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# The Canadian Entomologist.

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## THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

### V. THE COCCINELLIDÆ OF ONTARIO AND QUEBEC.

This family includes a moderate number of beetles, usually of compact, convex and often more or less hemispherical form, coloured as a rule in striking patterns of yellows or reds and black. In most cases the surface is glabrous, though in *Scymnus* and some less extensive genera it may be plainly pubescent. Technically, the family may be known by the clavate antennæ, the three-jointed tarsi with dilated second joint and the partially membranous dorsal abdominal segments; the ventral segments are free, the first usually with coxal lines, and the claws ordinarily appendiculate or toothed. It will, however, seldom be necessary to recur to these characters in the study of a limited fauna such as is presented by East Canada, as the facies is usually such as to render the fact of an insect belonging here unmistakable. Sexual characters are feeble and seldom used in specific or generic determinations.

The larvæ are common on leaves of plants, and may often be seen in numbers on twigs infested with aphides, which constitute the chief food of the more northern species, although *Epilachna borealis* (Fig. 35), which occurs farther to the south, is known to be phytophagous in habit. Most of the known North American larvæ of this family agree in being of somewhat elongate form, often quite spiny and usually spotted or banded in reds, black and yellows. They bear a resemblance to a minute alligator in shape, and are known under that name by children in some



Fig. 35.

parts of the country. When full fed the larva attaches itself by the anal extremity to some convenient surface—the under side of a leaf or the bark of a tree in wild countries—and transforms to a pupa (Fig. 36—pupa of *Coccinella 9-notata*), displaying the characteristic gaudy colours before mentioned, the old larval skin adhering to the posterior extremity.



Fig. 36.

The genera are extremely difficult to tabulate in a

satisfactory form, and I have been unable to find easily seen characters in all cases—partly because of the extreme resemblance in form among certain genera, and partly on account of the wide variation in colour shown by a few species precluding much use of this in a table. In part, I have followed the "Classification," while in other places I have used more readily perceived characters, which, while not in themselves of true generic value, will nevertheless allow the species here treated to be properly placed. The interpretation of specific characters is, in general, after the "Revision of the Coccinellidæ of the United States," by Mr. Crotch, although he has not tabulated most of them. *Scymnus* is omitted for the present.

A word of caution is necessary to beginners. Some of the species are very closely allied, and often so variable in colour, especially as regards the greater or less development of the elytral spots, that they may prove extremely puzzling, and in order to avoid mistakes the tables and descriptions, which have been made fuller than in preceding papers of this series, should be carefully studied. The considerable number of figures offered should also prove an aid to accurate work.

The species known from our region may be placed in their approximate genera by use of the following key :

- A. Body pubescent.  
 Antennæ reaching base of thorax ; body oblong-oval. . . . . *Coccidula*.  
 Antennæ scarcely as long as the head ; body nearly hemispherical. . . . . *Scymnus*.
- AA. Body glabrous, base of antennæ covered by a frontal plate, thorax very small ; upper surface black, elytra each with one red spot. . . . . *Chilocorus*.
- AAA. Body glabrous, base of antennæ exposed, thorax of moderate size.
- b. Form oblong-oval or elongate, ventral lines absent or nearly so.
- c. Elytra with sutural and discoidal black stripe. . . . . *Nemias*.
- cc. Elytra spotted.
- d. Thorax distinctly margined at base. . . . . *Megilla*.
- dd. Thorax not margined at base.
- Small (.13 in.). Elytra each with eight spots,\* sometimes confluent. . . . . *Anisosticta*.  
 Larger (.20—.30 in.). Elytra with not more than six spots\* on each. . . . . *Hippodamia*.

\*The common sutural spots excluded.

- bb. Form usually rounded and much more convex; metasternal and ventral coxal lines distinct.
- e. Antennæ longer (sometimes only slightly so) than the head; form looser, less contractile; colour above usually pale with dark markings.
- f. Size small (.08 to .10 in.).....*Psyll'bor'a*.
- ff. Larger (.16 to .38 in.).
- g. Antennæ only slightly longer than the head, elytral epipleuræ not extending to tip.
- Lines on first ventral angulate externally.....*Coccinella*.
- Lines on first ventral semicircular, complete . . . . .*Adalia*.
- Lines on first ventral incomplete externally.....*Harmonia*.
- gg. Antennæ longer, extending at least to middle of prothorax; epipleuræ entire.
- Claws bifid, body oval, more convex.....*Mysia*.
- Claws toothed, body rounded in outline, less convex.....*Anatis*.
- cc. Antennæ extremely short, about as long as the front; body compact, strongly retractile; colour above black, with yellow or red markings.
- Anterior tibiæ with a strong spine on the outer edge, elytral spots more numerous.*Brachyacantha*.
- Anterior tibiæ simple, elytral spots fewer in number.....*Hyperaspis*.
- ANISOSTICTA, Duponchel.

*A. strigata*, Thunb., which represents the above genus in the Canadian fauna, is a small ovate or somewhat elongate insect (.13 in.), black beneath excepting the sides and tip of the abdomen, which, with the legs and antennæ, are yellow. Above, the head is yellow anteriorly, the thorax yellow, with two triangular black spots, the apices of the triangles being applied to the base. These spots are sometimes irregularly v-shaped, or the outer limb of the v may even be separated as a spot. Elytra yellowish, with a common bilobed spot on the scutellar region, and usually eight others on each, black; these spots may, however, be confluent in a varying degree, so as to form a less number of larger size.

## NÆMIA, Muls.

To this genus belongs *N. episcopalis*, Kirby, a small species (.15 in.) of more than usually elongate and parallel form, black beneath, with the legs and sides of the abdomen yellow. Above, the head and prothorax are black with yellow stripes, the elytra yellow with a narrow common black sutural vitta, and on each a broader discoidal one; none of these reach the apex.

## MEGILLA, Muls.

The well-known *M. maculata*, DeGeer, is of an oval, not very convex form, black beneath, the prosternum and a row of triangular lateral abdominal spots reddish. Above, reddish, with large black spots as follows:—Two large black sub-triangular on the prothorax, one diamond-shaped on the scutellar region of the elytra, one transversely elliptical on the suture about three-fourths to tip; each elytron has in addition four spots (the second the largest) arranged longitudinally near the external edge. Legs black, head black with a triangular frontal spot prolonged on to both sides at the broad end. Length, .20 to .22 in. (Fig. 37.)



Fig. 37.

## HIPPODAMIA, Muls.

The species are rather numerous and vary to a considerable extent in the size of the elytral black spots. The thorax has a pale border and often two white dashes on the disk.

## A. Tibiæ black.

- b. Thoracic border sinuate or interrupted. Discal marks absent, or nearly so.

Basal elytral spots large, usually connected so as to form a transverse band. Length, .25-.27 in. . . . . *5-signata*, Kirby.

Basalelytral spots small or wanting, .28-.30 in. *Lecontei*, Muls.

- bb. Thoracic border nearly uniform, disk with two white dashes.

Elytral spots small, never united, .18-.20 in. . . . . *convergens*, Guer.

## AA. Tibiæ pale.

Thorax with quadrate yellow spot at middle of base, .16-.20 in. . . . . *parenthesis*, Say.

Thorax without spot at base, .20-.24 in. . . . . *13-punctata*, Linn.

Fig. 38 is a diagram of *Hippodamia 5-signata*; Fig. 39—A the larva, B the pupa, and C the imago of *H. convergens*; Fig. 40 *H. parenthesis*; Fig. 41 *H. 13-punctata*.



Fig. 38.



A



B



C

Fig. 39.



Fig. 40.



Fig. 41.

COCCINELLA, Linn.

A number of species of very convex form constitute this genus ; they vary, as do those of *Hippodamia*, in the extent of the black markings, but may be separated thus :—

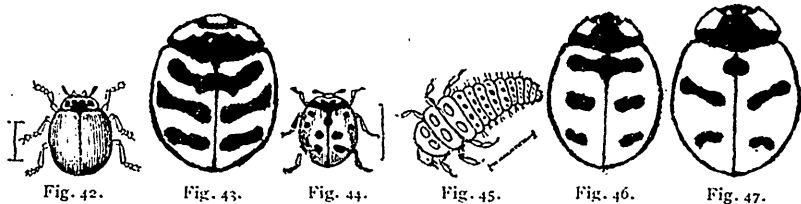
- A. Elytra red, immaculate. White margin of thorax with three branches.....*sanguinea*, Linn.
- AA. Elytra reddish or yellowish with black markings.
  - b. Thorax with anterior margin white.
    - Elytra with three black transverse fasciæ, sometimes reduced or partially divided, .22 in..... *trifasciata*, Linn.
    - Elytra with a common scutellar, and each with four other spots, black, the two anterior smaller, .26–.30.*9-notata*, Hbst.
  - bb. Thorax with anterior angles only white.
    - c. Elytra strongly punctulate, shining ; thorax with anterior angles triangularly white. Elytra each with a triangular subapical black spot and a common black sub-basal fascia tridentate anteriorly, .19 in.....*tricuspis*, Kby.
    - cc. Elytra alutaceous, obsolete punctulate. Thorax with a quadrate white spot on the anterior angles above.

