

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

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

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 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:

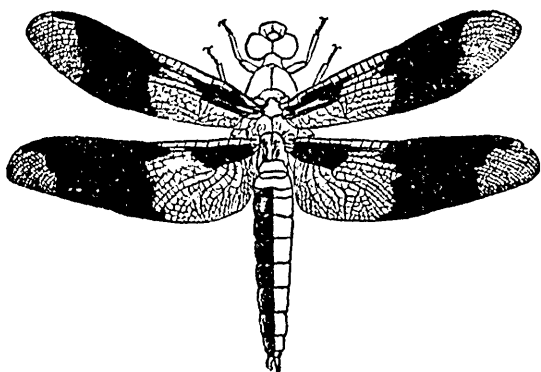
This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
							✓				

The
Canadian Entomologist

VOLUME XXIX.

No. 4.



LIBELLULA TRIMACULATA.

EDITED BY

REV. C. J. S. BETHUNE,

HEAD MASTER OF TRINITY COLLEGE SCHOOL,
PORT HOPE, ONTARIO.



APRIL, 1897.

LONDON:
LONDON PRINTING AND LITHOGRAPHING COMPANY.
1897.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

KERMES.—Desired from North America. Will return identified material. E. E. BOGUE, Agr. Expt. Sta., Stillwater, Oklahoma.

LEPIDOPTERA desired from all parts of N. America. Will collect in other orders in exchange. C. H. TYERS, 227 Front Street East, Toronto.

LEPIDOPTERA.—Exotic and native cocoons and pupæ. Preserved larvæ. Especially Rhopalocera. Correspondence invited. W. S. KEARFOTT, 24 South Water St., Cleveland, Ohio.

WILL COLLECT in many orders of Entomology and Herpetology of Arizona. Address DR. R. E. KUNZE, Phoenix, Arizona.

I OFFER perfect specimens of named diurnals from Central America and Northern South America, in papers, for diurnals from Northwest, Western and Southwestern States. LEVI W. MENGEL, Reading, Pa.

WILL COLLECT any Aquatic insects to exchange for Odonata and Plecoptera, nymphs or imagoes; nymphs preferred. Will determine nymphs or imagoes in these orders for duplicates. JAMES G. NEEDHAM, Cornell University, Ithaca, N. Y.

COLLECTORS OF AQUATIC COLEOPTERA should save all the Aquatic Hemiptera taken with the beetles, dredging or at light. I will give exchange for all such Hemiptera in any order, or purchase. CARL F. BAKER, Auburn, Alabama.

COLEOPTERA.—Exchange desired; only perfect specimens given and received. Will also collect in other orders in exchange for Coleoptera of N. A. R. J. CREW, 105 Oak St., Toronto, Ont.

N. A. LEPIDOPTERA not in my collection wanted; offer Manitoba Lepidoptera and Coleoptera. Send lists to A. W. HANHAM, Bank of B. N. A., Winnipeg, Man., Can.

LEPIDOPTERA.—I have for exchange duplicates collected last summer, also cocoons of Cecropia and Polyphemus. J. TOUGH, 156 South Water St., Chicago, Ill.

WANTED.—The 2nd and 3rd Report of the Ent. Soc. of Ontario. Address, HOWARD EVARTS WEED, Agricultural College, Miss.

LEPIDOPTERA FROM MINNESOTA.—To exchange for the same from other localities. Send lists to H. W. EUSTIS, 31 Elbert St., Augusta, Ga.

WANTED.—Live pupæ (cocoons) of *Attacus Columbia*, *Gloveri*, *Ceanothii*, etc., for such of *Saturnia Pyri*, *Pavonia*, *Spini*, etc. HERMANN AICH, Elberfeld, Germany.

COLEOPTERA.—Will exchange for species not represented in my cabinet. Coccinellidæ and Cicindellidæ especially desired. Good returns. FREDERIC ORMONDE, 59 Eustis Street, Boston, Mass.

CANADIAN ICHNEUMONIDÆ.—Will be glad to purchase undetermined material in this family, particularly from the vicinity of Quebec. Will determine or exchange specimens if parties prefer. G. C. DAVIS, Agricultural College P. O., Michigan.

COLEOPTERA.—Wanted, Halipididæ, Gyrinidæ, and Rhynchitidæ, named or unnamed; also *Atelabus genalis*. Good returns of named N. American Coleoptera. RALPH HOPPING, Redstone Park, Kaweah, California.

Correspondents desired in any part of the world who will collect Hesperidæ (either named or unnamed) in exchange for N. H. Lepidoptera. W. F. FISKE, Mast Yard, N. H., U. S. A.

TENTHREDINIDÆ AND UROCIDÆ wanted from all parts of the United States and Canada, especially the south and south-west, either by purchase or exchange. Will name specimens for privilege of retaining duplicates. ALEX. D. MACGILLIVRAY, Cornell University, Ithaca, N. Y.

WANTED.—Diptera of the families Sarcophagidæ and Muscidæ (sensu stricto) from all localities. Will purchase or exchange for insects of any order. GARRY DEN. HOUGH, M. D., 542 County St., New Bedford, Mass.

HYMENOPTERA.—Fossors and Bees wanted from West and South (named or unnamed). Offer in return good American and European Col., Lep. or Hym. S. N. DUNNING, 43 Niles St., Hartford, Ct., U. S. A.

HEMIPTERA AND HYMENOPTERA.—Liberal exchange for named or unnamed specimens. Also offer Coleoptera, or pay cash. Will determine Jassidæ. CARL F. BAKER, Auburn, Alabama.

VANCOUVER ISLAND.—Lepidoptera for sale or exchange—*C. gigas*, *M. Tylori*, *A. rhodops*; *New noctuidæ*. W. H. DANBY, P. O. Box 314, Victoria, British Columbia.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

The Canadian Entomologist.

VOL. XXIX.

LONDON, APRIL, 1897.

No. 4.

SYNONYMICAL AND DESCRIPTIVE NOTES ON NORTH AMERICAN ORTHOPTERA.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

In a review of *N. A. Decticinae* (CAN. ENT., XXVI.), I referred (p. 180) an undescribed Pacific Coast species provisionally to *Drymadusa*, an Old World genus of which I had not then seen specimens. Direct comparison shows that it differs from that genus in the lack of a humeral sinus on the posterior border of the lateral lobes of the pronotum and in the great posterior extension of the pronotum. I propose for it the generic name *Apote* ($\alpha\upsilon\tau\omicron\tau\eta$). The species, which may be called *A. notabilis*, is testaceous, tinged on the pronotum with olive-green, the abdomen fusco-testaceous, much and minutely marked with black and light testaceous, the tegmina abbreviate but attingent, testaceous with black veins. The length of the body is 37 mm.; of the ovipositor, 28 mm. Oregon.

We have, however, another genus of *Decticinae* not given in my table, consisting of long-winged species still more nearly allied to *Drymadusa*, but separable from it by the slender form, much narrower head and fastigium, narrower tegmina and the less incrassate base of the hind femora, and by the presence of spines on both sides of the under surface of the fore femora, though these are inconspicuous on the outer side of one species. It may be called *Capnobotes* ($\kappa\alpha\pi\nu\omicron\beta\acute{o}\tau\eta\varsigma$) in allusion to the smoky aspect of the insects.

