

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

The Canadian Entomologist.

VOL. XI.

LONDON, ONT., JULY, 1879.

No. 7

ON CECIDOMYIA LEGUMINICOLA, N. SP.

—BY J. A. LINTNER, N. Y. STATE MUSEUM NAT. HIST., ALBANY.

Cecidomyia trifolii, CANADIAN ENTOMOLOGIST, vol. xi., p. 44. 1879.

I am indebted to Dr. Hagen, of Cambridge, Mass., for the information that the name which I had selected for the clover-seed fly was preoccupied by Franz Loew, in *Verhandl. Zool. Bot. Gesell., Wien*, 1874, vol. xxiv., where he describes (p. 142) the male and female, larva, pupa and gall of a species occurring in a folded leaf of *Trifolium pratense*, and figures (pl. 2, f. 4) the deformation of the plant. I therefore propose the name of *C. leguminicola* for the American species, the larva of which inhabits the clover legume.

Bremi, in his *Monograph of the Cecidomyiæ*, 1847, p. 29, may possibly refer to Loew's species when he states: "I observed in the same place [with *Ranunculus bulbosus*] on the leaves of *Trifolium pratense*, similar cornucopiæ but less regular, as in some leaves only the tip was rolled (pl. 2, f. 34), and of others similar to a pod. The development was not observed, and as I supposed it identical with *Cecid. ranunculi*, I accept them as a variety of that species."

Another species may infest the clover in Europe, if the statement made by Perris, in *Ann. Soc. Ent. France*, 1870, p. 179, be reliable. He states that in the tips (*extremes tiges*) of *Trifolium subtercanicum* are to be found larvæ of a *Cecidomyia* (imago unknown). Fr. Loew, in a notice of these larvæ (*Wien Z. B. Gesell.*, 1876, p. 92), remarks that perhaps they were only *inquilines*, and that the deformation described by Perris may have been made by Acari.

The above references have been kindly communicated to me by Dr. Hagen.

From the inquiries and examinations thus far made, it is very probable that our *Cecid. leguminicola* does not occur in Europe. Baron Osten

Sacken has informed me that they have there a *Cecid. Loti*, infesting the heads of Lotus and Medicago, but that the larva as described by Winnertz seems different from ours, judging from the description given by me. Dr. Hagen compares our species with the European *Cecid. sysymbrii*, in its form and venation.

I have recently been successful in obtaining examples of the imago of *Cecid. leguminicola*, unknown to me at the time of my description of the larva. Anticipating failure (since realized) in my efforts to rear it from the larvæ obtained by me last year, I applied, in May last, to Mr. R. J. Swan, of Geneva, N. Y., who at the Annual Meeting of the N. Y. State Agricultural Society, in January, had spoken of the occurrence in very large numbers of the larvæ in a clover field upon his farm, requesting that some of the surface soil from the field might be collected and forwarded to me. A small box of the earth (containing also some of the clover roots) of about six inches cube, was received by me on the 2nd of June, and spread out in a glass-covered case. On the following morning a male and female, *in copula*, were found in the box. Additional examples were disclosed from the earth—about twenty-five in all—from that time to the 27th of June, since when none have been obtained. They had undoubtedly commenced to emerge during the month of May.

The insect is a true Cecidomyia, and belongs to Section I, subsection A of Winnertz' arrangement as defined in Osten Sacken's paper on the N. A. Cecidomyiæ in Loew's *Monograph of the Diptera of North America*, Part I., viz.: I. Wings with three longitudinal veins, the third either forming a fork or becoming more or less obsolete toward the tip. A. Cross-vein placed between the root and the tip of the first longitudinal vein (in this section the cross-vein is frequently almost obsolete).

The neuration is shown in fig. 1, p. 174 of Loew's *Monograph*.

Marked features of the species, which will serve in its recognition, are the genitalia of the male, which are quite broad, projected on a pedicel, and arranged in an extended pair of clasping organs; and the long jointed ovipositor of the female, of about twice the length of the abdomen.

The antennæ of the Cecidomyiæ afford perhaps the best features for determination of species. The following description of the antennæ of the male of *C. leguminicola* was drawn from fresh specimens just after death:

Number of joints seventeen in all—the basal one colored and short, the next one black, short and naked, followed by fifteen verticillate ones.

Joints on peduncles as long as the joints, subcylindrical with rounded ends, about one-half longer than broad, rather thickly verticillate; the longest hairs nearly three times as long as the joints, and projected at nearly right angles to them; the shorter hairs about equal in length to the joints, some of which curve upward and have their tips nearly in the plane of the succeeding joint; joints regularly and gradually diminishing in size to the terminal one, which is about but one-half the size of the penultimate one, and of an ovate form.

