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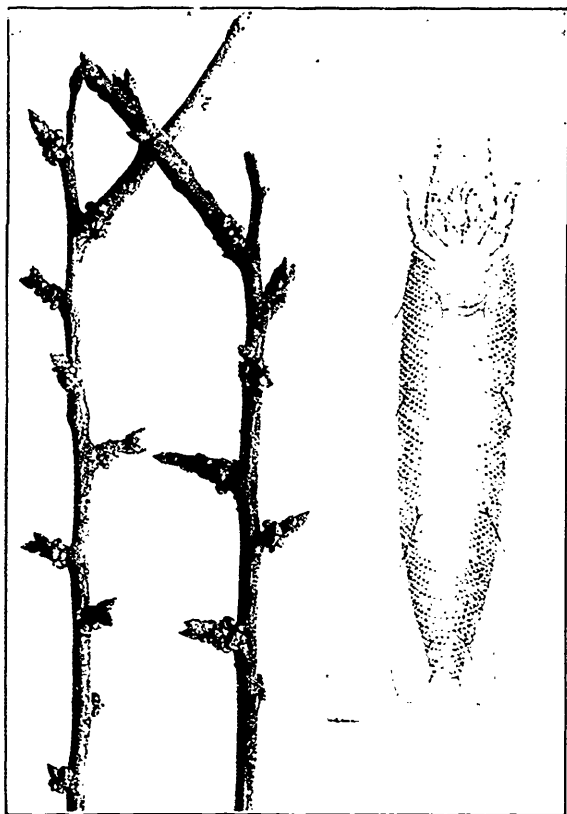
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THE PLUM-TWIG GALL-MITE (*PHYTOPTUS PHLOEOCOPTES*, NAL.)

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## THE PLUM-TWIG GALL-MITE.

*Phytoptus phloxcoptes*, Nalepa.

BY M. V. SLINGERLAND, CORNELL UNIVERSITY, ITHACA, N. Y.

In January, 1895, I received from a fruit grower at Industry, Pa., several plum-twigs which were badly infested with what was to me a new pest. Two of these twigs are shown, natural size, on the accompanying plate. It will be seen that a ring of small, sub-spherical excrescences encircles the base of each bud and also the bases of two short shoots. The correspondent wrote that he had 400 trees badly infested, and a majority of the plum trees in his neighborhood were affected. The Damsons seem especially subject to attack, but all varieties suffer more or less.

The excrescences were then of a dark brown colour, with a slight reddish tinge. Usually a slit-like opening could be distinguished on the surface. Upon carefully cutting through one of the excrescences, I was surprised to find a cavity in the interior that was packed nearly full of very minute whitish creatures, which proved to be four-legged mites or Phytoptids. Thus, these excrescences were the galls formed by the mites, and in which they were then hibernating. There were hundreds of the mites in each gall and all of them in a dormant condition. Thus, each twig was harbouring thousands of the little creatures. The fleshy portion of the galls, between the cavity and the outer skin, is of a dark magenta colour. The galls vary in size, some of the larger ones containing two or three cavities.

But little is known of the life-history of this curious gall-mite. The correspondent writes that the mites also live in the galls during the growing season. They probably leave the galls in which they hibernate and form new galls in the summer. On several twigs I found a ring of old, dry, deserted galls below a ring of inhabited galls.

Having ascertained the nature of the pest, I ransacked the literature for records of similar attacks by gall-mites. In *Insect Life*, Vol. I., p. 343, is recorded some correspondence which Dr. Riley had in January,

1888, with a fruit grower at Marlborough, N. Y., regarding what was doubtless this same Plum-twig Gall-mite. In this instance the galls also occurred along cracks on the bark of larger limbs, and in close connection with the Black Knot fungus, which was, of course, accidental. Again in 1891, Dr. Riley (Insect Life, Vol. V., p. 17) records a small mite as injurious to Damson plum trees at Berlin Cross Roads, Ohio. This was probably the mite under discussion. These are the only records I have found in American literature of any mite making galls on plum-twigs.

There has recently appeared in the European literature three admirable and exhaustive papers on the Phytoptidæ, by Dr. Alfred Nalepa [Sitz. der Math.-Natur. Classe der kais. Akad. der Wiss., Abtheil. I., Vol. 96 (1887), pp. 115-165; Vol. 98 (1889), pp. 112-156; Vol. 99 (1890), pp. 40-69]. Each article is accompanied by several finely executed plates. \*Luckily, I had access to Dr. Nalepa's work, and I found that but one Phytoptid had been described which lived in galls on the twigs of plum trees. In Vol. 99, p. 54, he describes and figures this mite as *Phytoptus phlæocoptes*. In figure 2, I have reproduced (photographically) one of Dr. Nalepa's figures of the mite; it is the female and is magnified 450 diameters. The mites in the galls were very similar to, if not identical with, this European species. The only noticeable difference is in the shape of the body. The Pennsylvania mites are shorter and wider, but this may be quite possibly due to their being in hibernation and dormant. The European species was first described and figured as *pruni*, by Amerling, in 1868.

The mites could have been easily introduced into this country on plum stock, but the correspondent writes that his trees were grown in his vicinity "and are known as sucker-growth trees." If our mite is identical with the European species, and it probably is, the pest was introduced into this country some time previous to 1887, and it is now present in New York, Ohio, and Pennsylvania.

The fruit grower informs me that his trees are thrifty, but the fruit is undersized. So many thousands of the little creatures working at the

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\*Dr. Nalepa puts our knowledge of the Phytoptidæ on a scientific basis. He rightly discards all previous descriptions of the mites as inadequate and not definite enough for the determination of any species. He gives new detailed descriptions with excellent figures: and the species are renamed, usually with new names, but sometimes the old names are retained, as in the case of the Pear-leaf Blister-mite, which he calls *Phytoptus pyri*, n. sp. We should thus write *pyri*, Nalepa, instead of *pyri*, Scheuten. Dr. Nalepa's work should be in the hands of every one interested in the Phytoptidæ.

bases of the buds must greatly lessen the vitality of the whole tree. When the mites occur as numerous as shown in the figures, they must prove a serious pest; and, with our present scanty knowledge of their life-history, they will prove a hard foe to combat. So far as we know, the mites are securely protected in their gall-homes during the whole year. Possibly there may be a few days, when they are leaving their galls to form new ones, that they could be hit with an insecticide. It is doubtful if kerosene emulsion will penetrate the galls, but it is worthy of a trial on a few trees during their dormant period; dilute the emulsion with only three or four parts of water, and make it by the Riley-Hubbard formula. The only other suggestion I can now make is to prune the trees as closely as possible, taking pains to cut out as many gall-bearing twigs as practicable, and to burn all prunings. As most of the galls are on the twigs, millions of the mites could be destroyed in this way.

