

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Cover title missing/
Le titre de couverture manque

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Showthrough/
Transparence

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Includes index(es)/
Comprend un (des) index

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title on header taken from:/
Le titre de l'en-tête provient:

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments:/
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The Canadian Entomologist.

VOL. XXVI. LONDON, FEBRUARY, 1894.

No. 2.

A CHECK LIST OF THE NEARCTIC COCCIDÆ.

BY T. D. A. COCKERELL, LAS CRUCES, N. MEX.

It is ten years since Prof. Comstock published his list of North American Coccidæ*, and as the work done since that time is scattered through very various publications, it seems opportune to present a check list, from which the student can learn precisely what species are now credited to our fauna.

All forms from America north of Mexico are included herein, but a few Mexican species which perhaps belong rather to the nearctic than neotropical region, are excluded. Species known to have been introduced and which have no claim to belong to the North American fauna, are placed within square brackets []. Synonyms are in italics.

ICERYA, Sign.

- [1. *I. purchasi*, *Maskell*, 1878.]
2. *I. rosæ*, *Riley & Howard*, 1890.

CEROCOCCUS, Comst.

3. *C. quercus*, *Comst.*, 1882.

GOSSYPARIA, Sign.

- [4. *G. ulmi*, *Geoff.*]

ERIOCOCCUS, Targ.

- [5. *E. azaleæ*, *Comst.*, 1881.]
[6. *E. araucariæ*, *Mask.*, 1878.]
7. *E. quercus*, *Comst.*, 1881.

DACTYLOPIUS, Costa.

- [8. *D. adonidum*, *Linn.*, 1767.]

9. *D. citri*, *Boisd.*

phyllococcus, *Ashm.*, 1879.

destructor, *Comst.*, 1881.

- [10. *D. longifilis*, *Comst.*, 1881.]

11. *D. crawii*, *Coquill.*, 1889.

12. *D. ryani*, *Coquill.*, 1889.

- [13. *D. iceryoides*, *Mask.*, 1891.]

BERGROTHIA, Kraatz.

14. *B. townsendi*, *Chll.*

PHENACOCCUS, Ckll.

15. *P. yuccæ*, *Coquill.*, 1890.

16. *P. helianthi*, *Ckll.*

17. *P. aceris*, *Geoff.*, 1762.

COCCUS, Linn.

18. *C. cacti*, *Linn.*

19. *C. confusus*, *Chll. MS.*

20. *C. sorghiellus*, *Forbes.*

21. *C. trifolii*, *Forbes.*

KERMES, "Linn."

22. *K. galliformis*, *Riley*, 1881.

TACHARDIA, Sign.

23. *T. larreæ*, *Comst.*, 1882.

ORTHEZIA, Bosc.

24. *O. americana*, *Walker.*

25. *O. occidentalis*, *Dougl.*, 1891.

* 2nd Rept. Dept. Entom., Cornell Univ. Exper. Station (1883).

26. *O. annæ*, *Ckll.*
 27. *O. edwardsii*, *Ashm.*, 1888.
 [28. *O. insignis*, *Dougl.*, 1887.]
 PROSOPOPHARA, *Dougl.*
 29. *P. rufescens*, *Ckll.*, 1893.
 ASTEROLECANIUM, *Targ.*
 [30. *A. quercicola*, *Bouché.*]
 31. *A. pustulans*, *Ckll.*, 1892.
 LECANIODIASPIS, *Targ.*
 32. *L. yuccæ*, *Riley MS.*
 POLLINIA, *Targ.*
 [33. *P. pollini*, *Costa.*
costæ, *Targ.*, 1869.]
 PULVINARIA, *Targ.*
 34. *P. innumerabilis*, *Rathv.*, 1854.
acericorticis, *Fitch.*, 1860.
acericola, *W. & R.*, 1868.
 35. *P. macluræ*, *Kenn. MS.*, *Fitch.*
 1855.
macluræ, *W. & R.*, 1868.
 ?[36. *P. vitis*, *Linn.*]
 37. *P. salicis*, "*Bouché*," *Sign.*,
 1873.
 38. *P. bigeloviae*, *Ckll.*
 [39. *P. camelicola*, *Sign.*, 1873.]
 LECANIUM, *Illig.*
 40. *L. hesperidum*, *Linn.*
 ?[41. *L. depressum*, *Targ.*]
 42. *L. armeniacum*, *Craw.*
 43. *L. pruinatum*, *Comst. MS.*,
Cog., 1891.
 44. *L. platycerii*, *Pack.*, 1870.
 45. *L. quercitronis*, *Fitch.*
 46. *L. quercifex*, *Fitch.*
 47. *L. fletcheri*, *Ckll.*, 1893.
 48. *L. quercus*, "*Linn.*," *Sign.*
 49. *L. ribis*, *Fitch.*, 1856.
 50. *L. tulipiferæ*, *Cook*, 1878.
 ?*vilis*, *Fitch*, nec *Linn.*
 [51. *L. pyri*, *Schrank.*]
 52. *L. robiniarum*, *Dougl.*, 1890.
robinia, *Riley MS.*
 [53. *L. persicæ*, *Fabr.*, 1798.]
 54. *L. juglandifex*, *Fitch.*, 1856.
 55. *L. fitchii*, *Sign.*, 1873.
 56. *L. cynosbati*, *Fitch.*, 1856.
 57. *L. corylifex*, *Fitch.*, 1856.
 58. *L. cerasifex*, *Fitch.*, 1856.
 59. *L. caryæ*, *Fitch.*, 1856.
 60. *L. antennatum*, *Sign.*, 1873.
 61. *L. hemisphæricum*, *Targ.*
 62. *L. hibernaculorum*, *Boisdv.*,
 1868.
 63. *L. filicum*, *Boisdv.*, 1868.
 64. *L. oleæ*, *Bern.*
 CEROPLASTES, *Gray.*
 65. *C. cirripediformis*, *Comst.*, 1881.
 66. *C. artemisiæ*, *Riley MS.* (*nec*
Rossi).
 67. *C. irregularis*, *Ckll.*
 68. *C. floridensis*, *Comst.*, 1881.
 ?[69. *C. rusci*, *Linn.*]
 CTENOCHITON, *Mask.*
 ?[70. *C. perforatus*, *Mask.*, 1879.]
 ASPIDIOTUS, *Bouché.*
 [71. *A. nerii*, *Bouché*, 1833.]
 72. *A. uvæ*, *Comst.*, 1881.
 var. *coloratus*, *Ckll.*
 73. *A. perniciosus*, *Comst.*, 1881.
 74. *A. ancylus*, *Putnam*, 1877.
 75. *A. abietis*, *Comst.*, 1883.
 76. *A. abietoides*, *Pettit MS.*
 77. *A. pini*, *Comst.*, 1881.
 [78. *A. cyanophylli*, *Sign.*, 1869.]
 [79. *A. spinosus*, *Comst.*, 1883.]
 80. *A. juglans-regiæ*, *Comst.*, 1881.
 81. *A. convexus*, *Comst.*, 1881.