Anterior thoracic angles only narrowly white beneath.

Sub-basal spots of elytra usually united into a common fascia, .28–.30 in. ....*transversoguttata*, Fabr.

Anterior thoracic angles as broadly white beneath as above. Elytra without sub-basal band, usually with an oblique medial fascia, a scutellar spot and a subapical spot on each, .28–.30 in.....*monticola*, Muls.

Of the above species, *C. tricuspis* is unknown to me in nature. Figures are given of *C. sanguinea*, Fig. 42 ; *C. trifasciata*, Fig. 43 ; *C. 9-notata*, Fig. 44, and its larva, Fig. 45, and pupa, Fig. 36 ; *C. transversoguttata*, Fig. 46 ; and *C. monticola*, Fig. 47.



## ADALIA, Muls.

Two species are found in the Canadian lists ; they are similar in outline to *Coccinella*, but less convex. Being very variable in colour, they are likely to make trouble, but may be separated thus :—

Elytra uniform yellowish red or with transverse fasciæ of small black spots in varying number, .18 in.....*frigida*, Schn.

Elytra yellowish-red with a rather large discoidal black spot, .19 in.....*bipunctata*, Linn.

Elytra black, humeral angles, or entire basal region, and a smaller post-median spot red.....var. *humeralis*, Say.

## HARMONIA, Muls.

The species of *Harmonia* are very troublesome to define by description, but are comparatively easily recognized after a short acquaintance.

*H. 12-maculata* is easily known by its convex form and resemblance in coloration to *Megilla maculata*, while the oblong-oval form and peculiar markings (see Fig. 48) of *H. picta* render the more typical specimens easily known.

*H. 14-guttata*, while of somewhat the same form as *12-maculata*, may be easily separated from it by the dark ground colour with lighter markings. The differences may be stated, then, as follows :—



Fig. 48.

Elytra testaceous or pinkish, with large black spots ; one common scutellar, one common at about three-fourths, and, on each elytron, one humeral, two medial, one post-medial, and one triangular apical. Thorax with two very large black spots. Form hemispherical, .22 in.....*12-maculata*, Gebl.

Elytra light red with pale spots, or black with red spots, normally seven on each, but sometimes reduced to two. Punctuation unequal. Thorax with front and hind margins pale, often also with a medial line and spot near the hind angles, .23 in... *14-guttata*, Linn.

Elytra entirely pale or with a longitudinal line, and a spot on each side (the spot often confluent with the line) dark or black. Prothorax pale, with black spots often coalescing into an **M**-shaped mark, with a dot on each side, or varying infinitely in size and shape. Form oblong-oval, less convex, .17 in. .... *picta*, Rand.

MYSIA, Muls.

*M. pullata*, Say. Oval, convex, head black with two yellow frontal spots, thorax black with narrow whitish front margin, sides broadly white and enclosing a black spot. Elytra reddish, sometimes with an irregular blackish dorsal vitta. Legs usually black, .28 in. Larger than *Coccinella sanguinea*, which it recalls at first sight, and with the thorax differently marked.

ANATIS, Muls.

Two species are recorded from Canada, differing thus:—

Elytra very distinctly punctured; thorax yellowish white, with a heavy, more or less **M**-shaped discoidal black mark, and a black marginal spot near the hind angles. The elytra are usually yellowish with black spots, arranged in three transverse rows, though occasionally specimens are found in which the elytra are brown or nearly black. Legs wholly or in part yellow, .30–.38 in. (Fig. 49)..... *15-punctata*, Oliv.

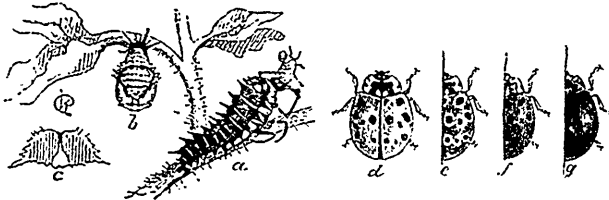


Fig. 49.

Elytra quite smooth, with oblong piceous spots, variable in form and extent, so that nearly the entire disk may become piceous, enclosing small yellow stripes or blotches..... *subvittata*, Muls.

The former is our largest Coccinellid, and is easily recognized. The latter I am unacquainted with, and owe the characters on which the separation is made to the kindness of Dr. Horn.

PSYLOBORA, Chevz.

A small, yellowish-white species (*P. 20-maculata*, Say.), only .08 to .10 in. in length, with numerous black spots; cannot be mistaken for anything



else, since it is the only black-spotted Coccinellid of such small size and hemispherical shape in the Canadian fauna.

#### CHILOCORUS, Leach.

*C. bivulneratus*, Muls., is the only Canadian species. It is a rounded, very convex species, with a very short thorax and wide margins to the elytra, which are black, with a red discoidal spot. The abdomen is red. Length, .20 in. Fig. 50, imago ; Fig. 51, larva.



Fig. 50.



Fig. 51.

#### BRACHYACANTHA, Dej.

One species comes from our region, *B. ursina*, Fabr., a rather small, oval convex insect (my specimens varying from .09 to .16 in. in length), black above, head yellow, the thorax with front margin yellow in the male. The elytra are black, with five yellow spots, one humeral, one basal, two medial and one sub-apical. The variety *10-pustulata*, Melsh, includes the small specimens in which the head is often black, with an orange spot on the vertex.

#### HYPERASPIS, Chev.

Resembles *Brachyacantha* in form, but differs in having no spine on the anterior tibiae. The ornamentation in the Canadian species is also usually less profuse.

- A. Elytra black, with marginal spots or lateral stripe and a discoidal spot before the middle yellow. Sides of prothorax (in ♂ the front margin and head also) yellow, .08-.10 in. .... *undulata*, Say.  
 AA. Elytra black, without series of lateral spots or stripes.

- b. Prothorax black (♀), with sides and front margin pale (♂).

Elytra black, each with a rounded red spot at about the middle, and sometimes another small one near the tip, .09-.16 in. .... *signata*, Oliv.

- bb. Prothorax with lateral spot or margin pale in both sexes, ♂ with head pale.

Elytra each with a round spot at middle and two small ones (sometimes wanting) one-fifth from the tip, sides of prothorax yellow; ♂ with front margin and head also yellow, .08-.12 in. .... *proba*, Say.

Elytra each with a round red spot near the tip, thorax with a large lateral spot, .11-.12 in. .... *bigeminata*, Rand.

Fig. 52 represents *H. undulata*.



Fig. 52.

## COCCIDULA, Kug.

A single species is known, *C. lepida*, Lec., about .12 in. in length, pubescent, and of rather elongate form. My specimens are yellowish above, the head black, except at sides. Elytra with a broad black common sutural stripe, dilated at apex and extending three-fourths to tip. At base this stripe is also dilated, and extends across to the sides, where it becomes confluent with a broad, black lateral vitta, which runs beyond the middle. Beneath, mostly black, the legs, sides of prothorax and four terminal abdominal segments yellow. Antennæ longer than usual, yellow.

The remaining Provinces of Canada, after excluding Ontario and Quebec, seem to have furnished comparatively few additional species of Coccinellidæ; the few published records that I am able to find (excepting *Scymni*) are appended.

*Ceratomegilla ulkei*, Cr. Hudson's Bay. "Oval, subopaque, antennæ and tarsi ochreous; head with a white spot in front of each eye, thorax bordered with ochreous on the sides, anterior angles broadly ochreous, and a very minute line in the middle of the anterior margin also ochreous; elytra rather closely punctate, a triangular spot on the base, the external margin irregularly, and an elongate common sutural spot near the apex fulvous. L., .22 in." Unknown to me.

*Adonia constellata*, Laich. Nova Scotia. "Black, tibiæ, antennæ and entire front of head pale; thorax with a narrow border, abbreviated medial line connected with the anterior margin, and a round dot on either side, white. Elytra with a scutellar spot, and six others (as in *Hippodamia*) variously united or absent." L., 19 in.

*Eriopsis connexa*, Germ. Vancouver. "Oblong, black; thorax with the sides and a spot on the front and hind margins yellow. Elytra with the base, margin and two dorsal spots yellow; the marginal line is dilated in five places, one basal, one subhumeral, one medial, one at three-fourths and one sub-apical. L., .22 in."