I am indebted to the "Rural New Yorker" for the use of the figures of this mite and its work.

#### PARTIAL PREPARATORY STAGES OF SOME MOTHS.

BY G. H. FRENCH, CARBONDALE, ILL.

##### *Catocala Minuta*, Edw.

*Full-grown larva.*—Length about one inch. As in most *Catocala* larvæ, seven stripes, the dorsal gray, lilac tinted; the next blackish-gray, paler on the middle of the joints; the next about the same colour, but tinted with the reddish-orange that forms the broad bordering lines between the stripes; the next also blackish and below this dull orange. The bordering lines on the back whitish, distinct white on the folds; lateral fringe orange tinted. Piliferous spots orange, the posterior pair to each joint more prominent than the anterior pair; the anterior pairs on joints 6 to 8 paler. The posterior part of joint 9 elevated and white between the spots; back of the elevation, and reaching down to the legs, orange tinted black. Head dull lilac-gray, mottled with white, a blackish patch above on each side and in front two black spots on each side. Venter yellowish-white, with black patches in centre of joints.

*Chrysalis.*—Length, .65 inch; diameter of thorax, .23 inch; tongue- and wing-cases extending back to posterior part of 5, the tongue-case as far back as the wing-case; tapering back from 5; abdominal joints very shallowly punctured, the punctures scarcely perceptible with the lens;

wing-cases much smoother than usual; cremaster hooks—two large ones at the tip of segment, and several small ones from near the base of these and some at a little distance from them. Colour chestnut-brown, covered as usual with a white powdery secretion. The puparium a case of leaves thinly lined with silk.

Pupal period, 20 days; food plant, Honey Locust.

*Agrotis brocha*, Morr.

*Egg*.—Diameter, .03 inch, height the same; blunt conical, tapering abruptly from near the base to a rounding base; longitudinally striated, 30 of these reaching the micropyle, about 60 of these striæ in all; marked with cross striæ, but these not prominent; centre of micropyle a round, slightly elevated piece. Colour various; some gray, some whitish blotched irregularly with red, the blotching being mostly a spot on the micropyle and a ring below. Duration of this period, 9 days.

*Young larva*.—Length, .07 inch; cylindrical. Colour of body pale smoky-white; head black; piliferous spots moderate, a white or pale hair from each. Duration of this period, 7 days.

*After first moult*.—Length, .15 inch; colour pale greenish-brown; head black; piliferous spots small, black; a small cervical shield. In confinement, ate clover and radish leaves.

*Apatela spinigera*, Guen.

*Mature larva*.—Length, 1.20 inch; when crawling, nearly cylindrical; with eight rows of tubercles, the lateral ones very small; the dorsal pair on joints 3 to 7 rather large, with the tallest on 3 and gradually diminishing back; joint 12 prominently elevated, the elevation tipped with a pair of tubercles, with a pair of small ones in the front part of the elevation, each tubercle bearing a single long and several short hairs. Colour bright green, the lateral tubercles scarcely discolouring the sides, slightly yellowish-green; a dorsal dark reddish-purple stripe that is nearly as wide as the head on the anterior part of 2, about half as wide on 3, narrow on 4 to 7, expanding in two ellipses on 8 and 9, the rest of the way narrow. From 2 to back of tubercles on 3 the stripe is bordered each side by clear white, coloured a little with green on 8 and 9, with a faint greenish line running through the centre of the stripe. Head rosy-red, whitish on the sides, with three more or less complete longitudinal rows of black spots. Feet and venter green.

Food plant, apple. Hibernated in the pupa, which was not described.

## CURIOS BEHAVIOUR OF EUDAMUS PYLADES LARVA.

BY H. H. LYMAN, MONTREAL.

When out on a short visit to Ausable Chasm, June 29th to July 1st, I noticed, on June 30th, a female of this species ovipositing, and secured three eggs. These eggs hatched in due course, one about a day in advance of the two others. The first larva was placed on a clover leaf in a tin-topped jelly glass, but refused to feed and dried up. I then arranged a homeopathic vial of water in a wine glass, with earth to steady it, and a few leaves of clover passing through a hole in the cork into the water, and placed the two other newly hatched larvæ upon the leaves. One immediately set to work constructing its nest, but the other seemed lazy and not inclined to make a nest for itself, or share in the construction of the other. The nest was soon complete, and the occupants hidden from view. What tragedy took place within that nest I know not, but at the first moult only one caterpillar remained, and I thought that possibly the energetic one had lost all patience with his lazy brother, and had eaten him up. The dates of the first three moults were not recorded, but the fourth one occurred on 3rd of August. The caterpillar was apparently mature by the 12th or 13th, and had left the food plant and spun some silk on the gauze top of the glass cylinder which I had placed over the wine glass, stretching several strands of silk from the gauze to the glass. I was leaving home on the 14th for a holiday at the seaside, and as I had a whole menagerie of other larvæ to take with me, and thought that this caterpillar was just going to spin its cocoon, and that disturbing it to take it with me would be a mistake, I left it behind. On my return, twenty-two days later, I found it apparently in exactly the same place as I had left it, though, of course, it may have crawled all over the cylinder during my absence, and it was still alive, though somewhat shrunken from its long fast. I immediately supplied fresh leaves in the small vial of water, and, taking the gauze from the top of the cylinder, arranged it so that the back of the larva was resting on the clover leaves, but it would not feed, and so, after a day or two, I replaced the gauze on the cylinder. The caterpillar then crawled down to a position near the base of the cylinder, where it rested for two or three days longer, and then was found dead on the window-sill, on which the cylinder was standing, having lived without food for fully four weeks in warm summer weather.

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 ENTOMOLOGICAL COLLECTIONS OF THE U. S. NATIONAL MUSEUM.
 

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The staff of the Department of Insects of the U. S. National Museum at Washington has been reorganized, as a result of the sad death of the former Honorary Curator, Professor C. V. Riley.

The reorganization has been effected by the appointment of Mr. L. O. Howard, Entomologist of the U. S. Department of Agriculture, to the position of Honorary Curator of the Department of Insects; of Mr. Wm. H. Ashmead, to the position of Custodian of Hymenoptera; and Mr. D. W. Còquillet, to the position of Custodian of Diptera. All museum custodians are honorary officers. Mr. M. L. Linell will remain as general assistant to the Honorary Curator.