82. *A. cydoniæ*, *Comst.*, 1881. *juglandis*, Fitch, 1856.
 83. *A. rapax*, *Comst.*, 1881. *pomicorticis*, Riley, 1873.
 ? = *camelliæ*, *Boisduv.*, 1868. PINNASPIS, Ckll.
 84. *A. perseæ*, *Comst.*, 1881. [102. *P. pandani*, *Comst.*, 1881.
 85. *A. tenebricosus*, *Comst.*, 1881. ? = *buxi*, *Bouché*.]
 [86. *A. ficus*, *Riley MS.*, *Ashm.*, CHIONASPIS, Sign.
 1880.] 103. *C. citri*, *Comst.*, 1883.
 87. *A. smilacis*, *Comst.*, 1883. 104. *C. euonymi*, *Comst.*, 1881.
 88. *A. obscurus*, *Comst.*, 1881. 105. *C. furfurus*, *Fitch*, 1856.
 [89. *A. aurantii*, *Mask.*, 1878. *cerasi*, Fitch, 1856.
 citri, *Comst.* 106. *C. lintneri*, *Comst.*, 1883.
 var. *citrinus*, *Coquill.*] 107. *C. salicis*, *Linn.*
 90. *A. corticalis*, *Riley MS.* *salicis-nigræ*, *Waish*, 1868.
 91. *A. sabalis*, *Comst.*, 1883. 108. *C. spartinae*, *Comst.*, 1883.
 PSEUDOPARLATORIA, Ckll. 109. *C. nyssæ*, *Comst.*, 1881.
 92. *P. parlatorioides*, *Comst.*, 1883. 110. *C. pinifolii*, *Fitch*, 1855.
 PARLATORIA, Targ. 111. *C. quercus*, *Comst.*, 1881.
 93. *P. pergandii*, *Comst.*, 1881. 112. *C. ortholobis*, *Comst.*, 1881.
 var. *camelliæ*, *Comst.*, 1883. [113. *C. biclavus*, *Comst.*, 1883.]
 94. *P. proteus*, *Curtis*, 1843. POLIASPIS, Mask.
 ?[95. *P. zizyphus*, *Lucas*, 1853.] [114. *P. cycadis*, *Comst.*, 1883.]
 FIORINIA, Targ. DIASPIS, Costa.
 [96. *F. fioriniæ*, *Targ.*, 1867. [115. *D. cacti*, *Comst.*, 1883.]
 camelliæ, *Comst.*, 1881. [116. *D. carueli*, *Targ.*, 1868.]
 ISCHNASPIS, Dougl. [117. *D. harrisii*, *Walsh*, 1860.
 [97. *I. filiformis*, *Dougl.*, 1887. ? = *circularis*, *Fitch*, 1856.
 ? = *longirostris*, *Sign.*, 1882.] *ostreaeformis*, *Sign.*, (nec
 MYTILASPIS, Targ. *Curt.*)]
 98. *M. citricola*, *Pack.*, 1870. AULACASPIS, Ckll.
 ? = *pinnæformis*, *Bouché*. 118. *A. rosæ*, *Bouché*, 1833.
 99. *M. gloverii*, *Pack.*, 1869. [119. *A. bromeliæ*, *Kerner*, 1788.]
 100. *M. albus*, *Ckll.*, var. *concolor*, [120. *A. boisduvalii*, *Sign.*, 1869.]
 Ckll. *Fossil Species*.
 101. *M. pomorum*, *Bouché*, 1851. LEACHIA, Sign., (nec *Risso*).
 ? = *linearis*, *Moder*. 121. *L. simplex*, *Scudd.*, 1890.
 pyrus-malus, *Kenn.*, 1854.]

NOTES.

(1.) An interesting Monophlebid, representing a new genus and species, is found on *Prosopis* at Las Cruces. It cannot be included in the

list, being at present nameless. Prof. C. H. T. Townsend has given an account of it in Bull. 7 of the New Mexico Exper. Station, and it will be described in detail and named at some future time by Prof. Riley.

The adult ♀ has a large white ovisac, and 9-jointed antennæ. The young (2nd stage) are so much like *Icerya palmeri* that I thought they might be that species; but Prof. Riley pointed out to me that the newly-hatched larvæ could be distinguished from *I. palmeri* without any difficulty, since they possess only four (instead of six) especially long terminal hairs, and these are not so long as in *palmeri*.

On July 21 I was fortunate in finding the ♂. Its body is dark dull red, antennæ and legs black. The wings are smoky with a dark costa and two white lines. There are no conspicuous caudal appendages, but two black bristles of only moderate length. Dorsum of thorax more or less shiny black.

(2.) It seems doubtful whether *Dactylopius adonidum*, as defined by Signoret, can be definitely recorded from North America.

(3.) *Dactylopius iceryoides*, *Ctenochiton perforatus*, etc., are mentioned in *Insect Life*, April, 1893, p. 281-2, as having been imported into California. I suppose, however, that they have not become established there, and so have marked them with a query in the list. The species referred to are Nos. 13, 41, 69, 70. Others mentioned in the same article are well-known to be established in America.

(4.) *Bergrothia* takes the place of *Westwoodia* (preoccupied). A second species is known to occur in North America, but it has not been named.

(5.) Nos. 14, 16, 26, 38, 67, 72 var., and 100 var. have not been published at the date of writing, but their descriptions have been sent out for publication.

(6.) *Phenacoccus* takes the place of *Pseudococcus*, Auctt., nec Westwood.

(7.) *Coccus confusus* (which probably includes all reputed *C. cacti* of the Rocky Mtn. Region) is congeneric with an insect from Mexico, which Lichtenstein identified as *Acanthococcus tomentosus* (Lam.). The larva has spines after the manner of *Capulinia sallei*; the antennæ of the adult ♀ are very degenerate, 5-jointed. Hab., Las Cruces, N. Mex., on cacti.

(8.) *C. trifolli* and *sorghiiellus*.—I know these only from Prof. Garman's account in 2nd Kentucky Report. One can safely say that they

do not belong to *Coccus*, as now understood; and until they are more critically examined it will be hard to guess at their proper location.

(9.) *Orthezia insignis* has been found by Mr. R. H. Pettit in a hot-house in the State of New York.

(10.) Nos. 32, 66, 52 syn., and 90 are credited to Riley MS. The names have all been published (two by Prof. Townsend, two by Mr. Howard), but no formal descriptions have appeared.

(11.) *Pulvinaria vitis* probably occurs with us, but it requires confirmation. It is recorded by Fitch.

(12.) *P. camellicola* I have from Macon, Ga., sent by Dr. Riley.

(13.) *Lecanium armeniacum* is a Californian species; to judge from published figures, much like *depressum*.

(14.) *Lecanium pyri* is recorded by Fitch. He confused some *Pulvinaria* with it, but there is no such species as *Pulvinaria pyri*, Fitch, properly speaking. Mr. J. Fletcher has sent me a *Lecanium* on apple, from P. Edward I.; the specimen arrived squashed flat, but on careful examination I cannot see that it is other than veritable *L. pyri*, Schr. It is strongly and thickly pitted, like the form found by Signoret on apple.

(15.) *Aspidiotus abietoides* will be described by Mr. Pettit. He has kindly sent me specimens.

