-green on the 2nd of August, flower not stated. Mr. C. Robertson has sent me the blue-green from Southern Illinois. *A. viridula* was founded on a male of the golden-green form; *A. lucidula*, Smith, on females of both. I have some suspicion, though I cannot produce any proof, that the two forms are distinct, but very closely allied species; if this is the case, it may be permissible to retain the name *lucidula* for the blue-green one.

Augochlora Banksiella, sp. n. (*pura*, subsp. ?).

♀.—Length 7-7½ mm.

Brilliant green, the abdomen golden green, the head and thorax also with a golden lustre—no blue or purple; mandibles with a green basal spot; antennae dark, flagellum obscure brown beneath; orbital margins strongly converging below; tegulae fusco-ferruginous with a green spot. Wings greyish; stigma and nervures testaceous; first r. n. joining second t.-c., second s.m. almost as broad as high, marginal cell appendiculate; area of metathorax with fine but strong striae. Legs piceous, anterior and middle femora green on under side; hind spur simple, curved; dorsal surface of abdomen nude, not hairy, or rather with exceedingly scanty short pubescence; no vibrissae; hind margins of segments exceedingly narrowly black.

Very closely related in all respects to *A. pura*, Say (*Robertsoni*, Ckll.), but readily distinguished by the strong golden tints and the usually larger area of metathorax. It is perhaps a subspecies of *A. pura*. The male has the tarsi ferruginous.

Hab. Glencarlyn, Virginia, May 4-July 20; one, June 21, from flowers of *Ceanothus*; Great Falls, Virginia, April 20; Odenton, Maryland, July 18. All collected by Mr. Nathan Banks.

The genuine *A. pura* I have from Ithaca, New York (*Banks*) and Illinois (*Robertson*). In identifying the latter I follow Robertson, but Say's original description could be applied to either form, perhaps agreeing a little better with

Banksiella. Apparently Say did not separate the two or three allied species of the *pura* type, and as he doubtless included the insect which Robertson calls *pura*, this application of the name may be allowed to stand.

Augochlora azteca, sp. n.

♀.—Belongs to group *Oxystoglossi*, with the hind spur not pectinate. Length about 7 mm.; anterior wing about 5.

Golden green, middle of second abdominal segment stained with coppery red; mandibles ferruginous, darker at base and apex; tubercle of labrum simple, truncate; face broad, orbits very strongly emarginate, and strongly converging below; clypeus with strong rather close punctures, and its anterior edge broadly black; flagellum dull ferruginous beneath; mesothorax and scutellum brilliantly coloured, appearing granular from extremely minute and close punctures; hind part of scutellum with some fuscous hairs; area of metathorax with fine longitudinal ridges, except the middle subapical part, which has finer transverse striæ; tegulae ferruginous with pallid margins. Wings dusky, somewhat reddish; stigma and nervures testaceous; first r. n. meeting second t.-c. Legs black, with the knees, the tarsi, and the anterior tibiae (except a cloud behind) ferruginous, the anterior femora green beneath. Abdomen with the hind margins of the first two segments more or less piceous, though very narrowly; no marginal vibrissæ, but the lower edge of the dark base of the second and third segments, which slides under the segment before, is very finely and regularly ciliate; venter piceous, with a subapical ferruginous stain. The ventral surface of the abdomen, as well as the hind legs, carries much pale yellow pollen.

In my table in 'Canadian Entomologist,' 1897, p. 4, this runs nearest to *A. labrosa*, Say, and *A. aurifera*, Ckll., but it is readily separable from both by the colour of the legs. In Schrottky's table of Brazilian species it runs near *A. urania*, Sm., but that is smaller, with a blue-green abdomen.

Hab. Tlacotalpam, Vera Cruz, Mexico, April 21 (*C. H. T. Townsend*). At the same place, on the same day, Professor Townsend took *Megachile candida*, Smith, ♀.

Augochlora cordiaefloris, sp. n.

♀.—Belongs to *Oxystoglossi*, but with stature of a *Chloractis*; length about 6 mm.