*Hippodamia moesta*, Lec. Victoria, Van. Isl. (var. of *Lecotei*). Elytra entirely black, with a small basal dot near the scutellum and a triangular marginal subapical spot, yellow. L., .29 in.

*H. falcigera*, Cr. Slave Lake, Hudson's Bay. Black, head with a small yellow frontal spot; thorax without discal marks, with a narrow uniform yellow border. Elytra yellow, with the suture black (narrowing out before the apex), and each with a black, equally broad vitta, suddenly incurved before the apex. L., .22 in.

*H. americana*, Cr. Hudson's Bay. Tibiæ pale, metepimera black, thoracic margin narrow in front, broader and emarginate at sides, sutural vitta suddenly dilated at one-third. L., .20 in.

*Coccinella transversalis*, Muls. Victoria, Van. Isl. A variety of *C. transversoguttata*, in which the basal band is divided, or only the scutellar spot left. It, therefore, resembles, superficially, *C. monticola*, from which it may be separated by the thoracic spot, as shown in the preceding table.

*Anatis Rathvoni*, Lec. Nanaimo, Van. Isl. (Holland). May be known from *A. 15-punctata* by the black meso- and metepimera.

*Psyllobora tædata*, Lec. Victoria, Nanaimo, Van. Island. Smaller than *P. 20-maculata*, spots mostly brown, sub-confluent, punctuation fainter.

The more essential bibliography of this family is not extensive, but in part very difficult to procure. The following are the principal titles:—

1850. Mulsant. Species des Coleopteres trimeres securipalpes. Ann. Soc. d'Agric., Lyon, Ser. II., 1850. Supplement Ann. Soc. Linn., Lyon, Ser. III., 1853. Additions et rectifications, I. c., Ser. II., 1856.

1852. Le Conte. Remarks upon the Coccinellidæ of the United States. Proc. Acad. Nat. Sci., Phila., Vol. VI.

1873. Crotch. Revision of the Coccinellidæ of the United States. Trans. Am. Ento. Soc., IV.

1880. Le Conte. Short studies of North American Coleoptera. Trans. Am. Ento. Soc., VIII. (p. 186, *Hyperaspis*).

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#### PHILAMPELUS ACHEMON.

While collecting on the 29th of last June, at an electric light on the outskirts of Toronto, in company with Mr. H. R. Hayter, he captured a ♀ specimen of *Philampelus achemon*, Drury. The insect had lost one antenna, but was otherwise in perfect condition. I have not heard of any other capture of this insect near Toronto.

G. M. STEWART, Toronto.

## ON THE LARVÆ OF TWO SPECIES OF ARACHNIS.

BY HARRISON G. DYAR, NEW YORK.

The larvæ of two species of Arachnis, from Mexico, were given to me by Mr. Jacob Doll. They are the following:—

*Arachnis aulea*, Geyer.

*Egg*.—Shape of two-thirds of a sphere, with flat base. Shining, pearly, iridescent. Diameter, .6 mm. The reticulations are rounded, moderately distinct, of quite uniform size, but smaller at apex. On the angles of the reticulations a series of short, stiff spines ( $\frac{1}{2}$  inch objective).

*First stage*.—Head bilobed, the lobes full, rounded; clypeus large, mouth projecting. Colour shining, blackish, ocelli black, mouth brown; width, .3 mm. Body, pale whitish-brown, shading into a milky colour dorsally. Warts small, black, hairs single from i. and ii. on joints 5-12, several from a wart on the others, pointed and very minutely spinulose. Cervical shield, thoracic feet and the abdominal ones outwardly, black.

*Second stage*.—Hairs more numerous, several from each wart, black, bristly. Width of head, .4 mm., colour shining black. Body pale chocolate-brown, with a diffuse darker sub-dorsal band, and very faint narrow, pale dorsal line. Warts black.

*Third stage*.—Head shining black; width, .6 mm. Body dark blackish-brown, with a flesh-coloured, narrow, dorsal line. Warts black; hairs of different lengths, stiff, more abundant at the extremities than centrally, with a few long, white ones anteriorly. Slight white lines above warts iii. and iv.

*Fourth stage*.—Dorsal space on joints 6-10 marked with brick-red around wart i.; dorsal line very narrow, pale; lateral white lines obscure. Hair on joints 2-5 and 11-12, more abundant and longer than centrally; black, the subventral hairs white. Width of head, .9 mm.

*Fifth stage*.—Head rather square, black; width, 1.2 mm. Body all black, with a narrow red dorsal line. Warts and thoracic feet shining. Hair black at ends, foxy-red centrally, the long anterior and posterior hair and most of the subventral ones pale, nearly white.

*Sixth stage*.—Head as before; width, 1.9 mm. Body black, immaculate, the warts shining; abdominal feet light reddish. Hair bristly, pointed, foxy-red, mixed with black, with a few long and pale; subventral hair indistinctly paler than the rest. Spiracles small, white.

*Seventh stage.*—Head black, reddish at vertex; width, 2.5 mm. Body as before, but the central lateral warts are brownish. Subventral hair scarcely paler.

*Eighth stage.*—Black, the warts brown; hair largely black, but still partly foxy-red. Abdominal feet dull crimson; spiracles reddish. Width of head, 3.4 mm.

*Ninth stage.*—Hair all black, body sooty black, warts light-brown, spiracles white. Thoracic feet black, abdominal ones dull crimson. Head black, labrum and antennæ pale; width, 4.5 mm. When full fed the larva hibernated until the following June. It then spun a large transparent double cocoon of soft silk, mixed with a few hairs, and the moth emerged in July.

*Arachnis suffusa*, Schaus.

*Egg.*—Nearly spherical, but with flattened base, somewhat conoidal; diameter, .6 mm. Colour fleshy yellowish with a pearly-bluish lustre. Magnified 50 diameters the surface is covered with large shallow pits with ill-defined edges, not sharp enough to form reticulations.

\*                    \*                    \*                    \*                    \*

*Second (?) stage.*—Head very pale yellowish, shining; the cluster of large ocelli black, mouth brown, a blackish shade at vertex; width, .6 mm. Warts quite large, but concolorous and inconspicuous, the hair bearing tubercles only black. Colour pale greenish-yellow, with a faint white dorsal line. Cervical shield small, lens-shaped, brownish. Warts ii. and iii. on joints 3, 4 and 12 tinged with dark orange. Hair fine, not abundant, brownish.

*Third stage.*—As before; width of head, 1 mm. Traces of a black subdorsal line. Hair more abundant, mostly short, white, but mixed with a few very long hairs, some of which are black. Feet colourless.

*Fourth stage.*—Head bilobed, brownish-yellow, ocelli black, mouth brownish, jaws black; width, 1.45 mm. Body rather sordid green, the thoracic segments, and an area around wart iii. on joint 12, shaded with orange; feet and venter whitish. A narrow, defined, white dorsal, lateral and substigmatal line, the lateral shaded above and below with black dottings, and enclosing the warts of row iii. Warts large, concolorous, the hair granules black. Hair long, stiff and straight, but fine, spinulose, white and black intermixed. Some hairs 8 mm. long. Length of larva, 15 mm. Line of tracheæ evident.

*Fifth stage.*—Head concealed beneath the hair of joint 2, pale brownish; width, 2.2 mm. Dorsal space whitish-gray, dorsal line white, narrow; lateral space dark greenish-gray, pale at the extremities; subventral space greenish with sordid white subventral line. Warts large, pale, the hair granules black, row iv. slightly orange, distinctly so anteriorly and posteriorly, especially on joint 12. Hair long, bristly but fine, abundant, black and white.

*Sixth stage.*—Head partly retracted below joint 2, its suture well-marked; orange-ochraceous, labrum and bases of antennæ yellow; width, 3 mm. Body gray, punctured and wrinkled with intermixed mottlings of fine white streaks and minute black dots. A poorly defined white dorsal line containing minute black dots; subdorsal line obsolete, but its location marks a boundary, where the colour becomes darker gray laterally. Warts i-iii, pearly gray, like the body, wart iv., orange. A bright yellow, broad substigmatal line; wart v., slightly orange; vi., whitish with yellow bases. Thoracic feet coloured like the head, abdominal ones slightly orange-tinted. Hair dense, of quite even length, pointed, bristly, heavily spinulated, black and white about evenly mixed, though there is considerable variation in this respect in different larvæ, some having the hair nearly all black. From the thoracic segments and joints 12-13, a few white hairs of great length (15-17 mm.). General appearance neat, silvery-gray. When full fed, the larvæ spun slight cocoons and hibernated in them. Changed to pupæ the following spring, and the moths emerged in June.

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### SHALL WE USE THE NAME EUDRYAS?

