

The Canadian Entomologist.

VOL. XXXIII.

LONDON, MAY, 1901.

No. 5

SOME RECENT WORK IN THE GENUS CATOCALA.

BY OTHO C. POLING, QUINCY, ILL.

Since the revision of this genus by the late Dr. Hulst, in 1884, contributions to our knowledge have not been extensive, while the material gathered in recent years has been very great. The popularity of the genus among students of Lepidoptera had made the necessity for a revision very keenly felt, so that when Prof. French generously undertook the work, a year or so ago, a feeling of gratitude was aroused by enthusiasts, who have known the thoroughness with which his work would be attended.

In offering him my assistance, I placed at his disposal a large number of Western forms, many of them from remote localities where no great amount of collecting in this genus had yet been done. I was not greatly surprised when my own opinion of some apparently new species was confirmed by that of Prof. French. Though reluctant about presenting these new forms until more material could be gathered for a more thorough study and comparison, I have consented to do so, since the assistance offered me by a more competent scholar has enabled me to bestow full credit for the work on Prof. French, who wrote the descriptions and modestly declined to "deprive me of the pleasure of naming my new forms."

Such sincerity is in marked contrast with some modern methods, where the object of contributing to our knowledge of science is lost sight of in the keen desire for personal prominence.

Catocala Frenchii, n. sp.

Expanse of male, 2.50 inches; of female, 2.75 inches.

General or ground colour, pale glaucous gray, sprinkled over with black or dark brown atoms, so as to make the general aspect a pale blackish, rather than a brownish tinge, differing in that respect from *C. Californica*. Lines distinct; basal line black, single, with a whitish

shading outside ; t. a. line black, double ; in the female the space between this and the basal line heavily shaded, with the inner part of the line broken on the subcostal and median veins, and the whitish shading reaching the basal line in the form of a triangle ; outer part of t. a. line much heavier than the inner, the enclosed space whitish, the line strongly dentate in two outer and two inner teeth, in this much like *C. Californica*, but the teeth sharper. T. p. line double, distinct, the two extra discal teeth nearly equal, inner part of line heavy, black, outer part brown, shading into the subterminal brown shade which is faint and indistinct ; s. t. line broken, also its white anterior shade, dentate, the outer dentations capping the white shade, the inner teeth mostly wanting in the line and faint in the white, towards the posterior angle the teeth form dashes with the intervenular lunules ; the lunules distinct ; the reniform brown, with a black annulus, situated in a blackish cloud ; subreniform white, more or less sprinkled with dark scales, pyriform with a point projecting towards base of wing from the upper inner part, closed, with the line connecting with the t. p. line sometimes indistinct ; preceding the reniform is a white or whitish space in the discal cell that reaches the t. a. line in a point ; it is whitish also outside or beyond the reniform to the t. p. line, though this is more indistinct than the white in the cell ; there is also a whitish space outside the t. p. line below the extra-discal teeth ; fringe gray, with a blackish line through the middle. Hind wings red, about the shade of *C. Californica*, slightly smoky at the base and the fringe of the inner margin ; median band nearly straight, of medium width, much like the band on *Californica*, slightly constricted in the middle, bent a little at posterior end, but not narrowed into a hook as in *Strechii*, ends abruptly about one-eighth inch before inner margin, without shade in either sex connecting with the margin ; marginal band wide, inner edge straight, to opposite end of median band, then with two prominent teeth, between which is a cavity reaching one-third the distance to outer edge ; apex white, slightly yellowish, but without red, the white space narrow, no other white outside the band ; fringe white, with a gray line that is not distinct throughout.

The thorax and abdomen as in allied species. The under side much as in *C. Californica* ; fore wings without tinge of red ; the s. t. white band quite narrow in its posterior third, a sharp but not long angle on submedian vein ; hind wings with inner two-thirds of light part red ; bands as above, but dentations of marginal band less distinct.

The above description is taken from two examples, one in collection of G. H. French, the other in the collection of O. C. Poling. They were taken at New Westminster, B. C., Canada.

This species belongs to the *Californica* group, resembling that species in size, and the bands of the hind wings; but it differs in having the ground colour more of a blue or glaucous gray, the markings more distinct, and a duller red to the hind wings, a deeper excavation in terminal band of hind wings near anal angle. The subreniform is nearly or quite separated from the t. p. line.

Catocala chiricahu, n. sp.

Expanse, 2.75 inches.

Colour gray, in places near the apex, and along the posterior margin, nearly as pale as the ground colour of *C. Robinsonii*; with a deep brown broken shade, not at first noticeable, extending from middle of base to apex, similar to that found in some examples of *C. innubens*, but a much brighter and deeper brown; all lines deep brownish black, prominent; basal line distinct, extending obliquely outward below the median vein to the submedian, and thence along this in a shade; t. a. line single, very broad on the costa, gradually narrowing to median vein, from which it extends to middle of posterior margin in about uniform width, with only one tooth pointing inward on internal vein, the line before the tooth a gradual curve with the convex side out; the space inside the t. a. line brown, except along posterior margin, the brown deeper in the centre, a small gray spot just outside the basal line below the median vein; t. p. line single, broad, shading inward somewhat, the extra-discal teeth extending well into the s. t. brown shade, subequal, the inflexion on submedian vein sharp, closed, extending almost to t. a. line; s. t. line nearly obsolete, as also its preceding whitish shade; terminal lunules scarcely more than dots; reniform brown, centre paler, a whitish annulus, with a median shade obliquely above the reniform, with the lower part of reniform in the edge of the central longitudinal shade that runs through the wing, the outer part with four more or less distinct teeth; subreniform prominent, rather wide open, white to the s. t. brown shade sprinkled with pale brown scales; scales of the s. t. brown shade and subreniform yellowish brown, those of the longitudinal shade mostly vandyke brown; in the cell and separated from it by its black annulus is an oblique white space or patch, not quite so large as the subreniform, that has a few brown scales, making with the subreniform an oblique whitish stripe from

near the subcostal vein to the s. t. brown shade ; the s. t. brown shade a little pale below the teeth of the t. p. line ; fringe gray, with a very little pale at the base.

Hind wings rich rosy crimson, about the colour of *violenta* and *Verilliana*, smoky at the base ; median band of medium width, wavy, almost broken by a sharp excavation on submedian vein, a few red scales between the line and the inner margin, where it ends a point of a triangle, the band is broad on the costa ; terminal band broad, inner edge slightly wavy, not excavate before anal angle ; apex very narrow, red ; a few red dots on edge of wing between the veins outside the terminal band, just before anal angle a narrow red patch with the fringe at this point also red ; elsewhere, fringe at apex white faintly rose tinted ; the rest of fringe black, with a little rosy white where the red dots are.

Under side with the black bands broad, the median of hind wings not reaching internal margin except by a faint shade ; the light bands of fore wings rosy, with white on the costa of the outer one ; posterior two-thirds of hind wings rosy red, the anterior part of outer band white with a rosy tint, the anterior part of base gray. Body as in allied species.

Described from one female from Southern Arizona, in the collection of O. C. Poling, Quincy, Ill. It stands between *aholibah*, Strecker, and *violenta*, Hy. Edw. The hind wings are more like *violenta*, of a brighter red than *aholibah*.

The shade of fore wings is much like that of *aholibah*, but brighter, and the s. t. brown shade much lighter. It is in general a much brighter insect than *aholibah*. It is much larger than *violenta*, and differs from *aholibah*, *violenta* and *Verilliana* in having a wide open subreniform.

Catocala fratercula, var. OUWAH, n. var.

This form, taken at Quincy, Ill., is between var. *gisela* and var. *Jacquenetta*.

The general tint is brownish gray, the brown of the vandyke type instead of olivaceous ; pale gray in the cell before the reniform ; a deep brown longitudinal shade runs from the base to the apex, that is broken only by the subreniform being a little paler, the whitish shade preceding the s. t. line broken by this shade. It differs from *gisela* in the base along the posterior margin and the terminal margin not being pale, and in the central shade being more distinct. The hind wings resemble *gisela*, but the anterior part of the median band is wider than in *gisela*.

Described from one specimen in the collection of O. C. Poling.

Parthenos nubilis, var. APACHE, n. var.

Smaller and much paler than the northern form. Markings of fore wings do not differ from those of the typical form. Hind wings pale yellow. All bands much reduced. Heavy black marginal band of the northern form is only represented by a few black scales on the veins, while all the space between veins is yellow. Submarginal band indistinct, nearly disappearing before it reaches upper margin.

Easily distinguished at a glance from the northern form by the row of dots which replaces marginal band and other characters above mentioned. Types, seven examples in the collection of Dr. William Barnes, of Decatur, and that of the writer.