The wings are clothed with numerous short, curved, blackish hairs, which give them a dusky appearance; ciliæ paler, long. The abdomen is fuscous, marked on each segment dorsally with black hairs forming a segment of a circle having the curve in front. The thorax is black above, clothed with rather long hairs.

The insect is in all probability quite generally distributed throughout the State of New York, and will be found in adjoining States. On the 1st of July, examples of the larvæ were obtained from clover heads gathered by me on Mount Equinox, Vermont, at an elevation of 2,500 feet above tide. On July 5th, although a late period for the larvæ, mature specimens were taken from clover growing within the city of Albany, from the sidewalk of Western Avenue. The only example of the fly which has up to the present, so far as my knowledge extends, been taken at large, was captured on the Hudson River, in the vicinity of Castleton, on the 16th of the present month (July), by Mr. Dempster A. Lansingh, of Albany. The keen eye that could detect so minute an object on the crowded deck of an excursion boat, deserves to be trained for use in entomological science.

From information kindly communicated to me by Prof. Wm. H. Brewer, of Yale College, New Haven, Conn., it is very probable that the existence of this clover pest was known at least thirty years ago. He writes as follows:

"My father, Henry Brewer, of Enfield Center, Tompkins Co., N. Y., was an enthusiastic grower of clover and clover-seed as far back as I can remember. Many years ago—how long, I cannot definitely say, but certainly before 1848, it was known to us that an insect attacked the clover, which hatched out a fly. Our belief then was, that the larva existed *within the seed*. On two occasions I hatched out the flies and sent them by mail to Albany, to the Entomologist there—once before 1848, and once later, somewhere between 1851 and 1855. The fly was very small

and very slender, but having been found so many years ago, that is all the recollection I have of it. The clover heads were not affected externally by its presence."

There cannot be much doubt but that the above insect is identical with the little midge which has so recently commanded our attention, as the result of its multiplication, or, as is more probable, from a period of its unusual abundance. Accepting their identity, it is quite interesting that the first notice of the species, so far as known, comes from a county which is believed to be suffering more from its depredations, at the present time, than any other portion of the State.

From the July number of the *American Agriculturist*, I learn, for the first time, that Prof. Riley has been engaged in investigations on this interesting insect. The article is drawn from a conversation with Prof. R., and in part from a communication by him a short time ago to the *N. Y. Tribune*. It contains a notice of the depredations, transformations and appearances of the midge, and is accompanied by excellent figures of the male and female with enlargements of parts, which will be of great service in its identification.

CONTRIBUTIONS TO THE COLLECTION OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

Through the kindness of Mr. O. S. Westcott, of Racine, Wis., our cabinets have lately been enriched with a number of named Orthoptera, some 25 species in all; also 13 species of Lepidoptera which were short or entirely wanting in our collection.

Mr. G. R. Pilate, of Dayton, Ohio, has also sent us some very beautiful things, including over 300 specimens of Coleoptera and 29 of Lepidoptera, a large proportion of which are distinct species and quite a number of them new to our collection. We are greatly indebted to these gentlemen for their kindness in this matter, and herewith tender them our sincere thanks.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KY.

ADELA.

A. biviella Zell.

I have received both sexes of this species from Prof. Fernald, of Orono, Maine. It is a prettier species than *A. bella* Cham., with the fasciæ much more distinct. Zeller describes only the ♂. It has the head and palpi dark brown with a very faint purplish tinge; the antennæ with annulations of dark purple and silvery white; the body and legs dark purple, the legs annulate with white; hind wings pale purplish with darker ciliæ; thorax and fore wings rich deep purple, appearing in some lights to be thickly dusted with brightly scintillating golden scales; behind the middle of the fore wings is a straight white fascia widest on the dorsal margin, dark margined before, and more faintly so on the costa behind; before the apex is another fascia which does not quite reach the dorsal margin and which is dark margined before. Zeller represents this fascia as having a sigmoid outline, but in one of my specimens it is perfectly straight and in the other scarcely perceptibly sigmoid. *Al. ex.* 7 lines.

The ♀ (a single specimen), now first described, differs only in having the hairs of the head straw yellow, those of the palpi whitish, and the second fascia reduced to a very short white costal streak.

The antennæ are simple in both sexes.

A. bella Cham.

The fasciæ in this species are as stated in the original description in the apical part of the wing, only visible in certain lights and are very indistinct even then; perhaps it would be more correct not to describe them as fasciæ, but to say that the apical part of the wings is somewhat suffused or overlaid with golden, except three or four narrow indistinct transverse lines, which are of the general hue. In the ♀ the basal half of the antennæ are densely clothed with long scales.