To this belong two species described by Thomas and referred to *Locusta*, and which I had not determined when I published my former paper. Prof. L. Bruner has kindly sent them to me, as well as two other species, one of them from Lower California. The three United States species may be separated by the following table:—

Outer margin of fore femora distinctly spined beneath; metazona considerably elevated above the prozona, so that the pronotum is subscutiform.

- b.* Metazona abruptly elevated above the prozona; anterior sulcus of pronotum very deeply impressed; ovipositor much shorter than hind femora; tegmina marked with pallid spots and streaks *fuliginosus*, Thom.
- b.* Metazona gradually elevated above the prozona; anterior sulcus of pronotum distinct but not deep; ovipositor longer than the hind femora; tegmina nearly uniform in coloration. . . *Bruneri*, sp. nov.
- a.* Outer margin of fore femora very faintly spined beneath; metazona scarcely elevated above the prozona, and the pronotum not sub-sellate *occidentalis*, Thom.

Fuliginosus was described by Thomas from a male from Arizona, and the specimen, a female, sent me by Bruner is from the same territory; *Bruneri* comes from California and was sent me by Professor Bruner; *occidentalis* was originally described from California, and the specimens I have seen come from Nevada and Utah. The sub-family Locustinae to which Thomas thought these species belonged has not been recognized in the New World.

On different occasions I have received from the extreme southwestern part of the United States specimens of a large speckled Acridian belonging to a generic type of *Eremobiini* very distinct from any known and differing widely from either of the two known genera of this group found in our territory. It may be called *Tytthotyle* (τυτθός, τύλη). It has a general *Oedipodid* aspect, not unlike *Anconia* or *Hadrotettix*. The body is not depressed, and but little compressed; the head is normal, with rather large and prominent eyes; the intraocular space, as seen from above, is narrower than the width of the eyes; the vertex is carinulate; the fastigium of the vertex sulcate, distinctly declivent, passing by a scarcely interrupted curve into the frontal costa; the latter is not very broad, contracted and sulcate just below the ocellus, then disappearing. The antennae are slender and shorter than the pronotum, at least in the female. The pronotum narrows rapidly from behind forward, is feebly carinulate with blunt lateral rugae or shoulders, the lateral lobes of equal width throughout; the metazona is a little longer than the prozona, sub-angulate posteriorly; the prozona is twice cut by transverse sulci, and is a little tumid on the disk. The tegmina and wings are fully developed and much longer than the body. The hind femora are scarcely compressed, of general *Oedipodid* form, merely carinate above; the inner and outer calcaria of the hind tibiae are subequal, and the arolea minute.

I know of but one somewhat variable species, described by Bruner as *Thrincus* (?) *maculatus*. Mr. Bruner has kindly sent me types of this for examination.

The tribe Thrincini has not been found in America. The second species which Bruner has referred doubtfully to *Thrincus*, viz., *T. aridus*, belongs to *Heliastus*, a genus of Oedipodini in near vicinity to the Thrincini. The species described by Thomas under the name *Thrincus californicus* also belongs to *Heliastus*.

Among the Oedipodini, *Mestobregma* Scudder and *Trachyrhachis* Scudder are synonymous and the former has priority.

In *Psyche* (vi. 265) I pointed out that my *Leprus ingens* from California belonged to a new generic type, for which I now propose the name *Agyrnastus* (*κνίμυρτος*) in allusion to its clumsy inactivity. It is most nearly allied to *Leprus* Sauss., but differs from it in its more bulky shape, due largely to the exceptional breadth of the mesosternum, its abbreviated organs of flight, which do not wholly conceal the abdomen when at rest, and the presence of a subcostal taenia reaching the base of the wings from the transverse fascia common to both genera; the posterior process of the pronotum also in rectangulate instead of rounded subcutangulate, and the intercalary vein of the tegmina is more or less obscure proximally and only a little nearer the median than the ulnar vein; the upper and lower carinæ of the hind femora, and especially the lower, are subfoliaceous.

One of the genera of our Tryxalinæ has been very much named. It was first described by me under the name *Aulocara*, males only of which were seen. Very shortly afterward I redescribed it, from the female only, as *Oedocara*. A few years ago Brunner renamed it *Coloradella*, and recently McNeill has given it the name *Eremnus*; *Aulocara* of course has priority, and the species on which it was founded proves, as Bruner has already pointed out, to be identical with Thomas's *Stauronotus Elliotti*. The genus under the name *Oedocara* was included by Saussure in the Oedipodinæ and by Brunner (as *Coloradella*) in the Tryxalinæ, an excellent illustration of the difficult definition of these two sub-families.

Some years ago, in *Psyche*, V., I attempted to show that certain genera that had been referred to Tryxalinæ should really be placed in the Oedipodinæ. I now think I was mistaken, at least as regards all the genera found in our own country, and would follow Brunner in placing them in the Tryxalinæ. It was partly owing to my statements that Mr. McNeill has rejected them from his recent Revision of the Tryxalinæ.

The generic name *Beta*, proposed by Brunner in 1893 for two unnamed species in his collection from Texas and Colorado, is proved by a specimen sent me by him to be the same as my *Philibostroma* (1875). His *Pseudostauronotus*, proposed at the same time and manner, is identical, as a specimen sent me shows, with my *Stirapleura*.

A REMARKABLE APPEARANCE OF CATOCALA INSOLABILIS.

On Friday, June 6th, 1896, the first *Catocalas* were noticed in this locality for the season. Three *Insolabilis* were taken. The weather was hot—87° in the shade at 1 o'clock. The Saturday following was also hot, and *Catocalas* were abundant. During the forenoon twelve were taken on trees near the house. In the afternoon twenty-one more were taken on trees at some distance from the house, and in the evening, at sugar, twenty-three more were captured. Of the entire number (56) fifty were *Insolabilis*, one *Nurus*, three *Ilia*, one *Uxor*, and one *Marmorata*. Sunday the weather was still hot, and on the way to and from church *Catocalas* could be seen on nearly every tree. The wind continued southwest. On Monday the wind had changed to south-east, and the *Catocalas* were still present, but resting higher up on the trees. This being a work day, I had but little time for observation or collection. After school hours, however, a few minutes were spent in the woods, and the *Catocalas* were found hard to capture. When startled they would light high up in the trees, sometimes fully twenty feet from the ground, and some would even alight upon the leaves of the trees. At dusk *Insolabilis* came to the sugar in abundance, and thirty were taken before it was dark enough to need a lantern. In all, fifty-seven were taken on Monday, all but five being *Insolabilis*. On Tuesday the wind was north-west, and not a *Catocala* was to be seen. Not one came to sugar that evening. The only *Catocala* that was seen on Tuesday was snapped out of a tree by a scarlet Tanager and immediately torn to pieces.

I have talked with other collectors of this vicinity, and all seem to have secured a goodly share of *Insolabilis*.

In the parks and suburbs of Chicago there were literally thousands of *Insolabilis* during the three days. Previous to this remarkable flight the species was not common, so far as I have been able to ascertain.

ARTHUR J. SNYDER, North Evanston, Ill.

DESCRIPTION OF THE STRUCTURAL CHARACTERS OF
THE LARVA OF SIBINE FUSCA, WITH NOTES ON
THE FOUR KNOWN LARVÆ OF SIBINE.