BY A. R. GROTE, A. M., BREMEN, GERMANY.

So far as I have present references Berg is the first to use again the term *Euthisanotia* for *Eudryas unio* and allies in his paper on Argentine moths. Berg's species is, however, as I have shown, not congeneric with *unio*, but belongs to my genus *Copidryas*. More recently Neumoegen & Dyar use *Euthisanotia* and cite Boisduval's *Eudryas* as a synonym. The facts appear to be these. Hübner, in his Zutraege, 3rd Hundred (N. & D. call it "Vol. III."), p. 12, No. 216, fig. 431-2, describes and illustrates *Euthisanotia unio* for the first time. He calls it a Noctua. In the

same Hundred (1825), a few pages further on, 39, No. 295, he describes Cramer's *timais* and refers it as congeneric with *unio*. His genus *Euthisanotia* thus comprises *unio* and *timais*. *Timais* was almost certainly autoptically unknown to Hübner when he wrote the Verzeichniss; he figures it in the Zutraege on account of Cramer's defective figure (unrichtiges Bild). In the Verzeichniss Hubner refers *timais* to *Xanthopastis*, and this course leads Berg to suggest that this latter term should be used for *timais*. Evidently in the Zutraege Hubner corrects this reference, and, in effect, *Xanthopastis* is really a synonym of *Polia*, Hubn. The European species of *Polia* show yellow dottings (*flavicincta*), and hence Hubner's generic name. Cramer's figure of *timais* shows the yellow dottings of this species. Hubner lays his greatest stress on markings and colour, and so, in the Verzeichniss, Cramer's species is catalogued with the European "*Polia*." Boisduval, in 1836, found thus two species of *Euthisanotia*, 1825. He took *unio* of the two generically dissonant species as the type of his new genus *Eudryas*. Was he free to do so? Does the fact that Hubner figures first (p. 12) *unio*, and then (p. 39) *timais*, make *unio* the type of *Euthisanotia*? Or, is *Euthisanotia*, 1825, a mixed genus?

The rule, as I understand it, with regard to mixed genera, is that the succeeding authority may take any of the species as the type of the new genus, unless the original type is actually designated. This is not the case with Hubner's genera, except by inference in the Tentamen, where only one species is given, which is, of course, the type. This makes the Tentamen so valuable. It is now generally known that Ochsenheimer and Treitschke's genera are only catalogue names, and catalogue names for such mixed assemblages that the "type" is difficult to decide. But the Tentamen often gives us the key, by showing us the species for which such names as *Agrotis*, *Apatela*, *Polia*, etc., were originally intended. It is an error to assume that the first species in any of the Verzeichniss genera is the type. In seeking for the type, the student must study all subsequent authorities to find out all restrictions of the original term. Such restrictions of the original generic title for a mixed genus have the force of priority and must be respected. A short and easy way is to refer to the original and take the first species as the type of a mixed genus, but this is a rough and insecure method. In my Buffalo List I have given some results of my studies as to a few of the older Noctuid genera, and these results, where my facts cannot be disputed, must be respected.

The question as to *Eudryas* is rendered difficult by Hubner's separation of the species by several pages, but virtually it seems to me we have to do with a mixed genus. For the use of *Eudryas* for the type *unio*, we have, then, Boisduval, Harris, Packard, Walker and myself. For the use of *Euthisanotia* for *timais*, we have the British Museum Catalogue and my own writings.

Upon a related point, I would say that it is now held generally by European classifiers that a change in a new specific or generic title itself or its limitation by an author in the same work or book, or, if a serial, in the same series of papers, or year or volume, must be respected. This would cover Guenée's changes of specific names in the *Species Général*. We must therefore write *Orthodes enervis*, *Catocala viduata*, etc. To this extent at least authors may correct their original publication. There will be no valid objection then to the latter name *Orthosia euroa*, G. & R. This reading would inferentially show that Hubner's reference of *timais* to *Euthisanotia* is sufficiently valid for its use as the type of the genus under Boisduval's restrictive action in 1836. We may therefore continue, I think, to use *Eudryas* for *unio* and congeneric species.

The question, I have admitted, is a difficult one, and the view I here take of it may be thought not entirely uninfluenced by my respect for the nomenclature of Harris's *Insects Injurious to Vegetation*. It is true I am unwilling to lose *Eudryas* from our lists; but, if the case was quite clear, I should not be free to object. I desire also to show that questions as to generic types are not always easy to solve; they demand some thought, some study beyond the mere reference to a page in some book. In the present case Hubner's prior reference of *timais* to *Xanthopastis*, *Verzeichniss*, 1818, adds to the difficulty. I think it not uninteresting to have followed Hubner's action with regard to *timais*. Evidently the yellow dots in Cramer's figure led him to believe he had to do with a foreign species of *Polia*. Afterwards, when he recognized Cramer's species in nature, he was evidently disappointed, and wished to correct the generic position of the moth. And, in his new reference, he is equally out of the way; perhaps, indeed, his second mistake is greater than the first. Here again it is the gay colours of *timais* that make him associate it with *unio*. Both are odd-looking moths, having a differing, while equally strange beauty. The notion that in *unio* and allies we have to do with aberrant



noctuids is not confined to Hubner. The form, the discal spots on primaries, the simple antennæ make the view plausible, so that, not so long ago, Moeschler is of this opinion. I may remark that I have never seen so pale a specimen of *timais* as that figured by Hubner. The pretty pink of the Spanish moth (which comes up to us in the Middle States from the South, blown against our light houses along the coast) has all faded out on Hubner's plate. Are there two species as suspected by Gueneé from alcoholic larvæ? My first specimen of *timais* was given to me by my old friend, Mr. W. H. Edwards, and I fell a victim to its attractions to the extent of redescribing it. If I had then conceived my theory of the migration of moths during the summer, following the gulf stream and the prevalent direction of the wind, from south to north, I should not have made my mistake. While Dr. Thaxter shows that *timais* breeds in Florida, it is still a tropical Gortynid form and contrasts with the rest of our North American Noctuidæ, which generally favour the European type.

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#### NOTES ON SOME SOUTH-WESTERN HEMIPTERA.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In the CANADIAN ENTOMOLOGIST, 1892, pp. 193-197, the writer published some notes on New Mexico Heteroptera and Homoptera. The notes on the fifty-three species in the present paper are additional and complete the list, so far as the names can be obtained, of all the Hemiptera collected by the writer in New Mexico and Arizona.

In seven cases there are no localities attached to the species. This is because the numbers of those species were returned to me in such confusion by Dr. Skinner that they can not be connected with the data referring to them.

It should be mentioned that the Homoptera and Heteroptera are not separated in the list, but are arranged together in alphabetical order.

*Acanonia bivittata*, Say.—Grand Canon, Arizona. Hance trail. July 8 and 11, 1892. Two. Det. Uhler.

*Agalliastes* sp.?—Soledad Canon, Oregon Mts., N. Mex. May 23, 1891. One. A small black capsid, with extremity of wing covers glassy. Eyes red. Det. Uhler.

*Anasa tristis*.—Las Cruces, N. Mex. July and August. Very numerous on college farm, causing death of squash plants. Also received from Eddy, N. Mex.

*Anasa Uhleri*, Sial.—Las Cruces, N. Mex. Often mistaken for the squash bug, *A. tristis*. Det. Uhler.

*Apiomerus spissipes*, Say.—Las Cruces, N. Mex. Several. Det. Uhler and Riley.

*Brochymena annulata*, Fab.—Las Cruces, N. Mex. Several specimens. Det. Riley.

*Brochymena obscura*, H. Schf.—Las Cruces, N. Mex. May 12. On *Prosopis juliflora*, on mesa. One. Det. Uhler.

*Bythoscopus pallidus*, Fitch.—Det. Uhler.

*Campylenchia curvata*, Fab.—Det. Uhler.

*Capsid* (new to Nat. Mus. Coll.)—Continental Divide, Tenaja, N. Mex. August 2, 1892. Two. Det. Riley.

*Chelinidea vittigera*, Uhler.—Grand Canon, Arizona. Hance trail. July 10. One. Det. by comparison.

*Cicadula*, sp.—Eddy, N. Mex. Sept. 1, 1891. Received specimens of this leaf-hopper from Mr. F. E. Downs, with report that they were doing much injury to potato vines. It is a small species, much resembling the vine *Typhlocyba*, and is about  $3\frac{1}{2}$  mm. long. Det. Riley.

*Clastoptera delicata*, Uhler.—Det. Uhler.

*Compsocerocoris annulicornis*, Proct.—Det. Uhler.

*Conorhinus*, sp.—Los Palomos, N. Mex. June 14, 1892. One. A dark-brown reduviid. Det. Riley.

