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THE LIFE-HISTORY OF THE VARIABLE CUTWORM, *MAMESTRA ATLANTICA*, GRT.

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

In the Report of the Dominion Entomologist for 1901 a notice was given of this insect, the moth of which has for some years at Ottawa been one of the commonest species of the genus found flying during the summer. Any species as abundant as this is must be injurious, should the caterpillars at any time attack a cultivated crop. The larvæ have occasionally been found in vegetable gardens, around peas and beet root, but no injury as yet has been noticed. The finding of a cluster of eggs last year by Mr. Gibson gave an opportunity of studying the life-history, which is herewith submitted.

On the 6th June, 1901, a batch of about 90 eggs of *Mamestra atlantica*, Grt., was found at Ottawa on *Lonicera caprifolium*, Linn. The eggs were laid on the upper surface of a leaf, in a compact heap of three layers.

Egg.—Dome-shaped, slightly smaller at the base than just above it, where it is widest; height, 0.4 mm.; width, 0.6 mm. In general appearance similar to the eggs of *Peridroma saucia*, Hbn., which have been so often figured. The micropyle is conspicuous, surrounded by about 5 rings of large cells. The ribs, about 24 in number, all divide once, and some of them twice, before they reach the base. The large cells, which show plainly above the point where the ribs divide, occur over the whole surface of the egg, forming a network connecting the ribs. When found, the eggs were of a pinkish shade.

The eggs hatched during the morning of the 10th June.

Stage I.—Length after hatching, 2.3 mm., of a dirty whitish colour, alimentary canal showing dark through the skin. After feeding, the colour is pale green. Head 0.4 mm., wide, large, rather flat in front, pale brown; mandibles reddish; ocelli dark; hairs on face black, each of which is

encircled by a dark brown spot. Besides these dark spots, there are smaller dots and short dashes of brown on the face, particularly near vertex. Cervical shield very pale brown, inconspicuous, on the front of which are 4 large black tubercles, and 4 smaller ones on the hind margin. Body cylindrical, skin shiny, appearing to be slightly wrinkled under a lens. Tubercles large, black, shiny, each bearing one bristle. Bristles long, stiff and black; tubercles i, iii and v in a line, iv close behind spiracles, which are small and black. Thoracic feet and prolegs concolorous with venter, plates on thoracic feet shiny black. The first two pairs of abdominal feet aborted.

On the 13th June the larvæ were quiet and swollen, ready for the first moult. At this time they were pallid. By the 14th nearly all had moulted.

Stage II.—Length, 5 mm. Head 0.6 mm. wide, round, slightly depressed and bilobed at vertex, greenish white, mottled with large and small blackish spots, the large spots at the base of each hair; ocelli dark; antennæ pale; tips of mandibles reddish. Cervical shield concolorous with body, and inconspicuous. Body above spiracles a dirty gray, some specimens greenish gray; ventral surface pale greenish. A pale whitish dorsal stripe is now apparent, also two whitish lateral stripes, one just below tubercle ii, the other just above tubercle iii. There is also a substigmatal band just below spiracles, touching tubercle iv. Tubercles as before, black, shiny, each bearing one black bristle. Skin of body smooth and shiny. Spiracles black, very small. Thoracic feet slightly darker than ventral surface and bearing blackish plates as before. Prolegs concolorous with venter; lower edge of claspers dark.

On the 15th June some were swollen and ready for the second moult. On the 16th nearly all moulted.

Stage III.—Length, 9.5 mm. Head 0.9 to 1.0 mm. wide, slightly depressed at apex, pale green, mottled or spotted as before, the large spots at base of each hair on face being black, and the smaller spots, which are mostly on the upper inner half of cheek, being brown; mandibles reddish; antennæ pale, darkened towards tips. Body cylindrical, dull greenish above spiracles, paler green beneath substigmatal band. In a few specimens the colour of the body above the spiracles is a dull reddish-brown. Dorsal and upper lateral stripes whitish. The lateral stripe apparent in last stage just above tubercle iii is very faint, but can be observed under a lens. The substigmatal band is a clear light

yellow, and is the most conspicuous marking on the body. The black tubercles are as before, but at the base of each there is a pale circle. Spiracles whitish, rimmed with black. Thoracic feet and prolegs concolorous with venter, thoracic feet darkened at tips. Claspers of prolegs slightly reddish; bristles pale and short.

On the 18th June a few larvæ passed the third moult, and on the 19th nearly all the remaining specimens moulted.

Stage IV.—Length 12.5 mm. Head 1.2 to 1.4 mm. wide, shaped as before, pale brown, finely mottled with darker brown, particularly on upper half of cheek; each hair on face encircled at base with black; antennæ and mandibles as before; ocelli dark. Body above spiracles dull brown with a greenish and a reddish tinge, below spiracles paler, namely, greenish brown with a reddish tinge. The colour of a few specimens above the spiracles is dull greenish, as in the case of the majority of specimens in last stage. Dorsal and upper lateral stripes whitish, distinct, edged with blackish brown; the lower lateral stripe just above tubercle iii very faint, as in Stage III. Substigmatal band very wide and conspicuous, of a bright light yellow colour, with a bright red stripe running through the lower half. Tubercles black, small, shiny, each with a pale circle at base, as in last stage; bristles very short and black. Spiracles yellowish, rimmed with black. Thoracic feet and prolegs pale, of a translucent appearance, all the feet spotted with black; bristles short.

On the 23rd June many of the larvæ passed the fourth moult, others a day or two following.

Stage V.—Length, 15 mm. Head 1.6 to 1.7 mm. wide, as in last stage, testaceous, mottled with darker brown. In this stage most of the larvæ are of an apple-green colour, only a very few being dull brown or reddish above spiracles; otherwise the larvæ are much the same as in the last stage. The pale lower lateral stripe just above tubercle iii has now disappeared, and the only stripes on the body are the dorsal and upper lateral (which afterwards will be mentioned as the lateral), and the wide, conspicuous substigmatal band. In the green larvæ the dorsal and lateral stripes are white, both bordered on each side with dark green, the dorsal stripe being the more heavily bordered. The substigmatal band is bright pale yellow, with no red on it. In the larvæ, which are reddish above spiracles, the substigmatal band is yellow, with some red on it, but not so much as in last stage. The dorsal and lateral stripes are not so white as

in the green specimens, and are bordered by dark brown. The ventral surface of all the specimens is slightly paler than the dorsal. Tubercles black and very small. Thoracic feet and prolegs concolorous with venter.