BY HARRISON G. DYAR, NEW YORK.

Stoll figures the moth of two species of Sibine. He also figures two larvæ of Sibine, but, owing to the unfortunate confusion into which his labels must have fallen, they are not attributed to the right imagines, but to two species of Dioptidae. After Stoll, Sepp also illustrated two species of Sibine, with their larvæ correctly shown. One of Sepp's species is the same as one of Stoll's, the other is different in both larva and moth. This gives three species of the genus known in both larval and mature states, assuming only that the larva which Stoll figures as *micilia* (228 G.) really belongs to the moth *nesea**, which I think is probably the case.

The names of the species are *nesea*, Stoll; *fusca*, Stoll (= *trimacula*, Sepp; *bonaerensis*, Berg. =? *megasomoides*, Walker =? *affinis*, Moeschler), and *vidua*, Sepp (=? *fumosa*, Walk.). As a fourth species we have *stimulea*, Clemens (= *ephippiatus*, Harr.).

The larvæ have in common the following characters: (1) The shape of the body, which may be sufficiently described by a reference to the well-known *S. stimulea*; (2) the absence of subdorsal horns which bear stinging spines on joints 6 to 10; (3) the presence of a large patch of detachable spines above the horn on joint 13 and the lateral horn of joint 12; (4) probably the presence of skin spinules only without granules, though this can not be definitely asserted till the two species *nesea* and *vidua* have been microscopically examined; (5) the coloration involves a square green patch on the middle of the back, variously modified. Other characters are shared by the whole group of spined Eucleids.

SYNOPSIS OF THE LARVÆ.

The subdorsal horns which are present, long.

Lateral horns long; green, the horns all purple-brown, dorsal mark square, dark green, broadly edged with yellow.....*vidua*.

Lateral horns short.

Subdorsal horns and body green; dorsal mark square, without a central dark patch, edged before and behind with yellow....*nesea*.

Subdorsal horns and body purple-brown; dorsal mark elongate, projected below the posterior subdorsal horns, and bearing a central, elliptical purple-brown patch edged with white...*stimulea*.

* Stoll's so-called larva of *nesea* is an absurd error. It is a Notodontian with a long yellow horn on joint 6.

The subdorsal horns short; green, the dorsal mark much elongated, reaching the posterior end of the body and projected forward below the anterior subdorsal horns, edged with yellow. *fusca*.

The larva of *fusca* is evidently the most highly specialized. I have received a number of alcoholic specimens from Mr. G. Ruscheweyh, of Buenos Ayres, Argentina, under the name "*Streblota bonacrensis*," but I am unable to find any differences in either moth or larva from Sepp's figures. The coloration is largely lost in my material through the effect of the alcohol, but the outline separating the two shades of green can easily be traced, and is exactly as shown by Sepp and Stoll.

Larva.—As compared with ♂ *stimulea*, Clem., the body is of the same shape, or a little more flattened, but all the horns are short. Subdorsal horns present on joints 3 to 5, 11 to 13, about .5 mm. long, alike, bristly with stinging spines; absent on joints 6 to 10. Lateral horns on joints 3, 4, 6 to 12, even shorter than the subdorsals, sessile spined. A subventral row of two distinct pale setae.

Dorsum broad, flattened, sides oblique, subventral space small, contracted. Segmental incisures deep, the depressed spaces (1) dorsal intersegmental paired, two lateral (4) and (6) all show as distinct black dots buried in the intersegmental folds; addorsal spots (2) also present, small. A large, elongate patch of detachable spines above the lateral horn on joint 12, and a smaller one above the horn of joint 13. Caltrop patches present on the bare tips of the lateral horns of joints 6 to 12 apparently, but nearly all the caltrops are lost in my specimens. The caltrops and spines correspond with those of *S. stimulea* (Journal N. Y. Ent. Soc., Vol. I., plate 1, figs. 5 and 6). Skin not very finely spinulose, the bases of the spinules enlarged, approximating g anules, but still bearing the sharp tips. Colour largely green, a line of dark spinules joining the subdorsal horns of joint 5 runs forward on each side below the subdorsal horn on joint 4, turns down behind the lateral horn of joint 3, and runs backward just above the row of lateral horns to joint 12, turns up over the subdorsal horn of 12, and joins its fellow again just above the horn on joint 13; a detached ring also surrounds the subdorsal horn of joint 11. This line evidently marks the joining of the dorsal green with a different tint, which obtains over the horns, the stigmatal region and the dorsum of joints 3 to 5. Thoracic feet and venter as usual; the spiracle on joint 5 moved up above the others.

Habitat.—If my synonymy is correct, *Sibine fusca* ranges throughout the eastern part of South America, from Guayana to Argentina,

DESCRIPTION OF THE LARVA AND PUPA OF
AULAX NABALI.

BY THOMAS W. FYLE, SOUTH QUEBEC.

The tall White Lettuce, *Nabalus altissimus*, Hooker, is a striking and graceful plant. At Quebec it is found in glades and on the edges of woodland roads. Its wand-like stems rise sometimes to the height of six feet, and end in panicles of greenish-white or pale straw-coloured flowers. The stems are hollow, but have a lining or inner coat of white downy pith, which in the summer is sometimes found to be broken with discoloured warts. Late in the fall, when the stems of the plant have become indurated and the pith has dried up, the warts are found to have developed into galls of the size, shape and colour of grains of hemp. I have found them in the stems from about six inches above the ground up to a height of three feet or perhaps more. Sometimes they appear in clusters, sometimes in rows, and sometimes singly at intervals. The proper inhabitant of each of these galls is a footless, spindle-shaped grub, one-eighth of an inch long. In colour it is like white wax, with the mouth organs brown. It is more pointed at the head than at the other extremity. It lies curled round in the gall.

Towards spring the pupal change takes place. This change may be hastened by warmth; the specimens I have kept in my study are now (January 9th) passing through it. A week or two after the change the pupa is of compact form, white, waxen, with amber-coloured eyes. The head is small, the thorax large and convex, and the abdomen ovate and closely joined to the preceding part. The legs are drawn up by the sides of the thorax, and the tarsi are stretched backwards under the body. The antennæ (beautifully translucent) are turned under the head and extended between the tarsi, reaching nearly to the end of the abdomen.

The perfect insects were described by Dr. Brodie, of Toronto, in the 25th volume of the CANADIAN ENTOMOLOGIST, p. 12. I copy his description for the benefit of those who may not have the volume at hand:

"♀.—Length, 2.50 xx. Antennæ 13-jointed; uniform brown; head and thorax black; abdomen shining brown, with a large anterior dorsal spot black; all the tibiæ, femora and tarsi brown, a little paler than the abdomen; wings ample, veins well-defined, hyaline, iridescent at certain angles."

"Abdomen of ♂ darker brown, and without the dark dorsal spot.
"From numerous specimens."

Dr. Brodie discovered the galls in great abundance at the roots of the White Lettuce. I have not yet found them at the roots of the plant, and I am inclined to think that the insects are less numerous at Quebec than Toronto.

A NEW SPECIES OF ANCYLOXYPHA.

BY G. H. FRENCH, CARBONDALE, ILL.