The Department is at present in excellent working condition. It contains a very great amount of material in all orders, and in many unusual directions surpasses any collection in the country. Among others the following are of especial interest:—

- (1) The large collection, in all orders, of the late Dr. C. V. Riley.
- (2) All of the material gathered during the past eighteen years by correspondents, field agents, and the office staff of the Division of Entomology, U. S. Department of Agriculture.
- (3) The greater part of the collection of the late Asa Fitch.
- (4) The large collection, in all orders, of the late G. W. Belfrage.
- (5) The collections in Lepidoptera and Coleoptera made by Dr. John B. Smith down to 1889, together with the types of the Noctuidæ since described by Dr. Smith.
- (6) The collection of Lepidoptera of the late O. Meske.
- (7) The collection of Lepidoptera of G. Beyer.
- (8) The collection of Coleoptera of M. L. Linell.
- (9) The bulk of the collection, in all orders, of the late H. K. Morrison.
- (10) The collection of Diptera of the late Edward Burgess.
- (11) The type collection of Syrphidæ made by Dr. S. W. Williston.
- (12) The collection of Ixodidæ of the late Dr. George Marx.
- (13) The collection of Myriopoda of the late C. H. Bollman.
- (14) Types of the neotropical collections of Herbert Smith.
- (15) The collection of Hymenoptera of Wm. J. Fox.
- (16) The collection of Tineina of Wm. Beutenmuller.
- (17) The large Japanese collection, in all orders, of Dr. K. Mitsukuri.



(18) The African collections, in all orders, of Dr. W. S. Abbott, Wm. Astor Chanler, J. F. Brady, the last "Eclipse" expedition to West Africa, and of several missionaries.

(19) The large collection from South California of D. W. Coquillett, in Coleoptera, Hymenoptera, Lepidoptera, and Orthoptera.

(20) The Townend Glover manuscripts and plates.

In addition to this material there are minor collections, which have been the result of the work of Government expeditions, or are gifts from United States Consuls, and many private individuals.

This enormous mass of material is being cared for by the active and honorary force of the Department, and the perpetuity of the collection is assured. The National Museum building is fireproof, and this, together with the fact that it is a national institution, renders the Department of Insects perhaps the best place in the United States for the permanent deposit of types by working specialists in entomology, and for the ultimate resting-place of large collections made by individuals.

The policy of the Museum at large, with regard to the use of its collections by students, is a broad and liberal one. Students are welcome in all departments, and every facility is given to systematists of recognized standing.

#### NOTES ON APHILANTHOPS.

BY CARL F. BAKER, FORT COLLINS, COLO.

Within a short time two very interesting species (*A-notatus*, Ash., and *taurulus*, Ckll.) have been added to this genus. I have lately received another new species from Mr. Chas. Palm, of New York City, collected in S. W. Utah, which is even more interesting than the two above mentioned. I describe it herewith:

*Aphilanthops utahensis*, n. sp.—Male: Length, 7.5 mm. Rufous; region of ocelli, mesonotum, metapleura, and fifth and sixth abdominal segments above, blackish. Markings pale lemon-yellow. Head evenly, somewhat sparsely punctate, covered with silvery pubescence, which is very dense on the face, extending over the bases of the mandibles in two pointed tufts. Clypeus with a yellow spot on either side, the median lobe strongly tridentate, the teeth short and blunt. Antennæ with scape yellow; flagellum slightly darker above. Thorax coarsely irregularly punctured, except on prothorax, scutellum, and postscutellum; pubescence most marked on mesopleura and sides of metanotum. Pronotum above, tegulæ and two spots below, scutellum anteriorly, and post-

scutellum, yellow. Wings normal. Fore and middle femora beneath at tip, hind femora above at tip, and all the tibiæ outwardly, yellow. Abdomen somewhat more remotely punctured than the head, feebly pubescent. Dorsal segments 1-5 with yellow bands; that on third interrupted at the middle, the two portions inwardly pointed; that on first strongly bent forward. Sixth segment with a median hemispherical yellow spot on posterior half. Seventh segment above not characteristic in structure. Ventral segments with punctures very coarse and remote; second, third, and fourth, with strong yellow bands, all slightly interrupted medially.

Hab.—S. W. Utah. (Chas. Palm.)

This pretty and very distinct species is as near *q-notatus* as any of the species of *Aphilanthops*, though it is as widely separated from all others by the tridentate clypeus as is *q-notatus* by the peculiar structure of the last dorsal segment.

The female of *q-notatus*, which has never been described, differs most noticeably from the male in size, the length being about 11 mm.

The North American species of the genus may be separated as follows:—

Clypeus strongly tridentate; ground colour throughout rufous; metathorax without spots.....*utahensis*.

Clypeus evenly rounded; ground colour of at least head and thorax black.

Last dorsal segment rectangular and strongly concave; clypeus margined with yellow; legs rufous; metathorax with a yellow spot on either side; ground colour of three basal segments of abdomen rufous.....*q-notatus*.

Last dorsal segment pointed, strongly convex; legs yellow and black; ground colour of abdomen black.

Bands of abdomen broad, continuous; clypeus yellow; metathorax with a yellow spot on either side; size small.....*laticinctus*.

Bands of abdomen, at least the first three, interrupted at middle; size large.

Clypeus and part of face above yellow; antennæ mostly rufous; metathorax with a yellow spot on either side.....*frigidus*.

Clypeus, face and antennæ, black; metathorax without spots.....*taurulus*.

## THE LARVÆ OF THE NORTH AMERICAN SAW-FLIES.

BY HARRISON G. DYAR, PH. D., NEW YORK.

It appears from a reference to the literature, that the larvæ of less than 25 per cent. of the Tenthredinidæ listed as inhabiting the north-eastern United States and Canada have been described. Of the Western species, scarcely half a dozen are known.

It seems desirable that something should be done to increase interest in this neglected subject, and I have thought it well to prepare a synoptic table of the larvæ already known, to facilitate the recognition of specimens and better indicate those as yet undescribed, and therefore needing study.

In the following table the Western species are excluded. If, by good fortune, any student of this group should arise there, he would find the field practically clear.

To the eighty odd species described I have added about forty well-marked forms, the diagnoses being taken from my notes on larvæ not yet reared; but as I intend to determine them as rapidly as possible, I have thought it best to include them, indicating them by marks to correspond with my notes.

The species of *Schizocerus* are omitted. *S. fumipennis* is Californian, and the two sweet-potato feeders, *S. ebenus* and *S. privatus*, are so imperfectly described that I cannot place them.

I shall be grateful to receive notes of any corrections or additions and the names of any of the undetermined forms.

RECOGNITION TABLE FOR THE KNOWN SAW-FLY LARVÆ OF THE  
NORTHERN ATLANTIC STATES.