On the 27th June some of the specimens passed the fifth moult, the remainder on the 28th and 29th.

Stage VI.—Length 23 mm. Head 2.0 to 2.3 mm. wide, as before, testaceous, mottled and reticulated with dark brown. The larvæ in this stage are almost the same as in the last. Nearly half the specimens are brownish, some having a slight reddish shade, the venter being of a paler brown than the dorsum. The majority of the larvæ, however, are of an apple-green colour, with the venter slightly paler. The whole skin is spotted with white. Dorsal stripe heavily bordered on either side with blackish brown. Lateral stripe also bordered with the same colour, but not so heavily. Substigmatal band pale yellow, the lower half being brownish red. In the green specimens the dorsal and lateral stripes are not so conspicuous as in the dark larvæ, and are only faintly bordered with dark green, the substigmatal band being bright yellow, with no red in it whatever. The spiracles are white, lined with black, in both the brown and the green larvæ. Tubercles small, black bristles short. In the green specimens the cervical shield is concolorous with the body. In the dark specimens the shield is noticeable, being of a darker colour than the body. Thoracic feet and prolegs all concolorous with venter.

On the 30th June several larvæ passed the sixth moult, and by 3rd July nearly all had moulted.

Stage VII.—Length, 29 mm. Head 2.8 to 3.1 mm., as in last stage. The intensity of the colour of the head, as is natural in a caterpillar presenting such a wide range of colour variation, varies in different specimens, but, on the whole, becomes darker and the markings more distinct with each moult. The larvæ in this stage are of two colours as before. For a day or so after moulting, the dorsal and lateral stripes are very conspicuous. After a few days the lateral stripe is not so plain as at first, and in some specimens is interrupted. The dorsal stripe remains conspicuous, and has the appearance of a blackish band with a medio-dorsal line of pale yellow. The substigmatal band is very wide, pale bright yellow, many specimens, both green and brownish, having the lower half suffused with light red. This band is very conspicuous, and extends from the front edge of segment 2 right

down to the base of the anal feet. In the larvæ of both colours the venter is slightly lighter than the dorsum. Cervical shield slightly darker than body. In all the specimens the whole skin above the stigmatal band is densely mottled with minute black blotches and streaks. In some of the brown specimens the skin between the dorsal and lateral stripes, and lateral stripe and substigmatal band, has a decidedly reddish tinge, chiefly along the lower edge of the lateral stripe. In a very few specimens traces are evident of the lower lateral stripe which was plain in Stages II., III. and IV. Tubercles normal, very small, black, each on a small black spot; bristles short. Tubercle iv. is in a straight line close behind the centre of the spiracle. Spiracles yellowish, ringed with black. Thoracic feet and prolegs concolorous with venter; thoracic feet tipped with black. Tips of claspers of prolegs dark.

The mature larva is 37 mm. in length at rest, and 40 mm. when extended.

In the Report of the Dominion Entomologist, mentioned above, at page 237, the following general description of the full-grown larva is given:

"The general appearance of these caterpillars may be described as follows: The ground colour of the body, which varies remarkably in different specimens of the same brood, ranges from yellowish-green, through a dull yellow ochre, a ruddy brown, to a dark umber brown. The markings may be described as minute mottlings, dots and streaks aggregated on the dorsal area into a regular pattern consisting of a medio-dorsal continuous band, with a pale disconnected narrow line in the centre, and two lateral less-connected stripes also centred with a pale thread and of about the same intensity as the medio-dorsal band. The space between the lateral stripes is closely speckled with black dots. The stigmatal stripe is black, narrow and distinct, and close beneath it is a wide, conspicuous, yellow substigmatal band with the ground colour showing through it in places. The ventral surface is slightly paler than the dorsal. The head is honey yellow, mottled with darker markings."

It will be noticed that in the above extract the conspicuous dark shading above the substigmatal band has been given the value of a definite stripe, and referred to as the stigmatal stripe.

On the 6th July nine specimens buried, and the rest soon followed. A slight cocoon is formed apparently without any silk.

The pupa averages 17 mm. in length by 5.5 mm. in width; colour dark mahogany brown, polished. Thorax, wing-cases, etc., finely wrinkled with transverse lines; abdomen polished, the segments finely punctured at base. Cremaster stout, rugose above, excavated beneath, with two very short points about half way from base, one on each side, and at the tip two slender, divergent and capitate spines 0.4 mm. in length.

The first moth emerged on the 17th July, and others appeared during the following fortnight. About half the brood wintered over as pupæ, the first spring moth appearing on the 15th April (in a cool cellar). This was probably a month earlier than would have been the case out of doors.

Food-plants.—As the eggs from which these larvæ were reared were found on the European honeysuckle, leaves of this plant and many other shrubs were offered to them. The larvæ, however, avoided the honeysuckle, and the only plants eaten to any measure were the red oak, curled dock, willows and poplar. Of these, a note was made that the oak was decidedly the favourite food-plant. Later, however, the leaves of all woody-stemmed plants were refused, and plantain, dandelion and a few other low-growing herbs were fed to them, plantain being the most eaten.

NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.

The fourth annual meeting of this Society will be held on Wednesday, November 5th, 1902, at 3 p. m., in the High School, Calgary, Alta. Among other things it is proposed to devise an extension of its work on the lines of a Natural History Society, and to that end to adopt as its title, "The Northwest Natural History Society," or a similar title. His Lordship the Bishop of Saskatchewan and Calgary will preside, and the Department of Agriculture will be represented. If this extension is carried out, the various objects will be entrusted to divisions of entomology, botany, ornithology, etc., with a central presiding officer at Regina.

TWO NEW ANTS'-NEST COCCIDS FROM TEXAS.

BY GEO. B. KING, LAWRENCE, MASS.