*Corimelaena extensa*, Uhl.—Cedar Ranch, Arizona. July 6, 1892. O.1 *Nicotiana*, sp. (See Psyche, 1893, pp. 547-548.)

*Coriscus fesus*, L.—Las Cruces, N. Mex. May 9 to 28, 1891. Many swept from alfalfa. A small grayish reduviid-like species. Det. Uhler.

*Corizus hyalinus*, Fab.—G Bar Ranch, Zuni river, Arizona. July 27, 1892. One. A *Nysius*-like heteropter. Det. Riley.

*Cydnus* (?) *obliquus*, Uhler.—Grant County, N. Mex., (W. J. Howard, 1882). Two. Det. Riley.

*Darnis*, sp.?—Las Cruces, N. Mex. Det. Uhler.

*Diplodus luridus*, Stal. Det. Uhler.

*Euschistus fissilis*, Uhler var.—Las Cruces, N. Mex. May 8 to 12, 1891. On alfalfa. Det. Uhler.

*Euschistus servus*, Say.—Grand Canon, Arizona. Hance trail, part way up towards the rim. July 8 and 12. Two. Det. Uhler. Las Cruces, N. Mex. July 8, 1891. One on cabbage on college farm. Reported to occur occasionally on cabbages. Det. Riley.

*Gargaphia opacula*, Uhler.—Las Cruces, N. Mex. July 16, 1891. A single adult, with a large number of young, of this small grayish species was taken on under side of leaves of very young egg plants. The plants were badly infested with the young, and showed abundant evidence of their work. Det. Uhler. This species was described by Mr. Uhler in his report on the Heteroptera of the Death Valley Expedition, from one specimen from the Argus Mts., California. Mr. Uhler examined the Las Cruces (adult) specimen in 1892, before receiving the Death Valley material, but did not venture to describe it at that time from the single specimen.

*Geocoris punctipes*, Say.—Las Cruces, N. Mex. May 9 to 28, 1891. On alfalfa. Some are almost black, but are determined by Mr. Uhler as same. A pair *in coitu* of lighter ones, May 28. Det. Uhler.

*Hadronema*, sp.—Cocanini Plateau, Arizona. Twelve miles north of Cedar Ranch, on road to Grand Canon. July 6, 1892. Two beaten from *Atriplex canescens*, with *H. militaris*. This is a larger species than the latter. Det. Riley.

*Hadronema militaris*, Uhl.—Cocanini Plateau, Arizona. Twelve miles north of Cedar Ranch, on road to Grand Canon. July 6, 1892. Several specimens beaten from *Atriplex canescens*. Det. Riley.

*Harmostes propinquus*, Stal.—Las Cruces, N. Mex. Det. Uhler.

*Harmostes reflexulus*, Say var.—Las Cruces, N. Mex. May 28, 1891. One swept from alfalfa. A green reduviid-like species. Det. Uhler.

*Lameria collaris*, Uhler.—Grand Canon, Arizona. Hance trail. July 8. One. A very small bluish species, with pale yellowish face and sternum. Eyes black, wings bluish. Det. Uhler.

*Largus cinctus*, H. Schf. var.—Las Cruces, N. Mex. Common. Det. Uhler.

*Lioderma congrua*, Uhl.—Las Cruces, N. Mex. May 8, 1891. Two adults of this fine green species on alfalfa. July 16, 1891. One taken on cabbage on college farm. Det. Uhler. On Nov. 13, 1892, there was taken on *Salix longifolia* in Alameda, a specimen very similar to this species, but distinct. It may be *Thyanta custator*, F., but is much lighter green.

*Lycotocoris campestris*, Fab.—Las Cruces, N. Mex. (?). Number lost, which makes the locality doubtful. Det. Riley.

*Lygaeus bistriangularis*, Say.—Chaves, N. Mex. August 6, 1892. One. Det. Riley.

*Lygaeus Kalmii*, Stal.—Las Cruces, N. Mex. Det. Uhler.

*Lygaeus reclinatus*, Say.—Las Cruces, N. Mex. July 8, 1891. On squash on college farm. Previously taken on various plants, mostly on flowers of *Aster spinosus*. Belen, N. Mex. August 7, 1892. One. Grant Co., N. Mex. (W. J. H.), One. Det. Riley.

*Melanocoryphus facetus*, Say.—Las Cruces, N. Mex. May 8, 1891. One on alfalfa. May 23, one on ground in Soledad Canon. May 24, one on ground on plain to east of Organ Mts. Det. Uhler and Riley.

*Membracid*.—Cocanini Plateau, twelve miles north of Cedar Ranch, Arizona. July 6. A long-horned tree-hopper found in numbers on the stems of *Ridellia tagetina*. They doubtless suck its juices.

*Metapodius granulatus*, Dallas.—Soledad Canon, Organ Mts., N. Mex. May 23 and 24, 1891. Three inside head, at bases of leaves of a century plant (*Agave*), up a north side branch of the Canon. The *Agave* was probably *A. Parryi*. Det. Uhler.

*Murgantia histrionica*.—Las Cruces, N. Mex. Numerous in July on Chinese cabbages on college farm. Eggs and newly hatched young observed July 16.

*Narnia femorata*, Stal.—Grand Canon, Arizona. Hance trail. July 10. Three. Det. Uhler.

*Narnia pallidicornis*, Stal.—Las Cruces, N. Mex. One. A grayish-brown bug resembling *Leptoglossus*. Det. Riley.

*Nezara marginata*, Beauv.—Grand Canon, Arizona. Hance trail. July 11 to 12, 1892. A bright green pentatomid. Found in numbers on the thin green pods of *Cercis occidentalis*, a round-leafed leguminous tree. From 2,000 to 3,000 feet below the rim. They were found only on this tree, and doubtless pierce the pods. Adults and nymphs. Det. Uhler.

*Notonecta mexicana*, Amyot.—Grand Canon, Arizona. Hance trail. July 8 to 11. Common in the stream. Larvæ and nymphs also taken. Det. Uhler.

*Oecleus decens*, Stal.—Las Cruces, N. Mex. Aug. 19. One on stalk of *Helianthus annuus*. Aug. 21, one on *Xanthium* leaf. Det. Uhler.

*Ormenis pruinosa*, Say.—Grand Canon, Arizona. Hance trail. July 8. One. A grayish-brown homopter. Det. Uhler.

*Phymata Wolffii*, Stal.—Las Cruces, N. Mex. Common. Also Grand Canon, Arizona. Hance trail, near rim, July 11 and 12. Det. Uhler.

*Resthenia* sp.?—Soledad Canon, Organ Mts., N. Mex. May 23, 1891. Four specimens on thistle, mostly on the flowers. A beautiful black and deep red capsid. The antennæ were missing, which made the determination uncertain. Det. Uhler.

*Salda interstitialis*, Say.—Det. Uhler.

*Scolops* sp.?—Las Cruces, N. Mex. A long-horned tree hopper. On herbage. Det. Uhler.

*Spilalonijs geniculatus*, Stal.—Grant County, N. Mex. (W. J. H.). One. A pale-coloured diptodid. Det. Riley.

*Stiretrus anchorago*, Fab. (Nymph).—Las Cruces, N. Mex. August 19, 1891. Several nymphs of this pentatomid taken on *Helianthus annuus*. The nymph is jet black, with a large red spot. The larvæ are almost wholly black. No adults. Det. Riley.

*Thyanta custator*, Fab. and var.—Las Cruces, N. Mex. Nov. 13. One. A light green pentatomid, with five very faint orange flecks on each edge of abdomen. Det. Riley.—Var. Las Cruces, N. Mex. May 8, 1891. One on alfalfa. Wholly of a clear light green. Det. Uhler.

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CORRIGENDA.

Page 251, line 21 from top, for "Limer," read, Zimm.

Page 254, line 25 from top, "One of the types of this species," should precede, "*B. fumatus*," etc., as it refers to *B. punctatissimus*.

Page 256, line 16 from top, for "(rods)," read, pods.

Page " line 3 from bottom, for "back," read, bark.

## NOTES ON NOVA SCOTIAN DRAGONFLIES.

BY PHILIP P. CALVERT, PHILADELPHIA, PA., AND WILLIAM SHERATON,  
TORONTO.

(In 1889 and 1890, Mr. William Sheraton, of Wycliffe College, Toronto, collected some Odonata at Pictou, Nova Scotia, for me. At the end of the collecting season of 1889, he sent me a letter containing his field notes on the specimens captured. These observations are so interesting, in my opinion, that any publication in which they appear ought also to bear Mr. Sheraton's name as joint author. He has kindly acceded to my wish in this respect, although modestly protesting that his part has "been only such as any child could have done." All notes in the present paper concerning localities, habits and dates are to be credited to Mr. Sheraton, while I am responsible for the determinations and the few bibliographical notes. With the exception of *Aeschna constricta*, none of the species mentioned below had been recorded from Nova Scotia previous to Mr. Sheraton's taking them, although I have since cited the locality, for some of the species, in various papers—P. P. C.)