1.	{ Abdominal feet present on joints 6-13; rarely rudimentary or absent in leaf-mining forms.....	2
	{ Feet on joints 6-11, either present on joint 13 or rudimentary. Cocoon compact, dark brown.....	27
	{ Feet on joints 6-10, or slight on joint 11; cocoon reticular, of yellow silk.....	48
	{ Without abdominal feet. A pair of long antennæ on the head and jointed processes on the last segment.....	53
2.	Sitting flat on the surface of the leaf; slug-like.....	3
	Sitting on the needles of pine.....	18
	Sitting on the edge of a leaf or curled spirally.....	20
	Leaf miners.....	26
3.	Shining, sticky, slug-like.....	4
	Smooth, not shining.....	10

- Body with rough points or spines . . . . . 15  
 Body with forked processes . . . . . 16
4. Large, blackish (Prunus, etc.) . . . . . *Eriocampa cerasi*.  
 Smaller, not blackish . . . . . 6
6. Sides of thorax orange tinted . . . . . 7  
 Sides of thorax not orange tinted . . . . . 8
7. Head black . . . . . *Eriocampa fasciata*.  
 Head pale . . . . . *Monostegia quercus coccinea*.
8. Head pale . . . . . 9  
 Head black . . . . . *Caliroa obsoleta*.
9. On Quercus, usually gregarious . . . . . *Monostegia quercus-alba*.  
 On Prunus, scattered . . . . . 3S\*
10. Head more or less black . . . . . 11  
 Head pale . . . . . 14
11. Body high, larvæ robust . . . . . 12  
 Body slender, as usual . . . . . 13
12. White and yellow; on Fraxinus . . . . . *Monophadnus barda*.  
 Gray and yellow, spotted with black; on Polygonatum (Solomon's  
 seal) . . . . . 4D.
13. With slight angles or rudimentary points on joint 2; a faint blackish  
 band; on Betula . . . . . *Taxonus multicolor*.  
 Smooth, waxy white; on Epilobium . . . . . 6M.
14. Yellowish, immaculate; on Rosa . . . . . *Monostegia rosa*.  
 With a pruniöse coating; on Alnus . . . . . *Pocilosoma inferentia*.
15. Head pointed; on Betula, etc., etc. . . . . *Strongylogaster pinguis*.  
 Head round; on Spiræa . . . . . *Blennocampa spirææ*.  
 Head black; on Vitis . . . . . *Blennocampa pygmæa*.
16. Head green; on Rubus . . . . . *Monophadnus rubi*.  
 Head black spotted; on Quercus . . . . . 17
17. Green . . . . . *Periclista emarginata*†  
 Dorsum purplish . . . . . *Monophadnus diluta*.
18. Without spots; head black; on Abies . . . . . *Lophyrus abietis*.  
 Similar (?) to the preceding; on Pinus . . . . . *Lophyrus pini-rigidæ*\*\*  
 With angular black spots . . . . . 19
19. Head black, no subventral spots; on Pinus strobus. *Lophyrus Abbotii*.

\*My notes are indicated by a combination of numbers and letters.

†Described as *Blennocampa bipartita*.

\*\*Insufficiently described.

- Head red, small subventral black spots; on Pinus  
*rigida*.....*Lophyrus Lecontei*.  
 Similar (?) to the preceding ....*Lophyrus pinetum*\*\*
20. Feeding on grass and grain (Poa, etc.).....21  
 Feeding on ferns (Pteris, Onoclea, etc.).....22  
 Not feeding on these plants.....23
21. Ochreous, immaculate.....4C.  
 Gray dorsally, white subventrally.....5O†  
 Green, a black band over head.....5M.
22. A row of subventral orange spots.....*Strongylogaster luctuosus*.  
 No orange, but head black spotted.....*Strongylogaster annulosus*††  
 Immaculate green.....*Strongylogaster soriculatus*††  
 On Onoclea; head and anal segment black spotted.....5G.
23. Woolly white, gray or blackish.....24  
 Green, yellowish or colourless.....25
24. Large, greenish white, somewhat granular—  
 A black dorsal stripe.....*Cimbex americana*.  
 No dorsal stripe.....*Trichiosoma triangulum*.  
 With long dense white wool in flattened masses; on  
 Carya.....*Monophadnus carya*.  
 Woolly white; on Cornus.....*Harpiphorus tarsatus*.  
 White, downy; on Polygonum.....*Emphytus testaceus*.  
 Immaculate with white bloom; on Diervilla.....4I.  
 Dorsum gray, pruinose, a black patch on head; on Corylus.....5F.  
 White pruinose, a black band on head, a row of lateral black dots;  
 on Sambucus.....*Macrophya tibiator*.  
 White with slight bloom and smoky-black markings; on  
 Rubus.....*Strongylogaster apicalis*.  
 Blackish-gray; on Viola.....*Emphytus Canadensis*.  
 Olivaceous-blackish; on a "perch" on Quercus, young leaves....F.  
 Leaden-gray, pruinose with black dots; on Cephalanthus.....5C.  
 Gray with orange and black spots; on Lonicera (honeysuckle).2F°  
 Dorsum olivaceous-black with gray squares, subventer yellow; on  
 Cornus.....60

\*\*Insufficiently described.

†Five larvæ of *Dolerus* spp. similar to this are described, but not identified.

††These names may require to be transposed.

°Described by Norton as *Hylotoma McLeayi*.

25. Greenish-ochre, a black subdorsal line; on  
 Alnus ..... *Hemichroa americana*.  
 Bluish-green, spotted with yellow and black; on  
 honeysuckle ..... *Zarcea inflata*.  
 Whitish, faintly orange banded; on Sambucus ..... 6I.  
 Like the preceding, but also black spotted ..... 6L.  
 Green or colourless, often with minute white or black points—  
 On Rumex; dorsum green with dark longitudinal  
 shades ..... *Strongylogaster abnormis*.  
 On Rosa; green ..... *Emphytus cinctipes*.  
 On Betula; subdorsal yellow fat-granules.. *Tenthredo Cressoni*.  
 On Spiræa; a yellow subdorsal fat-line, no white points .... 5T.  
 On Viburnum; with minute black points ..... 6C.  
 On Ilex; colourless, whitish ..... 6F.  
 On Fragaria (strawberry); head immaculate.. *Monostegia ignota*.  
 Like the preceding, but the head black  
 spotted..... *Harpiphorus maculatus*.
26. Mining in leaves of Alnus ..... *Fenusa varipes*.  
 Mining in leaves of Quercus..... *Fenusa curta*.
27. Sitting flat on the surface of a leaf or curled spirally ..... 28  
 Sitting on the edge of a leaf..... 33  
 Forming galls on Salix..... 45
28. With stiff white hairs..... 29  
 With pilose coating ..... 30  
 Pale, with large elevated subventral black patches; on Salix.... 5J.  
 Smooth, greenish ..... 31  
 Colourless, the abdominal feet small..... 32
29. Anal plate black..... N.  
 Anal plate yellow..... } *Trichiocampus gregarius*.  
 } *Trichiocampus viminalis*.
30. Dorsum olivaceous-black ..... *Cladius solitarius*.  
 Immaculate green; on Rosa..... *Cladius pectinicornis*.  
 With white ad-dorsal and stigmatal lines; on Salix..... 4L.
31. Slightly pruinose; on Amelanchier and Prunus... *Nematus thoracicus*.  
 With subdorsal green fat-granules; on Betula.... *Nematus unicolor*.  
 Curls spirally; on Populus..... 2G.
32. Head pale; on the young leaves of Quercus.. *Acordulecera dorsalis*.  
 Head black; on the young leaves of Carya ..... 6U.