NEW NORTH AMERICAN ORTHOPTERA.

BY A. P. MORSE, WELLESLEY, MASS.

ODONTOXIPHIDIUM, gen. nov.—Allied to *Ziphidium*, from which it is probably derived. Distinguished from that genus by the form of the anal cerci of the male, which are elongate, straight, with the lateral tooth reduced in size, and an additional tooth upon the dorsal side near the base; and, in the type, by the form of the pronotum, which is sub-sellate and prolonged backward, covering the base of the abdomen both above and on the sides, in correlation with the absence of flight-organs. The type is *O. apterum*, described below.

Odontoxiphidium apterum, sp. nov.—Pronotum sub-sellate, the dorsum straight (♂) or slightly convex (♀) in longisection, smoothly convex in transection, the sutures nearly obsolete, the lateral canthi entirely lacking; posterior margin of lateral lobe nearly straight, passing into the posterior margin of hind process with a barely perceptible sinuosity at an angle of 45° with the dorsum when viewed from the side. Tegmina and wings absent in ♀, tegmina alone present in ♂, covered at base for one-third to one-half their length by the pronotum, the exposed portion one-half to two-thirds as long as the pronotum, vaulted, even the speculum convex, opaque, and abbreviated. Hind femora very stout, almost bulbous, at base. Cerci of ♂ straight, slender, evenly tapering, about as long as the last two segments on the dorsum, the usual lateral, inwardly directed tooth small, about two-thirds as long as apex of cercus and borne at base of distal third, the stem of the cercus (proximal two-thirds) elongate and bearing an additional, dorsally-directed denticle

about midway between the lateral tooth and the base. Supra-anal plate of the ♂ with the posterior process narrow, sub-quadrate, the apical angles rounded, the entire process usually strongly deflexed. Ovipositor straight, about five-sixths as long as the hind femora, acute and symmetrical at tip.

Body: ♂, 11-13; ♀, 11-18. Pron.: ♂, 3.5-4; ♀, 4.5-5.3. Teg.: ♂, 2-3. Post. fem.: ♂, 10-12; ♀, 13-15. Ant.: ♂, 45-60; ♀, 45-50. Ovip.: 10.5-12 mm.

Rusty or olivaceous above, the face and sides of body greenish. A well-marked brown, median dorsal band sometimes present, bordered on each side by a narrow pale line. Sides of abdomen of male sometimes more or less infuscated. Abdomen of young marked with a conspicuous, broad, median fuscous band.

Twelve ♂, fifteen ♀, two young, Aug. 15-Sept. 5, Hastings, Fla. (Brown); 1 ♀, Sandford, Fla., G. B. Frazer (Scudder).

Scudderia cuneata, sp. nov.—In dorsal view the anal segment of the male resembling that of *furcata* (see Scudder, Proc. A.A.A.S., 1898, fig. 8), but with the excavation at apex deeper, twice as deep as its middle width, the sides sub-parallel or slightly approximated distally from the middle, convergent to a very bluntly rounded apex at base of furcation; limbs of the furcula relatively slender, slightly approximate at tip, obliquely depressed. In lateral view similar to *Mexicana*, but with the furcula narrow and sub-acute at tip and the subapical flanges appearing as if truncate, the emargination reduced to a shallow excavation, the outline of the apex as a whole roughly cuneate. Sub-genital plate reaching tip of anal segment, strongly arcuate, rather slender.

Pronotum with parallel sides and distinct lateral canthi. Posterior femora spinulose, the spines three in number on outer, six on inner edge, very small, black. Tegmina long and narrow, apex rounded.

Body: ♂, 22. Post. fem.: 25. Teg.: 30x5.5. Wings pass teg.: 5. Ant.: 45 mm.

Green. Antennae, tarsi and apices of tibiae of anterior and middle legs, dorsal margin of tibia opposite sense organ, and lateral canthi of pronotum, rufo-flavescent, palest on pronotum, darkest on tarsi. Posterior tarsi and apical seven-eighths of tibiae infuscated.

One ♂, Alabama (Baker).

Hesperotettix Floridensis, sp. nov.—Resembling *H. speciosus* (from which it is readily distinguished by the shorter tegmina), but rather

smaller, the pronotum more finely rugulose, the mid-carina less pronounced and nearly or quite obsolete on the prozona. Tegmina ovate, about two thirds as long as wide. Furcula variable, consisting usually of a pair of minute rounded lobes nearly as wide and long as the width of last dorsal segment at their base, but sometimes obsolete. Cerci resembling those of *speciosus*, but more finely pointed, twice as long as their width at base, the basal three-fifths tapering evenly, the distal two-fifths equal, acutely pointed, straight or a little incurved. Female with both valves of the ovipositor slender, their ento-horizontal contours relatively straight, and both dorsal and ventral scoops elongate.

Body: ♂, 17.5-21; ♀, 24-30. Post. fem.: ♂, 11.5-13; ♀, 15-16. Teg.: ♂, 4.5-6; ♀, 5-7. Ant.: ♂, ♀, 8-10 mm.

Grass-green, yellowish beneath, with more or less rufous on the anterior faces of the anterior and middle femora and the dorsal carina of the external face of the posterior femora. Posterior tibiæ bluish-green.

Fourteen ♂, four ♀, Aug. 15-28, Hastings, Fla. (Brown).

The following key may be added to that of Scudder—Rev. Melanopi, p. 57—under A²:

- b¹. Tegmina elongate, two to five times as long as broad, roundly acuminate at tip. *H. speciosus*.
 b². Tegmina ovate, at most one and one-half times as long as wide. *H. floridensis*.

CANNIBALISM AMONG CATERPILLARS.

The following interesting notes upon this subject are taken from a paper recently received from Mr. L. de Nicéville, of Calcutta*:

"The larvæ of many kinds of butterflies will, when they cannot get vegetable food, eat each other or soft, newly-formed pupæ. Mr. Bell has found that the greatest cannibals in this respect are the larvæ of certain *Lycænide*, and the worst among these, again, are the larvæ of *Zesius chrysomallus*, Hübn., for these will at times, even when plentifully supplied with their proper vegetable food, eat any larvæ which may be in a fit state to be eaten; *i.e.*, which are either on the point of casting their skins, have just cast them, or are just going to pupate. The *Lycænide* larvæ, which

*"The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency, with a revision of the Species of Butterflies there Occurring"; by Lionel de Nicéville, F. E. S., etc. Reprinted from the Journal, Asiatic Society of Bengal, Vol. LXIX., Part ij., No. 2, 1900, pp. 187-278.

are most addicted, after that of *Z. chrysomallus*, are those of the *Amblypodia* and *Tajuria* groups, those of *Arrhopala* and *Rapala* being nearly as bad. He has known one larva of *Tajuria cippus*, Fabr., to eat up over a dozen young ones of its own species. In Kashmir Mr. Bell bred a single imago of *Hysudra selira*, Moore, from a larva which had been reared on the dead leaves and flowers of its food-plant, *Indigofera atropurpurea*, Hamilt. (Natural Order Leguminosæ), together with several newly-formed pupæ of its own species. The imago was a very fine, large specimen, so that the insect diet evidently agreed with the larva. Mr. Bell particularly noticed this fact, as in all his previous experience he had been led to the conclusion that a cannibal diet was bad for the stomachs of the larvæ practising the habit of eating up their fellows, as they, as a general rule, have not been healthy, and have died before pupating.

"The tendency to cannibalism is not confined to the *Lycenidæ*, but exists also amongst the *Pierinæ*; the larvæ of *Appias* will eat each other and any other species of larva feeding on the same food-plant as themselves, if forced to it by hunger. He has seen the larvæ of *Appias libythea*, Fabr., and *A. taprobana*, Moore, eat freshly-formed pupæ of their own species, as well as larvæ changing their skins, and also the larvæ and pupæ of *Leptosia xiphia*, Fabr. Some of the caterpillars of the *Danainæ* will, when food is not to be had, eat individuals of their own species.

"Mr. Bell has never known a larva to eat another larva feeding on a food-plant of a species different from its own, so it is probable that all larvæ taste strongly of the plant they feed on, and it is also probable that cannibal larvæ are hardly conscious that they are eating up each other, being only guided to their proper food by the sense of taste, or possibly to a less extent by the sense of smell. None of the larvæ of the *Satyrinæ*, *Elymiinæ*, *Amathusiinæ*, *Acræinæ*, *Nymphalinæ*, *Libythinæ*, *Nemeobiinæ*, *Papilioninæ** or *Hesperiidæ* have been found by Mr. Bell to eat anything but vegetable food. All rhopalocerous larvæ, however, with but very few exceptions, eat their own cast-off skins while these are still soft and moist; and the young larvæ on emerging from the egg will almost invariably, under normal conditions, make their first meal off the empty egg-shell. He notes that all the butterfly larvæ he has bred change their skins five times from the time they leave the egg to the time they turn to pupæ."