Head and thorax brilliant green; abdomen with the first

segment brassy green, the hind margin broadly black; second and third segments similar, but not so green, and the margin redder; fourth segment hardly green at all; apex black, with short dark hairs; bases, which slide under the segments before, strongly reddish; venter rufo-piceous; mandibles ferruginous with dark tips; labrum ferruginous, with a small tubercle; clypeus strongly punctured, its anterior edge broadly dark; eyes strongly emarginate; flagellum ferruginous beneath, except at base; mesothorax and scutellum very finely and closely punctured, the colour of the scutellum especially brilliant; area of metathorax plicatulate basally; tegulæ dark reddish with hyaline margins. Wings scarcely dusky; stigma and nervures testaceous; first r. n. meeting second t.-c. Legs bright ferruginous, the anterior and middle femora infuscated, the anterior ones even slightly metallic; coxæ dark, the anterior ones metallic; abdomen with a fine pruinose pubescence.

Easily known by the small size, red legs, and comparatively dark abdomen.

Somewhat related, apparently, to *A. tisiophone*, Gribodo.

Hab. San Rafael, Vera Cruz, Mexico, on flowers of plant no. 31 (*Cordia*, probably *C. ferruginea*), middle of July (*C. H. T. Townsend*). On the same flowers, at the same time and place, Professor Townsend took *Megachile chrysophila*, Ckll., ♀.

Hesperapis larrea, sp. n.

Hesperapis larrea, Viereck, MS., 1902 (no description).

♂.—Length about 7 mm.

Black, with rather abundant white hair; hair of face and cheeks long and dense; mandibles reddened at tips; clypeus shining and very finely punctured; vertex shining, almost entirely impunctate; antennæ dark, flagellum faintly reddish, scape quite long; mesothorax shining, but very hairy; area of metathorax nude, smooth, and very shiny; tegulæ testaceous. Wings milky hyaline; stigma amber-colour bordered with dark brown; nervures brownish ferruginous. Legs black, hairy. Abdomen narrow, hairy, roughened with fine punctures, the bases of the segments depressed, the apical margins faintly reddish; apex with a narrow ferruginous pygidial plate.

The general aspect is suggestive of *H. olivæ* (Ckll.), but that has the wings dusky, the abdomen more distinctly banded, and the flagellum bright ferruginous beneath. The venation also differs, the basal nervure being more strongly

bent, and more distant from the transverso-medial, in *larrea* than in *olivie*.

Hab. Mesilla Park, New Mexico, at flowers of *Larrea*, May 16 (*Cockerell*); also taken by Mr. Viereck at Alamo-gordo, New Mexico, at *Larrea*.

Andrena pyrrhacita, sp. n.

♀.—Length about 11½ mm.

Robust, black, with very abundant erect hair on head, thorax, and abdomen. Head broad, facial quadrangle very much broader than long; facial foveæ black, broad but short: hair of clypeus, sides of face, and vertex black; of front and between antennæ, and occiput, yellowish white or pale ochreous; of cheeks black, with more or less pale above and below: antennæ black, third joint much longer than 4+5, flagellum faintly brownish beneath; process of labrum entire; clypeus dull, with dense minute punctures and a rather faint median ridge; thorax dull and granular, with abundant, long, erect, pale ochreous hair; lowest part of pleura with black hair; area of metathorax without rugæ or raised margin. Legs black, with mainly black hair, but it is long and pale on anterior femora behind, and pale on inner side of hind tibiæ; tegulæ piceous. Wings hyaline, nearly clear, the apex a little dusky; stigma and nervures dark rufo-fuscous; second s.m. receiving first r. n. beyond the middle; abdomen with only minute feeble punctures, not banded, but covered with erect hair of a rather light ferruginous colour, whitish on first and fifth segments, black or sooty at extreme apex; second segment depressed about one third; basal part of venter with coarse black hair.

At first sight this suggests *A. Hitei*, Ckll., but it has much less brilliantly coloured hair, a broader, more oval abdomen, and the sculpture of the clypeus is entirely different. It is a very distinct and beautiful species.

Hab. Salina, Boulder County, Colorado, 6550 ft. alt., at flowers of *Salix*, April 14, 1907 (*W. P. and T. D. A. Cockerell*). Another specimen, with the hair of the abdomen less brightly coloured, was taken by Mr. G. Hite at Boulder, Colo., March 25, 1907.

Andrena mimetica Falli, subsp. n.

♀.—Differs from *A. mimetica*, Ckll. (which occurs in New Mexico), thus: smaller, length about or just over 11 mm.; third antennal joint shorter than 4+5; second and third abdominal segments with white hair at base, conspicuous when the abdomen is seen from the side.

Hab. Southern California, Mt. Wilson (*Davidson*). Also on Mt. Wilson, Dr. Davidson took that remarkable species *A. cleodora*, Viereck, hitherto only known from Oregon (*cf.* *Canad. Entom.* 1904, p. 161).