The dragonflies which I obtained in Pictou were, with few exceptions, from three localities, (1) a small, shallow, weedy pond in an open field—"Simpson's pond"; (2) a small, boggy brook, full of rushes, etc., in a back pasture (marked on envelopes, "Brook north of Priest's Barn," or "Mr. Simpson's back pasture"); (3) a much larger and deeper pond, surrounded on every side but one with a thick second growth of spruce (marked "Pond on Back Road near the 'Boar's Back'"). Most of the kinds I got were found in all three localities, but they all appeared to have some preference in the matter.

*Lestes unguiculata*, Hagen. Pasture, Aug. 21, 1889.

*Lestes uncata*, Kirby (*hamata*, Selys, 1862.) June 19, 1889, common about Simpson's Pond and the boggy brook, and I think were also found at the larger pond, although I have not recorded the capture of any specimens there. July 23, 1889, the pasture; also 1890.

*Enallagma ebrium*, Hagen. Exceedingly abundant from the beginning (June 19, 1889) to the end of the season in the first locality, and quite abundant also about the boggy brook, particularly in the earlier part of the summer, and at points where it broadened into small pools with more or less open water. They were also abundant at the larger pond by the Boar's Back (a great ridge of gravel, running for some miles

through the country, and apparently the shore of a now vanished lake) on the one occasion on which I was able to visit it, July 23.

*Cordulegaster diastatops*, Selys. One male, June 24, 1889, brook.

*Aeschna constricta*, Say. Two males, July 26, 1889; one female, Sept. 2, 1889, may belong here or to the next species. First noticed towards the end of June, and during the remainder of my stay in Pictou was frequently seen everywhere, often far from water, but was difficult to catch. Two of the specimens I sent you were captured in rather unusual ways. One I knocked down with a stick, as I was walking along the road one evening, and I picked him up before he succeeded in picking himself up. The other alighted upon me one morning when I was standing on a ladder untying a clothes line, in such a way that when I lowered my arm (quite unconscious of its presence) it was held securely between my arm and my side. This latter occurrence seemed to me rather indicative of stupidity in the insect, other specimens of which I have known to fly almost in my face when I was not endeavoring to catch them. On the other hand they "dodged" the net with great skill, and on one occasion having found two hovering over a brook, at which I had seen them, when without a net, some hours before, having captured one, I made an unsuccessful sweep at the second, which had flown away a short distance on my scooping in the first, and then returned, when it flew straight away from the brook and did not return, at least to that part, although I waited for some time.

*Aeschna clepsydra*, Say. Three males, July 26, 1889. All my three specimens were taken at the deep pond near the Boar's Back, but I think I have also seen them in other localities, and flying about the country like the preceding species, from which it is, when on the wing, to me, indistinguishable at a short distance. (Two of these males are cited in a paper on this species in *Ent. News*, Vol. V., p. II.)

*Somatochlora Walshii*, Scudder. One female, July 23, 1889. I found one female laying her eggs in a little bit of open water, so surrounded and overarched by rushes that her movements were much restricted. (This female, which still remains the only known individual of its sex, has been described by the first of the two authors of the present paper in *Trans. Am. Ent. Soc.*, xvii., p. 33, 1890, with a supplementary note in *Ent. News*, iii., p. 23, 1892.)

*Libellula quadrimaculata*, Linné. One female, July 24, pasture; two males, one female, July 26, 1889, Abundant in all three localities, but

about the shallow pond I never succeeded in catching a single specimen. They "dodged" every time. I captured one which had alighted on a stump near the boggy brook, but as I was taking it out of the net it grabbed my finger savagely, whereat I was so taken aback that I let him slip from my fingers, when he, of course, lost no time in "making himself scarce." After this I made many vain attempts to capture specimens of this kind, but got none. On visiting the pond near the Boar's Back, however, I succeeded in capturing three, stealing up and sweeping them in suddenly when they were close under the steep bank at one side of the pond. Five males, one female, 1890—pond half a mile east of Boar's Back, July 12.

*Leucorhinia proxima*, Calvert. Two males, July 26, 1889. I saw none, to my knowledge, away from the pond by the Boar's Back, where the two specimens I sent you were taken. (These were two of the types of the original description of this species in *Trans. Am. Ent. Soc.*, xvii., p. 38, 1890.) One male, 1890.

*Leucorhinia hudsonica*, Selys. One male, one female, June 25, 1889; I never saw any but the two specimens I sent you, which were taken in locality No. 2. (These two were the types of what was too hastily baptized *Leucorhinia Hageni*, n., sp., with the first of us as sponsor, in *Trans. Am. Ent. Soc.*, xvii., p. 36, Jan., 1890, and as promptly buried in *Ent. News*, i., p. 73, May, 1890. If there were any hopes of a revivification, it is only necessary to add that in July, 1890, on the occasion of a visit to Cambridge, Dr. Hagen and myself compared this couple with types of *L. hudsonica* in the Museum of Comparative Zoology, and satisfied ourselves that they were specifically identical.)

*Leucorhinia intacta*, Hagen. Six males, July 12, 1890—pond half a mile east of Boar's Back.

*Diplax rubicundula*, Say. June 25, July 24, Aug. 21, 1889.

*Diplax obtrusa*, Hagen. July 24, 1889.

(Mr. Sheraton's notes refer to these two very similar species together.) No. 7 (specimens of *D. rubicundula* taken June 25) was abundant in all three of the places in which most of my collecting was done, but especially so about the boggy brook, where I first saw it. They were easily caught. They had a curious habit of rising suddenly from the weeds about the brook, flying along a short distance not far off the ground, and then alighting upon it like a locust. The likeness to the latter insect in so doing was much increased by their size, colour, and by their flight, which



was slow and unsteady for a dragonfly. (The colours of the specimens taken June 25 are pale, indicating recent transformation, a condition which explains the peculiarities of the flight).

Kind No. 10 (older individuals of *D. rubicundula* and *D. obtrusa*) did not appear until late in July, but speedily became very abundant, and during the last part of the summer was by all odds the most common species, even outnumbering the little *Enallagma ebrium* at Simpson's Pond. The back of the abdomen of this species in life was of a brilliant red.

It may be well to add, by way of postscript, that the species of Odonata, other than those named above, which have been recorded from Nova Scotia are, with the original place of record:—

*Lestes disjuncta*, Selys, Bull. Acad. Roy. Belg. (2), XIII., p. 303, 1862.

*Gomphus parvulus*, Selys, Bull. Acad. Roy. Belg., XXI., pt. 2, p. 56, 1854; in his Monog. Gomph., p. 158, 1858, the locality is given as based on "un male dans la collection du British Museum."

*Cordulegaster maculatus*, Selys, Bull. Ac. Roy. Belg. (2), XLVI., p. 690, 1878 (Cape Breton).

*Somatochlora elongata*, Scudder. *saturata*, Hagen (no descr.), Syn. Neur. N. A., p. 138, 1861, "Selys' collection," Selys, Bull. Ac. Belg. (2), XXXI., p. 293, 1871, cites the Nova Scotian specimen as in the British Museum.

*Somatochlora forcipata*, Scudd. *chalybea*, Hagen (no descript.), Syn. Neur. N. A., p. 138, 1861, "Selys' collection".

*Somatochlora tenebrosa*, Say. *tenebrica*, Hag. (no descr.) Syn. Neur. N. A., p. 138, 1861, "Selys' collection".

*Tetragoncuria semiaquea*, Burm. Hagen, Proc. Bost. Soc. N. H., XVIII., p. 61, 1875, "Selys."

*Cordulia Shurtleffi*, Scud. *bifurcata*, Hagen (no descr.), Syn. Neur. N. A., p. 137, 1861, "Selys' collection".

*Leucorhinia glacialis*, Hagen, Trans. Am. Ent. Soc., XVII., p. 234, 1890, (Cape Breton).

The precise localities are not given in these records quoted.

There is much reason to think that the Odonate fauna of Nova Scotia embraces many more species than the twenty-two known at the present time to inhabit the Province.

## A STUDY OF THE GENUS MENISCUS.

BY G. C. DAVIS, AGRICULTURAL COLLEGE, MICH.

*Synopsis of species.\**

Abdomen entirely black or with white margins of segments.

Femora rufous or honey yellow.

Antennæ with yellowish annulus..... *Bethunei*, CR.

Antennæ without yellowish annulus.

Areolet present.