33.	Head green or greenish.....	34
	Head brownish.....	38
	Head vinous-blackish.....	39
	Head black.....	40
34.	Body with subdorsal fat-patches.....	<i>Nematus pinguidorsum</i> .
	Body dotted with black.....	<i>Nematus trilineatus*</i>
	Body with lines.....	35
	Body without lines, green.....	36
35.	Long, straight, dusky shaded.....	3D.
	A distinct white subdorsal line; on Salix.....	3F.
	Dorsal vessel a double line; on Betula, etc.....	<i>Pristiphora tibialis</i> .
	A white stigmatal line—	
	On Poa, etc.....	<i>Nematus marylandicus</i> .
	On Abies.....	<i>Nematus integer</i> .
	On Vaccinium.....	<i>Pristiphora identidem**</i>
36.	On Ribes (gooseberry).....	<i>Pristiphora grossulariæ</i> .
	On Betula.....	<i>Nematus lateralis</i> .
	On Robinia.....	{ <i>Nematus similaris</i> .
		{ <i>Nematus robiniæ</i> .
	On Populus and Salix.....	37
	On Prunus, eating a curious sinuate hole when young.....	5K.
	On Azalea, disappearing early in the season.....	5S.
37.	With black lines on the head; on Salix.....	<i>Nematus mendicus</i> .
	Without black lines on the head; larger; on	
	Populus.....	<i>Nematus dorsivittatus</i> .
38.	On Alnus; green, with blackish shades.....	<i>Nematus Marlattii</i> .
	On Larix; green with more opaque bands.....	6D.
	On Prunus, etc.; vinous with oblique cut white fat-patches.....	5Z.
	On Carex (on the top of Mt. Washington); pinkish with white	
	bands.....	6T.
39.	On Alnus; not metallic-green shaded.....	<i>Nematus luteotergum</i> .
	On Betula; with slight metallic-green shades.....	<i>Nematus latifasciatus</i> .
40.	No black tubercles on the body.....	4I
	Black tubercles present.....	43
41.	With lateral yellow spots.....	42
	Olivaceous, paler subventrally; on Larix.....	<i>Nematus Erichsonii</i> .

\*Colour of head not stated in the description, hence this position may be erroneous.

\*\*Position of the pale line not stated.

- Honey-yellow and black ; on *Betula* . . . . . *Cræsus latitarsus*.  
 Honey-brown and leaden-black; on *Corylus* and *Alnus*. *Nematus coryli*.  
 42. Green with black spots ; on *Populus* . . . . . *Nematus Hudsonii-magnus*.  
 All black ; on *Salix* . . . . . *Nematus ventralis*.  
 43. The tubercles minute dorsally . . . . . 44  
 The tubercles of nearly equal size ; body blue green ; on  
     *Ribes* . . . . . *Nematus ribesii*.  
 44. " Black spotted " . . . . . *Nematus pallidiventris*\*  
 A row of subdorsal black spots . . . . . *Nematus salicis-odoratus*.  
 No subdorsal black spots . . . . . *Nematus brunneus* \*\*  
 45. Gall formed in the stem or bud . . . . . 46  
 Gall formed in the leaf . . . . . 47  
 46. A lateral bud enlarged before it begins to expand in  
     spring . . . . . *Euura salicis-orbitalis*.  
 A round sessile swelling lengthwise on the side of small  
     twigs . . . . . *Euura salicis-ovum*.  
 A gradual enlargement of the twig, five-fourths to twice its normal  
     diameter . . . . . *Euura salicis-nodus*.  
 47. Fleishy, sessile, the shape of a quarter of an  
     orange, evenly divided between the two  
     surfaces of the leaf . . . . . *Nematus salicis-desmodioides*.  
 Fleishy, globular, sessile, like a miniature apple, .3-.5  
     inch . . . . . *Nematus salicis-pomum*.  
 Subspherical, hollow, growing from a side vein, .2-.3  
     inch . . . . . *Nematus salicis-pisum*.  
 48. Tubercles in a square above the spiracles, more or less distinct . . 49  
 A single large subdorsal black tubercle ; on *Rhus copallina* . . . . . *Z.*  
 49. Body with a pale subdorsal line . . . . . 50  
 Body not lined . . . . . 51  
 50. Head black or red ; on *Salix* . . . . . *Hylotoma clavicornis*.  
 Head pale with a vertical dark band . . . . . *Hylotoma virescens* (2L).  
   { *Hylotoma pectoralis*.  
 51. Head red : spots distinct ; on *Betula* . . . . . { *Hylotoma scapularis*.  
   { *Hylotoma caeruleus*.  
 Head black . . . . . 52  
 52. Spots distinct ; on *Prunus* . . . . . *Hylotoma McLeayi* (S).  
 Spots pale, often dark ringed ; on *Quercus coccinea* . . . . . 2B.

\*Description imperfect. Possibly not different from the following.

\*\*Described as *N. monochroma*.



- 
53. Head dark . . . . . 54  
 Head testaceous or greenish . . . . . 55
54. Head black, body orange tinted; on *Prunus* . . . . . Q†  
 Head black, body dull olive-green; on *Abies* . . . . . Pack., No. 35††  
 Head dark brown, body pale reddish-brown; on  
     *Abies* . . . . . Pack., No. 36  
 Head pale reddish with a black spot between antennæ; on  
     *Pinus* . . . . . Pack., No. 82
55. Anal plates not black spotted . . . . . 56  
 Anal plates with black patches . . . . . 57
56. On *Corylus* . . . . . *Lyda ochreatea*.  
 On *Viburnum* . . . . . 6B.  
 On *Amelanchier* . . . . . 5W.  
 On *Pinus strobus* . . . . . Pack., No. 83
57. Antennæ all white; on *Populus* . . . . . 5Y.  
 Antennæ black ringed; on *Betula* . . . . . 4K.
- 

I add descriptions of two species which are here referred to for the first time.

*Fenusa curtus*, Norton.

Mines on the upper side of the leaves of *Quercus macrocarpa*, the mature mines about 50 x 10 or 30 x 15 mm. The larva has six stages with widths of head .3, .4, .6, .75, 1.0, and 1.0 mm. The early stages are very similar to the fifth.