Ancyloxypha Longleyi, n. sp.

Female.—Expanse 1 inch. Fore wings with the costa more straight from the shoulder to near the apex than in *Numitor*, in this respect approaching *Thymelicus*; apex rounded, but less than in *Numitor*; outer margin and hind wing rounded, much as in *Numitor*; antennæ reaching but little more than one-third the distance to apex of fore wings; palpi as in *Numitor*, but the third joint longer; abdomen surpassing hind wings, but less so than in *Numitor*; the whole insect more robust than *Numitor*.

Fore wings brown, darker than in *Numitor*, without the discal yellow patch, emitting a pale blue sheen in reflected light; a few yellow scales below the costa between the venules, and a few scattered on the base of the wing, but in either case not enough to give a yellow colour; otherwise the wing is uniform brown. Hind wings marked and coloured as in *Numitor*; yellow, with outer and costal borders and base brown, the brown along internal margin running to a point before reaching anal angle.

Under side differing very little from the under side of *Numitor*; the dark central and posterior area of fore wings a little darker brown, the costal and outer margins yellow, the yellow running to a point before reaching the posterior angle. Hind wings uniform yellow.

Antennæ black, annulate with white; club black, tipped with brown—the club of *Numitor* is tipped with black; palpi white at sides, black above, terminal joint black; thorax concolorous with fore wings, abdomen concolorous with hind wings.

The above description is drawn from a single specimen taken at Ridgeland, near Chicago, September 6th, 1896, by Mr. W. E. Longley, in whose cabinet it is and after whom I have named the species. In describing the species I have compared the specimen with *Numitor* because that species is so common all over this portion of our country. I hope the Chicago collectors will be on the lookout for this species the coming season.

THE COLEOPTERA OF CANADA.

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

XXII. THE CERAMBYCIDÆ OF ONTARIO AND QUEBEC.

The size and beauty of the Longhorns are in themselves sufficient to render them objects of interest to a beginner; adding to this the fact of the great abundance of certain species and the destructive work of their larvæ, we can readily understand their importance to all who are in any way interested in Entomology, whether as a pleasant recreation for leisure hours or a serious pursuit for gain. Although usually easily recognized by sight, the family is, as stated by Dr. Leconte, almost impossible to define. The tarsi are apparently four-jointed, the fourth joint being very small and connate with the fifth. The antennæ are usually very long, especially in the males, filiform or serrate, often borne on large frontal tubercles. The eyes are frequently deeply emarginate. Tibial spurs are present. The larvæ are grub-like, living in burrows or chambers which they excavate for themselves in the woody tissues or in the pith of plants, the pupa resting in a cell constructed by the larva in its gallery.

The collector will obtain many species of this family by carefully beating branches (especially if partially dead) and flowers, over a sheet or an umbrella. Dead logs should be searched, on both the upper and lower surfaces, and particularly freshly-cut timber or sawed lumber. A morning spent in a wood yard will often repay one richly in rare specimens. Some are to be found commonly under bark and may be trapped by loosely fastening pieces of bark to a tree over night and examining the under side of bark in the morning. A great number fly to lights after dusk. Dead twigs and branches may be sawed or cut off, preferably during the autumn months, and kept in large boxes or in an empty room until the beetles are disclosed through the development of the larvæ contained therein. While the activity of the Canadian collectors has already resulted in the recording of a great number of species, there can be no doubt that others will reward the efforts of explorers of the more remote districts.

Although mostly of at least moderate size, and after once identified easily recognized again, their classification presents considerable trouble owing to the fact that structural characters are so unstable and consequently of less than usual value for the separation of large groups. In the main, the arrangement adopted is that presented in the Leconte and

Horn "Classification," though the tables are constructed on a different plan and on account of the limits of the fauna it has been possible to do away altogether with the use of certain characters difficult of observation.

The prothorax in the Longhorns offers two principal types: that in which the lateral edge is sharp or thin for almost or quite the whole length, more or less toothed, giving us the form called *marginèd*, and that where it is cylindrical or rounded on the sides, which may, however, be either spined, tuberculate or plain. Thus we have a point of departure for sub-family separation, which may be aided by taking into account, among those genera in which the thorax presents the second form, a study of the palpi. These may have the terminal joint more or less compressed or subtriangular as in the Cerambycinæ, or this joint may be cylindrical and pointed at tip as in the Lamiinæ. The front tibiæ in the latter group have an oblique sulcus or groove on the inner surface, not always very distinct, but to be seen without difficulty in the larger species like *Monchammus*; once seen it may be used with some facility elsewhere. In the Cerambycinæ this groove is wanting.

Following the Classification, we may, then, throw the characters into tabular form, separating three sub-families, thus:

Prothorax marginèd, antennæ not pubescent, labrum connate with the epistoma PRIONINÆ.

Prothorax not marginèd, labrum free.

Front tibiæ not grooved; last joint of palpi not acute at tip, often subtriangular. CERAMBYCINÆ.

Front tibiæ with an oblique groove on the inner side; palpi with last joint cylindrical, pointed at tip. LAMINÆ.

The Canadian species of the first sub-family, the Prioninæ, are but three in number and represent as many genera. All of them are of rather large size, brown colour, and with elytra of a leathery appearance. The genera may be distinguished thus:

Sides of prothorax two- or three-toothed.

Form elongate, parallel; antennæ more slender, joints not overlapping. *Orthosoma*.

Form stout; antennæ heavy, joints overlapping, especially in the male *Prionus*.

Sides of prothorax with one tooth, antennæ slender. *Tragosoma*.

ORTHOSOMA, Serv.

Represented by *O. brunneum*, Forst. (Fig. 12), a large brown insect, .88 to 1.60 in. long, the elytra nearly parallel-sided, shining and rather thickly punctured. Prothorax more coarsely sculptured above than the elytra, each side with three sharp teeth. The head bears a deep, sharp impression between the eyes. The basal antennal joints are stouter in the males than in the females. I have found the larvæ in rotten pine timbers under sidewalks.

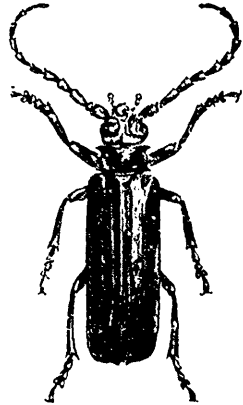


FIG. 12.

PRIONUS, Geoff.

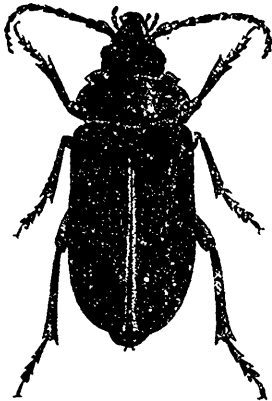


FIG. 13.

The largest Canadian Longhorn is *P. laticollis*, Drury (Fig. 13). It varies in length from .88 to 1.88 in., and is of a brownish or blackish colour, the prothorax almost or quite as broad as the base of the elytra, sides with three teeth, of which the posterior is sometimes poorly marked. The elytra are much broader at base than at apex. Antennæ twelve-jointed in both sexes, much heavier in the male. The larva (Fig. 14) is said to injure the grape, poplar, apple, and pine, by boring in the roots.