Dicte (Adela) corruscifasciella Cham., CAN. ENT., v. 5, April, 1873.

A. Schlägeri Zell., Bei. z. Kent, May, 1873.

In my judgment the characters of this and similar species are sufficient to distinguish them generically from *Adela* as represented by such species.

as *A. bivittella*, *trigrapha*, *bella*, etc. Prof. Zeller's figure and description leave no doubt as to the identity of the species described so nearly at the same time respectively by him and by me.

ANTISPILA.

A. ampelopsiella Cham.

In Vol. 6 I have given this name to a mine and larva found in leaves of *Ampelopsis quinquefolia*, the imago being then unknown. I have also, *loc. cit.*, described a species bred from Grape leaves, without naming it, because I thought it probable that it would prove to be *ampelopsiella*. Since then I have bred it both from *Ampelopsis* and from Wild Grape leaves (*Vitis cordifolia*), and it proves to be the same species described in Vol. 6. The description, however, is imperfect, having been prepared from a single slightly worn specimen.

A. hydrangeæcella Cham.

This species was also named from the larva and mine only. I have since bred it. It is a little larger than *ampelopsiella*, though scarcely so large as *isabella* or *viticordifoliella*, and is perhaps the prettiest species of the genus. The palpi and tips of the antennæ (last five joints), and the under side of a few of the basal joints snowy white. Head, thorax, abdomen, inner surface of legs, hind femora, and tibial spurs of hind legs, like burnished steel; tarsi of anterior and middle legs and tips of hind tarsi yellowish white, posterior tibiæ on outer surface and tarsi, except the tips, purplish with metallic reflections; anterior wings and a spot on each side of the thorax bronzy brown, without greenish reflections; ciliæ purple tipped with silvery gray. The fascia, costal and dorsal streaks and apical spot are brilliant silvery; the fascia is not constricted on the fold and the streaks are placed as in the other species; the costal spot is small and the dorsal large and almost an exact triangle, being, however, a little widest on the base and the margins very faintly concave. Hind wings and ciliæ pale purplish fuscous.

It thus differs from *ampelopsiella* in having the tips of the antennæ white and in other minute particulars. The case in which it pupates is elongate and narrow, a long ellipse; that of *ampelopsiella* is a short and wider ellipse, that of *viticordifoliella* is nearly oval, that of *isabella* a very wide oval, almost circular, and that of *cornifoliella* is smaller than that of

isabella, though resembling it more in shape than that of *viticordifoliella*, which is nearer to it in size. That of *nyssæfoliella* I have not seen. It requires careful observation to distinguish the species. They are more readily distinguished by their cases than by the marks of the imago; *hydrangeælla* and *ampelopsiella* may be distinguished at once from the others by the possession of the apical spot, but they require close observation to distinguish them from each other. So likewise do *isabella*, *nyssæfoliella*, *cornifoliella* and *viticordifoliella*; *cornifoliella* and *isabella* are, however, of a duller darker brown than the other two, and *viticordifoliella* likewise has white annulations towards the tips of the antennæ.

I have not seen any of the European species, but comparing our species with the figures of *Pfcifferella* and *Treitschkiella* in Nat. His. Tin., vii., the latter are much paler or lighter in color than our species.

NOTES UPON THE PREPARATORY STAGES OF CERTAIN SPECIES OF BUTTERFLIES. NO. I.

BY W. H. EDWARDS, COALBURGH, W. VA.

I have in my note-books descriptions of one or more stages of several species, of which no part of the life-history has hitherto been published, and I propose, with the permission of the Editor, to give them in a series of three or four papers.

I. ERESIA TEXANA, Edw. (*Cincta*, Edw., *Smerdis*, Hewn.).

On 13th Sept., 1878, I received from Mr. J. Boll, Texas, a lot of newly-hatched larvæ. The eggs were laid in cluster upon the leaf of *Diclippa*, on 7th Sept., and were immediately mailed to me, arriving five days after. Nearly all the plant had withered, but there was a little green about the flower-heads, and the larvæ fed upon this till it was consumed. I put in the glass with them leaves of *Aster*, on which *Tharos* and *Nycteis* feed; of *Actinomeris squarrosa*, on which *Nycteis* feeds, and *Chelonia barbata*, the food of *Phaeton*, but for some days the larvæ refused all and most of them died. About a week after their arrival I found the few survivors were eating *Actinomeris*, and thenceforth

I had no difficulty. The first moult escaped me, the second occurred 25th Sept., the third 6th Oct., the fourth about 15th, and the first chrysalis formed 21st Oct. The butterfly emerged 8th November. The resemblance to genus *Phyciodes*, especially to *P. Tharos*, was close in all stages. I doubt if *Eresia* and *Phyciodes* are properly more than groups of one genus.