*Fifth stage*.—Head very flat, the lobes rounded with the ocellus on the dorsal aspect; mouth projecting in front; shining pale brown, shading into dark brown on the sides of lobes and mouth; eye black; width, 1 mm. Body much flattened, rounded posteriorly, the segments of nearly equal width, joint 13 divided by a distinct incisure, the posterior part only half as wide as the anterior; a rounded subventral ridge. Thoracic feet small, black, almost lateral in position, unused; abdominal, none. A large brown-black cervical shield on joint 2 dorsally and a similar one ventrally between the thoracic feet of joint 2, large, quadrate, brown, bordered with black posteriorly. Colour slightly shining sordid

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†Supposed by Prof. Riley to be *Lyda fasciata*; not bred.

††No. 35 of spruce insects in Packard's 5th report U. S. Entom. Commission. I have included Dr. Packard's undetermined saw-fly larvæ only in the case of *Lyda*, which is such a well-marked genus.

greenish-white; length, 5 mm. The larva is not transparent, rather grayish. The cast skins are light cinereous and may all be found in the mine intact, thick and opaque.

*Sixth stage.*—On assuming this stage, the larvæ burst through the upper skin of the mine and fall to the ground, where they enter the earth.

Head more rounded than before, the mouth scarcely projecting. Pale watery-yellowish, the eye concolorous; width, 1 mm. Subventral ridge prominent, undulate. Thoracic feet concolorous, scarcely distinguishable. Body translucent-white with a yellow tint, becoming darker or ochreous on the thoracic segments.

Larvæ from Plattsburg, N. Y.

*Hylotoma virescens*, Klug.

I have recently described this larva under the name *Hylotoma McLeayi* (2L.). The male flies sent to Mr. Marlatt were positively determined as *McLeayi*, confirming my own determination. However, some female flies, subsequently emerged, seem not to differ from my specimens named *clavicornis*, in which the posterior half of the abdomen is black. But, as the larvæ are quite different, I would suggest to revive the name *virescens*, Klug., from the synonymy for them. Food plants: *Betula*, *Salix*, *Amelanchier*, *Pyrus* (choke berry and mountain ash) and *Fragaria* (strawberry).

*Hylotoma*, sp.

The larvæ marked 2B have been bred, but only males so far. Consequently I hesitate to apply a name to them.

*Hylotoma clavicornis*, Fabr.

*Eggs* (deposited by a fly with abdomen all reddish).—Laid in the edge of a leaf of *Salix* in the usual manner. The young larvæ are paler than the mature ones and very faintly marked. Gradually they assume the mature characters.

*Mature larva.*—Head rounded, full at the vertex, the sutures obscured, shining black or light red or intermediate, a little paler around the mouth; width, 1.8 mm. Thoracic feet very large, spreading; abdominal small, on joints 6-11 and 13, a spot on joint 13 representing the foot there, the posterior feet the smaller. On the body are nine black tubercles in a square, the middle anterior one a little out of line, the anterior row smaller, confused on the thoracic segments. Some small spots in a row ventrally and one behind the spiracle. Subventral ridge with a large black spot and on some segments with two or more small ones. Setæ minute, black. Body greenish-yellow, with a whitish tint, more green dorsally; a whitish subdorsal line between tubercles 1 and 2. Thoracic feet except at joints and abdominal ones outwardly black; anal feet yellow.

Larvæ from Plattsburg, N. Y., and Jefferson, N. H.

The larvæ of *clavicornis* are frequently gregarious, whereas those of *virescens* are almost always found singly.

## TWO NEW CROCOTAS FOUND IN WESTERN PENNSYLVANIA.

BY GEORGE A. EHRMANN, PITTSBURG, PENN.

*Crocota rubricosta*, n. sp.—♀. Antennæ and eyes black; palpi and prothorax reddish-brown; head a little lighter than the prothorax; thorax dark brown, almost black; abdomen dark brown, tipped anally with red. Under side of abdomen and thorax, including the legs, light reddish-brown.

Primaries: Upper side obscured with dark velvety-brown, slightly tinted, or dusted, with red on the costa. Secondaries: Dark brown, almost black, with a large red elongate spot on the costa—hence the name *rubricosta*.

Under side of primaries light brown; costa fiery red; the inner marginal area is also heavily dusted with red. Under side of secondaries fiery red, shaded along the anal margin with dark brown; the limbal space has a brown angulated bar, beginning at the discal cell and widening outwardly; discal spot dark brown, almost black; fringes dark brown. Exp., one inch and three-eighths. Hab.—Jeanette, Pa.

Since drawing up the above description I have been so fortunate as to secure a male in the same locality. The female was taken while beating a Hawthorn for beetles, while the male was captured around an electric light. The male corresponds with the description given of the female in every respect, except that the shade of the ground colour is a little lighter on both surfaces, and the discal spot is present on the primaries as well as on the secondaries. The species bears more resemblance to *C. opella*, Grote, than to any other North American species that I am acquainted with, but the description that I have given will show in what respects it differs.

*Crocota belmaria*, n. sp.—♂. The whole upper surface is obscured with pale slaty-brown, almost of a greyish-mouse colour; the under side is much lighter, almost buff, including the legs. ♀. The upper surface is a little darker than in the ♂, and without any shading; the under side is a little lighter than the upper, but not as light as in the ♂; the costa of the primaries has a slight shading of red. Exp.—♂, 1½ inch.; ♀, 1¼ inch. Hab.—Pittsburg, Pa.

I know of no North American species with which I can compare *C. belmaria*; it is the most peculiar species of this genus that I have yet met with.

## THE LIFE-HISTORY OF PAMPHILA MANITOBA, SCUDDER.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

I think that I am the first man who has witnessed the hatching of the eggs of *Pamphila Manitoba*. I take pleasure in the belief; and I am glad to add another chapter to the history of our North American Rhopalocera.

*Pamphila Manitoba* is a sub-Arctic species. The first specimens taken in the neighbourhood of Quebec were captured by Mr. Hanham and myself in September, 1892 (See 23rd Rep. Ent. Soc., Ont., p. 31). The species had, in previous years, been taken at Rivière-du-Loup *en bas*, Cacouna, Metis, and Gaspé (See Mr. H. H. Lyman's article, 22nd Rep. Ent. Soc. of Ont., p. 27). In 1893, it appeared at Quebec on the 5th of August, and this year a specimen left the chrysalis, in my house, on the 21st of July. It would seem as if change of climate and locality were bringing forward the insect's time of appearance.

In the first week of August, 1894, I confined two or three impregnated females of the species, in a gauze cage, over a pot of lawn-grass. I obtained eggs from them on the 8th of the month. The eggs were laid dispersedly on the blades of grass and on the gauze cover. On the approach of winter I sank the pot to the rim in a flower-bed in my garden, leaving the grass and cover with their precious burden untouched. In the course of the winter the snow accumulated above them till it was six feet deep.