TRAGOSOMA, Serv.

T. Harrisii, Lec. (now considered by some writers as identical with the European *T. depsarium*, L.), is a curious-looking beetle of elongate form and brownish colour. The antennæ are slender, the prothorax small in comparison with the elytra, very hairy and armed on each side with a single sharp tooth, in front of which the lateral margins are convergent. The elytra are shining, distinctly punctured and with numerous longitudinal raised lines. I have taken the species under pine bark. It varies in length from 1.20 to 1.40 in.

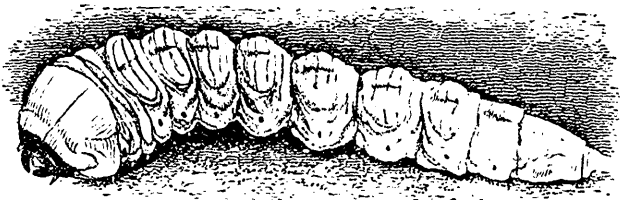


FIG. 14.

The next sub-family, the Cerambycinae, is of great extent, and in consequence more difficulty is encountered in arranging the genera. In the use of the table considerable care must be exercised by those who are unfamiliar with the structure of the Longhorns. This is especially true of the first character involved, *i. e.*, the enveloping of the base of the antennæ by the eyes. In order to obtain a proper appreciation of this structure, the antennæ should be extended forward from the head: in this position it will be seen that in those genera where the "base of the antennæ is partially enveloped by the eyes" a line passing from the anterior or inner border of the upper lobe of the eye to a corresponding point on the lower lobe will pass through the antennal socket, whereas in the other genera this line would run behind the socket. Of course none of the genera in which the eyes are entire (*i. e.*, not emarginate) will belong to the former category, though those with emarginate eyes may belong to either. Comparisons of a few specimens ought to make this clear.* The remaining characters may be easily verified by careful examination of a few species the positions of which are already known to the student, and with these as a point of departure he should meet with no greater difficulty than is always to be expected in dealing with a group of large size, wherein colour and sculpture are inconstant and secondary sexual characters well marked. The following table is submitted for generic discrimination; a short account of the method of using may be useful to some. Suppose on taking up our insect, which we have previously ascertained to belong to this sub-family, we examine the position of the base of the antennæ with regard to the eyes, since this is the first point of departure: ascertaining the antennal bases to be partly enveloped, we find ourselves referred to the number 12 at the end of the line. We now run down along the numbers at the *beginning* of the lines until we reach 12, which shows us where to recommence our analysis, with a scrutiny of the second antennal joint. Suppose we find this joint large, we are referred to the number 36, under which (on searching out its position at the beginning of a line) we are again confronted with a query, this time as to the relative proportion of the second joint to the fourth; if these two joints are about

*Cases will, however, arise in which this point is in doubt. In such an event the choice will rest between the Callidioides and the Cerambycoides. The former have the second antennal joint larger (as a rule) than the latter, but I can find no hard and fast distinction which will serve the beginner as a sure test. A certain number of properly named specimens serving as a guide to tribal and generic facies is almost indispensable here. It should be stated that the table is based on the characters developed in the "Classification," but is intended to apply only to the Canadian fauna.

equal, our insect belongs to *Microclytus*. The generic sequence followed in succeeding pages is the same as that employed in the table and is hence slightly different from the Henshaw Check-list.

TABLE OF GENERA OF SUB-FAMILY CERAMBYCINÆ.

- Base of antennæ not enveloped by the eyes 2.
- Base of antennæ partially enveloped by the eyes 12.
2. Front coxæ transverse, not prominent (*Callidioides*) 3.
- Front coxæ conical, prominent (*Lepturoides*) 37.
3. Eyes divided, apparently four in number *Tetropium*.
- Eyes not divided, often deeply emarginate 4.
4. Brown species, second antennal joint proportionately larger, often half as long as the third and sometimes twice as long as wide. Elytral costæ usually distinct 5.
- Variouly coloured, often ornate species, second antennal joint proportionately smaller, often much less than half the length of the third and never much longer than wide. Elytral costæ usually indistinct 6.
5. Eyes hairy, finely granulated *Asemum*.
- Eyes not hairy, coarsely granulated *Criocephalus*.
6. Elytra with narrow raised white lines, prothorax with very deep median groove, thighs strongly clubbed *Physocnemum*.
- Elytra without distinct raised white lines (traces are sometimes visible in *Merium*) 7.
7. Prothorax very short, strongly rounded on the sides. Upper surface entirely opaque, lustreless. Black, prothorax red . . . *Rhopalopus*.
- Prothorax not very short, the width not apparently much exceeding the length. Upper surface at least moderately shining 8.
8. Thighs more slender; antennæ with the eleventh joint divided in the male. Colour above blackish, prothorax red *Gonocallus*.
- Thighs strongly clubbed, colour variable 9.
9. Anterior coxæ contiguous 10.
- Anterior coxæ at least moderately distant 11.
10. Palpi unequal, the labial much the shorter *Phymatodes*.
- Palpi about equal *Callidium*.
11. Dorsal surface of prothorax with narrow median and moderate or small lateral callosities *Hylotropes*.
- Dorsal surface of prothorax with a very broad, smooth, shining median space, which bears a few large punctures. Elytra with more or less distinct raised lines of a yellowish or whitish colour *Merium*.

- 12. Second joint of antennæ large (*Cerambycoides*) 39.
 Second antennal joint small 13.
- 13. Eyes coarsely granulated 14.
 Eyes finely granulated 21.
- 14. Front coxal cavities open behind 15.
 Front coxal cavities closed behind; small pale species with the first
 abdominal segment very long 20.
- 15. Scutellum acute, triangular, antennæ very long, prothorax with lateral
 spine *Chion*.
 Scutellum rounded behind 16.
- 16. Elytra with elliptical elevated ivory-like spots, in pairs *Eburia*.
 Elytra without raised ivory-like spots 17.
- 17. Femora not strongly clubbed, antennæ spinose 18.
 Femora strongly clubbed 19.
- 18. Large species; metathoracic episterna narrower behind . . . *Romaleum*.
 Moderate-sized species, episterna parallel *Elaphidion*.
- 19. Antennæ bisulcate externally *Tylonotus*.
 Antennæ not sulcate nor hairy *Heterachthes*.
 Antennæ not sulcate but quite hairy *Gracilia*.
- 20. Prothorax much narrower at base than at apex *Phyton*.
 Prothorax dilated at middle, but about equal at base and apex. *Obrium*.
- 21. Elytra either very short, not covering the abdomen, or rapidly narrow-
 ing behind and broadly dehiscent along the suture 22.
 Elytra normal, not abbreviated nor notably dehiscent 23.
- 22. Elytra about as long as the prothorax *Molorchus*.
 Elytra about twice as long as the prothorax *Callimoxys*.
- 23. Scutellum rounded or (in *Cyllene*) broadly triangular 24.
 Scutellum acutely triangular 25.
- 24. Tibial spurs small, thighs suddenly and strongly clubbed. Form slen-
 der and cylindrical. Black, elytra and abdomen scarlet. *Ancylocera*.
 Tibial spurs large 27.
- 25. Prothorax opaque, sides with spine or large tubercle 26.
 Prothorax shining, sides unarmed *Batyle*.
- 26. Elytra coarsely punctate, sutural angle produced *Purpuricenus*.
- 27. Tibiæ strongly carinated, form slender. Elytra without narrow cross
 bands of pubescence, punctuation sparse and coarse. Antenna
 as long (♀) or longer (♂) than the body *Stenosphenus*.