(16.) *Aspidiotus spinosus* and one or two other species are marked as introduced, because only found on hot-house plants, although their native country is unknown.

(17.) *Aspidiotus juglans-regia*, from its mode of occurrence, might be suspected as a foreigner; and it is to be observed that in the same year that it was published, Colvée described an *A. juglandis* from Catalonia. Dr. J. V. Carus has most kindly transcribed for me the description of the latter, and I find it very nearly fits *juglans-regia*,—so nearly, that the differences in the descriptions may not be essential.

(18.) *Parlatoria zizyphus* I have found on lemons exposed for sale at Las Cruces, N. Mex. The vendor told me he thought they came from Mexico, but was not sure.

(19.) It has seemed strange that *Ischnaspis filiformis* was not described until 1887. Dr. V. Carus has kindly transcribed for me the description of *Mytilaspis longirostris*, Sign., 1882, and on reading it, I can hardly believe it is other than *I. filiformis*.

(20.) *Leachia simplex* was described as a *Monophlebus*. Mr. Scudder

has kindly sent me a drawing of the fossil, and judging from this and the description, I would place the insect preferably in *Leachia*.

Postscript.—*Leachia*, Sign., may be altered to PALÆOCOCCUS, as the name is preoccupied in Mollusca. I did not make the change in the list, as I was not sure whether the Mollusean name was valid, and I hold the "once a synonym, always a synonym" doctrine to the ridiculous. However, I have just received the following from Dr. W. H. Dall, to whom I had applied for information:—" *Leachia* Leseuer, = *Loligopsis*, Lam., but *Leachia*, Risso, according to Monterosato, is valid and is the earliest name for the group to which it is applied. I should advise changing your Coccid *Leachia* under the circumstances." T. D. A. COCKERELL.

NOTES ON COLEOPTERA.

BY C. W. STROMBERG, GALESBURG, ILL.

There are still a few species of *Agrilus* in our fauna whose food plant is unknown. Any contribution in that direction may, therefore, be of interest. It is a genus that seems to be much neglected by collectors, owing undoubtedly to the difficulty met with in separating some of the species. There are several seemingly difficult ones, however, which are stamped with such distinct characters as to make their study exceedingly interesting. With Dr. Horn's valuable paper, "The Species of *Agrilus* of Boreal America," and a well-trained eye, one should be able to get along without much assistance. That does not apply to myself, for it was only after Mr. Blanchard kindly undertook to help me out that my material was properly labelled.

Agrilus masculinus, Horn, was taken during July on the common box-elder or ash-leaved maple (*Negundo aceroides*.) This species resembles *otiosus*, but the ♂ has "prosternum with a space in front densely covered with short erect pubescence." This patch of hair is of a yellowish colour and can be seen distinctly with an ordinary lens if the insect is held up sidewise to the light. Once seen it will always be recognized. The ♀ is not easily distinguished from *otiosus*.

A. otiosus was beaten from hickory, walnut, butternut and dogwood.

A. arcuatus, oak, elm and hazel.

A. fallax, oak, June 12.

A. obsoletoguttatus, quite common on the red and laurel oaks, June.

A. Lecointei, not rare on hackberry (*Celtis occidentalis*), June and July.

A. impexus occurs on the two locusts (*Gleditschia triacanthus* and

Robinia pseudacacia), July and Aug.

This sp. resembles *fallax*, but it has antennæ serrate from the fifth joint, while in *fallax* they are serrate from the fourth. There are other well-marked characters for separating them, which are all given in the above-mentioned paper.

Dicerca lepida, Lec., is rare here. It has been beaten from hawthorn, and also found hibernating near the trunks of large trees on the ground among the leaves. Also found it once under bark on a stump, where it had spent the winter.

Pacilonota thureura, Say., occurs on the black willow during July and Aug., and is not common.

Cinyra gracilipes, Melsh., is quite common on the burr or moss-cup oak (*Quercus macrocarpa*).

Chrysobothris azurea, Lec., not common. Beaten from linden.

Cacoplia pullata, Hald., is not often seen in exchange lists. Two specimens of this species were beaten from moss-cup oak several years ago.

Zeugophora scutellaris, Suffr., is another which is not offered for exchange. This pretty species occurs on the cottonwood during July and Aug., but seems to be rare.

NOTES UPON LYCÆNA EXILIS, BOISDUVAL, WITH DESCRIPTIONS OF SOME OF ITS EARLY STAGES.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

On July 24th, 1893, I received a number of pupæ of *Exilis*, made on the road, and three nearly adult larvæ (after the last moult), sent me by Mr. T. D. A. Cockerell, at Las Cruces, New Mexico, and found on flowers of *Atriplex canescens*, of which a plentiful supply was also sent.

Description of ADULT LARVA.—Length at rest, .26 inch; in motion, .3 inch; very like *L. Comyntas* in shape, being long, narrow, about equally rounded at the two ends, segment 2 turned forward to the plane of the underside of the body, and concealing the head; the sides at base nearly parallel, a little convex; the dorsum elevated; from 3 to 10 on dorsum is a flattened, sub-triangular tuberculous process to each segment, as in many species of the genus; colour light green, with a silvery sheen that is caused by innumerable fine, white appressed hairs; the dorsal triangles yellowish, mottled crimson, and there is a crimson mid-dorsal line; on 11 is a dorsal cross-slit, as in *Pseudargiolus* and *Comyntas*, and no doubt there is a pair of cylindrical membranes with

tentacles concealed within 12, as in the species mentioned, though I had no opportunity to see them active; head minute, obovoid, dark brown, placed on the end of a long, conical neck.

CHRYsalis.—Length, .22 inch, breadth at mesonotum, .06, at abdomen, .09 inch; shape elliptical; the head case rounded and truncated somewhat; the mesonotum slightly prominent, rounded at tip, not carinated, the sides a little convex, followed by a slight depression; abdomen somewhat tumid; colour yellow-white, with a pink tint over the head case; surface sparsely and irregularly dotted black, with two sub-dorsal rows of larger dots of same hue from 5 to 12. One pupa from the three larvæ gave imago 14th August, but as I had omitted to note the date of pupation, I am unable in this case to give the duration of the stage. But another pupa of those formed in route gave imago 29th July, and as it had been mailed on the 22nd, I conclude the stage must endure through six or seven days.

Mr. Cockerell wrote 22nd July:—"Yesterday, walking to the Agricultural College, I found a bush with ants running in numbers over the twigs. Looking to see what they were after, I came across a larva and then another. Presently I saw that the bush was swarming with them, only they were so perfectly concealed by their colour that I should not have noticed them except for the ants. They (the larvæ) were little and big and quite exposed to view. On same bush were many Coleopterous larvæ in their cases, and flying about the bush were many of the *Exilis* butterflies." Some of the ants were sent me with a supply of the flowers, and they were tiny creatures.

In letter of 29th July:—"Yesterday I saw a female *Exilis* deposit an egg; she thrust it under a flower on the outside. I had to look very closely to find it, even after seeing it laid. The egg is circular, seen from above, flat, greenish-white."