As soon as the gauze covering showed itself in the spring, I dug up the pot and carried it into my study, and then carefully removed the portions of grass, etc., on which the eggs appeared—placing them in a perforated cardboard box with a glass cover, which I set upon my study table. The eggs, therefore, were after that time constantly under my observation.

On the 20th of April I noticed a minute dot on the very summit of one of the eggs. I brought a magnifying glass to bear upon it, and found that the enclosed larva was biting its way to liberty; the black head of the creature was showing through the opening that it had made. I could detect the motion of its jaws as it enlarged the orifice. It continued the operation at intervals through the day and following night, and next morning, having bitten the shell down till it resembled the walls of a game pie, it crawled out. It left no *débris*; it had simply made a meal of the upper crust of its shell.

In the course of two days and nights sixteen larvæ had thus set themselves free. As each left the egg I took it up with a moistened camel's-hair pencil, and placed it on a tuft of timothy (*Phleum pratense*, L.) that I had rooted in a small bottle of mud, and soon I had the satisfaction of seeing the young stock begin to feed.

The fifth day seemed to be a critical period for the larvæ, and I lost several. Why this was I cannot tell. I could detect no signs of a moult. Becoming alarmed, I divided my brood, placing half out of doors on an isolated patch of grass, which I protected with a wire dish-cover. This provision proved a failure, for a small ground-beetle found its way to the larvæ, and devoured them. I adopted every precaution I could think of to save the six specimens I had left. I was careful to have healthy growing plants of grass always ready for them. I covered them with a glass shade to protect them from sudden changes of temperature. Whenever a mild rain fell I let them have for a few moments the benefit of the shower, and I kept them where they would have plenty of light without being exposed to the extreme heat of the sun. These precautions were crowned with success. I brought several of the larvæ to their full growth, and eventually I had the satisfaction of seeing the perfect insect burst from its chrysalis. The following is a detailed account of the insect in its different stages:—

*Newly-laid Egg*.—Nearly one-twentieth of an inch in diameter at the base. The shape of a gumdrop—flat at the bottom and rounded above. Snow-white, and in some lights irrorated with red, blue, and green.


*Egg in the Spring*.—Somewhat shrunken—one twenty-fourth of an inch in diameter. Dull white. Surface rough, and slightly indented. Hatched April 20th.

NOTE.—*P. Manitoba* spends eight months, or two-thirds of its existence, in the egg.

*Newly-hatched Larva*.—Length, one-tenth of an inch. Head large, round, jet-black, shining, has an indented line down the middle, and a few whitish bristles scattered over the face. Plate or collar on the second segment glossy black. First pair of legs black. Colour of body, that of yellow wax, marked at wide intervals with round brownish spots. The second and third pairs of true legs and the pro-legs, the same colour as the body. The creature spun a slight web for a rest, something

after the plan of *P. turnus*, and, on the 5th of May, it drew the edges of the blade of grass together, and spun a light web about itself. It moulted on the 8th of May.

*Larva—Second stage.*—Length after moult, three-twentieths of an inch. Head and collar black as before. Colour of the rest of the body pale waxen-yellow. The spots have developed into warts, and the body is dotted over with short black spines.

In this stage the larva made for itself a retreat by gathering several blades of grass together, and fastening them with a beautifully reticulated web, the meshes of which were as perfect as those of a cabbage-net. A funnel-shaped opening allowed the larva to protrude as much of its body as it deemed safe, to enable it to feed. In feeding, it bit from the blades till semicircular gaps were formed, thus : . It moulted May 21st. The skin of its head came away complete, like a helmet; the larva apparently having withdrawn its head from the neck opening.

*Larva—Third stage.*—Length, four-tenths of an inch. Head and collar jet-black as before; the former indented. Colour of body, pale grass-green. The larva in this stage is thickly set with black spines or processes. On the third and fourth segments, above the second and third pairs of legs, are, on either side, twin dark brown warts, one above the other and near together—thus (:). Over the last pair of pro-legs is a large and conspicuous wart of the same nature, and on each of the other segments are three smaller warts, one above another at wide intervals. Above the claspers are a number of bristles. The larva moulted on the 2nd of June. The head-case came away as before.

*Larva—Fourth stage.*—Length after moult, seven-tenths of an inch. Head deeply indented, black, with two dull yellow stripes extending down the face. Body dull greenish-yellow, very thickly set with black processes and brownish warts, giving the effect of a dull grass-green. The large wart above the hindmost pro-leg, on either side, larger and more conspicuous than before.

On the 12th of June the larva became quiescent, resting in its nest. On the 13th I noticed that the skin had parted at the neck, and that the creature was withdrawing its head (which was white and resembled parchment) from its old case. The process was not completed till 10 o'clock a. m. of the next day. Then the head rapidly darkened to black.

*Larva—Fifth stage.*—Head as before. Body of a dark sage-green, approaching to brown, and thickly set with minute black warty processes. A dark dorsal line and an indistinct spiracular line (of a lighter tint than the body colour) mark the larva in this stage. The spiracles are black, and the fore legs black; the pro-legs are of the colour of the body. Between the 10th and 11th and the 11th and 12th segments, on both sides at the bottom, are conspicuous white patches (or breaks in the skin), the nature of which I do not understand. The larva attained its greatest size on the 24th of June. It was then an inch and two-tenths long. It continued to feed till the end of the month. It then became restless, and shrank up considerably. On the 3rd of July it fixed upon a place for its nest. It gathered the surrounding blades of grass together and bound them with a net-work of silk, in which were flakes of whitish scurf [Query.—Did these come from the white side patches?]. It changed to the pupa on the 6th of July. Its head-case and skin came off together and fell to the bottom of the nest.

*Chrysalis* seven-tenths of an inch long. Head-cover and wing-cases mouse-colour. Abdomen dull yellow, with a tinge of blue above. The Imago appeared on the 21st of July—the chrysalis case having opened from the back of the head to the back of the thorax to allow of its escape.

*Imago* ♂.—Expanse of wings 1.6 inches; length of body .6 inch. Basal half of the primaries, ochre-yellow; outer half, brown. Near the apex is a broken curve of ochreous dots. In the centre of the wing is a long metallic dash in a dark brown setting; fringes brown. The secondaries are brown with ochreous spots and dashes; fringes gray. Underneath the primaries are paler than above, and the secondaries are sage-green with small white lunettes edged on the inner side with brown, and arranged in a double curve.

*Imago* ♀.—Somewhat more robust in form than the male, and deeper in colour—the brown prevailing. Instead of the metallic dash there is merely a brown patch in the middle of the fore wing. The ochreous spots on the upper side of the secondaries are more conspicuous than in the male.