- Tibiæ not carinated, form usually stouter. Elytra in most cases with lighter coloured angulated cross-bands; antennæ usually shorter than the body in both sexes. Punctuation fine. 28.
28. Head comparatively small, front short, oblique; legs hardly clubbed. Intercoxal process of first ventral rounded 29.
Head large, front long, intercoxal process acute. 32.
29. Prothorax transversely excavated at sides near the base, prosternum perpendicular at tip. *Cyllene*.
Prothorax not excavated at sides, which are rounded and constricted at base. Prosternum declivous at tip. 30.
30. Antennæ filiform. 31.
Antennæ subserrate, compressed. Size large, colours strikingly contrasted with black and yellow bands. *Plagionotus*.
31. Large species, prothorax entirely black, much rounded on the sides. *Calloides*.
Smaller, less robust; prothorax with central black spot, the remainder clothed with gray pubescence, sides much less rounded *Arhopalus*.
32. Elytra plane; moderate sized species. 33.
Elytra gibbous at base; small ant-like species 35.
33. Head with a carina of variable form *Xylotrechus*.
Head not carinated. 34.
34. Prothorax with transverse dorsal rugæ or ridges. *Plagithmysus*.
Prothorax without transverse ridges. *Clytanthus*.
35. Elytra with a transversely oblique ivory-like band. *Eudercus*.
Elytra without ivory band. *Cyrtophorus*.
36. Second joint of antennæ equal to the fourth. *Microclytus*.
Second joint of antennæ less than half as long as the fourth. *Atimia*.
37. Elytra short, not covering the wings. *Necydalis*.
Elytra normal 38.
38. Joints 3 to 5 of antennæ much thickened at their tips, inner angle sometimes much produced. Large insects, bright blue with an orange band across base of wing-covers *Desmocerus*.
Joints 3 to 5 of antennæ normal, usually slender and never produced inwardly at tips. Elytra usually tapering to apex, sometimes more or less dehiscent. 39.
39. Spurs of hind tibiæ terminal. 40.
Spurs of hind tibiæ not terminal, but borne at the base of a deep excavation. Thorax tuberculate or spinose at sides. *Toxotus*.

40. First joint of hind tarsi with the usual brush of hair beneath (except in certain *Acmæops*). Prothorax, with rare exceptions, distinctly tuberculate at sides or with heavy lateral spine. Head obliquely narrowed behind eyes. 41.
 First joint of hind tarsi without brush-like sole. Prothorax, with few exceptions, broadest at base, sides never spined and rarely tuberculate. Head suddenly constricted behind the eyes. 46
41. Antennæ short, joints 5 to 11 wider. Prothorax with a heavy spine at sides, elytra strongly costate *Rhagium*.
 Antennæ long or moderate, not thickened, elytra never strongly costate. 42.
42. Eyes large or moderate. Thorax (except in *Pachyta monticola*) with sharp, strong, lateral spine. 43.
 Eyes small, not emarginate, prothorax angulate or rounded on sides. 45.
43. Eyes coarsely granulated, very prominent; form of body parallel. *Centrodera*.
 Eyes finely granulated; body narrowed behind. 44.
44. Eyes feebly emarginate. *Pachyta*.
 Eyes more strongly emarginate. *Anthophilax*.
45. Mesosternum not protuberant, body above more or less pubescent, sometimes moderately shining *Acmæops*.
 Mesosternum protuberant, body above brilliant metallic green. *Gaurotes*.
46. Head constricted far behind the eyes, neck consequently very short. Form extremely slender, hardly tapering behind, prothorax with lateral tubercle *Encyclops*.
 Head constricted close behind the eyes. Form variable, usually much narrowed behind, prothorax rarely bulging at sides and never with distinct tubercle. 47.
47. Last ventral of male deeply excavated. 48.
 Last ventral of male not excavated. 49.
48. Antennæ without poriferous spaces, size large, sides of elytra deeply sinuate. *Bellamira*.
 Antennæ with impressed poriferous spaces on sixth and following joints. Size moderate, sides of elytra sinuate, form very slender. *Strangalia*.
49. Antennæ with poriferous spaces. *Typocerus*.
 Antennæ without poriferous spaces. *Leptura*.

THE LOST LEDRA AGAIN.

BY HERBERT OSBORN, AMES, IOWA

The interesting note by Prof. Baker on *Ledra perdita* (*Centruchus perdita*, A. & S.) deserves notice on account of the mystery which it clears up, and it may also be worth while to add some testimony in the way of corroborative evidence.

A few weeks ago (Dec., '96) I had occasion to review the matter in an attempt to locate the *perdita*, and, in a critical examination of Amyot and Serville's figure and description, was struck by the resemblance to our common *Microcentrus carye*. On careful comparison, however, with this species and with the *Centruchus Liebeckii* of Goding, I concluded the figure and description must apply to the latter. It seemed so strange that a connection so obvious, when once seen, should have so long escaped the attention of Homopterists that I made a further search in the available literature, with the result of finding in a note by Dr. Goding, on "Fitch's Types of N. A. Membracidae" (CANAD. ENT., Vol. XXV., p. 172), the statement that "No. 2152, labelled *Ledra perdita* and *capra*, Mels., is *Centruchus Liebeckii*, Godg." There is no comment to indicate that Dr. Fitch corrected the family reference from Ledridae to Membracidae, but considering his familiarity with the Homoptera in general, and the Membracidae in particular, it is probable that he appreciated the full significance of his specific determination, and it is quite likely that his unpublished notes would show comments on this reference.

In any case, we have the testimony of Dr. Fitch in identifying his specimen as *Ledra perdita* and its recognition by Dr. Goding as *Centruchus* to confirm Prof. Baker's conclusion.

OCCURRENCE OF SCHISTOCERCA AMERICANA (DRURY)
AT TORONTO.

Mr. C. T. Hills recently brought me a specimen of the large, handsome locust, *Schistocerca Americana*, Drury, which was taken about the 12th of October, 1896 (the exact date was not recorded), by Mr. H. Parish, while collecting at High Park. Mr. Parish found the insect resting on the trunk of a tree. The specimen is a female, in perfect condition, measuring 4.75 inches in expanse of wing, and is in every respect similar to examples of this species which I have from Tennessee. This is only the second time it has been taken in Canada; Mr. J. A. Moffat having recorded it from London (CAN. ENT., XXVII., p. 52.).

E. M. WALKER, Toronto.

NEW COCCIDÆ FOUND ASSOCIATED WITH ANTS.

BY GEORGE B. KING AND T. D. A. COCKERELL.

[The species described below were all collected by Mr. King. The notes on the microscopical characters were prepared by Mr. King, but have been extended and rewritten from Mr. King's mounts by Mr. Cockerell, who is also responsible for the comparisons with allied species. The notes on the living insects, habitat, etc., are all by Mr. King.]

Lecanopsis lincolata, n. sp.