*The larvæ of *Papilio philenor*, Linn., whose food-plant is *Aristobchia siphia*, have been known to devour their comrades in captivity when supplies ran short.—ED.

ON SOME BEES OF THE GENUS *AUGOCHLORA*.

BY E. S. G. TITUS, FORT COLLINS, COLO.

Augochlora Coloradensis, n. sp. (subg. *Augochlora*).

♀.—Green, often tinged with purple; face finely and confluent punctured above the base of the antennæ, more coarsely, confluent so below, supraclypeal space sometimes not confluent punctured; clypeus with large punctures, black at tip; basal process of labrum subquadrate, broadly rounded, rufopiceous; mandibles black, rufous at tips; antennæ black, flagellum near the tip fulvotestaceous beneath; striation of the disc of the metathorax reaching to the summit, posterior truncation rounded above, lateral portions rounded, truncation not shining rugosely punctured; tegulæ, often with a black dot in the centre, stigma and nervures testaceous; legs piceous, femora and tibiæ sometimes with a greenish cast, knees testaceous, tips of tarsi generally inclined to rufous; hind tibial spurs of posterior leg finely serrated; abdomen shining, polished, finely punctured; ventral segments black; *pubescence* of face, sides of thorax, tarsi partly, and abdomen, whitish; scutellum and first dorsal abdominal segments very fine and short, margins of segments fringed with white hairs; hair on tarsi often inclined to be rufous. Length, 6-7 mm.

♂.—Green; clypeus sometimes confluent punctured, slightly produced, anterior edge of clypeus and posterior portion of labrum white, labrum polished, testaceous anteriorly, slightly notched at tip; mandibles black at base, yellowish in middle and distinctly rufous at tips; antennæ black, flagellum, except last joint, yellowish testaceous beneath; thorax finely closely punctured, with the impressed lateral and central longitudinal lines smooth and distinct; striation of disc of metathorax as in female; posterior truncation distinctly bounded by carina; groove shallow; tegulæ, stigma and nervures testaceous, wings hyaline; legs green, knees testaceous, anterior tibiæ with the green restricted to a line posteriorly, two posterior pairs of tibiæ at the tips, and all the tarsi, darker toward tips, yellowish testaceous; abdomen shining, rather closely and finely punctured, apical portion of first segment somewhat constricted; ventral segments black, fourth widely emarginate; face, clypeus, cheeks, scutellum, legs and abdomen dorsally, sparsely clothed with whitish pubescence, ventral segments with fine short sparse white pubescence. Length, 5-6 mm.

Described from numerous females: Ft. Collins (5,000 ft.) and Boulder in May and June, Ft. Lupton (4,500 ft.) in July; and two males

on *Aster commutatus* at Ft. Collins, Colo., August 29. Females were taken on *Helianthus annuus* and *Malvastrum coccineum*.

A specimen from Ft. Lupton, Colo., has the second submarginal cells very narrow and also narrowed above; and one of the male specimens has the second submarginal cell in the left wing petiolate, the first and second transverse nervures being coalescent for one-third of their length above, the first recurrent nervure entering the second submarginal cell near the middle in both wings.

This species is closely related to *A. pura*, Say, *A. similis*, Robt., and *A. confusa*, Robt.; but seems to be easily separated from the descriptions of either of them. I have an *Augochlora* from Mr. E. P. Van Duzee, taken at Colden, N. Y., which answers to the description of *pura*, Say.

A. Coloradensis may be separated from *A. pura*, Say, by colour of thoracic pubescence, base of mandibles with no green spot, abdominal segments never margined with black; from *A. confusa*, Robt., by the less metallic tibiæ and tarsi; from *A. similis*, Robt., by the pure green colour, abdominal segments not at all testaceous. Although near *A. neglectula*, Ckll., it is a narrower species and also differs in colour and pubescence. I possess two specimens from Elmdale, Mich., that I believe are referable to *A. similis*, Robt.

Augochlora neglectula, Ckll. (subg. *Augochlora*).

A. neglectula, Ckll. Bull. 24, N. Mex. Agrl. Stat., Aug., 1897, p. 43.

Two female specimens: Ft. Collins, Oct. 17, and Greeley, Sept. 17. The former was taken on *Chrysopsis villosus*. This is a bluer species than *A. Coloradensis*, and the flagellum of the antennæ is uniformly paler. There are New Mexico specimens in our collection presented by Prof. Cockerell.

Augochlora humeralis, Patton (subg. *Augochloropsis*, Ckll.).

A. humeralis, Patton. Bull. U. S. Geog. Surv., 1879, p. 365, n. 39. Ashmead, Bull. 1, Colo. Biol. Assoc., 1890, p. 31.

This species has been recorded from the State, but I have seen no specimens from Colorado that I can refer to it. Specimens from Onago, Ks., (F. F. Crevecoeur) answer to Patton's descriptions. Mr. Ashmead very kindly examined specimens in the U. S. N. M. of *A. humeralis*, Patt., marked "N. W. Kans., Williston," and writes me that the hind spur of the hind tibiæ of the ♀ has but three spines.

Augochlora cleomis, n. sp. (sub. *Augochloropsis*, Ckll.). Fig. 6.

♀.—Blue-green; face above antennæ very finely confluent punctured, below antennæ more coarsely so; clypeus black at tip, punctures

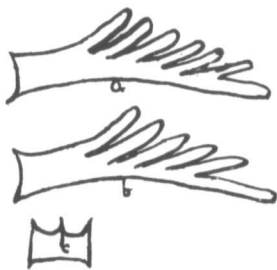


FIG. 6.—a Hind tibial spur of *A. cleomis*, female.
b Hind tibial spur of *A. caerulea*, female.
c Fourth ventral segment of *A. cleomis*, male.

large and deep; labrum rufotestaceous; mandibles black with a green spot at base, rufous in middle and darker at tips; antennæ black, flagellum dark rufotestaceous beneath; prothoracic angles sharp, tubercles prominent; mesothorax very closely and finely punctured anteriorly, more sparsely so posteriorly; postscutellum with some larger separate punctures; metathoracic disc roughened, posterior truncation rounded above, distinctly punctured, lateral angles sharp, median groove shallow; tegulae green, with a black spot shading into yellowish testaceous on the outer edges; wings hyaline, nervures and stigma yellowish testaceous, costal nervure of anterior wings very dark; anterior and middle femora and all the tibiae blue green, posterior femora piceous, all the tarsi testaceous, hind tibial spur of hind legs with six spinous processes; all the tarsi, two posterior pairs of tibiae and hind femora with dense pale pubescence; abdomen closely finely punctured, covered with short pale hairs, apical margins of first and second segments depressed slightly, fringed with short pubescence, ventral segments reflecting blue-green, densely pubescent; thorax, scutellum, postscutellum, behind tubercles, behind wings, and along the lateral sides of the posterior truncation with pale ochraceous pubescence, face clothed with short pale pubescence, cheeks with long white pubescence. Length, 8 mm.

♂.—Resembles the female; clypeus strongly produced, entirely green; labrum dark rufopiceous; flagellum testaceous beneath; tegulae with more yellow than in female and with no black spot; mesothorax more closely punctured; legs green, tarsi yellow, testaceous at tips, legs with pale pubescence; abdomen shining, closely punctured, pubescence as in female, but the short pale pubescence of the segments is heaviest near the apical margins of the segments; fourth ventral segments so produced posteriorly in the middle as to form two deep curves on each side (see drawing). Length, 9 mm.

Described from a male (Aug. 19) and a female (July 17) taken on *Cleome serratula*, in Horsetooth Gulch, near Ft. Collins, at an altitude of over 7,000 ft.

This species differs from *A. humeralis*, Patt., as identified by specimens in the collection here, by the pale ochraceous pubescence, prothoracic margin not sinuous, posterior truncation not shining, median groove shallow, legs blue-green, not black beneath, hind tibial spur of female; colour of tegulae; and first three ventral segments being green. The male most resembles *A. fervidus*, Smith, but that is described as having long white hair on the legs, and tarsi pale testaceous with yellow hair.

Angochlora cerulea, Ashm. (subg. *Angochloropsis*, Ckll.).

Agapostemon ceruleus, Ashmead. Bull. 1, Col. Biol. Assoc., 1890, p. 7.