YOUNG LARVA.—Length .08 inch ; cylindrical, of even size, the segments well rounded ; color greenish-brown ; on dorsum four rows of pale-colored flattened tubercles, from each of which springs a long black hair, curved forward ; head larger than body, reddish-brown ; shape sub-ovate, bilobed.

After second moult.—Length .17 inch ; dorsum and upper part of side brown, the lower part and under side yellow-green ; furnished with seven rows of spines, one dorsal, three lateral, each spine stout, broad at base, tapering to a blunt point, and thickly set with short brown bristles ; the dorsal spines, and the tubercles from which they spring, greenish ; those of first lateral row black ; the two lower rows greenish ; over the feet is a row of minute spines with bristles, all greenish ; head sub-cordate, the vertices rounded ; color dark brown, shining.

After third moult.—Length .26 inch, same shape ; color dark brown, specked with blue-white ; the lower part of side greenish-white, finely marked with brown ; on the lower side of second lateral spines is a longitudinal black stripe, only found on the middle of each segment ; all the spines dark brown except the lower laterals and the minute ones over feet, which, as well as their bristles, are greenish-white ; head as before, bronze-brown.

After fourth and last moult.—Length .6 inch.

MATURE LARVA.—Length .7 inch.

Color yellow-brown, the dorsum and upper part of side much specked with dull white ; running with first laterals is a whitish line, and just below a black stripe, broken at the joints of the segments ; along the base of body, embracing the spiracles on its upper edge, is a broad dull white band, mottled with greenish and brown ; the lower lateral spines on this band, and the spines over feet, greenish-white ; all others brown ; head sub-cordate ; the vertices rounded, smooth, brown.

CHRYSLIS.—Length .5 inch ; cylindrical, the abdomen stoutest ; head-case short, bevelled at the sides, nearly square at top, the vertices pyramidal, not prominent ; mesonotum slightly raised, rounded, followed by

a shallow depression; on the abdomen three rows of small tubercles, corresponding to the larval spines of dorsal and first lateral rows; the latter continued to mesonotum, on which they are larger than elsewhere; color dark brown, specked with buff; or sometimes light brown, specked and streaked with darker; the head and wing cases clouded with olivaceous; about the hind margins of the wings two parallel rows of whitish points; the tubercles yellowish, but on the anterior side mostly black.

2. *PHYCIODES VESTA*, Edw. The butterfly figured in *But. N. A.*, Part 7, Vol. 2.

CHRYSALIS: shape of *Tharos*.—Length .4 inch, cylindrical; the wing-cases a little raised above surface; head-case stout, narrow at top and a little convex; excavated at sides; mesonotum moderately prominent, rounded, followed by a shallow depression; abdomen stout, the segments elevated at their anterior edges, and the foremost one quite prominently, as in *Tharos*; on abdomen several rows of fine tubercles, two of which pass to mesonotum; color apparently had been yellow-brown, specked with black and dull white, but the example was dead, and I could not be certain as to the shades of color in life. This was sent me recently by Mr. Boll.

3. *MELITAEA BARONI*, H. Edw.

I received from Mr. Oscar T. Baron, at Mendocino, Cal., about twenty larvæ in hybernation, after third moult, in fall of 1878. Mr. Baron wrote that the eggs were laid 29th June, in clusters, one large and several small ones, besides a few scattered eggs. The large cluster contained 60 or 70 eggs, the small ones from 5 to 20. The larvæ hatched 20th July, or after 21 days. The first care of the young larvæ is to spin a web which covers the whole brood, and they occupy this, enlarging as necessary, till the time for hibernating comes. Then some of the larvæ leave the common web and spin for themselves in the wilted leaves of the food plant. (I infer from this that some of the larvæ still remain in the common web.) Mr. Baron sent me roots of the plant, which I forced in the winter and got weak stems and a few leaves, but eventually all died. The larvæ did not survive the winter, though I treated them as I did the hibernating larvæ of *Nycteis*, which lived. On 18th May, 1879, I received from Mr. Baron quite a number of chrysalids of this species, of which several were in good condition on arrival. From these emerged 6 butterflies.