Dactylopius Wheeleri, n. sp.—♀ flesh colour, covered with a white, fluffy material, elongate oval, $1\frac{3}{4}$ mm. long, 1 broad, $\frac{1}{2}$ high, convex, very flat beneath. Segmentation distinct. Boiled in potash, they turn brown; transferred to cold water, the internal juice becomes colourless. Pressed under cover-glass, the skin is colourless, with several long hairs anteriorly and on the caudal region above the anal ring and caudal tubercles. Anal ring normal, with six stout bristles. Caudal tubercles very prominent, with two long bristles 120 and 260 μ long. Legs stout, front leg coxa 140. Femur and trochanter 220. Tibia 148. Tarsus 100 μ long. Claw thin, sharp, with a distinct tooth near the end. Tibia and tarsus have several short hairs. Digitules of tarsus and claw very small. Labium small. Rostral loop exceedingly long.

Antennae 7-jointed: Joint (1) 48, (2) 52, (3) 52, (4) 44, (5) 40, (6) 40, (7) 100. Formula 7(23)14(56) of a finished mount in balsam. The same examples measured, while they were wet with alcohol under cover-glass, as follows: Joint (1) 40, (2) 60, (3) 44, (4) 44, (5) 44, (6) 44, (7) 104. Formula 72(3456)1. All the joints have several short hairs, excepting joint 7, which has two long hairs at the tip of that joint. Antennae 216 μ apart. Eyes large, oval.

Hab.—Austin, Texas, in nests of *Camponotus maculatus*, var. *sansabeanus*, Buckley. Collected and sent to me for study by Prof. William M. Wheeler, of the University of Texas, who says the ants remove the coccids to their chambers when the nests are disturbed, and that they are very frequently met with. I have given the measurements of the several joints of the antennae while wet and hardened in alcohol and a finished mount in balsam, for the purpose of calling attention to the variability of the antennal joints under each process. Owing to our large list of Coccidæ now described, it seems to the writer that all such changes should be recorded, so as to assist in every way possible the identification of the species if found in another locality or country. This is the first ant-nest coccid from Texas, and the first species of the genus *Camponotus* found in North America to harbour coccids in its nest.

Eriococcus Texanus, n. sp.—The females of this species received from Prof. Wheeler were in alcohol, and seemed to be flesh colour; when placed in liquid potash, they turn red-brown. "When alive, they are of a peculiar green colour" (Wheeler).

♀, examined with a hand lens, very much resembling a *Dactylopius* naked, i. e., without ovisac, distinctly segmented, oval, tapering behind, plump, $2\frac{1}{2}$ mm. long, $1\frac{3}{4}$ broad. Boiled in K. O. H., the derm is tinged with yellow, with spines of the normal type and confined to sides, short, $20\ \mu$ long, those of the outer margin twice as long; several spine-like long hairs of two sizes are found scattered irregularly over the body, $28 \times 60\ \mu$ long, and some round gland-pits. Antennæ, legs and mouth-parts light brown. Antennæ 6-jointed: Joints (1) 40 , (2) 40 , (3) 112 , (4) 28 , (5) 28 , (6) $40\ \mu$ long.

Legs long and stout.

Front leg coxa,	120.	Femur and trochanter	200.	Tibia	120.	Tarsus	132.
Middle "	120.	" "	"	216.	"	120.	" 133.
Hind "	180.	" "	"	220.	"	140.	" 180.

Claws $6\ \mu$ long, stout, curved and thin towards the end. Digitules of tarsus filiform, with small knobbed ends. Anal ring normal, with 8 bristles, which are thin, $100\ \mu$ long. Posterior tubercles large and rounded, about $80\ \mu$ long and broad, with one long bristle and four stout spines $24\ \mu$ long.

Hab.—San Angelo, Texas, on roots or young shoots in the earthen nests of *Cremastogaster punctulata*, Emery. "They were undoubtedly being cultivated by the ants" (Wheeler). Collected by Prof. Wheeler, March, 1902. Its nearest North American ally is *Eriococcus Tinsleyi*, Ckll., which has in the hind leg a very long tarsus as in *E. Texanus*, but differs very materially in other respects; in the antennæ a general type of *E. Palmeri*, Ckll., but in *Texanus* joint 3 is very much longer than in *Palmeri*.

This is the first species of the genus *Eriococcus* known to inhabit ants' nests. The absence of an ovisac in this species is no doubt due to the habit of the ants lapping the bodies of the coccids, and thus preventing a sac from forming. In a recent letter from Prof. Cockerell, he says: "If this really has no ovisac, even when producing eggs, it is not an *Eriococcus*, but a *Rhizococcus*. Such forms occur in Australia, and Signoret recorded one from Europe. *Rhizococcus* is to *Eriococcus* as *Calymnatus* is to *Pulvinaria*."

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND
PARASITIC WASPS, OR THE SUPERFAMILY
VESPOIDEA.

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(Paper No. 10.—Continued from p. 273.)

SUBFAMILY II.—Emboleminæ.

The globose or rounded head, which is never flat, oblong, and the difference in the antennæ, the antennæ in males being 10-jointed, in the females 13-jointed, readily separate the subfamily from the Bethylinæ. The group comes quite close to the Dryininæ, but in the latter the head is transverse or subquadrate, never rounded, while the antennæ are 10-jointed in both sexes.

The genus *Olixon*, Cameron, originally described as a Braconid, belongs here, without much doubt, I think, judging from the description and the figure. Cameron says: "I am unable to point out the natural position of this curious genus. The elongated fore legs give it a look of a Bethyloid, to which, indeed, it bears a general resemblance; but I feel inclined to regard it as a true Braconid." I have not seen a specimen of this genus, but Mr. Cameron's figure and description clearly show that it belongs here; the thickened fore femora are characteristic of the group.

Table of Genera.