The new subspecies is named after Mr. H. C. Fall, the Coleopterist of Pasadena, California.

Nomada Ednæ, sp. n.

♂.—Length 9 mm. or a little more; anterior wing about or not quite 8 mm.

Black with lemon-yellow markings, the legs red. Head and thorax very hairy, the hair light fulvous; vertex and mesothorax dull and densely punctured; eyes in life greenish grey, delicately suffused with red, especially above; maxillary palpi long; head broad; mandibles simple; clypeus not hairy, but supraclypeal region very hairy; clypeus, broad lateral corners of face, extending narrowly up the orbital margins nearly to level of antennæ, a mark beneath eyes behind, labrum and basal two thirds of mandibles, all yellow. Antennæ stout, scape not especially swollen, mainly yellow in front; flagellum bright ferruginous, its first four joints with a large black mark above, that on first narrower than on the others; last joint normal; second antennal joint sunken into apex of scape; third joint much shorter than fourth; prothorax above, tubercles, patch on lower part of pleura, and a pair of large coalescent spots on the gibbosities of the scutellum, all yellow; minute red axillar spots; post-scutellum and metathorax all black; tegulæ red with a large yellow spot. Wings strongly dusky at apex; stigma bright amber-colour, nervures more fuscous; b. n. passing a little basad of t.-m.; second s.m. as large as third, not especially narrower above, and receiving the r. n. at its middle. Legs red, hind femora mainly black behind; anterior coxæ unarmed. Abdomen dullish, with exceedingly fine punctures; basal half of first segment black, after which comes a yellow band on a red field, interrupted in the middle; segments 2 to 6 with very broad entire yellow bands, those on 2 and 3 a little notched behind laterally; hind margins of segments broadly red, those of 1 and 2 infuscated; apical plate notched; venter red, banded with yellow.

A species of the *Xanthidium* group, which runs in my table of Rocky Mountain *Nomada* (Bull. 94, Colorado Exp. Station) to 47, and runs out because of the comparatively large size and notched apical plate. It has a strong superficial resemblance to *N. ornithica*, Ckll., but that is much less hairy, and differs in the colour of the legs &c. Among the

Old World species, it shows a general resemblance to *N. succincta*, Panz.

Hab. Boulder, Colorado, on the campus of the University of Colorado, at flowers of *Taraxacum taraxacum*, in company with *N. cuneata*, Rob., *Osmia*, &c., April 10, 1907. Collected by Miss Edna Baker.

Osmia gaudiosa, sp. n.

♂.—Length 6 mm. or slightly over.

Brilliant golden green, including legs; the vertex, front, and thorax above with a strong suffusion of coppery-red or almost crimson; abdomen with strong reddish-golden tints; hair of head and thorax long and white; antennæ normal, slender, not moniliform, black with a slight brown tint; tegulæ bright green, shining golden; wings clear. Abdomen strongly punctured, its hair white; first ventral segment feebly subemarginate; second ventral peacock-green; sixth dorsal with a very feeble median depression, hardly emargination; seventh segment bidentate.

Hab. Boulder, Colorado, on the campus of the University of Colorado, at flowers of *Taraxacum taraxacum*, April 10, 1907 (*Edna Baker*).

A most lovely little species, very distinct from all others in North America.

Osmia universitatis, sp. n.

♂.—Length about 9 mm.; anterior wing about 7.

Head and thorax olive-green, some brassy colour on middle of front, metathorax bluish green; abdomen dark green, approaching bluish green, the hind margins of the segments narrowly purplish black; legs black, with no metallic tints. Head and thorax very densely punctured as usual, their hair long and abundant, dullish, with a yellowish tinge, but over clypeus forming a dense shining white beard; no black or dark hairs intermixed anywhere; antennæ long and slender, black, the flagellum obscure ferruginous beneath, not moniliform; tegulæ black. Wings hyaline, very clear; b. n. falling just short of t.-m.; hair of legs mostly pale, but black or dark fuscous on basitarsi (redder within), and the hind tibiæ have long black hairs on outer side, while the hind femora show short black hair, easily overlooked because of the longer pale hair. Hair of abdomen partly black on fourth and following segments; sixth segment entire; seventh bidentate, the points quite wide apart; first ventral entire, third deeply emarginate. Eyes slate-colour. Second and third joints of middle tarsi broadened and thickened.