In 1876, Mr. Baron had sent me living larvæ in tin-box with food plant. They were twelve days on the way in the mail, and but one larva was alive on arrival. Several had made chrysalis in the box, but were eaten, and probably the single larva had lived on the chrysalids. It had barely strength to suspend within a few hours after I opened the box, and died before chrysalis. This shows that caterpillars may be sent great distances per mail. They will live and thrive so long as the leaves remain fresh, and I have frequently received them in good condition after five or six days on the road. *But they should always be forwarded in tin or metal boxes*, as in these the leaves remain fresh several days. The larvæ get plenty of air under the cover of the box, so that it is unnecessary to punch holes therein. *It is useless to send eggs or larvæ in paper or wood even for two or three days*, as the plant dies and the larvæ starve. If eggs are sent, there should always be leaves with them, to supply food in case the young larvæ come forth. I frequently receive eggs or larvæ badly packed, and hence I give these directions. I shall be glad of butterfly eggs or larvæ at any time, and will gladly exchange butterflies for them.

As will be seen above, the resemblance in larval habits of *Baroni* to *Phaeton* is close.

EGG.—Shaped like *Phaeton*; a truncated cone, rounded at base; the lower two thirds smooth, but under a high power seen to be finely grained or pitted; the upper third ribbed vertically.

YOUNG LARVA.—Length .08 inch; cylindrical, the segments well rounded; translucent, greenish-brown; on each segment a transverse row of fine tubercles, giving out recurved hairs; head obovoid, bilobed, the vertices rounded, black.

After first moult.—Length .15 inch; mottled greenish and brown; armed with seven rows of spines (as in this genus), besides a row of minute spines over feet; spines slender, and with black bristles; the dorsal row yellow, as also the small spines over feet; all others black; on 2 a collar of fine tubercles, each of which gives out a pencil of hairs; head sub-cordate, vertices rounded, black, with black hairs.

After second moult.—Length .22 inch; color black; all spines black except dorsal row and the small ones over feet. (These three stages are described from specimens in alcohol.)

After third moult.—Length in hybernation, and therefore contracted, .3 inch; black; spines thickly beset with divergent bristles,

forming a dense covering to the body; the dorsals and the small spines over feet orange, all others black; head black.

MATURE LARVA (after fifth moult probably).—Length 1 inch; color velvet-black, dotted with whitish points; under side smoky-brown; the dorsal spines yellow, with black bristles, those over feet yellow; all others black; feet black, pro-legs brown; head small, sub-cordate, the vertices a little prominent; dark brown; much covered with black hairs.

CHRYSLIS.—Length .6 to .65 inch. Cylindrical; head case narrow, short, compressed transversely, excavated at sides; mesonotum not prominent, rounded, followed by a shallow depression; abdomen stout, furnished with several rows of sharp, conical, rather short tubercles, those of medio-dorsal row standing on the anterior edges of the segments; the wing cases a little flaring at base, depressed in middle; color a delicate blue-gray; of wing cases buff, more or less, but always slightly, tinted with red; whole surface much marked with black; on wing cases a black patch extends from base almost to hind margin, the nervules being orange; the hind margins are bordered by two parallel rows of serrated spots; the head case is largely black, and the mesonotum also; the tubercles more or less enclosed by black; behind those of medio-dorsal row are four small spots forming with the tubercle a triangle, and there are similar spots on sides. Different chrysalids vary in respect to these black markings.

This history of *Baroni* is more complete than that of any other of the Californian *Melitææ*. The species is the most beautiful of its genus on this continent, the larger part of the under surface of wings being of a brilliant red-lead color. In size and in the appearance of upper surface it is near to *Editha* Bois.

A SUCCESSFUL MOTH-TRAP.

BY O. S. WESTCOTT, RACINE, WIS.

Many attempts have been made to devise something by means of which to capture the Noctuidæ, but the results have been usually so meagre that the contrivances have been abandoned in disgust. I have been using a contrivance this season which will really abundantly repay

one for the trifling trouble and expense involved in its construction. It consists first of a gallon glass jar, heavily charged with cyanide of potassium. To the top of this is fitted a funnel, the spreading mouth of which opens at right angles to the axis of the poisoned jar. The lower end of the funnel is four or five inches below the mouth of the jar and has an opening three inches in diameter, the funnel mouth being twelve or thirteen inches across. Opposite the mouth of the funnel, and on the opposite side of the jar, is soldered to the funnel a sheet of tin so bent as to thoroughly enclose a lamp. The lamp is supported by a piece of tin *hinged* to the outer edge of this projection. The lamp being placed in position, the tin support is made to rest upon the projecting part of the jar below its neck. Immediately in front of the light is placed a sheet of mica. The whole contrivance is placed within a tight wooden box, and a tin flap is also arranged above the lamp chimney as a precaution against an undesired conflagration.

The moth, attracted by the light, flies into the mouth of the funnel, is stopped by the mica, and after fluttering a very short time, is so far overcome by the fumes of the potassium as to fall within the poisoned jar, whence it cannot emerge. A projecting lip of an inch or so in height is soldered to the lower edge of the mouth of the funnel in such a way as to catch any insect that falls outside the mouth of the jar. It thus is most likely to return to the light. I have taken with this contrivance hundreds of Noctuidæ and Coleoptera, among the former many things—especially among the Tineidæ—entirely new to my cabinet.