The perfect insect frequents the flower-heads of *Solidago lanceolata*, L., and has a bold and rapid flight. Last season I did not see a single specimen at large.

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NOTE ON THE SETÆ OF THE LARVÆ OF THYATIRIDÆ,  
AND A CORRECTION.

Recently I have examined the larvæ of some European Thyatiridæ, and find the setæ arranged exactly as in our species. [See Proc. Boston Soc. Nat. Hist., 1894, p. 399.] The supplementary seta behind iii. varies a little in position, but is uniformly present. The species examined are *Habrosyne derasa*, *Thyatira batis*, *Bombycia or, B. duplaris*, *Asphalia ruficollis*, and *A. fluctuosa*. A correction must be made in my description just referred to (pp. 400-401). The species there described in all its stages as "*Thyatira scripta*" is really *Pseudothyatira expultrix*. The following list may straighten out the matter:—

*Habrosyne scripta*.

1883. Thaxter, Papilio III., 10. Describes egg and sixth stage.

*Pseudothyatira cymatophoroides*.

1863. Grote, Proc. Ent. Soc., Phil., II., 124. Sixth stage.

1883. Thaxter, Papilio III., 10. Sixth stage.

1895. Dyar, Proc. Bost. Soc. Nat. Hist., XXVI., 400. Egg, all stages (as *Thyatira scripta*).

*Euthyatira pudens*.

1889. Dyar, CAN. ENT., XXI., 209. Mature larva.

Thus, the larvæ of only thirty-three per cent. of our species of Thyatiridæ are known. This is a poor showing for such a small family. Of the Notodontidæ fully sixty-six per cent. are known.

HARRISON G. DYAR.

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A NEW GENUS AND SPECIES IN THE APHELININÆ.

BY L. O. HOWARD, WASHINGTON, D. C.

I recently received from Mr. T. D. A. Cockerell, Las Cruces, New Mexico, a minute parasite of a Ceroplastes on *Euphorbia hypericifolia* from the Red Hill district of Jamaica, which was transmitted to him by Dr. M. Grabham. Both genus and species prove to be new, and are printed separately, partly for the reason that my revision of the Aphelininæ of North America has recently been published and I do not expect to do any extensive work on the subfamily again for some time, and partly for the reason that Mr. Cockerell wishes to use the names in the Journal of the Institute of Jamaica. The description follows:



*Aneristus*, n. gen.

Resembles *Coccophagus*. Flagellum of antenna strongly flattened. Scape short, inserted just above the mouth and reaching to middle of face; pedicel short, triangular, as long as broad. Funicle joint 1 twice as long as pedicel, somewhat longer than broad. Funicle joints 2 and 3 each shorter than 1, and 3 shorter than 2; each about as broad as is joint 1 at tip. Club distinctly 3-jointed, a little broader than funicle joint 3; joints 1 and 2 of club subequal in length and each as long as funicle joint 3. Joint 3 of club about as long as 2, somewhat narrower at base than 2, pointed at tip. In other respects resembles *Coccophagus*, except that the hind tibiae are considerably flattened and have a row of short stiff bristles above. Middle tibial spur long and slender, nearly as long as first tarsal joint.

*Aneristus ceroplastæ*, n. sp.

Female.—Length, .8 mm.; expanse, 1.6 mm.; greatest width of fore wing, .27 mm. Mesonotum finely and closely shagreened, with sparse, rather long, dark pile; eyes hairy. Colour black, slightly shining, all coxæ and femora black; front and middle tibiae and all tarsi pallid; hind tibiae black. Wings with a very large discal infuscated patch, covering nearly half the wing area.

Described from two specimens reared by T. D. A. Cockerell from *Ceroplastes* on *Euphorbia hypericifolia* from Jamaica.

## CORRESPONDENCE.

Sir,—On looking over my paper in the CANADIAN ENTOMOLOGIST, I note one or two unfortunate errors. Page 313, lines 8 and 10, read *C. helloides* and *P. tharos* in lieu of "Epixanthe" and "Pratensis." The specimens that I thought to be "epixanthe" and "pratensis" respectively were determined by Mr. Fletcher to be only varieties of "helloides" and "tharos," and the error in my paper seems to have escaped notice and correction. I may here mention that this spring I took several specimens of *Lycena sæpiolus*, which has hitherto appeared rather scarce in this neighbourhood. This last season has been the worst, from an entomological point of view, I have had since I came to the country. I have never seen so few insects, either Diurni or Noctuæ; and even the number of mosquitoes was considerably diminished. During May and the early part of June we had constantly frost at night, which seemed to do great damage to insect life.

E. F. HEATH, The Hermitage, Cartwright, Man.

## BOOK NOTICE.

THE NATURAL HISTORY OF AQUATIC INSECTS, by Professor L. C. Miall, F. R. S. London and New York. Macmillan & Co. (66 Fifth Avenue, N. Y.) Price, \$1.75. Pp. 395.

This interesting work is intended, as the author states, "to help those Naturalists who take delight in observing the structure and habits of living animals," and also to revive an interest in the writings of some of the old Zoologists who did notable work in their day, but who are now almost forgotten, namely. Lyonnet, Reaumur, Swammerdam and De Geer, of whose lives and work he gives a short account.

To any lover of Nature, who wishes to look into the lives and doings of living creatures and to investigate their structure and appliances for carrying on the business of their lives, this book will prove a very great help as well as an unfailing pleasure, and it ought to lead many a reader to explore for himself the ponds and pools in his own neighbourhood, which teem with insect life. The different groups of insects that live in the water in their larval or perfect states are treated of in turn: water beetles and the larvæ of many flies, the caterpillars of some moths, caddis worms, May-flies, Alder-flies (*Sialide*), stoneflies (*Perlidae*), Dragon-flies, pond-skaters, water-boatmen, etc. The very names of these insects bring to mind what one cannot fail to have seen and watched and wondered over. To have many of these wonders explained and described, and to have the insects themselves depicted and the peculiarities of their structure made clear by excellent wood-cuts, is what we owe to the author of this book, and we hope that many will turn to its pages with profit and delight. It is a handsome volume, with clear, large type and a number of very good illustrations.

THE FIRST ANNUAL REPORT of the Entomological Society of Ontario, 1870 (published early in 1871), has just been reprinted *verbatim* by the Department of Agriculture for Ontario. It was thought best to reissue the volume without any alterations or attempt to bring it down to date, as it is chiefly wanted for completing sets in libraries and private collections. That there should be a demand for a work of this kind nearly a quarter of a century after its first publication is a somewhat remarkable event. Copies may be obtained by applying to Mr. J. A. Moffat, Victoria Hall, London, Ontario.

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