Dr. Boisduval described *Exilis*, in 1852, from a female, which he says is the only example of the species he has seen; and speaks of it as one of the smallest Lycænæ known. The male is considerably smaller than the female, and I think may be the smallest butterfly in the world. Notwithstanding its littleness, it flourishes in southern California, Arizona, New Mexico, parts of Colorado, Texas, and has even reached Florida. Mr. Cockerell wrote me 9th December:—" *Exilis* is still in the imago here. I caught one to-day at rest on the stalk of a Solanum. Is it possible that they hibernate as butterflies? We have had plenty of frost, though no snow as yet."

ON SOME AQUATIC LARVÆ, WITH NOTICE OF
THEIR PARASITES.

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

During the past summer, while on a visit to the northern portion of this State, my attention was attracted to the presence of numerous mud cells on the lower surface of stones lying along the banks of the Wapsipinicon River. These cells, most of them empty, with one end forced off, somewhat resembled the single one with which some of our common mud-wasps start their establishment on the ceilings of little-used rooms, or on the rafters of outhouses, but very much smaller. The largest measure about 12 mm. in length and 8 mm. in breadth, while the small ones are only 5 mm. long and 2.5 mm. wide.

After considerable search I finally succeeded in obtaining a curious pupa from one of the large cells, quite different from any with which I was previously acquainted. A cursory examination showed it to possess four eyes, two on each side of the head, the components of each pair being connected by a fine black line. This character directed suspicion to the probability of its being a Gyrinid, and confirmation was furnished by finding the legs, though rather poorly defined, evidently belonging to a beetle of that family. It was finally decided to be *Dineutes assimilis*, Aubé, the common large whirligig of our country. A half day of stone-turning resulted in the finding of more pupæ and several larvæ, as well as two or three of the soft and helpless freshly-emerged beetles. A number of the inhabitants of the little cells were also found in all three stages, and proved to be a *Gyrinus*, probably *picipes*, Aubé.*

Two of the *Dineutes* pupæ were each seen to be accompanied in their cells by a little white larva of rather robust form, evidently there with intent to do great bodily injury. Bringing them home in their original cells, I was able to watch the growth of these little creatures until one transformed to a pupa, and finally disclosed a beetle, which proved to be a species of *Brachinus*, probably *janthinipennis*, Dej. However, the determination cannot be considered authoritative, because the beetle died before attaining its full colours. The larva lies in the cell of its host and extracts the juices through an opening made in one of the wing-pads; the maggot-like body is adorned, but not supported, by six very soft and short legs, which can be of little service except perhaps as "feelers" in

* Detailed descriptions of these larvæ, with figures, may be found in Vol. II., No. 4, of the Bulletin from the Nat. Hist. Lab. of the State Univ. of Iowa.

its dark abode. The mouth is filled with a blackish fluid when withdrawn from the feeding spot. If gently touched, the head and fore part of the body would be raised, as stiffly as consistent with such a soft insect, and this posture maintained for some moments.

The little animals were carefully watched and examined several times a day, until finally the larger one, having withdrawn nearly all the juices from the pupa and become swollen to an unwieldy size, changed, after a day or two of resting, into a pupa—still in the original cell which I had removed from a stone and turned upside-down for more convenient examination. The smaller one was restless and refused to finish its feeding on the original pupa, so, as it had apparently not completed its growth, I tried it with a fresh one of *Tropisternus glaber*, which was immediately accepted as a substitute. The first pupa was probably spoiled, either by mould or bacterial decomposition, hence the necessity for fresh food in this instance. As soon as the larva had completed its growth I consigned it to the alcohol bottle for study.

How the *Brachinus* gets into the cell of its host, whether brought as a young larva clinging to that of *Dineutes*, or deposited as an egg by the mother, is a mystery to me. When small it is more active than when larger grown, and with advanced age becomes gradually more helpless. In any case the complete adaptation to a parasitic habit is apparent in the whole structure—the soft, juicy body, unprotected by chitinous scutes, the weak legs, quite useless for ambulatory purposes, and the lack of strong, locomotive bristles. The appearance is almost that of some Hymenopteron, not at all resembling the strong raptorial larvæ of Adephega in general. I cannot believe that the larvæ of all our American *Brachinus* live on *Dineutes*, but it is quite possible that they feed on the helpless pupæ of such other Adephega as frequent the damp spots favoured as habitations by these beetles. Perhaps some of the readers of the CANADIAN ENTOMOLOGIST may be induced to investigate the matter, or to make known the results of study if the investigation be already made.

While two *Dineutes* pupæ were infested as noticed above, another of the same species was seen to be the abode of several little maggots, which soon changed to small black pupæ, loose in the cell, without spinning cocoons. From these I finally got four specimens of a small Chalcid, eleven or twelve days after I first noticed the larvæ, which, however, were nearly full grown at that time. From Mr. Ashmead, to whom I sent the little insects, I hear that they belong to the genus *Cyrtogaster*, not

previously recorded (though known) in North America. He has called it *C. dineutis*, and as Mr. Howard, in a recent paper on the biology of the Chalcididæ*, has remarked that Hymenopterous parasites of aquatic insects are excessively rare, I have thought it worth while to give a rather detailed account of the circumstances connected with breeding them.

Two unbroken cells of *Gyrinus* each contained, besides the remains of the pupa, one specimen of a little Ichneumonid belonging to the sub-family Tryphoninæ, which Mr. Ashmead has described as *Gausocentrus gyrini*. One of these was quite fresh and bright, the other had been dead long enough to break in handling. I think it extremely unlikely that the *Gausocentrus* will prove to be a hyper-parasite, but of course this can only be settled with certainty by further observations on the habits of the larva.

A specimen of the pupa of *Tropisternus glaber* was given alive to a large Carabid larva for food, but not attacked because the larva had just fed up. Two or three days later it was seen that the pupa was dead and the body infested by maggots, which afterwards produced a species of *Phora*, a Dipterous insect which Dr. Williston (who kindly furnished the generic determination) writes me is known to enter pupæ either living or dead. I have no means of ascertaining when or how the eggs were deposited on the pupa, or whether it was attacked in this way before or after death.

Besides the two Gyrinidæ already mentioned, I found under a stone, close to the margin of the river, another larva somewhat resembling them, with long abdominal filaments, only one of which was terminal. Not being able to see the mouth parts on account of the activity of the living specimens, I was unfortunately led to speak of it as probably a Gyrinid larva in the paper referred to, chiefly because of the fact that Packard and Westwood both figure larvæ of this family with large heads. The creature lived in a tin box of earth for five weeks, then moulted and died almost immediately afterward. An examination of the mouth shows it to be a Sialid larva, corresponding closely to Westwood's figures,† except that only one of the mandibles has two teeth, the other being furnished with but one, and the outer lobe of the maxilla has a process articulated to the inner angle instead of a simple production.

* Proc. U. S. National Museum, Vol. XIV.

† Modern Class. of Insects, Vol. II., p. 46.

DESCRIPTIONS OF THE LARVÆ OF CERTAIN TENTH-
REDINIDÆ.

BY HARRISON G. DYAR, NEW YORK.

*(Continued from Vol. XXV., page 248.)**Monostegia quercus-coccineæ*, n. sp.