♀ (cleared and mounted).—(Oval, length somewhat over 2 mm., dermis practically colourless, legs and mouth-parts tinged with sepia, anal plates a warm yellowish-brown, quite a different colour from the legs. The mouth-parts inclined rather to a madder-brown. Legs and antennæ small, hind legs not nearly reaching the anal plates, tip of femur of middle legs reaching extreme base of hind legs. Posterior cleft wide. Antennæ fairly stout, gradually decreasing in size distad, 8-jointed: 3 longest, not quite twice as long as broad: 2 and 4 next, and about equal; 5 and 1 of about equal length, but 1 much broader than long, 5 longer than broad; then the last three subequal, but 3 the longer. Formula 3 (24) (15) 8 (76): 8 with several small hairs. Anterior tibia and tarsus as long as antennal joints 2 to 6, the tarsus about half as long as tibia; femur very stout, not as long as tibia on its inner side, but a little longer on its outer, trochanter and coxa both very large. The legs are altogether noticeable for their stoutness, but the basal parts are especially enlarged. Claw large, moderately curved, digitules of claw stout, extending beyond its tip; tarsal digitules filiform, all but two broken off in the specimen. The claw-digitules are enlarged at ends to an obliquely truncate club, but the tarsal digitules with only an excessively minute club. There is the usual long bristle at the tip of the trochanter, and a short erect hair a little way up the femur on the inner side. Anal plates rather broad, the caudolateral side a little longer than the cephalolateral; a large bristle near the tip and another at the extreme base; these bristles are very large, and may possibly be dermal, beneath the plates; especially as there is a corresponding pair on the skin laterad of the plates, that opposite the hindmost bristle being considerably shorter than it. Hairs of anal ring broken, but apparently they were stout and not numerous. Skin without any distinct markings; marginal spines fairly large, pointed, simple, easily deciduous, a very little further apart than the length of one. Stigmatal spines in threes, one long, two much shorter but not very short.

Hab.—With *Cremastogaster lincolata*, two specimens in a nest at Lawrence, Mass., July 15th, 1894.

This is not a strictly typical *Lecanopsis*, but belongs apparently in the subgenus or genus *Spermococcus* of Giard. By its 8-jointed antennæ it resembles *L. formicarum*, Newstead, but it differs at once from that by the smaller (though still large) first antennal joint, the longer second joint, the much longer third joint, the femur decidedly stouter, the tibia not beset with numerous bristles, and the claw-digitules stout. *Lecanopsis* is simply a segregate from *Lecanium*, modified for underground existence. Maskell's *Lecanopsis filicum* hardly belongs here; in some respects, but not in others, it seems to approach *Myxolacanium*: it also recalls in some of its characters such forms as *Lecanium Urichi*.

Phenacoccus americana, n. sp.

♀.—When alive fusco-testaceous, smooth, soft, sticky, and free from any wax or down; when put into alcohol its colour changes to a rufous-violaceous, and it becomes quite wrinkled, its general form is rounded, with a slice of nearly one-fourth cut off, making its under surface flat. Length (in alcohol) $3\frac{1}{2}$ mm., width 3 mm.

♀ (cleared and mounted).—Oval, brown of a rather warm sepia tint, antennæ and legs very pale yellowish. The legs are slender, and although the insect is much larger, its legs are not so large as those of some of the ant's-nest species of *Rhipersia*; but at the same time they are well-formed and ordinary, not shortened or swollen as in the *Lecanopsis*. Trochanter with one long and at least two short bristles. Femur little longer than tibia, its inner margin straight, with four or five erect bristles; its outer margin very gently arched or bent, with a conspicuous erect bristle at the bend. Tibia slender, with eleven conspicuous bristles, tending to form three whorls. Tarsus rather over two-thirds length of tibia, with similar but finer bristles, no nobbed tarsal digitules. Claw large, little curved, with a minute denticle on inner side near the tip; digitules of claw extending beyond its tip, slender, with hardly noticeable knobs. Antennæ slender, club not conspicuously swollen, formula 9 (123) (45678), or it might be written as well 9132 (87) (456), but the additional differences indicated by the latter formula are almost too slight to be accurately measured by the eye: 9 is very nearly as long as 7 + 8; 1 is cylindrical, its base not noticeably wider than the apex. The joints have sparse whorls of hairs, 9 having two such whorls. Eyes prominent. Mouth-parts small, mentum (so-called) very obscurely or not

dimerous, broad and short, its apical half with three whorls of erect bristles. Skin with sparse small round gland-spots.

Hab.—Andover, Mass., Oct. 27th, 1896, under a stone in the nest of *Lasius americanus*, Emery. A small colony of five individuals captured, and only one herd as yet found; they were not feeding on any roots entering the nest of the ants, but were altogether on the surface of the nest, and some of the ants were attending them. It is to be presumed that they would eventually produce cottony matter.

Both by colour and habits this differs at once from *P. aceris*, Sign., which has been recorded from Massachusetts, and there is no species with which it is likely to be confounded.

Ripersia Blanchardii, n. sp.

♀.—Dark reddish-purple, segments prominent, much broader in front, pointed behind, subglobular or subelliptical, convex, antennæ short and thick. Length, 2 mm.; breadth, $1\frac{1}{2}$ mm.

♀ (cleared and mounted).—Skin quite thickly beset with round gland-spots, and also minutely hairy, the minute but abundant pubescence being a striking characteristic of the species. So abundant are the hairs in the vicinity of the anal ring that it is impossible to be sure how many really belong to the latter, though there seem to be six, the usual number. The legs, antennæ and mouth-parts are tinged with ochreous, and are large for the size of the insect; particularly the mouth-parts, which have at least twice the diameter, and many times the bulk, of those of the larger species *Phenacoccus americanæ*. The mouth-parts are also much broader in proportion to their length than in *P. americana*, and the rostral filaments are quite stout. The antennæ are stout, 6-jointed, just about as long as in *P. americana*, but very much stouter and quite different in appearance. The formula is (36) 21 (45), but if anything, 3 is a little longer than 6; 3 about twice as long as broad; 4 and 5 broader at apex than at base, so that the sutures between 3 and 4, 4 and 5, and 5 and 6, are very deep, the last two approaching a right angle. The whorls of hairs are very sparse. The legs are also peculiar; fully a third longer than in *P. americana*, and very stout, with large coxæ and trochanters, they are tolerably thickly beset with small hairs. The tarsus is somewhat over two-thirds the length of the tibia, and tapers quite rapidly from a broad oblique base, it shows a slight tendency to be jointed a little before the

end. Claw large, moderately bent, on one leg minutely notched at the end. Digitules wanting; there is a small bristle in the place of the claw-digitule.

Hab. Haverhill, Mass., Oct. 14, 1896, in a nest of *Lasius claviger*, Rog., under a stone with a small herd of another species; only one found, not feeding. Named after Mr. Blanchard, who has interested himself in the Coleoptera associated with ants in the same region.

Of the Massachusetts species, this most resembles *R. lasii*, particularly in the antennæ, but it differs widely in its colour, hairiness and stout legs. Still less does it seem to resemble any of the foreign species.

Reviewing the above three species, it seems that the *Lecanopsis* is most modified for an underground life, the *Ripersia* somewhat, but the *Phenacoccus* hardly or not at all. It is probable that the last will be found in summer on some plant above ground.