This is an ordinary looking species, having a general resemblance to the following:—

- (1) *O. faceta*, Cress., from which it differs by the green abdomen, without black hair on sides of second segment; segment 6 entire, &c.
- (2) *O. inurbana*, Cress., from which it differs by the clear wings, different tint of abdomen, different colour of hair of thorax above, &c.
- (3) *O. iridis*, C. & T., from which it differs by the absence of black hairs on head, the smaller, greener abdomen, &c.
- (4) *O. chlorops*, C. & T., from which it differs by the non-moniliform antennæ, &c.

Among the Old World species it resembles *O. Latreillei*, Spin.

Hab. Boulder, Colorado, on the campus of the University of Colorado, at flowers of *Taraxacum taraxacum*, in company with *O. gaudiosa*, April 10, 1907 (*Edna Baker*).

Bombomelecta arizonica, Ckll.

This species was described from a single female. Professor R. H. Forbes has found a male in a cell of *Anthophora Forbesi*, Ckll., at Tucson, Arizona, April 13, 1907.

This is the first record showing the host-relationships of *Bombomelecta*. The male *B. arizonica* is very similar to that of *B. Alfredi*, but smaller (length hardly 12 mm.), with a very distinct black band between the wings, consisting of a densely punctured area free from the white pubescence, but with a moderate amount of black hair. The middle tibiæ are densely covered with snow-white hair on the outer side; the posterior tibiæ and tarsi have much white hair on the outer side. The fourth and fifth ventral abdominal segments are covered with white hair.

Exomalopsis solidaginis, Ckll.

Mesilla, New Mexico, June 24, ♀ (*Cockerell*); Albuquerque, New Mexico, June 30, ♂, with only two submarginal cells, the same on both sides (*Cockerell*).

Perdita dasylirii, sp. n.

Exceedingly close to *P. luciae*, Ckll., but with the mesothorax, scutellums, and upper surface of metathorax entirely dark metallic green, the green being also of a bluish tint, not yellowish as in *luciae*. It is also close to *P. Martini*, Ckll., but the male has a large yellow patch on the pleura, and largely darkened nervures, and the yellow of the face does

not reach to the anterior ocellus, nor are any black dots left at the sides of the eyes.

♀.—Length about $4\frac{1}{2}$ mm.

Bright but light yellow; mandibles tipped with rufous; head yellow except a broad area from the vertex, a little in front of anterior ocellus, to the occiput, which is dark green and granular; cheeks yellow, the dark area not extending downwards; antennæ yellow, a dark dot on second joint above; thorax dark above, but yellow at sides and beneath, except a dark mark just below wings; prothorax above with a broad yellow margin; nervures and margin of stigma fuscous, third discoidal cell absent; marginal cell broadly but obliquely truncate; legs yellow, hind tibiæ with a faint dark shade above. Abdomen yellow with apex a little reddened; first segment black with two more or less triangular yellow marks, and sides yellow; four straight black bands, not reaching lateral margins, the first three broad; venter yellow, rufescent apically.

♂.—Length $3\frac{3}{4}$ –4 mm.

In general similar to the female, but dark colour extending a short distance down cheeks, leaving a narrow yellow line next to the eye; flagellum, except last joint, fuscous above; sides of thorax dark, but pleura with a very large yellow patch anteriorly; hind tibiæ and tarsi behind, and a spot at apex of their femora, dark brown; apical part of abdomen orange or brownish yellow, without bands; there are four well-formed bands.

Hab. Alamogordo, New Mexico, at flowers of *Dasylyrion Wheeleri*, Watson, June 6 to 9, very many specimens (*H. L. Viereck*).

University of Colorado,
Boulder, Colorado, U.S.A.,
April 20, 1907.

BIBLIOGRAPHICAL NOTICES.

The Crayfishes of the State of Pennsylvania. By Dr. A. E. ORTMANN. *Memoirs of the Carnegie Museum, Pittsburg, Pa.*, vol. ii. no. 10, pp. 343–523, 7 plates: December, 1906.

SINCE Huxley, in a well-known paper, first placed the classification of the Crayfishes on a morphological basis and showed the interest attaching to their geographical distribution, much attention has been given to this group of Crustacea. In particular, the very numerous species occurring in North America have been the subject of important memoirs by Faxon and others. Dr. A. E. Ortmann, who is well-known as an authority on the higher Crustacea, has produced, in the memoir under review, a study of the Crayfishes of