Eggs apparently inserted by a series of thrusts of the ovipositor parallel to the midrib of the leaf. The saw cuts under the upper epidermis are confluent, forming a long blotch over 1 mm. wide and about 20 mm. long, running close to the midrib. The larvæ feed gregariously, eating the lower epidermis and parenchyma.

First stage.—Head oval, higher than wide, mouth pointed; blackish-brown, nearly black on vertex, shining; mouth pale; width, 0.25 mm.

Second stage.—Head shining, pale brown, darker around the black ocellus, pale around mouth; jaws dark; width, 0.4 mm.

Third stage.—Head oval, yellowish testaceous, shining; a brownish shade across between the black eyes; mouth dark; width, 0.55 mm. Body thick through the thoracic segments, slightly flattened, of even width posteriorly. Thoracic feet scarcely visible from above, pale. Abdominal feet on joints 6–12, joint 13 not touching the leaf in walking, but appears to possess a rudimentary pair of feet. Body entirely shiny, sticky, translucent whitish, shading into orange-yellow at the front and sides of thorax. Alimentary canal appearing by transparency dark green.

Fourth stage.—Head orange-yellowish, transparent; eye black; antennæ projecting before, conical; width, 0.8 mm. Body as before. Alimentary canal blackish or green. Dorsal vessel and tracheæ very plainly visible, the latter white, branching into fine ramifications, connected along the stigmatal line.

Fifth stage.—As before, but the body is very slightly milky, not, however, obscuring the internal parts, which are visible. Head, 1.1 mm. in width. The dorsal vessel shows plainly, contrasting with the milky-whitish body.

Sixth stage.—Head light-yellowish, eye black; width, 1.1 mm. Body shaped as before, but whitish, *not shining*, faintly 3-annulate, the internal organs obscured. The colour shades into orange (not ochereous-orange as before) on the thorax anteriorly and laterally; the alimentary canal giving a purplish median shade, centered by the darker dorsal vessel. Upon arriving at this stage, the larvæ leave the tree and form little elliptical cells in the ground for pupation.

Food-plant.—Black oak (*Quercus coccinea*).

Imago.—Black; basal, two-thirds of the wings smoky. Head densely punctured; a polished prominence behind the ocelli; two converging ridges in front, between which the lower ocellus lies; thorax polished. End of femora, all of the tibiæ and tarsi of anterior and middle legs white, except the last tarsal joints, which are dusky. Basal two-thirds of the posterior tibiæ and bases of all the tarsal joints white, the outer third of tibiæ and tips of tarsal joints banded with dusky. Forewings hyaline along outer margin for a space limited by a line drawn from stigma to internal angle, the basal part of wing smoky-blackish; veins and stigma black. Hindwings hyaline, the basal half faintly smoky. Expanse of wings, 10 mm.; length of body, 4.5 mm.

Two ♀♀, Woods' Holl., Mass.

Strongylogaster pacificus, Macgillivray.

Head round, pale, sordid whitish with a faint blackish, mottled line from above each eye to the vertex; eye large, round, black; jaws dark-brown; width, about 1.5 mm. Thoracic feet large, bent outward; abdominal ones present on joints 6-12, 13; segments 6-annulate. Colour, shining, translucent green, with a white subdorsal line running the whole length, nearly joining its fellow at the extremities. Spiracles small, black, joined by the thread-like white line of the tracheæ, showing by transparency. Length, about 20 mm.

When through eating, the larva becomes reddish and bores a gallery in a piece of decayed wood, where it remains till the following spring.

Food-plant.—Common brake (*Pteris aquilina*). Larvæ common in June at Portland, Oregon.

Monostegia quercus-albæ, Norton.

Larvæ bred by me on the white oak do not agree with Norton's description. His characterization of the fly, however, seems to fit my specimens perfectly.

Eggs.—Deposited in the manner described by Norton; forming small blisters on the underside of the leaf near the tip, separated from each other, each about 1.2 mm. in diameter.

* * * * *

Second stage.—Head oval, brown, blackish around the eye; mouth pale; width, 0.25 mm.

Third stage.—As in next stage. Width of head, 0.35 mm.

Fourth stage.—Head angularly pyriform in outline, narrowing upward, widest above the eyes; partly retracted below joint 2; smooth, shining black; width, 0.5 mm. Body very thick through the thoracic segments, more slender posteriorly, then gradually tapering. Thoracic feet covered to the dorsal view; tinged with blackish; abdominal ones present on joints 6-12, 13, the larva resting on them on the surface of the leaf. Colour slightly greenish, transparent, shining and sticky; alimentary canal plainly visible.

Fifth stage.—Not different. Head brownish-black; width, 0.7 mm.

Sixth stage.—Head shaped as before, but of a pale whitish-yellow, eye black; width, 0.7 mm. Body not shining, scarcely more than translucent, of the same yellowish colour as the head, and marked with orange on the sides of the enlarged thoracic segments. Two transverse, dorsal, watery lines on each joint 5-13, the anterior one short, the other reaching the sides. The larvæ now form a cavity in the earth, lined with a brown secretion.

Nematus coryli, Cresson.

Eggs.—Laid on the midrib in the manner of *Cresus latitarsus*, in a central incision.

* * * * * *

Second stage.—Head black; width, 0.45 mm.

Third stage.—Head rounded, shining blackish, mouth a little paler; eye black; width, 0.65 mm. Body shining, annulate, whitish, the alimentary canal giving a distinct light-green shade. Thoracic feet largely black. A row of blackish spots along the sub-ventral ridge; a pair of black, conical, anal projections. Abdominal feet present on joints 6-11, 13. No tubercles.

Fourth stage.—Head round, shining black; width, 0.9 mm. Body shining, coarsely 4-annulate, smooth, with minute setæ seen with a lens. Colour uniformly slightly olivaceous-green; thoracic feet marked with black at base and tip. A series of large olivaceous patches ventrally on joints 6-10.

Fifth stage.—Head flat before with clypeal dents; shining black; width, 1.25 mm. Segments shining, 4-annulate, setæ with inconspicuous concolorous bases. Colour olivaceous-green, shaded with leaden-blackish subdorsally and on sub-ventral ridge. Venter blackish, with eversible glands as in the mature larva.

Sixth stage.—Head round with a row of indentations bordering

clypeus; entirely shining black; width, 1.8 mm. Abdominal feet on joints 6-11 and 13, with fine ventral eversible glands on joints 6-10, blackish and longer than the feet. Body segments coarsely 4-annulate, smooth, shining, the tubercles represented by minute dark setæ. Colour, honey-brown, the dorsal region to the spiracles shaded with plumbeous black. Thoracic feet pale, tinged with blackish. Greatly resembles the larva of *C. latitarsus*; but the colour is a watery umber-brown, the black marks leaden.

Cocoon.—Formed below the ground. Thin, paper-like, shining, black, elliptical, 8×3.5 mm.

The flies emerged the latter part of July. Found on *Corylus rostrata* at Woods' Holl., Mass., and Plattsburgh, N. Y.

FOOD PLANTS OF SOME CALIFORNIAN LEPIDOPTERA.