♂.—Entirely blue; pubescence rather dense, short, appressed, whitish, denser on face, and on apices of first and second abdominal segments, where it is longer and forms yellowish ochraceous hair-bands; face and occiput, excepting clypeus and supraclypeal space, very closely densely punctured; clypeus with elongate shallow separate punctures, and slightly produced, hardly truncate at tip, shining; supraclypeal space with round separate punctures; face and cheeks with rather long dense white hairs; mandibles with a green spot at base, rufous in middle and with darker tips; only the scape and three joints of the flagellum remain; the original description reads: "Antennae ferruginous, blackish above." Prothoracic angles sharp, more prolonged than in *A. cleomis*, joining the prominent green tubercles by a curved line, which is fringed with short hairs; mesothorax finely closely punctured; scutellum with fine punctures, not very close in centre; postscutellum finely confluent punctured; disc of metathorax shining, green, punctured, lateral angles sharp, base of

metathorax very finely punctured except around the posterior edge and sides, where the punctures are *very few* and scattered; sides of metathorax finely confluent punctured, base distinctly enclosed; thorax on sides and beneath, scutellum, behind tubercles, with medium ochraceous hairs; tegulae deep blue-green, smooth in centre; wings hyaline, nervures and stigma testaceous; legs blue-green, tarsi yellowish testaceous, darker at tips; anterior and middle legs fringed with pale pubescence, becoming somewhat rufous near the tips of the tarsi; posterior legs wanting; abdomen dorsally, purple, finely closely punctured, entirely covered with short pale hairs, four apical segments more densely pubescent; fourth ventral segment as in *A. cleonis*, but the curvatures are not nearly so deep; first, second and third ventral segments densely, closely punctured, violet blue, posterior margin of second and third with a triangular space in the centre, extended narrowly along the sides, smooth and testaceous, remaining segments black, venter with very short hair. Length, 11 mm.

♀.—Resembles the male closely; pubescence dense on sides of face, cheeks, beneath, and clypeus, behind wings, on scutellum and pleura, quite dense; thorax closely, finely, partly confluent punctured, pleura more coarsely so; metathorax with a faint trace of triangle, truncation shining, punctured; tegulae green with an impunctate wide outer margin; legs green, femora darker beneath, tarsi and tibiae piceous, inclined to ferruginous at tips; anterior and posterior legs and middle tarsi with dense pale pubescence; hind spur of hind tibiae pectinate with *five* pointed spines; venter piceous, with a decided bluish tinge, margins of segments testaceous, fringed with hair. Length, 10 mm.

Male taken at Denver, Colorado, by Mr. Horace G. Smith, and is in Mr. Ashmead's collection. Through the kindness of Mr. Ashmead, I have had the type specimen to examine. The female was taken at Ft. Lupton, Colo., (R. Haynes) and is now first described.

I wish to express my thanks to Prof. Cockerell and Mr. Wm. H. Ashmead for the many favours I have received from them during the preparation of this article.

On October 30th, 1900, at 8.25 a. m., I watched the emergence of a male *Vanessa antiopa* from its chrysalis. The temperature was 51°, with a stiff breeze blowing. The chrysalis was under the ledge of a fence and had been exposed to several degrees of frost. Several of the same species emerged during the previous week. A. E. NORRIS, Montreal.

THREE NEW PARASITIC HYMENOPTERA FROM SOUTH AFRICA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

Prof. Charles P. Lounsbury, Government Entomologist, of Cape Town, South Africa, has recently sent to Dr. L. O. Howard, U. S. Entomologist, a lot of bred parasitic Hymenoptera for names, among which were found three new species, which, at the request of Dr. Howard, are characterized below :

Family LVII.—PLATYGASTERIDÆ.

Genus *Allotropa*, Förster.(1) *Allotropa Lounsburyi*, new species.

♀.—Length, 0.9 mm. Polished black; antennæ and legs mostly brown or brown-black, the base of the scape, pedicel, funicle joints 1 to 4, trochanters, knees, base of tibiæ, the tarsi except last joint, and the petiole of abdomen, yellow. Wings hyaline, entirely veinless, except the subcostal vein which terminates in a small knob.

The antennæ are 8- or 9-jointed, depending upon whether the enlarged antepenultimate joint is counted as a single joint or as two closely-united joints; funicle joints 1 to 4 much slenderer than the pedicel or joints 5 and 6 of funicle, the first joint being not quite twice as long as thick, the second shorter, the first and fourth subequal, subquadrate. The abdomen elongate, conically pointed, about one-third longer than the head and thorax united, the petiole very short, wider than long, while the second segment is large and occupies about half of the whole surface of the abdomen.

♂.—Length, about 0.8 mm. Agrees well in colour with the female, but differs in having the antennæ distinctly 9-jointed, the joints being distinctly separated, the flagellum filiform, the joints oblong, with whorls of sparse long hairs, while the abdomen is oblong oval, not pointed at apex and not longer than the thorax.

Type.—Cat. No. 5727, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch. : *Dactylopius* sp. on Gorse.

Bred by Prof. Chas. P. Lounsbury, Oct. 22, 1898.

The Platygasterids, so far as we know, are parasitic only upon Dipterous insects, and probably this species will be found to be a hyperparasite upon a Dipteron infesting the scale insect.

Family LXVII.—ENCYRTIDÆ.

Genus *Coccidencyrtus*, Ashmead.

(2) *Coccidencyrtus flavus*, new species.

♀.—Length, 0.8 mm. Golden yellow; legs yellowish white; antennal club brown; eyes brown-black. Wings hyaline, the marginal vein punctiform, not longer than thick, the postmarginal scarcely longer than the radius or stigmal vein; the stigmal vein, although comparatively short, is fully twice as long as the punctiform marginal vein and terminates in a little knob.

The flagellum is subclavate, the funicle 6-jointed, the joints submoniliform, increasing in width and size to the club, the first three or four joints being very small, narrower than the pedicel, the sixth about as wide as the pedicel, the club stouter, cone-shaped and as long as, or a little longer than, funicle joints 3 to 6 united.

Type.—Cat. No. 5728, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch.: *Dactylopius* sp. on Gorse. (Chas P. Lounsbury.)

Evidently the same thing, only slightly differently coloured, being more of a brownish yellow, having the sutures of the thoracic sclerites, a spot on the anterior part of the thorax and a band across the base of the abdomen, dark brown, but otherwise agreeing structurally; was bred by Prof. Lounsbury from a *Lichtensia* sp. on *Pittosporum*.

Family LXXI.—EULOPHIDÆ.

(3) *Tetrastichus prospalta*, new species.

♀.—Length, 0.7 mm. Black (possibly polished, the specimens being mounted on a slide in balsam, and the sculpture, if any, not being noticeable); face anteriorly and the legs, except the hind femora, apparently pale yellow; hind femora brown. Wings hyaline, the tegulae and veins pale yellowish; the front wings, from base to the origin of the marginal vein, are wholly hairless, beyond they are closely, finely hairy and ciliate at margins; the marginal vein is very slightly longer than the subcostal, while the stigmal vein is much less than its length.

Type.—Cat. No. 5729, U. S. N. M.

Hab.—Outspoom, South Africa.

Host.—Hym. : *Prospalta aurantii*, How., infesting a *Mytilaspis* sp. on *Salix Capensis*.

THE LIFE-HISTORY OF THE GREENHOUSE LEAF-TYER.

(*Phlyctænia ferrugalis*, Hbn., = *Botis Harveyana*, Grt.)

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

The larvæ of *Phlyctænia ferrugalis*, Hbn., have been since 1897 the cause of some loss to roses in the large houses of Mr J. H. Dunlop, Toronto. References to this occurrence will be found in the Reports of the Entomologist and Botanist to the Dominion Experimental Farms for 1899 and 1900.

On the 12th November, 1900, a visit was paid to the above houses by Mr. Gibson, and specimens of the mature larvæ found feeding both on violets and chrysanthemums were secured, as also some larvæ in other stages of development. These all changed to pupæ, and in due course the moths appeared, the pupal state lasting from 17 to 20 days.

On the 4th December six moths, which had just emerged (the whole six within three days), were placed in a muslin bag over a violet plant. On the 7th December a large number of fresh eggs were noticed. They were laid on the under side of the leaves, sometimes singly, in pairs, in rows of 3 or 4, or in clusters of from 3 to 7, placed close together and overlapping at the edges.

The following notes, describing the egg and larval stages, were made:

Egg.—0.5 mm. in width, round in outline, much flattened, slightly raised in centre, pearly white, coarsely reticulated, and, from their flattened appearance, remarkably like those of the Codling Moth. Before hatching, the black heads of the young larvæ are very apparent through the shell.