THE TYPICAL COLLECTIONS OF THE DIPTERA OF NORTH AMERICA IN THE MUSEUM IN CAMBRIDGE, MASS.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

The new edition of the Catalogue of the described Diptera of North America, by the Baron Osten Sacken, Washington, 1878, ranges doubtlessly among the most important works published on the North American Fauna. A very detailed and elaborate preface tells only in brief manner the immense amount of work done by the author since the publication of the first catalogue in 1858. A large part of new information is given at the end of the Catalogue in 335 notes.

Being by no means competent to give a scientific record of the work, which contains indeed much more than the names and quotations which are only printed on the pages, I felt it my duty to compare carefully the collections of Diptera in the Museum with the Catalogue.

The collections consist of

1. The typical collection of the Diptera of Osten Sacken.
2. The typical collection of the western Diptera of Osten Sacken.
3. The typical collection of the N. American Diptera of Prof. Loew, in Guben, Germany.

All three are labeled by Osten Sacken and Prof. Loew, and are still kept separated according to the wishes of Osten Sacken. They are all in the same condition as when received. After a careful investigation they are found to contain 2,136 species, named in the catalogue for *Orthoscapha* 1,317 species, *Cycloscapha* 212 species, *Pupipara* 7 species. But it should be noted that about one-third of them, 648 species, are *unica*. Of the species starred in the catalogue only 33 are not in the collection. Of the Cecidomyidæ, which are not starred in the catalogue, 22 species are represented in the collections. Besides those enumerated a very large number of manuscript names of Loew and O. Sacken are attached to yet undescribed species, besides a very large number of undetermined or even assorted specimens.

The collections of Osten Sacken are presented to the Museum.; the collection of Prof. Loew has been bought.

DESCRIPTION OF A NEW FOSSORIAL WASP.

BY W. H. PATTON, WATERBURY, CONN.

CHLORION AERARIUM.

Length one inch. Bronzed-purple; antennæ, mandibles, tegulæ and feet black, postscutellum blue; wings dark brown, with a purple reflection. Clypeus terminated by a row of five teeth, the lateral teeth a little more remote from the intermediate teeth than the intermediate teeth are from the median tooth. Head and thorax smooth, with scattered and shallow punctures; metathorax transversely striate throughout, the striæ on the

upper face finer. First recurrent nervure received by the second submarginal cell in the middle, second recurrent nervure received by the third submarginal cell near the base. Spiracles of the first segment of the abdomen situated upon tubercles.

One ♀ specimen. Plainville, Conn., Aug. 30, 1871.

NOTES ON THE HUMBLE BEES.

BY G. J. BOWLES, MONTREAL, P. Q.

(Read before the Montreal Branch of the Ent. Soc. of Ontario.)

Packard places the Hymenoptera at the head of the Class Insecta, on account of the completeness of their transformations and the perfection of their instincts. This is also the position assigned to this Order by Dana. Packard ranks the Bees (Apidæ) at the head of the Hymenoptera, thus placing them at the very summit of the insect creation. Cresson, however, in his "Catalogue of the Described Species of N. A. Hymenoptera," has them a long way down the list, after the Ants, Wasps, etc. Who shall decide when such authorities disagree?

I wish to draw attention to the Humble Bees of this part of Canada, giving as far as I can the names of the species found here and some notes on their economy, the latter chiefly taken from Putnam's paper published in 1863.

The genus *Bombus*, says Swainson, appears to be a Northern and chiefly European and American genus; there are very few inter-tropical species, and very few Oriental. Some of the tropical species, however, are very large, much larger than those found in temperate climates. As regards North America, Cresson, in 1863, enumerated 46 species, of which the greater number are found in the northern part of the continent. I have carefully tabulated his list, and find that the arrangement of their habitats is as follows, beginning at the South: Mexico 6, Southern States 3, Middle 7, Western 5, Kansas and Utah 8, California 2, New England 8, Canada 7, Hudson Bay 5, Arctic 13, Sitka 3, Greenland 1, unknown

3, and one species from Antigua. The large number from Arctic America is surprising, and would lead one to think that the number given for the more southern parts is not correct. The Arctic species, however, are peculiar to that part of the continent, only three of them being found in Hudson Bay Territory, and only one of them coming as far south as Canada. Many of the other species are also local, but some are found over a wide area. Thus *virginicus* is found all over Canada and the United States east of the Rocky Mountains, *vagens* from Canada to the west, *fervidus*, *pennsylvanicus* and *separatus* the same, and *ternarius*, the only Arctic species found in Canada (according to Cresson), seems to extend also over the North-Eastern, Middle and far Western States. Britain possesses about 40 species.