BY JOHN B. LEMBERT, JERSEYDALE, MARIPOSA CO., CALIFORNIA.

I have observed the egg laying of the following species of Lepidoptera in the vicinity of the Yosemite Valley, California:—

Danaus archippus.—Oviposits on the tender leaves near the flower bud of *Gomphocarpus cordifolius*.

Argynnis epithora.—On the underside of the leaves of *Viola ocellata*.

Argynnis egleis (Highland variety).—On pine burrs, pine leaves, sticks and stones, on the shaded side and as far underneath as is possible for the ♀ to get.

Argynnis egleis (Lowland variety).—Anywhere on the leaves or stems of *Carex filifolia*, *Festuca ovina*, *Horkelia fusca*, *Potentilla gracilis*, *Viola canina*, etc.

Melitæa chalcodon.—In a cluster like a bunch of grapes, from two to fifteen or thirty eggs at a time on *Castilleia parviflora*.

Chrysophanus cupreus.—Under the leaves and on the side of the stalk of *Rumex pauciflorus*.

Chrysophanus arota.—On the underside of the leaf of *Vaccinium*.

Chrysophanus helloides.—On the seed pods or in the leaf whorls or the stems of *Oxytheca spergulina* and *Gayophytum diffusum*.

Chrysophanus editha.—On the underside of the leaf of *Horkelia fusca*.

Lycæna dædalus.—Between the petals and sepals or between the sepals and bracts of the flower of *Trifolium monandrum*.

Lycena rusticus.—As many as four eggs in succession on the upper side of the erect leaves of *Dodecatheon meadia* var. *lanceifolium*.

Anthocharis ausonides.—Mostly underneath the leaves of *Arabis* [? sp.].

Colias Behrii.—In the heart of the flower buds or tender leaves of *Vaccinium cæspitosum* and *Gentiana Newberryi*.

Parnassius smintheus.—On the side or top or hidden out of sight on the leaves of *Phlox cæspitosa*, *Carex filifolia*, *Gayophytum diffusum*, or on pine burrs, sticks and rocks.

Papilio eurymedon.—Under the leaves of *Ceanothus prostratus*.

Pamphila sabuleti.—At or near the base of the stem of *Carex filifolia* and under the leaves of *Trifolium monandrum*.

Pyrgus cæspitalis.—In the centre of the plant, *Horkelia fusca*.

Eudamus tityrus.—On the underside of the leaves and on the stalk of *Hosackia grandiflora*.

Eudamus nevada.—Singly or two beside each other on the leaves or stem of *Trifolium monandrum*.

Lepisesia clarkia.—On the underside of the leaves of *Clarkia rhomboidea* and *Gayophytum diffusum*.

Hemaris cynoglossum.—On the same.

Alypia mariposa.—On *Clarkia elegans* and *Godetia Williamsonii*.

Alypia Ridingsii.—On *Clarkia rhomboidea* and *Godetia Williamsonii*.

Oncocnemis exemplaris.—On the underside and top of the leaves of *Gentiana Newberryi* and on the grasses in the shadow of the plant.

Anarta Kellogii.—On the upperside of the erect, channeled leaves of *Carex filifolia*.

Plusia californica.—On *Trifolium monandrum*.

Plusia Hoehenwarthi.—Mostly underneath the leaves of *Carex filifolia*, *Gentiana Newberryi*, *Salix*, *Vaccinium*, *Antennaria dioica*, *Mimulus primularioides*, *Castelleia Lemmonii* and *Pentstemon confertus*.

Heliothis dipsaceus.—On *Erythræa venusta*.

Pyrausta unifascialis.—On the stems or stalk and on the leaves. A sugar-loaf-like egg, which is laid on sideways, applied near the pointed end on *Oxytheca spergulina* and *Gayophytum diffusum*.

THE GENERA *PIERIS*, *SCHRK.*, AND *EUCHLOË*, *HB.*

BY J. W. TUTT, LONDON, ENGLAND.

In the *Ent. Am.*, 1889, pp. 33-34, is a note by Mr. T. D. A. Cockerell, F. Z. S.; "On the origin of the genus *Anthocharis*, Bdv. (= *Euchloë*, Hb.)," and from his remarks on p. 34, it would appear that the larva of *Pieris protodice* and that of *Anthocharis ausonides* are practically identical, Mr. Cockerell's assumption being based on a letter received from Mr. W. H. Edwards. I am not at all certain as to the characters of the American species included in *Anthocharis*, or whether the American Anthocharids are co-generic with our species placed in *Euchloë*, Hb. Kirby separates the genera and includes our common British species, *cardamines*, in *Euchloë*, the American species in *Anthocharis*. I am anxious to learn whether our species of *Euchloë* are co-generic with the American species of *Anthocharis*.

In spite of the similarity of the larva of *Pieris* to that of *Anthocharis* as mentioned by Mr. Cockerell, an unailing (I believe) point of distinction occurs between *Pieris* and *Euchloë*, the larva of the latter having distinctly 7 subsegments to each segment, the larva of *Pieris* but 6. But a still more constant character exists in the neuration. In *Pieris*, the neuration (Fig. 2) is as follows:—

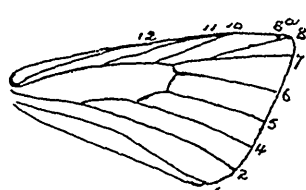


FIG. 2.

i.e.—Nervure 3 is absent, as also is 9, but 8 gives off a small branch at apex—8a. *Pieris brassicæ*, *rapæ*, *napi*, *callidice*, *daphnidice* and *bellidice* are identical in this respect.

But *Euchloë* has a different type (Fig 3). It is as follows:—

By comparing the diagrams above it will be noticed that in *Euchloë*, 7 starts on 8 much nearer the discoidal cell than in *Pieris*.

8a, is much larger in *Euchloë*, and 9 is an extra nervure in *Euchloë* not found in *Pieris*; 10 starts nearer the end of the cell in *Pieris* than *Euchloë*; whilst 6 is nearer to the base of 7 in *Pieris*.

Our *Aporia* is like *Pieris*, except that 7 starts nearly from the base of 8 (near the apex of cell), as in *Euchloë*, whilst 8a also is arranged as in *Euchloë*; 9 is absent as in *Pieris*.

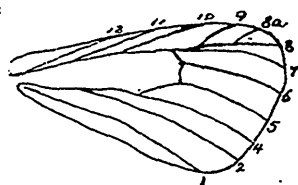


FIG. 3.

Leucophasia is a modification of *Euchloë*, but owing to the 'atrophy of the cell which occupies only a small portion of the basal area of the wing, 10 and 11, as well as 7, 9 and 8a, all rise from 8.

I should be exceedingly obliged if any one who has a good collection of the N. American *Pieridæ* would tell me which of the *Pieridi* and *Anthocharidi* have neuration of these types.

I do not wish in any way to suggest disagreement with Mr. Cockerell's views, which may or may not be correct, but at the same time I do wish to show that the superficial larval resemblance is unreliable; and I wish also to obtain some information as to which of the American *Pieridi* and *Anthocharidi* agree generically with our British *Euchloë* and *Pieris*.

Rayleigh Villa, Westcombe Hill, Blackheath, S. E.