The eggs which were laid on the 7th December hatched in a warm office on the 21st December, making the duration of the egg state 14 days.

Stage I.—Length, 2 mm. General appearance, semi-translucent creamy-white larvæ, body bearing long whitish hairs. Head 0.2 mm. wide, rather flattened, horizontal, inclined to be wedge-shaped, large, deep black, shining, and bearing slender whitish hairs. Mouth-parts pale brownish. Tubercles on segments piliferous and faintly darker than body,

the hairs whitish and slender. Skin of body smooth and shining. Thoracic feet and prolegs concolorous with body, all bearing short whitish hairs. After feeding, the colour of the green food contents gives the young larvæ a light greenish appearance.

The young larvæ feed on the under side of the leaves, and eat little holes into the soft tissue. When at rest they curl the head and front segments around to the side of the body, and if disturbed, fall and hang suspended on silken threads. When settled on a leaf, the young larva spins a few threads of delicate silk, from one portion of the leaf to another, feeding and living inside this slight, almost transparent enclosure.

On the 28th December one larva passed the first moult. Before moulting (a day or so), its colour changed, becoming very pallid. On the 29th December two more larvæ passed the first moult, and by the morning of the 31st December, eleven specimens had moulted.

Stage II.—Length, 2.5 mm. General appearance, shiny, semi-translucent, creamy larvæ, with a greenish tint, some specimens whitish; after feeding, dorsal surface distinctly green; body bearing long whitish hairs. Head 0.27 mm. wide, indented at vertex, rather flattened and horizontal, and shaped as before, shining, blackish-brown, in some specimens light brownish mottled with darker spots, margins of clypeus distinctly darkened, ocelli black, mouth-parts brownish, the face bearing slender light hairs. Body cylindrical, tapering slightly towards extremities, segments deeply divided, skin smooth and shining. Green dorsal vessel distinct, on either side of which are two very faint bands. Tubercles piliferous, larger and more noticeable than in last stage, the hairs long and slender. On segment 2 are two distinct black spots, one on each side, at margin of dorsal area. The thoracic feet and prolegs are concolorous with ventral surface of body, and bear slender pale hairs.

On the 7th January two larvæ were swollen and the next day they passed the second moult. Other specimens moulted on the 9th and 10th January.

In this moult, as in the previous one, the cast skin and head remain united, and look as if the larva had simply shrunk and dried up.

Stage III.—Length, 3.5 mm. General appearance, shiny, semi-translucent, pale green larvæ, with a green dorsal vessel and faint stripes down the back, the body bearing slender whitish hairs. Head 0.4 mm. wide, shaped as before, deeply indented at vertex, slight furrow between cheeks, pale brownish-yellow, rather translucent, mottled with brown

blotches, some specimens almost wholly light brown with darker blotches; margins of clypeus darkened in some specimens, ocelli black, mouth-parts brownish, in some examples light reddish. antennæ pale, darkened at tips, hairs on face white, long and slender. Body shaped as before: after feeding, dark green dorsally, pale ventrally. Piliferous warts large, but rather indistinct, hairs white, long and slender, skin smooth and shining. Dorsal vessel dark green, distinct, bordered on each side with two white bands. On segment 2 are the two distinct black spots as before. Spiracles are very small and faint, and are joined by an almost imperceptible white, hair-like line. Thoracic feet and prolegs concolorous with ventral surface of body, all bearing slender pale hairs.

On the 14th January three specimens were slightly swollen, and by the morning of the 15th had passed the third moult.

Stage IV.—Length, 6 mm. The general appearance of the larvæ in this stage is the same as in stage III. Head 0.67 mm. wide, small, not quite as large as segment 2, shaped as before, deeply indented at vertex, slight furrow between cheeks, honey colour, with pale brownish blotches, margins of clypeus not so distinctly darkened as before, but slightly furrowed at sides, mouth-parts pale reddish, antennæ honey colour, darkened towards tips, ocelli black. On lower side of cheek, close to posterior margin, in line with ocelli, there is a distinct black spot. The whole face bears slender pale hairs. Body tapers slightly towards extremities, as before; piliferous warts concolorous with body, each bearing a single long, slender, whitish hair. Dorsal area dark green, sides and venter pale green. On segment 2 the two black spots are the same as before, but now appear as if in a small rounded cavity. Behind each of these large spots, almost touching them, is a very small black dot. Segments deeply divided. The dorsal vessel and the double sub-dorsal band are very distinct in this stage. In some specimens the green space between the two bands bordering each side of dorsal vessel is suffused slightly with white. Spiracles whitish, joined by a distinct, slightly wavy, white line. Thoracic feet and prolegs concolorous with venter, all bearing a few slender hairs. The thoracic feet have each two blackish dashes exteriorly. The anal prolegs are extended, giving a bifurcate appearance to the anal segment.

During stage IV. the larvæ increased rapidly in size, and consumed much food, and also spun considerable quantities of silk.

On the 19th January one larva passed the fourth moult, and others on the 21st and 22nd January.

Stage V.—The general appearance of the larvæ in this stage is the same as in the last two stages. Length at rest, 11 mm. Head 1.0 to 1.1 mm. wide, large, about the same width as segment 2, shaped as before, deeply indented at vertex, and slightly furrowed between cheeks, pale honey colour, splashed with light brownish angulated blotches, which are larger than in stage IV., and mostly on cheeks. Mouth-parts pale reddish brown, antennæ pale, darkened at tips, ocelli black. The distinct black spot on the lower side of cheek, near posterior margin, is not now present, but close to where it was is a large elongated brownish blotch. Hairs on face and around mouth-parts pale and slender. Shape and colour of body as before; segments not so deeply divided as in last stage. The two large black spots on segment 2 are as before, as are also the two small black spots, observed in last stage, close behind these. In some specimens these latter spots are hardly visible, and in a few larvæ the large spots appear as if simply expanded slightly posteriorly. The piliferous warts resemble small swellings, and, being concolorous with body, are indistinct, unless examined with a lens. The large lateral warts on segment 2, just above the thoracic feet, bear a few brownish blotches. The dorsal vessel, the double sub-dorsal band, and the slightly wavy line joining the spiracles, are as before, but are faint on segments 2, 3, 12 and 13. The spiracles are small and whitish, slightly darkened at edge. The thoracic feet are concolorous with ventral surface of body, and bear two blackish-brown dashes exteriorly, prolegs pale; all the feet bear slender hairs. Anal prolegs divergent. Position of tubercles normal, except that ii is almost exactly in a line posterior to i.

When mature, the larvæ at rest measure 15 mm. long, and when extended, 18 mm.

On the 29th January one larva folded a leaf over, preparatory to changing to pupa. On the 30th January the folded portion was sealed, and by the 1st February the larva had changed to pupa. Another which began to spin its cocoon on the 30th January had changed to pupa by the 2nd February. In the remaining specimens the period covering the change of the larvæ to pupæ agreed with the above two.

When forming its cocoon, the larva simply folds over a portion of a leaf, and fastens it with threads of fine white silk, or choosing a central portion of a leaf, draws down another leaf to serve as a covering, and

then changes to pupa. The cocoon itself is very slight, and is merely a web or covering of slender threads of white silk.

Pupa.—Length, 8.75 mm.; width at widest part, 2 mm. The wing-cases and thorax are shiny black, lightly chased with vermiform lines. The abdomen is dull black, and finely shagreened, the segments transversely wrinkled on dorsum; the folds between the segments are ochraceous. On the thorax are 10 rather long, stiff, blunt, rust-red bristles, curving forward, 5 on each side, and along the dorsum are 2 series of conspicuous black warts, 1 on each side, each bearing a single, long, rusty, twisted hair, which first slopes forward and then swings towards the centre of dorsum, and backwards for $\frac{3}{4}$ of its length. The spiracles are black, and just above them is a row of small, black, piliferous warts, each with a single, thin, short hair. The cremaster is prominent, of a dull red colour, edged with black, and terminates in a bunch of 8 rust-red bristles, 4 on each side, which converge and cross at their tips, forming an arch. In one specimen the two posterior segments were the same colour as the cremaster.

The length of the pupal state of these specimens was the same as that of those moths bred from mature larvæ in, and previous to, November, 1900, viz., 17 to 20 days.

TWO NEW SPECIES OF PULVINARIA.

BY GEORGE B. KING, LAWRENCE, MASS.