Abdominal segments without white margins.

Pleuræ more or less rufous, yellow spots before and  
beneath tegulæ ..... *scutellaris*, CR.Pleuræ black, a yellow spot before and beneath tegulæ  
..... *superbus*, PROV.Pleuræ black, without spot before or beneath tegulæ  
..... *parva*, CR.Abdominal segments margined with white... *pulcherrimus*, CR.

Arolet wanting.

Mesothorax more or less rufous..... *ostentator*, n. sp.Mesothorax black and yellow..... *mirabilis*, CR.Femora black, areolet present. . . . . *Stossonæ*, n. sp.

Abdomen rufous, black at base.

Arolet present, antennæ without annulus.

Posterior femora black with yellow markings..... *elegans*, CR.Posterior femora rufous..... *comptus*, n. sp.Arolet wanting, antennæ with white annulus.. *Michiganensis*, n. sp.Abdomen black, banded with yellow at base of segments.....  
..... *Johnsonii*, n. sp.

## MENISCUS OSTENTATOR, n. sp.

♀. Length, 7.5 mm.; ovipositor, 7 mm. Black, polished; with orbital lines from occiput to middle of eyes in front, cheeks, clypeus, mandibles except tip, palpi, gula, cuneiform lines on mesonotum, tegulæ, spot in front, lines beneath extending irregularly back to posterior coxæ, sides of scutellum, line on lower pleuræ between anterior and middle coxæ, prosternum, anterior coxæ, middle and posterior coxæ except a black dash above and large spot inside, all the trochanters except black

\**Meniscus Ashmeadii*, PROV., and *M. marginatus*, PROV., belong to *Pimpla annulipes*.

base, posterior tibiae except black annulus near base and black extremity, and tips of the abdominal segments beyond the first, yellowish-white. Remainder of legs fulvous, with a black spot at the base of all the femora and an annulus near the tip of the posterior femora; tarsi dusky. Antennae long, slender, black. Wings hyaline, without areolet. Mesosternum and meso- and metapleurae rufous. Metanotum smooth, oval, coarsely punctured, with one small circular transverse carina near the abdomen. First segment of the abdomen shining, 2 and 3 finely punctured. ♂ with the abdomen as in the ♀. The head is yellow except the central part of the vertex and occiput, which are black. Pronotum and a spot on the front edge of mesonotum, black; remainder of mesonotum rufous, with yellow markings as in the ♀; scutellum, pleurae and venter, yellowish-white. Antennae reddish-brown, with scape beneath yellow. Legs same as in ♀ except more yellow.

Described from 3 ♀♀ and 1 ♂ taken at the Michigan Agricultural College.

*MENISCUS SLOSSONÆ*, n. sp.

♀. Length, 12 mm.; ovipositor, 8 mm. Black, with lemon-yellow markings as follows: orbits, two more or less united longitudinal stripes on the front, cheeks at base of mandibles, mouth except tip of mandibles, tegulae, minute spot beneath and dash in front, sometimes wanting, V on scutellum, post-scutellum, central spot on metanotum, tips of abdominal segments 1, 2 and 3, and sometimes base of the first. Legs yellow, with all the coxae, and posterior legs with first joint of the trochanter, femora except tip and base, tibiae except base, and tarsi, black. Antennae black. Apex of wings infumated; areolet large, petiolate. Thorax and head coarsely and closely punctured, metanotum rough. Abdomen shining, smooth.

Described from 3 ♀ specimens collected at the top of Mount Washington, N. H., by Mrs. Annie Trumbull Slosson, to whom I take pleasure in dedicating this species.

*MENISCUS COMPTUS*, n. sp.

♀. Length, 8 mm.; ovipositor, 6 mm. Black, with abdomen beyond second segment rufous. Orbital lines nearly enclosing base of antennae, face, except three short black dashes just beneath antennae, mouth, gula, nearly all of prothorax, tegulae, line beneath, long line in front confluent with triangular spot on mesonotum, spot in front of scutellum, scutellum

except a small wedge in front, post-scutellum, a large irregular diagonal spot on mesopleura, spot beneath posterior wing, circular spot just back and above, semicircle around insertion of abdomen with a ray extending forward from each coxa, and a third from the abdomen, base and apex of the first two abdominal segments, 4 anterior coxæ and trochanters, stripe on posterior coxæ above and second joint of posterior trochanter, yellowish-white. Posterior coxæ and first joint of trochanter black; posterior tarsi dusky at tips; remainder of legs honey-yellow. Antennæ black, fulvous toward the tip. Wings hyaline, infumated at the apex; areolet small, petiolate. Entire thorax coarsely, but not closely, punctured. Abdomen smooth, shining.

Described from 2 ♀ ? collected at the Michigan Agricultural College.

*MENISCUS MICHIGANENSIS*, n. sp.

♀. Length, 10 mm.; ovipositor, 8 mm. Black, with yellow markings; abdomen beyond second segment rufous. Broad orbital lines, entire front, scape beneath, annulus on antennæ, mouth except tips of mandibles, gula, entire prothorax, tegulæ, line beneath, large triangular spot in front confluent with a cuneiform line on mesonotum, extending back nearly to the scutellum, venter except anterior part of mesosternum, with a continuation of the same on to the pleuræ, ending in a large hook beneath the wings, metapleuræ and two lines above joining posteriorly, base, apex and a large spot in the centre of the first abdominal segment, base and apex of second segment, connected by a longitudinal line, lemon-yellow. Posterior femora rufous; 4 posterior trochanters black at base, and coxæ with black stripe above; 2 hind coxæ black inside; extremity of posterior tibiæ, and basal joint of tarsi, except tip, black; remainder of legs lemon-yellow. Wings hyaline without areolet. Antennæ brown, black above. Thorax and face coarsely, but not closely, punctured. Abdomen smooth, shining.

Described from 1 ♀ taken at the Michigan Agricultural College.

? *MENISCUS JOHNSONII*, n. sp.

♀. Length, 11 mm.; ovipositor, 1.5 mm. Black, with yellowish-white markings, as follows: Entire head, except occiput, spot enclosing ocelli and antennæ, narrow central line beneath, reaching to clypeus, and tips of mandibles; prosternum; mesothorax with two cuneiform lines on margins of mesonotum, two stripes in front of scutellum, scutellum except posterior part and spot in front, two spots beneath primary wings and

another in front of middle coxæ, posterior part of mesosternum; metathorax with a transverse row of 5 spots across the anterior part and 3 across the posterior part; abdomen with first segment to spiracles and a short line in centre beyond, broad band at base of second and third segments, narrower band at base of succeeding segments and entire venter. Antennæ wanting. Legs honey-yellow, except 4 anterior coxæ beneath, which are whitish, joints 3, 4 and 5 of middle tarsi, which are dusky, and apical third of posterior tibiæ and basal fourth of first tarsal joint, which are black. Wings hyaline, somewhat infumated around the apical margin; areolet wanting. Entire thorax punctured, metanotum rugose. Abdomen somewhat clavate, smooth and polished.

Owing to the short ovipositor and shape of abdomen, this species will probably belong to a new genus, and is only temporarily placed here.

Described from 1 specimen taken at Jamesburg, New Jersey, by Mr. Chas. W. Johnson, to whom I take pleasure in dedicating this species, as a slight token of thanks for the many valuable specimens of Ichneumonidæ sent me.

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## NEW SPECIES OF TENTHREDINIDÆ, WITH TABLES OF THE SPECIES OF STRONGYLOGASTER AND MONECTENUS.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following descriptions are offered, preparatory to publishing a list of the saw-flies of the Upper Cayuga Lake Fauna. The types are in the Entomological Collection of Cornell University.

### CALIROA, Costa.

*Caliroa Nortonia*, n. sp. Body entirely black, head finely, densely punctate, clypeus emarginate, antennæ black, broad, of the same width throughout, third segment one-third longer than fourth, fourth and fifth subequal in length, sinus each side of the ocelli reaching the back of the head, from each side of the lateral sinuses there is another sinus starts off behind the posterior ocelli, crossing back of the median ocellus and running down each side of this ocellus for a short distance, where it becomes obsolete; tegulæ and collar very narrowly dull white, thorax and abdomen glossy black; legs white, coxæ, trochanters, basal half anterior and basal two-thirds of middle and posterior femora black,

posterior tibia with a band at apex, and posterior tarsus except base of metatarsus, brown; wings hyaline, veins and stigma black, costa at immediate base white, first submarginal cross-vein distinct. Length, 7 mm.

Habitat—McLean, N. Y. 1 ♂ 30th May, 1890.

This species is readily separated from *obsoleta* by the crossing sinus on the front, the colour of the femora, and the larger size. The species is dedicated to Mr. Edward Norton, the well-known student of American Tenthredinidæ.