ADDITIONS TO THE LIST OF CANADIAN COLEOPTERA.— PART II.

BY A. H. KILMAN, RIDGEWAY, ONT.

As a supplement to my list of additions to Canadian Coleoptera published in CAN. ENT., Vol. XXI., I beg to submit the following list of species taken since 1889, in Canada, and, as far as I can learn, not recorded in any of the published lists.

In the identification of species I have been aided by Mr. Ulke and Dr. Hamilton.

(The numbers prefixed are those in Henshaw's List.)

- 264 *Clivina rubicunda*, *Lec.* Very rare, on lake shore.
 296 *Panagæus fasciatus*, *Say.* One, on railway, May 23.
 413 *Bembidium cautum*, *Lec.* Several, in moss, in early spring.
 433 *Tachys proximus*, *Say.* Rare, hibernating in moss.
 620 *Evarthrus sodalis*, *Lec.* Five, in clay, under moss, February.
 712 *Diplochila obtusa*, *Lec.* One, under a log, May.
 739 *Badister flavipes*, *Lec.* Rare, hibernating in moss.
 820 *Platynus vicinus*, *G. & H.* One, on lake shore.
 838 " *exaratus*, *Mann.* Rare, on lake shore, in the debris.
 892 *Lebia analis*, *Dej.* One, found while beating willows at Point Abino.
 1119 *Harpalus testaceus*, *Lec.* Rare, in pasture field, May.
 1285 *Cœlambus punctatus*, *Say.* Several, in a pond, in low woods, May.

- 1426 *Agabus stridulator*, *Sharp*. Several, in marsh drain, at Crystal Beach, April.
- 1477 *Hydaticus stagnalis*, *Fab*. Eight, in marsh drain, April.
- 1545 *Helophorus nitidulus*, *Lec*. One, on lake shore.
- 1667 *Cercyon nigricolle*, *Say*. Not rare here, in the manure of pasture fields, June.
- 2114 *Quedius ferox*, *Lec*. Very rare, in moss, March.
- 2337 *Stenus indigenus*, *Casey*. Rare, hibernating in moss.
- 2484 *Cryptobium badium*, *Grav*. Rare, on lake shore, June.
- 2633 *Tachyporus elegans*, *Horn*. Rare, on fungus, July.
- 3753 *Cryptarcha strigata*, *Fab*. One, on a stump, June.
- 3799 *Corticaria dentigera*, *Lec*. Not common, found by beating withered branches, July.
- 3804 *Corticaria deleta*, *Mann*. Not common, got while sifting moss in spring.
- 3872 *Bactridium cavicolle*, *Horn*. Very rare, a pair on maple stump, May 16.
- 4607 *Buprestis fasciata*, var. 6—*plagiata*. Two specimens.
- 4882 *Podabrus basilaris*, var. *discoideus*, *Lec*.
 " " var. *flavicollis*, *Lec*.
 " " var. *punctulatus*, *Lec*.

The varieties of this species are not rare here. They are found on the foliage of pine and other trees in summer.

- 5013 *Collops vittatus*, *Say*. A few specimens of a variety in which the thoracic spot is obsolete.
- 5594 *Odontæus obesus*, *Lec*. One, from Vancouver.
- 5771 *Lachnosterna marginalis*, *Lec*. Not rare.
- 9623 " *profunda*, *Bland*. Rare.
- 9612 " *dubia*, *Smith*. Common with *L. fusca*.
- 5774 " *rugosa*, *Mels*. Occasional.

These species were found along with thousands of specimens of *fusca* and other common kinds gathered on the sands of Lake Erie after a storm in June.

- 6550 *Orsodacna atra* var. *tricolor*, *Mels*. Rare.
- 6553 *Zeugophora puberula*, *Cr*. Rare, by sweeping low bushes on bank of creek.
- 6895 *Trirhabda convergens*, *Lec*. Nepigon. Sent me by Rev. C. J. S. Bethune; determined by Mr. Ulke.

6944 *Edionychis 6-maculata*, Ill.

Found this species abundant on one occasion while sweeping with a net in a weedy swamp, July 8. Could not determine what plant.

7070 *Microrhopala porcata*, Mels. One specimen taken while beating.

8677 *Orchestes niger*, Horn. Swept from weeds in June, three years in succession. Never found it prior to 1890. W. H. Harrington mentions this species among those found at Ottawa.

8956 *Euchætes echidna*, Lec. Rare, one found on elm. This specimen is in Mr. Reinecke's collection.

9213 *Eusphyrus Walshii*, Lec. Not rare, found on dead basswood.

A VERY REMARKABLE AND ANOMALOUS SYRPHID, WITH
PECULIARLY DEVELOPED HIND TARSI.

BY, C. H. TYLER TOWNSEND.

In a lot of flies sent me from Illinois, by Professor S. A. Forbes, I find a most remarkable species, which I am satisfied must be located in the *Syrphidae*, though the wing shows no sign of the spurious vein, and the first posterior cell is open. The third antennal joint bears a terminal arista, which character is shared by only two previously known North American genera; but the remarkable character of the fly lies in its hind tarsi. These are most abnormally developed, probably only in the ♂ sex, and might well be taken for monstrosities, did they not fully correspond with each other. I regard this as a secondary sexual character.

This syrphid will probably demand the erection of a separate tribe for its reception, its venation being radically different from both *Pelecocera* and *Ceria*, the two genera above referred to as possessing a terminal arista. The wing and hind tarsus are figured in outline, merely to give a more correct idea of the characters of this peculiar fly. On account of its elaborately developed hind tarsi, I propose the name CALOTARSA for the new genus.

CALOTARSA, nov. gen.

Rather small, cinereous or blackish with yellow bands on abdomen, the latter thinly pilose. Eyes contiguous in ♂ for fully $\frac{2}{3}$ distance from ocelli to base of antennæ, bare, extending on sides nearly to oval margin. Ocelli situated on vertex. Antennæ small, all three joints short, the

third but little longer than the second, rounded and laterally compressed but small, with a delicate, bare, terminal arista which is 2-jointed at extreme base. Face bare, wholly dark coloured, not prominent, neither carinate, tuberculate, nor hollowed, rather abbreviated below. Thorax narrower than head, with a few weak bristles posteriorly and on scutellum. Abdomen at base about as wide as thorax, narrowing posteriorly. Hypopygium prominent, curved under the abdomen. Wings (see fig. 4) longer than abdomen, spurious vein absent, third vein straight and not bent into first posterior cell, marginal cell wide open, anterior cross-vein far before middle of discal cell and rectangular, first posterior cell open, an apical cross-vein springing from fourth vein about as far beyond posterior cross-vein as length of latter, this apical cross-vein evenly bowed in and leaving the remaining section of fourth vein as a stump at its origin. While the apical cross vein greatly narrows the first

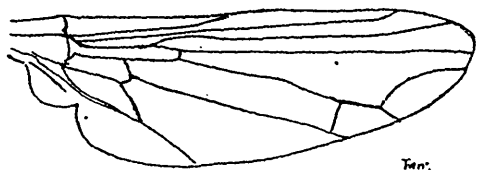


FIG 4.