ARGYNNIS IDALIA IN NEW BRUNSWICK.

On February 1st I happened to spend a few hours in St. John, N. B., and through the kindness of Mr. Herbert E. Goold, of Sussex, N. B., and Mr. A. Morissey, of St. John, I was enabled to visit the very interesting museum of the Natural History Society of New Brunswick. In looking over the cases of insects I noticed two fine specimens of *Argynnis idalia*, which Mr. Goold told me were taken by himself or his father at St. John. I could not remember at the time any record of *A. idalia* having been taken in New Brunswick, so asked Mr. Goold to enquire from his father if he remembered anything of the capture. He has since written to me: "In *re Argynnis idalia*—On my return home from St. John I asked my father about the specimens. He remembered the circumstances of their being caught distinctly, as he was perfectly familiar with the insect, having been one of the most active members of the entomological branch of the Natural History Society of Portland, Maine. In 1880 quite a number of specimens of *A. idalia* appeared in the vicinity of St. John, and the specimens you saw were taken at that time." It is to be deeply regretted that at the present time very few members of the strong local Natural History Society at St. John are studying entomology. The locality is one of extreme interest scientifically, and very much requires working up.

J. FLETCHER, Ottawa.

[In the C. E. for March, 1896, Vol. XXVIII., p. 74, the capture of a specimen of *A. idalia* at Windsor, Ont., is recorded.—ED. C. E.]

ON REARING DRAGONFLIES.

BY JAMES G. NEEDHAM, ITHACA, N. Y.

Field work in Entomology is full of delightful opportunities, and none, just at present, is more inviting, none more certain to repay well even a little effort, none more sure to yield discoveries of scientific value, than work upon the life-histories of Dragonflies.

Of the species occurring throughout the central tier of States, a majority perhaps has now been bred; but of the Canadian, far western and southern species the known nymphs are few and far between.

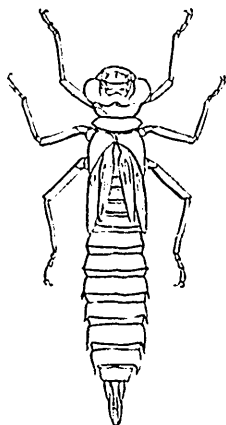


FIG. 15.—AESCHNID NYMPH.

The nymphs (fig. 15), which are all aquatic, have an interesting distribution in depth. Those of *Agrionidae* and of most *Aeschninae* cling to floating or submerged vegetation. These at least every aquatic collector has seen. Those of *Libellulidae* sprawl upon the bottom amid fallen trash. Those of *Gomphinae* burrow shallowly along beneath the film of sediment that lies on the bottom, with the end of the abdomen turned up for respiration.

It is very easy to collect them, especially in spring. A garden rake with which to draw ashore the stuff to which they cling and a pail of water in which to carry them home is all the apparatus desirable at that season. Later, when a new growth of weeds is rooted fast to the bottom, the rake will have to be exchanged for a water-net. Withdrawn from the water, the nymphs render themselves evident by their active efforts to get back, and need only to be picked up. The number of species one will find will generally depend on the variety of aquatic situations from which he collects. The places apt to yield the best collecting are small permanent pools, shallow inlets in the shores of lakes, and the places where the trash falls in the eddies of streams.

They are quite as easily reared. I have found common wooden kits and pails half filled with water, with screen or netting covers, entirely satisfactory. A number of nymphs, if near one size, may safely be kept together (excepting only a few notoriously cannibalistic *Aeschninas*: e. g. *Anax junius*), and if not grown may be fed upon such small insects as a net will gather in any pond. A good square meal once a week will keep

them thriving. The water should be reasonably clean. Three things should be carefully observed. (1) There must be a surface up which they can climb to transform: if the sides of the kit are too smooth put in some sticks; (2) there must be room enough between the netting cover and the water for complete expansion of their wings; (3) they must remain out of doors where the sunshine will reach them. This last point especially is essential to success. But there is still an easier way to do it, and one which, when a species is very common, will prove entirely satisfactory. The several nymphal stages (excepting the youngest, not likely to be collected) are very much alike. I am in the habit of preserving the younger nymphs and putting into my kits only those well grown, as shown by the length of the wing-cases, which should reach the middle of the abdomen. But if, when a species is becoming common, one will go to the edge of the water it frequents, at the time of its emergence, one may find nymphs crawling from the water, others transforming, imagoes drying their wings, and others ready to fly, and may thus obtain in a few minutes the material necessary for determining nymph and imago. The time of emergence may be determined by noticing at what time pale young imagoes are seen taking their first flight, and then going out a little earlier. The unfortunate thing about it is that many of the larger species transform very early in the morning, and to take such advantage of them one must be on the ground between daybreak and sunrise.

Several imagoes should be kept alive until they have assumed their mature colours. It is most important that each imago and its cast skin should be kept together.

Eggs, also, are easily obtained. Every collector has seen the female of the species figured on the front of this magazine, or of related species, dipping the tip of her abdomen into the surface of the water, depositing eggs. If the ovipositing female be captured, held by the fore wings, leaving the hind wings free, and "dipped" by hand to the surface of clean water in a vial or a tumbler, an abundance of eggs will usually be liberated. Eggs of those species which possess an ovipositor and which place them within the tissues of plants may be obtained by collecting the stems in which they have been inserted.

Eggs and nymphs should be dropped in boiling water for a minute and then preserved in alcohol. Imagoes, if mounted, should have a wire or bristle inserted into the body its entire length to prevent otherwise

certain breakage, or if placed unmounted in envelopes, these should be of soft paper, loosely packed, so that the eyes will not be crushed.

In my own field work upon Dragonflies I try to cover for each species the points of the following outline :

I. Imago.

- (1) Name ; locality ; date ; occurrence ; etc.
- (2) Haunts : places frequented , places avoided ; the reasons, if discoverable.
- (3) Flight : its hours ; its duration ; its directness ; average altitude ; places of rest : altitudes.
- (4) Food : its kind ; how obtained ; where eaten.
- (5) Enemies : what are they, and how do they destroy Dragonflies ?
- (6) Oviposition : does the ♀ oviposit alone or attended by the ♂.
- (7) The eggs : where placed ; number in a place ; incubation period.

II. The Nymph.

Points 1, 2, 4 and 5 of above, and Imagination : hours ; places ; distance from water ; etc.

I shall have to admit at once that it is very difficult to determine all these points for a single species, but the effort will lead on into delightful intimacy with these beautiful insects.

At the kind invitation of the editors, I venture to say to the readers of this magazine that I am now engaged upon a semi-popular monograph of N. American Dragonflies, which, in so far as it includes accounts of habits and life-histories of the species, must of necessity be a co-operative work. And I have written this to invite co-operation. The foregoing simple methods are the very best. I will furnish (if desired) half a dozen named nymphs of typical genera to any one who will undertake to collect and rear others. I shall be very willing to determine nymphs or imagoes for any one, and to point out for description such as are new. But I especially desire that accurate field observations and notes be made on many of our species of which we now know only the names, and to such observers I will give all possible aid.

THE ANNUAL REPORT of the Entomological Society of Ontario for 1896 is now in type and will soon be ready for distribution.