The common name, Humble Bee, is said to be derived from Hummel or Hummer Bee, alluding to the noise made by the wings during flight. In Scotland the largest species found there is called the Bumbee.

In North America the Humble Bee is the nearest approach we have, as far as indigenous Bees are concerned, to the Hive Bée. The latter (*A. mellifica*), however, has become naturalized on this continent in the forests to a considerable degree beyond civilization, making its nests in hollow trees, or among the branches, sometimes under ledges or in clefts of the rocks. It is said not to have been found to the west of the Mississippi before 1797, but in 14 years it had advanced 600 miles further in that direction. I have never heard of the Honey Bee becoming wild in Canada, but it probably would if neglected when swarming takes place.

To return, however, to the Humble Bees. They do not form communities so large as Honey Bees, seldom more than two or three hundred occupying one nest, in some species not more than fifty or sixty. The community is dissolved on the approach of winter; the males and workers die, and only females have the power of passing the winter in a torpid state, among moss, in rotten wood, or in some other situation where they may enjoy protection from frost and concealment from enemies—to perpetuate the race by founding new communities in the ensuing spring. Workers are chiefly produced in the earlier part of the season, males and perfect females in the latter part of it. The females are much less prolific than those of Honey Bees, and seemingly as a kind of provision for this deprivation, they, unlike the Honey Bees, live in the same community without seeking to destroy one another, provided they belong to the same colony or nest.

Their nests are placed in different situations, some species having different habits from others in this respect. Thus of the English species, *B. terrestris* makes its nest in holes in the ground, at the depth of a foot or more, floored with leaves and lined with wax, and often entered by a winding passage. Others, as *B. lapidarius*, make their waxen nests among stones; others, as *B. muscorum*, among moss, which they mix and join with wax. The nests are enlarged as the community increases. In the spring the female or queen bee, having awaked from her torpid state, roams about until she finds a suitable place for a nest. On deciding, she immediately collects a small amount of pollen mixed with honey, and in this deposits from seven to fourteen eggs, gradually adding to the pollen mass until the first brood is hatched.

As regards the Bees which I have examined, some were taken at Quebec by me some years ago, and one or two species here. I have to thank Mr. Caulfield for the principal part of the material.

There are certain differences between the sexes which render it easy to distinguish them. Not to enter too scientifically upon this part of the subject, I give the principal points of difference.

The females may be known by their large size, and the corbiculæ or baskets on the posterior tibiæ, formed by a fringe of long hairs on *each side*.

The workers generally resemble the females very closely, the only observable difference being in the size, and this varies greatly. They may be found of all sizes from the female downwards, so that it is impossible to tell the difference in some cases.

The male is smaller than the female and larger than the generality of the workers. It has one joint more in the antennæ and one section more in the abdomen than the female.

Cresson says a very conspicuous character to distinguish the sexes is this: In the male the inner tooth of the tarsal claws is almost as long as the outer, in the female the inner tooth is quite short compared with the outer. The posterior tibiæ are without baskets, but have a fringe of hairs on the outer side.

APATHUS, Newm.

The following remarks on this genus are from Mr. Cresson's "List of the North American Species of *Bombus* and *Apathus*," Proc. Ent. Soc'y Phil., 1863:

This genus is parasitic on that of *Bombus*, and resembles it very much in general appearance. The characters with which to distinguish it from *Bombus* are as follows: The posterior tibiæ are destitute of corbiculæ (or baskets) and are convex exteriorly; the basal joint of the posterior tarsi has no tooth at its base above. In the *female* the apex of the abdomen curves under, and the apical segment beneath has the lateral margins elevated. The mandibles have a single notch, while those of *Bombus* are distinctly toothed. This genus has no workers.

The males may be distinguished from those of *Bombus* by the posterior tibiæ being exteriorly convex and thickly coated with short hairs. The males of the latter genus have the exterior surface of the posterior tibiæ concave in the centre, with a few scattered hairs, and are fringed at the exterior margins.

The economy of our species is almost unknown.

LIST OF BEES OF THE GENERA BOMBUS AND APATHUS TAKEN IN
THE PROVINCE OF QUEBEC.

BOMBUS, Latreille.