Pulvinaria Hunteri, n. sp.—Old, dried and wrinkled female scales, cream-colour, more or less mottled with patches of red-brown, and the outer margin practically red brown. Ovisac clear white, texture as in *innumerabilis*, and not so large. The size of the scale, cleared and spread under cover glass, practically hemispherical, is from 6 to 7 mm. in diameter. The texture of the scale is quite thin and requires little boiling in caustic potash to make it very clear and colourless. The following measurements of antennal segments are in micromillimetres:

1	2	3	4	5	6	7	8	
40	48	64	48	20	24	20	36	} On maple.
40	40	60	52	20	20	20	36	
40	40	60	48	28	20	20	44	} On honey locust.
40	40	68	52	28	24	24	44	

Joint 3 is longest, 4 next; there is little difference in the length of 1, 2 and 8, and 5, 6 and 7 are nearly equal in length. The first joint has 3

hairs, two short and spine-like and one very long; the second has 3, two short and one long; the third has 1 long hair; the fifth, 3; the seventh, 2; and the eighth, 10; all of medium length. Legs ordinary, with the coxa, 140; width coxa, 88. Femur with trochanter, 192; width trochanter, 60. Tibia, 160; width, 28. Tarsus, 80; width, 24. Claw, 28. Spines of the lateral clefts in threes, one very long, not stout, 88 long; two short and small, 28 long. The large marginal spines are practically the same as those of *innumerabilis*, 36 and 40 long, but in the short, spine-like hairs of the margin they differ in being placed behind the large spines, whereas in *innumerabilis* they are in front.

Hab.—On maple at Kansas City, Kansas, (C. H. Swobode,) Col. auct., at Lawrence; Kansas, on honey locust, Col. S. J. Hunter, after whom I have the pleasure of naming this species, for the good work he has done in the publication of his studies in the *Coccidae* of Kansas.

Pulvinaria Hunteri is evidently a native species and very distinct from any hitherto found in America.

Pulvinaria Ehrhorni, n. sp.—♀ scales dark brown. Ovisac clear white, texture as in *innumerabilis*, and smaller. The shape of the scales under cover glass is practically round, although some of the smaller individuals are somewhat pyriform in shape, 4 and 5½ mm. in diameter. After prolonged boiling in caustic potash, the derm is strongly stained with brown; texture tough and thick. Gland pits numerous, of two sizes. Marginal spines thin, sharp and inclined to be curved at their end, those of the area at the posterior cleft longest, 44 long, while those anteriorly are only 24 long. Spines of the lateral incisions in threes, one long and stout, 68 in length; two short and stout, 36 long. Anal plates, heart-shaped; each plate with three small spines at tip, and three larger bristles on the outer margin. Front leg: Coxa, 120; femur, with trochanter, 220; tibia, 128; tarsus, 88; claw, 28 long. Width: Coxa, 120; trochanter, 64; tibia, 32; tarsus, 24; with one long stout bristle on the coxa, and one on the femur, with two shorter ones on the trochanter. Antennæ, 8-jointed: 3 longest, 4 and 5 next, and in some individuals nearly equal; 1 is next, then 8, 6 and 7 are shortest and nearly equal. The first joint has one long and one short hair; the second, two long; the third, one; the fifth, two; the sixth, one; the seventh, two; and the eighth, nine;

these all stout, with one very long. The measurements of the several joints are as follows :

Joint—1	2	3	4	5	6	7	8
52	48	92	60	60-48	28	28	40
52	40	80	56	52	24	24	40
48	40	80	52	60	36	32	44

The approximate formula will be 345128(67). There are a number of long, thin hairs between the antennæ, very variable in length, 136, 80, 56 and 40. There are also some short, spine-like hairs.

Hab.—At Mountain View, California, on alder and willow; found May 3rd, 1899, by Mr. Edw. H. Ehrhorn. It is a very distinct species and can be separated easily from its nearest American ally, *Pulvinaria occidentalis*, by the antennæ. I take pleasure in naming this insect after Mr. Ehrhorn, in recognition of the fact of his good work done in the discovery and technical study of the Coccids of California. So far as known at the present time, this makes the fifteenth species native to the United States; and *P. Hunteri* is the fourth species found to infest maple.

I take this opportunity to record the finding of *Dactylopius Kingii*, var. *Neo-Mexicana*, Tinsley, in nests of *Lasius Americanus*, Em., at East Las Vegas, New Mexico, by Prof. Cockerell, and also *Ripersia flaveola*, Ckll., at Gullinas Canon, New Mexico, by Prof. Cockerell and Mrs. Wilmatte Cockerell, under a log in the transition zone, altitude about 7,500 feet. The same species was found by Mrs. E. L. Hewett and Mr. Cockerell at East Las Vegas, N. M., in the nest of *Lasius*, sp. Hitherto this species was only known from Massachusetts, from ants' nests.—G.B.K.

TYPES AND SYNONYMY.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, N. J.

Two papers in the last (April) number of the CANADIAN ENTOMOLOGIST are of great interest to me, and both on the same general topic applied to very different species. Mr. Lyman makes an earnest effort to save Mr. Walker's name *Spilosoma congrua*, and gives all the facts relating to the name, its publication and subsequent history; upon which facts Mr. Lyman and Sir George Hampson reach opposite conclusions. I have no liking for Mr. Walker's species, but I think I would side with Mr.

Lyman in this case, because, with all the examples before them, Messrs. Grote and Robinson separated out a good species with which a specimen of another, previously known, was erroneously associated. By removing one example, a good species remained, to which the name given by the author could be correctly applied.

All of us are apt to err in associating examples, and I have always made it a rule to hold a name if I can do it. So I think Mr. Lyman correct in this case on his statement of facts, though I had reached a different conclusion from a somewhat different combination of real and supposed facts.

On page 122, Dr. Harrison G. Dyar, Washington, D. C., assistant in charge of the Lepidoptera in the U. S. National Museum, has some remarks on certain species of *Acronycta* which are suggestive indeed.

First, he accepts my identification of *impleta* with *luteicoma* in so grudging a spirit that he suggests destroying the type—of *impleta*, I presume—"lest future changes in the synonymy result." It is to be assumed that Dr. Dyar wishes to be taken seriously, and in view of the fact that there are several hundred types in his charge, the suggestion is unpleasant reading. It is a somewhat startling method of securing stability of nomenclature!

Without disputing the facts as I stated them, that the type of *brumosa*, Gn., directly compared with that of *persuasa*, Harv., proves them to be identical, he yet proposes to retain *persuasa*, Harv., but to apply the name *brumosa* to what we have heretofore considered *hamamelis*. In other words, he desires to apply the name to a totally different species from that which was in the hands of its describer. That Guenée mixed up matters in attempting to associate Abbott's drawings of larvæ with the imagoes, is undoubtedly true, but it was the moth that was described and named, not the larva.

I am perfectly aware that a species is entirely represented only by all its stages and both sexes of the adults; but it is nevertheless true that it is the adult form that receives the name, and when we have the adult to which the name is applied, we have assumed that we had the court of ultimate resort by which the validity of the species must be tested. If we could set that adult aside because the description does not quite fit it, or because of an error in associating an earlier stage with the type, we might just as well abandon the effort to fix a type. And why should the U. S. National Museum desire types under such circumstances? If

its official representative refuses to recognize the application of type labels to the specimens with which they are associated in the British Museum, why should anyone else give greater credit to similar labels in the U. S. National Museum?

Dr. Dyar is not even consistent: it rather suits him to restore the term *clarescens* to the form which Mr. Grote originally and correctly so identified, though the description applies so much better to *haesitata* that I felt myself entirely safe in following Mr. Butler's reference of the name to the latter species. But because *hamamelis*, as applied to the form afterwards named *afflicta* by Mr. Grote, does not agree with his preferences, he suggests its application to what Mr. Grote named *subochrea*, because the description better suits that form.

The question narrows itself to this: Which is the court of final resort, the type specimen which the author named and intended to describe, or the description which, if it does not apply to the specimen it was made for, may apply to nothing at all?

In reference to the *var. b* of *brumosa*, Dr. Dyar is correct in saying it is not described; but Guenée evidently received additional information and perhaps specimens after writing the original description, for he refers again to the species on p. 390 of the 3rd volume of the *Noctuelites*, without adding to or changing the characterization of the adult.

Mr. Walker is not particularly good authority, but it is an indication at least that he suggested *brumosa* and *hamamelis* as sexes of one species; and Mr. Walker was not famous as a lumpner either. Assuming my suggestions as to synonymy to be correct, Walker's remark is not so far out, especially when that *var. "b"* is considered; but assuming Dr. Dyar to be correct, the suggestion becomes ridiculous, because Walker, ever on the lookout for differences, simply could not have considered *hamamelis*, Auct. (not Gn.), as the same as *subochrea*. The bare fact is that the specimen which in the British Museum is marked as the type of *hamamelis*, Gn., is that form which Mr. Grote afterward called *afflicta*, and that the form to which Dr. Dyar now wishes to apply the name *brumosa* was apparently not in Guenée's hands at all!