#### STRONGYLOGASTER, Dahlb.

- |   |                              |
|---|------------------------------|
| 1. Lanceolate cell with a cross-line.....   | 2.                           |
| Lanceolate without a cross-line.....  | 15.                          |
| 2. Under wings with incomplete outer cells; if complete, no cross-vein in cell in front of lanceolate cell..... | 3.                           |
| Under wings with complete outer cells, and with a cross-vein in cell in front of lanceolate cell .....          | <i>pinguis</i> , Nort.       |
| 3. Antennæ in part pale.....  | 4.                           |
| Antennæ wholly black.....   | 9.                           |
| 4. Antennæ pale at apex .....   | 5.                           |
| Antennæ pale at base .....  | <i>epicera</i> , Say.        |
| 5. Head testaceous.....   | 6.                           |
| Head black.....   | 7.                           |
| 6. Median lobe of mesothorax black, margined with white .....   | <i>mellosus</i> , Say.       |
| Median lobe of mesothorax rufous.....   | <i>terminalis</i> , Say.     |
| 7. Eyes margined before and behind with black.....  | <i>apicalis</i> , Say.       |
| Eyes margined with white or rufous in part.....   | 8.                           |
| 8. Eyes margined before and behind with white .....   | <i>pallidicornis</i> , Nort. |
| Eyes margined behind with rufous, black in front.....   | <i>rufoculus</i> , n. sp.    |
| 9. Lanceolate cell of posterior wings not attaining the margin, an appendiculate vein at apex.....              | <i>abnormis</i> , Prov.      |
| Lanceolate cell attaining the margin, not with an appendiculate vein at apex.....                               | 10.                          |
| 10. Eyes partly margined with white .....   | <i>fidus</i> , Cress.        |
| Eyes wholly margined with black.....  | 11.                          |
| 11. All the coxæ and trochanters white.....   | 12.                          |
| Some of the coxæ and trochanters black or in part black.....  | 13.                          |
| 12. Scutellum black.....  | <i>pallicoxus</i> , Prov.    |
| Scutellum white.....  | <i>proximus</i> , Prov.      |

13. Abdomen entirely black..... *rubripes*, Cress.  
 Abdomen transversely banded above with rufous or yellow . . . 14.
14. All the femora rufous.... *rufocinctus*, Nort.  
 The femora in part black..... *tibialis*, Cress.
15. Antennæ pale at base..... *rufescens*, Nort.  
 Antennæ entirely black..... 16.
16. Thorax reddish-yellow..... *unicus*, Nort.  
 Thorax black..... 17.
17. Abdomen wholly rufous..... *tacitus*, Say.  
 Abdomen in part black..... 18.
18. Abdominal segments two to four wholly pale..... 19.  
 Abdominal segments two to four in part black..... 24.
19. Coxæ wholly pale..... 20.  
 Coxæ entirely or in part black. . . . . 21.
20. Scutellum black..... *pallidicoxus*, Prov.  
 Scutellum white..... *proximus*, Prov.
21. Basal abdominal segment wholly black . . . . . 22.  
 Basal abdominal segment not wholly black. . . . . 23.
22. Femora black at base..... *annulosus*, Nort.  
 Femora rufous..... *luctuosus*, Prov.
23. Coxæ wholly black..... *impressatus*, Prov.  
 Coxæ waxen-yellow at apex..... *longulus*, Nort.
24. Abdominal segments yellow at base and black at apex  
 . . . . . *multicinctus*, Nort.  
 Abdominal segments black at base and yellow at apex, or with  
 only the two basal segments black..... 25.
25. Coxæ wholly rufous..... *soricuiatus*, Prov.  
 Coxæ in part black..... 26.
26. Abdomen with the two basal segments black. . . . . 27.  
 Abdomen with the two basal segments not wholly black . . . . . 28.
27. Legs waxen-yellow..... *longulus*, Nort.  
 Femora in part black at base ; female with a whorl of hairs at  
 apex..... *pacificus*, MacG.
28. Abdominal segments finely margined with white.... *politus*, Prov.  
 Abdominal segments with the apical half testaceous or reddish-  
 yellow..... 29.
29. Coxæ wholly black..... *annulosus*, Nort.  
 Coxæ pale at apex..... *distans*, Nort.

*Strongylogaster rufoculus*, n. sp. Head black, clypeus and labrum white, labrum broadly rounded, a prominent rufous spot behind each eye, antennæ black, segments six to nine white, the third segment one-third longer than the fifth, sinus at side of ocelli not reaching the back of the head; thorax black, the tegulæ rufous; apex of the abdominal segments slightly darker, basal plates black; legs rufous, coxæ black, posterior coxæ slightly marked with yellow, anterior and middle trochanters black, posterior yellow, femora and tibiæ rufous, posterior femora slightly marked with black at apex, tarsi yellow; wings slightly yellowish, veins brown, costa at base of stigma yellow, apex of stigma brown, lanceolate cell with an oblique cross-nervure, posterior wings with two middle cells, outer cells incomplete. Length, 11 mm.

Habitat—Ithaca, N. Y. 3 ♀♀, June 5-10, 1890.

*Strongylogaster primitivus*, MacG., should more properly be referred to *Tenthredopsis*, having the cross-vein of the lanceolate cell perpendicular or wanting, and the third and fourth segments of the antennæ equal.

BIVENA,\* gen. nov.

Wings with three marginal and four submarginal cells, the first marginal cell receiving the two anterior submarginal cross-veins and the second the third, the second and third submarginal cells each receiving a recurrent nervure, lanceolate cell open at the shoulder, subcontracted at middle with a cross-vein near the apex, subcosta wanting, posterior wings with two middle cells, the cross-vein closing the apex of the anterior one runs to the margin of the wing at about one-third the width of the cell, thence follows around the margin of the wing to the vein forming the posterior side of the cell; antennæ nine-jointed, filiform, reaching to about the base of the abdomen, the segments all of the same width, head as wide as the thorax, very slightly dilated behind the eyes; abdomen about as long as the head and thorax, somewhat widened at middle, ovipositor stout, of the usual type of Macrophyta. Type, *Bivena maria*, sp. nov.

A very interesting genus, belonging to the subfamily Tenthredinæ. Easily separated from both the Lydiinæ and Xyliinæ by the absence of subcosta, from the former by the nine-jointed antennæ and from the latter in not having the ovipositor greatly exerted and the basal segments of the antennæ dilated.

\*Bis, twice; vena, vein.



*Bivena maria*, sp. nov. Head black, with white on the anterior orbits, beneath the eyes, around the immediate base of the antennæ, a quadrangular spot between the antennæ, the clypeus, and the labrum; antennæ brownish-yellow, the third segment slightly longer than fourth, fourth and fifth subequal, clypeus truncate, sinus each side of the ocelli, reaching the posterior part of the head; the tegulæ, collar narrowly, the scutellum, cenchri, and apex of the basal plates, yellow; abdomen rufous, the basal half of the first segment and three apical segments, including the ovipositor sheath, black; legs yellow, the anterior and middle coxæ slightly at base, the posterior above and below, and the posterior tibia at apex, black; wings hyaline, veins brown, including the costa, stigma black, lighter at apex and behind. Length, 8 mm.

Habitat—West Danby, N. Y. 1 ♀, 31 May, 1890.

#### MONECTENUS, Dahlb.

1. Wings smoky; scutellum black; antennæ with thirteen segments  
..... *fulvus*, Nort.  
Wings hyaline; antennæ with more than thirteen segments.... 2.
2. Lateral fulvous line of abdomen interrupted on the three or  
four basal segments; antennæ fifteen-jointed.... *suffusus*, Cress.  
Lateral fulvous line continuous from the base of the abdomen.. 3.
3. Antennæ fourteen-jointed..... *melliceps*, Cress.  
Antennæ sixteen-jointed..... *juniperinus*, n. sp.

*Monectenus juniperinus*, n. sp. Fulvous, with the following parts black: mandibles, antennæ, a lunatic mark, including the ocelli, its horns reaching the antennæ; a broad dash on the lateral lobes, the scutellum, in some cases only its apex, metathorax, basal plates, tergum and venter except a lateral line, pectus, pleuræ except a dark fulvous spot, coxæ at base, and tarsi at apex; antennæ decidedly serrate beneath, with sixteen distinct segments; clypeus emarginate; wings hyaline, veins brown, caudal half of cross-vein between first and second submarginal cells hyaline, stigma brown, clearer at middle. Length, 8 mm.

Habitat—Ithaca, N. Y. Collected by Mr. R. L. Junghanns, a student in the Entomological Department of Cornell University. Described from four females, collected on Red Cedar (*Juniperus virginiana*).