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|--|----|
| 1. Males: antennæ 10-jointed..... | 4. |
| Females: antennæ 13-jointed..... | |
| Wingless or subapterous forms..... | 2. |
| Winged forms..... | 3. |
| 2. Scape much shorter than the first joint of the flagellum; form elongate; head long, oval, wider than the transverse pronotum; ocelli wanting; eyes prominent, placed high up on the sides of the head and extending forward to hardly half the length of the head; antennæ long, slender, inserted anteriorly <i>below</i> a line drawn from the base of the eyes; first joint of flagellum the longest.. (1) <i>Olixon</i> , Cameron.
(Type <i>O. testaceus</i> , Cam.) | |
| Scape much longer than the first joint of the flagellum; form less elongate; head rounded, with a frontal tubercle; ocelli very minute or wanting; eyes rounded, not prominent.. (2) <i>Pedinomma</i> , Förster.
(Type <i>Myrmecomorpha rufescens</i> , Westw.) | |

3. Eyes arched; ocelli large; scape shorter than the first joint of the flagellum..... (3) *Embolemus*, Westwood.
(Type *E. Ruddii*, Westw.)
4. Pronotum shorter than the mesonotum, *without* a median sulcus; scape much shorter than the first joint of the flagellum; stigma in the front wings three or more times longer than thick..... (3) *Embolemus*, Westwood.
- Pronotum as long as the mesonotum, *with* a deep median sulcus; scape much longer than the first joint of the flagellum; stigma in front wings not twice as long as thick..... (4) *Ampulicomorpha*, Ashmead.
(Type *A. confusa*, Ashm.)

SUBFAMILY III.—*Dryiniinae*.

This natural group is easily recognized by the antennæ, which are 10 jointed in both sexes, and by the shape of the head, which is quite different in shape from that in the *Bethylinae* and the *Emboleminae*.

The species in their habits and development also differ from the others, all of them being parasitic upon the nymphs of various Rhynchota, belonging to the suborder Homoptera, the families Fulgoridae, Cercopidae, Membracidae and Jassidae being especially subject to their attacks.

Table of Genera.

1. Males..... 7.
Females.....
- Vertex convex, *not* impressed..... 3.
 Vertex deeply impressed or concave; anterior feet chelate..... 2.
2. Wingless, *without* a scutellum..... (1) *Gonatopus*, Ljungh.
(Type *G. pedestris*, Ljungh.)
- Winged, with a scutellum..... (2) *Dryinus*, Latreille.
(Type *D. formicarius*, Latr.)
3. Front wings with an oval or ovate stigma..... 4.
 Front wings with a narrow or lanceolate stigma; front feet chelate.
 Pronotum not quite as long as the mesonotum, much contracted;
 fourth joint of front tarsi not much longer than the third, the
 first twice as long as the three following united; maxillary
 palpi 4-jointed..... (3) *Bocchus*, Ashmead.
(Type *B. flavicollis*, Ashm.)
4. Front tarsi not chelate..... 6.
 Front tarsi chelate..... 5.

5. Pronotum almost as long as the mesonotum ; fourth joint of front tarsi much longer than the third, the first *not* or scarcely longer than the three following united ; maxillary palpi 5-jointed..... (5) *Chelogynus*, Haliday.
(Type *C. fuscicornis*, Hal.)
- Pronotum much shorter than the mesonotum ; fourth joint of front tarsi scarcely longer than the third, the first *not* longer than the three following united ; maxillary palpi 4-jointed..... (6) *Anteon*, Jurine.
(Type *A. jurineanus*, Latr.)
6. Pronotum much longer than the mesonotum, the latter *without* a trace of furrows ; head large, broad..... (7) *Mystrophorus*, Förster.
(Type *M. formicæformis*, Ruthe.)
- Pronotum not or only slightly visible from above ; mesonotum well developed *with* furrows..... (8) *Aphelopus*, Dalman.
(Type *A. melaleucus*, Dalm.)
7. Front wings with an oval or ovate stigma..... 8.
Front wings with a narrow or lanceolate stigma.
Occiput deeply concave ; vertex and neck separated by a sharp angle ; mesonotum usually with distinct furrows ; front wings with a discoidal cell ; maxillary palpi 4-jointed..... (1) *Gonatopus*, Ljungh.
= *Labeo*, Haliday.
- Occiput not deeply concave, straight and broad ; front wings without a discoidal cell ; maxillary palpi 5-jointed..... (4) *Phorbas*, Ashmead.
(Type *P. laticeps*, Ashm.)
8. Pronotum always much shorter than the mesonotum, sometimes hardly visible from above..... 9.
- Pronotum much longer than the mesonotum.
Mesonotum *with* furrows ; maxillary palpi 5-jointed..... (5) *Chelogynus*, Haliday.
Mesonotum *without* furrows ; maxillary palpi 4-jointed..... (7) *Mystrophorus*, Förster.
9. Pronotum distinct ; mesonotum with or without a trace of the furrows ; maxillary palpi 4-jointed..... (6) *Anteon*, Jurine.

Pronotum not or scarcely visible from above, more or less hidden by the front margin of the mesonotum, which is strongly developed, the furrows on the latter distinct; maxillary palpi 5-jointed. (8) *Aphelopus*, Dalman.

FAMILY XXXIII.—*Trigonalidæ*.

This family, on account of its anomalous character, is one of the most interesting in the superfamily Vespoidea. The species are extremely rare, although widely distributed, and only four genera are known.

The family is usually associated with the *Evaniidæ* and the *Ichneumonidæ*, in my opinion an unnatural position for it.

Prof. Westwood, however, evidently had a true appreciation of the affinities of his genus *Trigonalys*, the type of the family, for when he described it, in 1835, he observes: "*Genus anomalum familiæ dubiæ caput et antennæ Lydæ, abdomen Mutillæ. Alarum nervi ut in Myrmosa dispositi.*" Again, five years later, in his *Introduction Mod. Classif. Insects*, Vol. II., p. 215, he wrote: "I may here mention another anomalous genus, which I have described under the name *Trigonalys*, having somewhat of the aspect of a male *Mutilla*, but with the head flattened and the antennæ longer, very slender at the tips, and composed of 23 or 24 joints, very like those of *Lyda*; the legs are simple and the abdomen punctured. The veins of the wings are nearly as in *Myrmosa* and *Mutilla* Europeæ male."

The responsibility for the removal of *Trigonalys* to the Terebrant Hymenoptera appears to be due to Shuckard, an able British Hymenopterologist, who, in 1851, deceived by the anomalous character of the antennæ and the two-jointed trochanters, incorrectly associated it with *Aulacus*, Jurine, into a family to which he gave the name *Aulacidæ*, placing the family next to the *Evaniidæ*.

Mr. Cresson, in his *Synopsis of the North American Hymenoptera*, published in 1888, properly established the family *Trigonalidæ*, but has incorrectly placed it between the families *Evaniidæ* and *Ichneumonidæ*.