The twentieth annual meeting of the Royal Society of Canada will be held at Ottawa, beginning on Tuesday, May 21st, under the Presidency of Mr. Louis Frechette, C. M. G., LL. D.

THE AMERICAN BEES OF THE GENUS ANDRENA DESCRIBED BY F. SMITH.

BY REV. F. D. MORICE AND T. D. A. COCKERELL.

*(Continued from page 124.)**Andrena fragilis*, Smith, 1853.

"This I suspect is the ♂ of *integra*; area similarly strigose, and abdomen also corresponds; tubercle matches also!"

Robertson thought this might be *A. platyparia*: but, he said, the description applied even better to *salicis*, and nearly as well to *mandibularis*. It cannot well be *salicis*, as that has the abdomen impunctate; if it is the ♂ of *integra*, it cannot well be *mandibularis*; it may perhaps be *platyparia*.

Andrena frigida, Smith, 1853.

"(Very near *apicata*, but hairs of thorax much darker) ? = *lapponica*: antennæ with very long third joint; tubercle ♂; area granulated; abdomen in style of *apicata*."

Type locality, Nova Scotia. I do not know any similar species.

Andrena fimbriata, Smith, 1853 (*Americana*, D. T.).

"♂ abdomen rugulose and punctured, clothed with long adpressed hairs; tubercle slightly emarginate (?); area dull granulose; ♀ ditto. (Very near *fuscipes*, perhaps identical with it.)" This agrees with what I had already identified from Smith's description. It seems to agree with the description of *A. simillima*, Sm., even better than with that of *fuscipes*, but I doubt its actual identity with either.

Andrena hirticeps, Smith, 1853.

- ♂. "Tubercle pointed apparently, hard to see under thick bush of hair on clypeus; area obliquely rugose at base only, no raised margin; abdomen tessellate, practically impunctate; apical ventral valve somewhat bilobed; antennæ with article 3 = 4 + 5 about, all joints pretty long. Has a good deal the aspect of *geoyuana*." This was considered the ♂ of *A. vicina*, but Robertson (1900) has come to regard it as a valid species. He further adds: "But for the description of the ♂, I would say that *A. errans* is the same as *A. hirticeps*." I have an Illinois "*hirticeps*," ♂, from Mr. Robertson, and the abdomen is distinctly punctate at the bases of the hairs, while the third antennal joint is barely longer than the fifth, the fourth being a little shorter than either. The apical ventral

valve also is not bilobed. In the female of Robertson's "*hirticeps*," the basal process of labrum is low, broad and rounded (semi-circular, Robertson expresses it), which does not agree with *vicina* or *errans*. Robertson's insect will therefore need a new name, as follows:

Andrena Carlini, n. n., Ckll.

Andrena bicolor (not of Fab.), Rob., Tr. Am. Ent. Soc., XVIII., 51.

Andrena vicina (not of Sm.), Rob., Tr. Am. Ent. Soc., XXII., 118.

Andrena hirticeps (not of Sm.), Rob., Trans. Acad. Sci., St. Louis, X., 47.

The true *A. hirticeps* is a northern species, from Hudson's Bay.

A. Carlini is from Illinois; type locality, Carlinville. It also occurs in Kansas, N. Y. and N. M. (see below).

Andrena algida, Smith, 1853.

- ♂. "Tubercle truncate; apical ventral valve 0; antennal joint 3 about = 5, slightly longer than 4; area (longitudinally) somewhat rugose; abdomen tessellate and also delicately punctured." Type locality, Hudson's Bay. The ♂ is rather suggestive of *Carlini*, except as to the tubercle.

The ♀ described by Smith is not at all like *Carlini*.

Andrena nubecula, Smith, 1853.

- ♀. "Tubercle emarginate; area shortly rugose at base; abdomen tessellated, impunctate; a pretty insect, with broad white bands and pale reddish-yellow apex; antennal article 3 scarcely = 4 + 5 (cf. *proxima* or *dorsata*)." "Wings remarkably clouded."

I have this from Lincoln, Nebraska, collected in August and September, sent by Prof. L. Bruner (No. 12). Smith's description of the abdomen is inaccurate as regards the punctuation.

Andrena obscuripennis, Smith, 1853.


- ♀. "Tubercle convexly truncate; abdomen closely punctured; area bordered with raised ridge, rugose but not very largely so, and laterally only granulated; wings beautiful violet; pilosity rich red (large grand species)." Type locality, Georgia. This has some resemblance to *A. Hallii*, but is quite distinct.

Andrena perplexa, Smith, 1853.

- ♀. "Tubercle truncate; area seems nearly smooth, but dull, with fine close tessellations; abdominal segments smooth and closely punctured, except towards their apices, which are rugulose." Type

locality, Georgia. This is evidently different from any species I have seen.

Andrena nivalis, Smith, 1853.

- ♀. "Tubercle ; antennal joint 3 longer than 4 + 5; area rugose at base; abdomen distinctly punctured, but on an aciculated surface." Type locality, Hudson's Bay. This is very near to *A. semirufa*, Ckll., from New Mexico; possibly it is the same species.

Andrena hilaris, Smith, 1853.

- ♀. "Tubercle of labrum wide, truncate, below its centre a projecting pencil of golden hairs; clypeus coarsely punctured, with a smooth shining carina down its middle; metathoracic area finely rugulose, with some coarse short longitudinal strigæ at its base; abdomen distinctly punctured, its surface also microscopically (hardly visibly) rugulose; wings very yellow." Type locality, Georgia. Evidently distinct from anything I have before me.


Andrena vicina, Smith, 1853.

- ♀. Length "about 14 mill.; tubercle wide, truncate; clypeus with wide unpunctured central elevation; area dull rugulose; abdomen finely rugulose all over, and distinctly but shallowly punctured." Smith gives the length as only 5 lines, and says the species closely resembles *A. nitida*. I hardly know what to make of this; the species referred to *vicina* in American collections has the tubercle low and rounded, by no means truncate; also, it does not have the very shiny, oval abdomen of *nitida*, which species, it may be remarked, has the tubercle concavely truncate. *A. vicina* is said to be from the United States and Nova Scotia.

Andrena placida, Smith, 1853.

- ♀. "Tubercle very narrowly truncated; area rather coarsely rugulose, but not margined, I think; abdomen rugulose, a few sparse punctures; length about 12 mill., much smaller and narrower insect than *vicina*—looks like a *parviceps*." From "U. S." Smith gives the size the same as that of *vicina*, but this must be a mistake. *A. placida* seems to come close to *A. Macgillivrayi*.

Andrena fastuosa, Smith, 1879.

- ♀. "Tubercle , difficult to say if actually emarginate; area and abdomen as ♂."


♂. "Tubercle emarginate; huge stipes! area rugose, unmargined; abdomen closely punctured." From Orizaba, Mexico. *Andrena*

argemonis, Kll., from New Mexico, is possibly not separable from *fastuosa*.

Andrena discreta, Smith, 1879.

- ♀. "Coloured like a big bright *ceii*; tubercle emarginate; area finely rugose, unmarginated; abdominal segments densely clothed above with fulvous hairs, except the basal which is naked." Oajaca, Mexico. When describing *A. jessicae* I suggested that it might possibly be the ♂ of *discreta*, but it is now evident that this cannot be.

Andrena sodalis, Smith, 1879.

- "Tubercle ; abdomen shining, though rugulose, and also very delicately punctured; area not margined nor rugose." Oajaca, Mexico.

Andrena simulata, Smith, 1879.

- "Labrum almost pointed Δ , I see no definite tubercle; abdomen smooth, very shining, shallowly punctured; area without ridge, rugosities slight, longitudinal at base." Orizaba, Mexico.

Andrena agilis, Smith, 1879.

- ♂. "Labrum looks truncate, I can't see tubercle; clypeus not all white, but marked with yellow like a ♀ *Ceratina*; abdomen finely punctured; area rugulose, not clearly defined at sides; central impression deep?" Oajaca, Mexico.

Andrena modesta, Smith, 1879.

- ♀. "Sides of propodeum fringed with short white hairs; area rugulose, not margined; abdomen finely punctured; no tubercle to be seen." Oajaca, Mexico.

Andrena commoda, Smith, 1879.

- ♀. "Tubercle pointed Λ ; area not margined, fine basal strigæ; abdomen punctured, also aciculate, dull." This nearly agrees with *A. pruni*, Rob., but the tubercle of that species is not at all pointed. *A. commoda* is from Canada.

Andrena flavoclypeata, Smith, 1879.