Tenn.

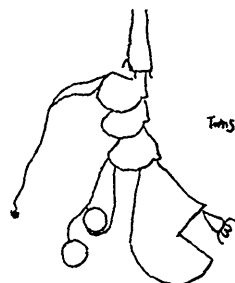


FIG 5.

posterior cell, this stump, or rather this last section of the fourth vein, proceeds on to the margin of the wing, thus forming an extra posterior cell. Posterior cross-vein nearer to margin of wing (on fifth vein) than $\frac{1}{2}$ its length. Anterior and middle metatarsi about as long as remaining tarsal joints together. Hind metatarsi (see fig. 5) and two following joints equal, widened outwardly, thin and flattened, the metatarsus on its outer edge with a long slender cilium or petiole which is winged at its base; the third tarsal joint with a similar cilium, but not winged at base, bearing two round, thin and flattened chitinous tips or appendages, one at the end, the other on posterior border of cilium a little beyond middle and connected with base and inner extent of cilium by a clear thin membranous wing; fourth joint more elongate, its body or inner portion more thickened, but furnished outwardly with an enlarged thin and flattened wing which is strongly notched on its posterior inner border,

convexly curved on its outer border, and fully 3 times as long as the flattened joint preceding; fifth joint and claws normal.

Calotarsa ornatipes, nov. sp., ♂.

Eyes cinnamon-brown; face, anterior portion of front, cheeks, occiput, and oral region cinereous. Antennæ fulvous, arista brownish. Thorax cinereous, with four brownish vittæ. Scutellum cinereous. Abdomen light brownish, all of second, third and fourth segments except hind borders dark yellow, the yellow on fourth segment being more of a rufous, fifth segment and hypopygium nearly black; thin pile of abdomen yellowish on three anterior segments, darker posteriorly. Front and middle legs light fulvous, tarsi hardly darker. Hind legs fulvous, distal $\frac{2}{3}$ of femora blackish, first three tarsal joints and body of fourth clothed with brassy hairs; the winged base of petiole on metatarsus light brownish; the chitinous tips or plates of petiole on third joint, wing of fourth joint, and whole of fifth nearly black. Claws and pulvilli a little elongate. Wings nearly hyaline, hardly tinged with tawny, the third costal cell pale yellowish. Halteres large, knobs brownish, stalks yellowish.

Length, hardly 6 mm.; of wing, 6 mm.

Described from a single ♂ specimen. Illinois.

BOOK NOTICES.

MONOGRAPHIE DES PHYCITINÆ ET DES GALLERIINÆ: PAR E. L. RAGONOT.

The first volume of M. Ragonot's long-expected Monograph of the Phycitinæ and Galleriinæ of the World has just appeared, and forms a quarto volume of 658 pages, besides 56 pages in the preface and introduction, and three plain and twenty coloured plates.

The first plate is devoted to structural details of the head, palpi and antennæ, while the next two plates represent the various forms of venation. The remaining twenty plates represent from twenty to twenty-five species each, with the body and wings of one side, while, in some cases, the underside of the wings of the other side is represented. Many structural details of the head, palpi and antennæ are also exhibited on these plates.

The figures are very accurately and beautifully drawn, and show a delicacy and softness rarely seen. An attempt has been made, for the first time, as M. Ragonot truly says, to represent the veins in the hind

wings correctly, and this seems to have been done quite successfully. The colouring, however, is not as satisfactory, in some cases, as could have been desired.

The introduction gives a complete history of the sub-family and of their structure and classification, and, at the end, a synoptical table of the genera of the Phycitini, the first division of the Phycitinæ. The second division (Anerastini) and the Galleriinæ will appear in the next volume.

It will be seen that M. Ragonot does not agree with many English and American entomologists in classification, for he regards these insects as a sub-family, while many others give them family rank. I must confess that I have, for a long time, been of M. Ragonot's opinion, and varied from it in Smith's List of the Lepidoptera only for the sake of uniformity, since the plan of that work was determined by others. It was a case of "Mohamet and the mountain."

The entire work will form two volumes of Romanoff's magnificent Memoirs of the Lepidoptera, and all the species will be figured, so far as it is possible to secure specimens, except such as have already been figured. American students of the Microlepidoptera, as well as those of other countries, owe a debt of gratitude, not only to Mons. Ragonot for the excellent manner in which he has done his work, but also to His Imperial Highness the Grand Duke Nicolas Mikhailovitch, for affording M. Ragonot the opportunity of publishing this beautiful and useful work, and of illustrating it so profusely.

C. H. FERNALD.

EVOLUTION AND TAXONOMY: An essay on the application of the theory of natural selection in the classification of animals and plants, illustrated by a study of the evolution of the wings of insects and by a contribution to the classification of the Lepidoptera, by John Henry Comstock, B. S. The Wilder Quarter-Century Book, pp. 37-113.

All scientific entomologists will be gratified at the appearance of this paper, which is an attempt to base a classification of the Lepidoptera upon the ground of evolution. It is evolution by natural selection, not befogged by the questionable action of so-called "acquired characters." The Lepidoptera are divided into two suborders, the Jugatæ and Frenatæ, according to the two essentially different methods of uniting the fore and hind wings in flight.

The primitive venation is supposed to have consisted of six principal veins or groups of veins, from which the present ones were derived by a

process of specialization in adaptation to new conditions of life. A nomenclature is adopted for these veins, following Redtenbacher, which is to be applicable to all insects, taking account of the veins developed in certain families between radius (sub-costal) and media (discal), and between media and cubitus (median). These the author believes to be of secondary origin. The paper is illustrated by 33 figures of venation and three plates.

It is a valuable contribution to American entomology, and should be carefully read by all who wish to see a scientific classification take the place of the misty divisions heretofore in use in Lepidopterozoology.

HARRISON G. DYAR.

CORRESPONDENCE.

PAPILIO CRESPHONTES.

On the 17th of October I found near London a colony of larvae of this butterfly, from one nearly full fed to half-a-dozen little ones about half an inch long.

J. ALSTON MOFFAT, London, Ont.

ON TRIÆNA.

The generic term *Triæna* is used by Hübner (see my list, CAN. ENT., xvii., 95, of the North Am. Dagger Moths) for a genus of *Noctuidæ*. Consequently, the Thysanurid genus (CAN. ENT., xxv., 318) must be re-named, and may be called *Macgillivraya*, with *T. mirabilis*, Tullb., as type.

A. R. GROTE, A.M.

EUDRYAS CYPRIS.

I would add to my description of this South American species in the Dec. No. of the CANADIAN ENTOMOLOGIST, that the point in which it agrees with *grata* is the deep, outward, even sweep of the pale median field of primaries. In *unio*, the uneven outer margin of the median field is nearly perpendicular from within apices on costa to above internal angle. *Cypris* differs from *grata* by the darker marginal band being continued inwardly from apices along costa, as also by the absence of the prominent dark costal stripe from base outwardly. The darker, creamy and olivaceous or ochraceous median field of primaries, as well as the red unbanded hindwings and undersurface, are quick characters by which *Cypris* may be distinguished from either of its allies. A. R. GROTE.

Mailed February 3rd.