The *Trigonalidæ*, in my opinion, have nothing to do with the *Evaniidæ* or the *Ichneumonidæ*; they are far removed and widely separated by many salient characters, and represent a natural group in the superfamily Vespoidea. Their affinities, to me, seem to be clearly with the *Bethylidæ*,

Sapygidae, Myrmosidae and Mutillidae; they also agree with the three last-mentioned families in habits, since species of *Trigonalys* have been bred from the nests of wasps (*Vespa* and *Polistes*). It is probable also that, like the Mutillidae, they will be found to live parasitically in the nests of some of the bees.

Table of Genera.

1. Second cubital cell triangular or petiolate, the first recurrent nervure not interstitial, joining the cubitus before the first transverse cubitus; anterior margin of clypeus truncate or slightly rounded, never emarginate; second ventral segment in ♂ normal. 2.
 Second cubital cell not petiolate, the first recurrent nervure interstitial with the first transverse cubitus; second recurrent nervure joining the third cubital cell at or a little *before* the middle; anterior margin of clypeus more or less emarginate medially; second ventral segment in ♂ produced at apex medially into a tooth or process (1) *Lycogaster*, Shuckard.
 (Type *L. pullatus*, Shuck.)
2. Front wings with *three* cubital cells, the marginal cell not attaining the apex of the wing. 3.
 Front wings with *four* cubital cells, the marginal cell attaining the apex of the wing.
 Legs not short, rather slender, not robust, the tarsi slender, the basal joint elongate, joints 2-4 much longer than wide; antennæ more than 16-jointed, tapering off toward tips. (2) *Trigonalys*, Westwood.
 (Type *T. melanoleucus*, Westw.)
 Legs short, robust, the tarsi stout, the first joint hardly thrice as long as thick; joints 2-4 transverse; antennæ 16-jointed. (3) *Nomadina*, Westwood.
 (Type *N. Smithii*, Westw.)
3. Second cubital cell receiving the second recurrent nervure. (4) *Liaba*, Cameron.
 (Type *L. balteata*, Cam.)

THREE NEW SPECIES OF CULEX.

BY D. W. COQUILLET, WASHINGTON, D. C.

Culex atropalpus, new species.

♀. Black, the halteres, apices of coxæ, and bases and under side of femora, except toward the apex, yellowish white; scales of palpi black, occiput covered with broad, appressed whitish scales and with a patch of black ones near the middle of each side, the middle of the upper side covered with narrow yellowish scales, the upright forked scales yellow; scales of mesonotum golden yellow and with a median vitta of black ones; scales of abdomen purplish black, and with a narrow fascia of whitish ones at the bases of the segments, becoming much broader on the venter; scales of legs black, those at base and on under side of femora, except toward the apex, also at extreme apices of femora, both ends of tibiæ and of the tarsal joints, except the last two and apex of the third on the front and middle tarsi, white, those on last joint of hind tarsi wholly white; claws of front and middle tarsi toothed, those of the hind ones simple; wings hyaline, lateral scales of the veins long and narrow, first submarginal cell slightly over twice as long as its petiole.

♂. Colouring as in the female, except that the short joints of the antennæ are ringed with white; palpi two-thirds as long as the proboscis, slender, the apex blunt, last two joints less than half as long as the remaining portion, and bearing a few rather short hairs; claspers of nearly an equal thickness, evenly covered with hairs, and with a long, slender, curved claw at apex of each; fourth joint of front and middle tarsi as broad as long; larger claw of front and middle tarsi one-toothed, the smaller one and the claws of the hind tarsi simple.

Length, 3.5 to 4.5 mm. Thirty-seven females and three males. Type No. 6558, U. S. National Museum.

Habitat.—Richmond, Va. (Sept. 26: E. G. Williams); Plummer's Isd., Montgomery Co., Md. (May 18 to Aug. 14: R. P. Currie and H. S. Barber); Shenk's Ferry, Pa. (Oct. 21: S. E. Weber), and White Mts., N. H. (H. K. Morrison).

Near *Canadensis*, but readily distinguished by the colour of the scales on the palpi and mesonotum.

Culex varipalpus, new species.

♀. Same as *atropalpus*, with these exceptions: Scales on apices of palpi and a ring near the middle, white; occiput with two patches of

black ones on each side, the upright forked ones black and whitish; first submarginal cell noticeably less than twice as long as its petiole.

Length, ♂ mm. A female specimen collected July 29 by Mr. H. S. Barber. Type No. 6559, U. S. N. M.

Habitat.—Williams, Arizona.

Culex quadrivittatus, new species.

♀. Differs from *atropalpus* as follows: Scales at apices of palpi and several on the upper side white, scales of occiput yellowish and with four patches of black ones; scales of mesonotum black and with four vittæ, and lateral margin of golden yellow ones; abdomen black scaled, each segment with a lateral patch of white ones extending nearly to the middle of the venter; scales of legs at apices of tibiæ and of joints of tarsi black, on the last two joints of the hind tarsi wholly black, tarsal claws simple.

Length, 4.5 mm. Eight females received, June 13, by Dr. L. O. Howard from Prof. Gustav Eisen, of San Francisco, Cal. Type No. 6560, U. S. N. M.

Habitat.—Chacula, Guatemala (6,600 feet altitude).

A NEW MYODITES (RHIPIPHORIDÆ).

BY W. DWIGHT PIERCE, LINCOLN, NEBR.

The specimens on which this description is based are in the collections of the University of Nebraska and of the author. I owe especial acknowledgments to Mr. J. C. Crawford, Jr., for specimens and field observations, and to Professor Bruner for directing my work. A sixteen-power glass was used in determining characters.

Myodites solidaginis, n. sp.—Female: Length, 7.9 mm. Head depressed, finely and evenly punctate, clad with dense yellowish-white, perpendicular pubescence.; antennæ pectinate, ten-jointed, pubescent, very finely punctate, third joint with base of tooth yellowish; vertex between antennæ elevated; mandibles with the exterior side finely punctate, densely pubescent, grooved, in front and on interior sides shining glabrous. Thorax densely punctate, with median groove, but becoming mesially carinate behind the centre, clad with dense, upright, yellowish-white pubescence. Scutellum very finely and densely punctate, pubescent; postscutellum shining glabrous; metathorax bilobed, densely pubescent, punctate; first dorsal segment of abdomen glabrous, remaining dorsal segments punctate, pubescent; thorax and abdomen below, pygidium and legs punctate, pubescent; elytra irregularly punctate,

slightly pubescent; posterior tarsi with first joint large, elevated, obliquely truncate and emarginate at tip, more than twice as long as second and much thicker, second joint longer than the third; claws pectinate; anterior and median tibiæ with the first joint longer than the three following joints.