- ♂. "Clypeus has a *third* black spot in middle of apex; tubercle hard to see through hairs, I think a little emarginate; area not ridged; abdomen tessellated, scarcely punctured." Locality, Canada. This is regarded as a synonym of *A. bipunctata*, Cresson, and is well known. The third black spot is not always present.

Andrena miranda, Smith, 1879.

♂ ♀. "Clypeus $\sqrt{\text{V}}$; area coarsely clathrate and margined; abdomen strongly punctured." Canada. Related to *A. Forbesii*, but not the same.

Andrena moesta, Smith, 1879.

"Area scarcely rugulose, not margined; abdomen scarcely punctured (*lapponica* style); tubercle slightly emarginate or bilobed. Canada. This species appears to differ from any known to me.

Andrena errans, Smith, 1879.

"Area not margined, smooth nearly; abdomen with shallow punctures; tubercle pointed (one ♀ has the discs of abdominal segments densely clothed with black upright hairs, probably a different species)." Vancouver I. This is not the north-western species which I have regarded as *errans*; the female with hairy abdomen may be *pluvialis*.

A close study shows that there are several species confused with *vicina* or *errans* in American collections. These (♀) all agree in being about 13 or 14 mm. long; the thorax densely clothed with upright rather short hair (bright ferruginous in *Hallii*, pale ochraceous in the rest); the abdomen shining black, without hairbands; the anal fimbria black; the wings decidedly brownish. The species of this series now before me are:

A. Carlini, Ckll.: Tubercle of labrum broad and evenly rounded; clypeus with a median impunctate ridge; hair of face mixed pale and black, of pleura black; basal area of metathorax roughened, not plicate; abdomen tessellate and well punctured; antennal joint 3 rather shorter than in *Hallii*. Illinois; Beulah, N. M., May 30 (*W. Porter*); Baldwin, Kansas, May (*J. C. Bridwell*); Ithaca, N. Y., May 17 (*Macgillivray*). Seven specimens examined.

A. Hallii, Dunning: Tubercle of labrum broad but truncate; median line of clypeus impunctate, but minutely tessellate; hair of face and pleura black; basal area of metathorax obliquely plicatulate at base; abdomen tessellate, with numerous small punctures. Pullman, Wash. (*C. V. Piper*).

A. cupreotincta, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without a median impunctate ridge, or it is very short and rudimentary; hair of face, cheeks, occiput and

pleura black; basal area of metathorax strongly longitudinally plicate, its sculpture entirely different from that of the adjacent lateral areas, though it has no raised margin; abdomen well punctured on a smooth surface, the punctures very strong and close at the sides of the segments; hair on inner sides of basal joints of tarsi tinged with coppery. Skokomish River, Wash., April 26, 1892 (*Trevor Kincaid*).

A. pluvialis, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without any impunctate line; hair of face black, a little pale at sides, of vertex and cheeks black, of occiput pale, of pleura black; area roughened, not plicate, longer than in *cupreotincta*, and so larger, larger than in *Carlini* because broader behind, its posterior angle greater; abdomen with a sericeous lustre, the punctures small; surface of abdomen quite hairy, the hairs black. Olympia, Wash., May 1, 1894 (*Trevor Kincaid*).

A. anogræ, Ckll., n. sp.: Agrees with *pluvialis*, except that pubescence of thoracic dorsum is brighter, more fulvous; hair of face is wholly black; tubercle is small and emarginate or binodulose at apex; area is more coarsely rugulose and much narrower behind, being shaped as in *Carlini*. Colorado Springs, Colo., middle of July, at flowers of a white *Oenothera* (Ckll., 3567).

A. vicina, Smith: Tubercle broad and truncate, the truncation sometimes concave and distinct, sometimes rather obscure; clypeus with a median impunctate ridge, which is more or less roughened; hair of face pale, black only round the mouth, or only below the mouth; hair of cheeks, vertex, occiput and pleura pale, area roughened, large, not narrower behind, shaped as in *pluvialis*, but the sides of the metathorax are clothed with pale hair, whereas in *pluvialis* it is black; abdomen tessellate and well punctured, hardly hairy except apically, being much less hairy than in *pluvialis*; hair on first segment pale. Olympia, Wash., June 4, 1895 (*Trevor Kincaid*); Michigan (*C. F. Baker*, labeled *A. bicolor*); Hartford, Ct., May 30, 1894, and May 31st, 1896 (*S. N. Dunning*). This is evidently the true *vicina* of Smith; it ranges further north than *Carlini*.

Andrena cærulea, Smith, 1879.

"Area smooth, not margined; abdomen rugulose with slight raised points; tubercle I think slightly emarginate." Vancouver I. *A.*

cerulea, var. *terrata*, Ckll., Entom., 1898, p. 89, is perhaps a distinct species; in the description, line 15 from top of page, tinge is misprinted "fringe." *A. nigrocerulea*, from the same region, has the tubercle concavely truncate, one might say slightly emarginate, but it is otherwise different from *cerulea*.

Andrena subtilis, Smith, 1879.

"Tubercle Λ ; abdomen tessellated, hardly punctured; area smooth, not ridged laterally." Vancouver I. I do not know this species.

Andrena candida, Smith, 1879.

"Abdomen dull green, scarcely punctured; area with rugosities slight, no ridge; labrum? a little emarginate." Vancouver I.; Olympia, Wash., June 18, 1895 (*Trevor Kincaid*). In Mr. Kincaid's specimen the hair at apex of abdomen is blackish, but the species is doubtless the same. *A. geranii*, Rob., is closely allied.

Andrena auricoma, Smith, 1879.

"Can't see labrum; a pretty insect with fulvous upright pilosity on discs of segments and golden fasciæ at the apices; area granulose, not margined." Vancouver I. Unknown to me.

BOOK NOTICE.

REPORT OF INJURIOUS INSECTS and Common Farm Pests during the year 1900, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, L.L.D. London: Simpkin, Marshall & Co., 1901 (1s. 6d.; pp. 111).

It is with deep regret that we learn from the preface of this her twenty-fourth annual report that the talented authoress has decided that it shall be the last. For almost a quarter of a century Miss Ormerod has labored hard and well in the service of her country, without any remuneration and with scanty recognition from the officials who should have been the first to express their gratitude to her. But, on the other hand, she has won for herself a high reputation in Great Britain, in America, in South Africa and Australia, and also in several European countries. She is known far and wide as a painstaking entomologist, a keen observer, a diligent collector of facts and observations, a thoroughly practical and sensible adviser, and one who has been all through these years most unselfish in placing her time and her work at the disposal of those who needed them most—the farmers and gardeners of her native land.

When she began her life-work in 1877, to quote her own words, "comparatively little was known of the habits and means of prevention of insects seriously injurious to our crops, and of this little, a very small amount was accessible for public service, and I undertook the series of Reports in the hope (so far as in my power lay) of doing something to meet both these difficulties." How fully her hope has been realized is shown by her further statement: "Now, the *necessities* of the case have been gradually changing. Year after year information has been sent, gradually completing *most* of the histories of *most* of our worst insect pests, and now additional information is rarely on points of great agricultural importance." In other words, she has succeeded, by dint of long-continued and hard work, in making fully known the life-histories of all the most serious insect pests in the British Isles, and in prescribing the best available methods of dealing with them. No such work can ever be finished or ever be perfect, but Miss Ormerod has done the task of the pioneer; she has cleared away the obstructions of ignorance and has laid solidly and well the foundations of a knowledge that requires now only to be kept up and added to as time goes on and changes naturally occur. Working without remuneration and publishing at her own expense, she has done a noble and patriotic work, and her name will long live, we may be sure, in the hearts of those she helped so well, and in the affections of those who have the privilege of being her friends.

The present Report, the second of the new series, is on the same plan as its predecessor. It deals at some length with twenty species of injurious insects affecting the apple, pear and plum, currant and raspberry, potatoes, beans, wheat and mustard, ash trees and sheep's nostrils—a varied list, indeed. There is also an account of the curious flatworm (*Bipalium Kewense*) which feeds upon earthworms, and of the fungous disease which produces what are known as "bladder plums." The volume closes with short notices of some insects that have often been referred to before in these Reports—the apple Psylla, gooseberry Sawfly, cabbage Moth attacking peas, and the pine-shoot Tortrix. The various papers are illustrated with about thirty excellent wood-cuts.

We grieve to say "good bye" in this way to our venerated friend, whom we have known and esteemed for so many years. We earnestly hope that her days on earth may be prolonged, that she may enjoy a rest that she has assuredly earned, and that she may still continue her interest in Economic Entomology and give the help of her knowledge and experience when from time to time it may be sorely needed.

C. J. S. B.