Colour: Antennæ with the exceptions above mentioned, head, thorax, pygidium, genital sheath, femora, first ventral segment, transverse band on the first dorsal and lateral segments, two spots on second ventral, and median spots on the last four dorsal segments, black; abdomen, with the above exceptions, red; elytra honey-yellow; wings transparent honey-yellow, with a large fuscous cloud on the costal margin toward apex; tarsi and tibiæ varying from black to yellow. The ♀ abdomen varies from red to brownish.

Male: Length, 7-9 mm. Similar to the female, with the following exceptions: Antennæ double flabellate, 11-jointed, finely punctate throughout, pale yellow, tipped with dark; abdomen dark, with joints of first three dorsal segments yellowish, membranous. Legs yellow, with black spot at junction of femora and tibiæ.

This species differs from *Popenoi*, *semiflavus* and *scaber* by having the abdomen red in the ♀ and black in the ♂. From the first two it differs by having the prothorax black, punctate, densely pubescent, vertex pubescent; from *Popenoi* by having the first joint of posterior tarsi more than one-half longer than second; from *scaber* by having the first joint much thicker than the second.

A large series of females was caught by the author on August 24, 25, 26, 1901, and by Mr. Cary on August 26, on flowers of *Solidago Missouriensis*, *rigida* and *Canadensis*, at Lincoln, Nebr. A large number were also taken August 21, 1902, and during the following week. These were, as a general rule, ovipositing in the buds of *Solidago rigida*, while a few were on the flowers of *Solidago Missouriensis*. The distribution was limited to the regions near the salt basins.

A large swarm of males was caught flying in the region of colony of *Epinomia triangulifera*, Vachal, *Perdita albipennis*, and certain species of *Andrena* and *Nomada*, on August 25, 1901, by Mr. Crawford, on the salt basins at Lincoln. Two males were caught on *Solidago* by the author; also two pairs on August 26 and 27, 1901.

A ♂, taken from the Pine Ridge, in Northwestern Nebraska, during July, has the antennæ orange coloured, the clouding of the elytra fulvous, and is slightly smaller. This may be a different species.

TWO NEW SPECIES OF LEPIDOPTERA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

Peridroma canities, n. sp.—Form and markings of the Texan *P. annexa*, but of a different, dusty gray, colour and a little shorter winged. Primaries dusty gray, with a slight dusky shading along costa, against which the pale dots, marking inception of transverse lines, are relieved. T. p. line tolerably distinct, indentate interspaceally, with included pale shade. Veins marked with fuscous. T. a. line double, with a strong outward inflection above internal margin. Claviform blunt, filled in with fuscous. Orbicular with central dot. Reniform moderate, filled in with fuscous. Cell slightly darker shaded. Markings inconspicuous, concolorous. Hind wings (♀) white.

Received with *P. massium*, Guen., from G. Schimpf, Buenos Ayres. I am indebted to Sir George Hampson for determinations. The present species is unnamed in the British Museum. The thoracic markings are faint; collar dusky, abdomen paler, with faint dorsal shade. According to Tutt, *sauzia* is the type of *Peridroma*, Hb. (see Grote, List, etc., 20).

Loxostege triumphalis, n. sp.—Apparently allied to *annaphilalis*, Grote, but a smaller insect (20 mm.), and without the brown spot on primaries and the black line on the orange hind wings (see CAN. ENT., XIII., 34). The species has the same false air of an *Annaphila*, owing to the colours. Fore wings blackish, with a sprinkling of bone-coloured or white scales, somewhat lustrous. Reniform a black cloud. Transverse lines obsolete. A discontinuous series of black antemarginal dots. Fringes blackish, intermixed with whitish scales. Hind wings pure dull orange, with neatly defined blackish fringes, and a blackish shading at base; beneath both wings orange like hind wings above; a black mark on fore wings in place of reniform. Costa of primaries marked with black before apices, which latter show a blackish shading. Body above and appendages black or blackish like primaries, the abdominal segments vaguely defined by scattered pale scales; beneath, with under side of palpi, orbits of the eyes, legs, more or less white or whitish. The clypeal prominence is feeble.

Two male specimens of *L. triumphalis* were sent me from San Luis Obispo, California, by Mr. Geo. Franck. So far as the literature is accessible to me, I find no description of the species. One specimen is unsexed.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The thirty-ninth annual meeting of the Society was held in London on the 29th and 30th of October. A business meeting of the Council was held during the first morning. In the afternoon a conference on the pea weevil in Ontario took place. Dr. Fletcher gave an account of the spread of this insect and the injury and loss it had caused; the pea crop of this Province he considered to be one of the most valuable products of the country, and yet it was rapidly being reduced by the weevil to such an extent that no less than seventy thousand acres had been withdrawn from this crop during the last ten years, involving an annual loss to the community of about five millions of dollars. The policy of abandoning its cultivation for two or three years was advocated in some quarters, but this he believed to be entirely unnecessary, as there was a cheap, easy and effective remedy available. If the pea-growers would harvest and thresh their crop at as early a date as possible, and then fumigate the stored peas with bisulphide of carbon, there would be no difficulty in getting rid of the pest. The important point is how to prevail upon the farmers to adopt this method of controlling the insect. In the discussion which followed, and which was participated in by Prof. Lochhead, Mr. Fisher, Dr. Bethune, Mr. Pearce, and Prof. James, it was suggested that the Superintendent of the Farmers' Institutes of Ontario should have the matter brought before all the meetings during the coming winter, that information regarding the insect and the remedial measures to be employed should be disseminated as widely as possible, and that the Government of Ontario should be requested to send a competent staff of men to the rural sections of the country, whose duty it should be to show the farmers practically how these remedies can most easily and successfully be carried out. Resolutions in accordance with these suggestions were unanimously adopted.

Mr. George Fisher, the Provincial Inspector of Scale insects, gave a report upon the insects of the year in the Niagara and Hamilton districts, and referred especially to the San José scale. He gave a detailed description of the methods employed in treating fruit trees with the lime and sulphur wash, which he has now proved to be a thoroughly effective remedy for the scale. Dr. Fletcher stated that he had just returned from visiting the scene of Mr. Fisher's operations, and could bear the highest testimony to their complete success. At the close of the discussion, which included the chemical composition of the wash as well as the mode of preparing and applying it, a resolution was adopted congratulating the

Minister of Agriculture for Ontario and his assistants on the excellent results which had been achieved by their efforts, and the important discovery of a practicable and effective remedy for this most destructive insect.

In the evening a public meeting was held at the Normal School, at which Prof. James, Deputy Minister of Agriculture for Ontario, presided. The Rev. Dr. Fyles read his presidential address on "Insect Life," illustrated by a series of beautiful coloured diagrams which he had himself prepared. Prof. Lochhead followed with a lecture on "Some noted Butterfly-hunters and some common Butterflies," which he illustrated with a large series of lantern pictures.

On Thursday, Oct. 30th, the reports of the Council, Directors, Officers, Branches and Sections were read, and also a number of valuable and interesting papers; these will all be published in full in the Annual Report to the Legislature. Many rare and interesting specimens were exhibited, and a considerable number were kindly presented to the Society's collections. The election of officers resulted as follows:

President—Professor William Lochhead, Ontario Agricultural College, Guelph.

Vice-President—J. D. Evans, C. E., Trenton.

Secretary—W. E. Saunders, London.

Treasurer—J. H. Bowman, London.

Directors: Division No. 1—C. H. Young, Hurdman's Bridge.

Division No. 2—C. E. Grant, Orillia.

Division No. 3—E. M. Walker, Toronto.

Division No. 4—G. E. Fisher, Freeman.

Division No. 5—J. A. Balkwill, London.

Directors Ex-officio (ex-Presidents of the Society)—Professor Wm. Saunders, LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa; W. H. Harrington, F.R.S.C., Ottawa; John Dearness, Normal School, London; Henry H. Lyman, M.A., F.R.G.S., F.E.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Librarian and Curator—J. Alston Moffat, London.

Auditors—W. H. Hamilton and S. B. McCready, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal;

J. D. Evans, Trenton ; W. H. Harrington, Ottawa ; Professor Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Committee on Field Days—The Chairmen of the Sections and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie, and Saunders, London.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness, Moffat, and Saunders, London.

REMARKS ON THE THIRD VOLUME OF TUTT'S BRITISH LEPIDOPTERA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

The third volume of Mr. J. W. Tutt's "A Natural History of the British Lepidoptera," etc., is marked by the same care and fullness of detail as the previous volumes. The detail with which the subject is treated appears in the fact that this volume of 540 pages treats of but 14 species of moths. It is a veritable storehouse of information.

Mr. Tutt has quoted my views on the larval characters in several places, and has raised certain questions in this connection on which I wish to remark.

For some unexplained reason, Mr. Tutt refuses to accept the homology of the primary setæ of the Sphingidæ as being the same as that of other Lepidoptera (pages 233 note, 359, 364 note, 365, 367 and 499). He states that tubercle v is absent, and there is an additional tubercle before the spiracle, which is not v moved up, but something new. I cannot imagine any reason sufficient to account for such a radical supposition. How remarkable such a structure would be Mr. Tutt himself does not seem to appreciate. If it were so, it would almost remove the Sphingidæ from the Lepidoptera; for if there is one thing constant in Lepidopterous larvæ, it is the five upper primary setæ, which are absolutely uniform, not only in the Lepidoptera, but in other allied lower forms, such as the Mecoptera. The number of these setæ may be increased by the addition of secondary ones, and they may be obscured by specializations, but a subtraction from their number may

not occur. In the more generalized larvæ, tubercles iv and v occur side by side, in line, neither one higher than the other. In certain Tineids this position begins to fluctuate, in some iv being a little higher than v, in others v a little higher than iv. In the Bombycid phylum (culminating in Noctuidæ and Arctiidæ), the tendency of iv to be elevated is emphasized, and it rises as high as the top of the spiracle, or even a little above it, on certain segments of some Noctuidæ, while v remains in its original subventral position. Mr. Tutt accepts this interpretation, and does not feel called upon to invent hypothetical setæ to account for the change in position of tubercle iv. Now, in the Sphingidæ the tendency of v to be elevated is emphasized, while iv remains in the original subventral position. The dorsad movement of v in the Sphingidæ is not greater, not so great, in fact, as that of iv in the Bombycid phylum, yet here Mr. Tutt finds a difficulty, and wishes to regard v as absent and represented by a new seta. This seems to me a gratuitous assumption, intrinsically improbable, and contradicted by the very palpable homology of the primary Lepidopterous setæ. Mr. Tutt would homologize "the so-called" tubercle v of the Sphingidæ (page 367) with "the prespiracular wart of the Lachneids." This wart is secondary, as shown by my figure of *Tolype* (Proc. Bost. Soc. Nat. Hist., XXVII., 144, 1896) and *Malacosoma* (Psyche, VII., 259, 1895), but it is accompanied by other secondary structures, while the primary tubercles are all accounted for. He can hardly really mean this, as he does not draw the obvious inference of a close relation between the Sphingidæ and Lachneidæ.

Mr. Tutt's references to the Lachneid tubercles are far from clear. He says that in *Pachygastris trifolii* (p. 23), "iv and v form a subspiracular, many-haired wart," and of *Lasiocampa quercus* (p. 60), "iv + v almost postspiracular." This would imply a union of tubercle iv and v, which I have never observed in the Lasiocampid phylum. These tubercles remain separate, but become reduced, while the large lappet is formed from tubercle vi. It is unfortunate that Mr. Tutt did not bring out clearly the complicated but pretty homology of the Lachneid warts. Figures would have been useful here.

Finally, a word on the relationship of *Dimorpha (Endromis)* and *Chelepteryx* (p. 230). My own view is that these forms are nearly related, though I have not the material to prove the point. It is true that the mature larvæ look very unlike, one being a smooth Sphinx, the other a big, hairy Lasiocampid. But these characters are only

special adaptations. In the first stage, *Dimorpha* has many-haired warts, as shown by my figure in Grote's "Die Saturniiden." I have re-examined the material, and have no correction to make to the figure. Tubercle vi is clearly absent, while i to v are converted into warts, ii smaller than i, iv and v nearly in line, iv only a little dorsad. On the thorax there are two warts above the stigmatal wart. I do not find tubercle iib; if present, it must be a small rudiment (the larvæ are very difficult to examine from their opaque black colour). The arrangement suggests the Lachneid phylum, though the subprimary tubercles are strangely absent, but it does not suggest the Lachneidæ nor Liparidæ proper, on account of the presence of but two upper warts on the thorax. It is, however, nearly paralleled by the first stage of *Bombyx mori*, in which the lower of the three thoracic warts (iib) is reduced to a single small hair; but here the subprimary tubercles are present. *Bombyx* also resembles *Dimorpha* in the loss of the tubercles after the first stage and the development of a "caudal horn." Without specimens of *Chelepteryx* larva, and especially of stage I, it is difficult to get far in comparison with *Dimorpha*. Scott's figure shows a big Lachneid-like larva, with proportionately small, many-haired warts. Wart ii appears absent, corresponding with its extreme reduction in *Dimorpha*, but there are two subdorsal warts in line on the thorax, as in the Lachneid phylum, while warts i on joint 12 are separate. The lateral warts are not shown in the figure, but according to the description there is only one wart to represent iv and v, while vi is present. Someone in Australia ought to give us a full account of *Chelepteryx*.

Mr. Tutt (p. 272 note) queries what I intended by the primitive first stage in *Aglia*, stating that it seems specialized to him. Further on (p. 286 note) he says: "We do not agree that *Aglia* has a primitive first stage." By the primitive first stage I mean that condition in which only the primary setæ are present, unmodified, not converted into warts, and without the addition of any secondary setæ. This condition obtains in *Aglia*, therefore it has a primitive first stage. I do not consider in this definition other specializations of the larva, the hypertrophy of the tubercles, etc. They may be present or not. If present, they naturally constitute a specialization, as Mr. Tutt remarks, but I have not regard to these in this connection.

On page 364, Mr. Tutt states that I consider the Sphingids, Notodonts and Lachneids related on larval characters, and he designates

this as an "impossible combination." In this designation he is perfectly right; but I never held the view attributed to me. I pointed out an analogy in the development of a process on the eighth abdominal segment in the larvæ of these families, but I never intended to imply any homology between them, and I do not think that my article, referred to by Mr. Tutt, reads in this way.

THE HYMENOPTEROUS PARASITES OF PHENACOCCLUS CAVALLIÆ, CKLL.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

About the first of October, Prof. T. D. A. Cockerell sent me for names several parasites bred by him from a Coccid, *Phenacoccus cavallie*, Ckll., collected at Roswell, New Mexico. In the lot were four distinct species of Chalcids, two being new, but one of these is a hyperparasite, as follows: (1) *Blepyrus phenacocci*, sp. nov.; (2) *Cheiloneurus dactylopii*, How.; (3) *Signiphora dactylopii*, Ashm.; and (4) *Tetrastichus blepyri*, sp. nov. The new species are described below:

Blepyrus phenacocci, sp. n.—♀. Length, 1.3 to 1.4 mm. Stature and general appearance similar to *B. mexicanus*, How. Aeneous black, the thimble-like punctuation of the head more or less metallic greenish; antennæ, except the pedicel and the club, all tarsi, and the extreme tips of middle and hind tibiæ, honey-yellow; the pedicel is obconical, about thrice as long as thick at apex, brown-black; the funicle is 6-jointed, the joints transverse, gradually widening to the club, the latter being large, stout and black. Wings hyaline, the tegulæ black, the veins dark brown, the marginal vein very short, hardly twice as long as thick, the post-marginal and stigmal veins long, about equal.

♂. Length, 1 mm. Agrees well with the female, except in colour and structure of the antennæ: the antennæ are wholly black, except the scape narrowly at the extreme apex and beneath towards apex, the pedicel being much shorter, only a little longer than thick, while the flagellum is filiform, clothed with a short pubescence, the joints longer than thick.

Type.—Cat. No. 6604, U. S. N. M.

Hab.—New Mexico: Roswell.

Host.—Rhynch.: *Phenacoccus cavallie*, Ckll.

Tetrastichus blepyri, sp. nov.—♀. Length, 0.8 mm. Black, shining, impunctate, except some punctures in the parapsidal furrows; in one specimen the mesonotum is blue-black; the middle grooved line on the mesonotum is nearly obsolete, wanting posteriorly; metanotum smooth, with a median carina; the scape, the extreme apex of the pedicel, the tegulae, the apices of the femora, and all tibiae and tarsi, are yellowish white. Wings hyaline, the veins light brown. The abdomen is ovate, depressed, and very little longer than the head and thorax united.

Type.—Cat. No. 6605, U. S. N. M.

Hab.—New Mexico: Roswell.

Host.—Hym.: *Blepyrus phenacoci*.

XANTHOENCYRTUS, gen. nov.

This new genus, on account of the very short marginal vein and the arrangement of the ocelli, comes near to *Psyllæphagus*, Ashm. The two genera may, however, be separated as follows:

Lateral ocelli not close to the eye margin.

Yellow; pedicel more than twice as long as the first funicle joint; all funicle joints wider than long; club rather large,
 stout.....Xanthoencyrtus, gen. nov.

Aeneous black or metallic; pedicel not twice as long as the first funicle joint; not all the funicle joints wider than long; club neither so large nor so stout.....Psyllæphagus, Ashm.

Xanthoencyrtus nigroclavatus, sp. n.—♀. Length, 16 mm. Yellow; the legs and the sutures of the abdomen yellowish white; eyes and club of antennae brown-black; scape above more or less, the pedicel basally and the first four joints of the funicle light brownish, the tip of the pedicel and the fifth and sixth funicle joints yellowish white. Wings hyaline, finely pubescent, but with an oblique hairless line from the marginal vein; the marginal and postmarginal veins are punctiform, while the stigmal vein is moderately long, with a slight upward curve.

Type.—Cat. No. 6606, U. S. N. M.

Hab.—Indiana; Princeton (Prof. F. M. Webster).