- Virginicus, Oliv. 1 male, 4 females, 1 worker; Quebec, Montreal.
 Separatus, Cresson. 1 male; Montreal.
 Vagans, Smith. 2 females, 1 worker; Quebec, Montreal.
 Perplexus, Cresson. 1 male; Montreal.
 Fervidus, Fab. 1 male, 3 females, 2 workers; Quebec, Montreal.
 Pensylvanicus, DeGeer. 1 female; Montreal, Quebec (Provancher).
 Terricola, Kirby. 2 females; Quebec, Montreal.
 Ternarius, Say. 1 male, 6 females, 2 workers; Quebec, Montreal.
 Flavifrons, Cresson. 1 male, 3 workers; Montreal.
 Sylvicola, Kirby. 3 workers; Montreal.

APATHUS, Newm.

- Ashtoni, Cresson. 1 male, 2 females; Quebec, Montreal.
 Elatus, Cresson. 3 females; Montreal.

THE HESSIAN FLY.

The following circular in reference to the Hessian Fly has been issued from the office of the U. S. Entomological Commission. The subject is a most important one, and fearing it might not otherwise reach all our readers, we present it here:

DEPARTMENT OF THE INTERIOR—OFFICE OF THE U. S. ENTOMOLOGICAL COMMISSION.

Providence, R. I., June, 1879.

DEAR SIR,—The Commission desires your co-operation in obtaining facts concerning the habits of the Hessian Fly, with statistics of losses occasioned in your town or county by its attacks; and accounts of the remedies best calculated to prevent its increase, and to destroy it. In brief, the habits of the Hessian Fly are as follows: In May and June two or three small, reddish-white maggots may be found embedded in the crown of the roots of the wheat, at or near the surface of the soil, causing the stalks and leaves to wither and die; the maggots harden, turn brown, then resembling a flax-seed, and change into little *black* midges with *smoky* wings, half the size of a mosquito, which appear in spring and autumn, and lay from twenty to thirty eggs in a crease in the leaf of the young plant. Specimens of the fly may be obtained by sweeping the wheat when three or four inches high, with a gauze net. Please send me specimens of the fly, eggs, maggot and "flax-seed," in vials of alcohol, with notes as to the date when found, and full information as to the insect enemies and parasites.

The *Wheat Midge* is apt to be confounded with the Hessian Fly. It is a small, mosquito-like fly, *orange yellow*, with clear wings, which hovers over fields of young wheat in June. It attacks the heads of the wheat, laying its eggs when the wheat is in blossom. On hatching, the maggots crowd around the young kernels of wheat, causing them to become shrivelled. The maggots in July and August descend into the ground, spinning a round cocoon smaller than a mustard seed, remaining an inch below the surface till the following June.

Information regarding the following topics is respectfully solicited; to be forwarded at the close of the season:

1. When, where, and how are the eggs deposited?
2. When does the maggot appear?
3. When is the "flax-seed" state of the Hessian Fly, or the seed-like cocoons of the Wheat Midge assumed?
4. At what date do the Midges appear in spring and autumn?
5. Look for minute parasites in the eggs and maggots. They may be bred by placing the eggs and maggots with the wheat in bottles covered with gauze, and the parasitic flies preserved in vials of alcohol.

6. Give statistics as to abundance and losses in your town.

7. State the best preventive remedies, as deep ploughing or burning in the fall, or the rotation of crops.

Specimens of the wheat affected by these insects, and of the eggs, maggots and flies, together with their parasites, in alcohol, are requested. When mailed, the alcohol can be poured out, and cotton soaked in alcohol will keep the specimens wet until received. Packed in a tin box they can be sent through the mail. Address as below. Respectfully yours,

A. S. PACKARD, JR., Providence, R. I.

LIST OF BUTTERFLIES COLLECTED IN DAYTON, OHIO.

BY G. R. PILATE.

Papilio ajax.	Euptoieta claudia.
“ “ <i>var.</i> telamonides.	Phyciodes nycteis.
“ “ “ Abbotii.	“ tharos.
“ “ “ marcellus.	Grapta interrogationis.
“ philenor.	“ “ <i>var.</i> umbrosa.
“ asterias.	“ comma.
“ troilus.	“ “ <i>var.</i> dryas.
“ turnus.	Vanessa antiopa.
“ “ <i>var.</i> glaucus.	Pyrameis atalanta.
“ crespontes.	“ huntera.
Pieris protodice.	“ cardui.
“ “ <i>var.</i> vernalis.	Junonia lavinia.
“ rapæ.	Limenitis ursula.
Colias eurytheme.	“ disippus.
“ philodice.	Apatura celtis.
“ “ <i>var.</i> alba.	“ clyton.
Terias nicippe.	Neonympha eurytris.
“ lisa.	“ canthus.
Danaï archippus.	Debis portlandia.
Argynnis cybele.	Libythea Bachmanni.
“ myrina.	Thecla calanus.
“ bellona.	Chrysophanus thoe.

Chrysophanus americana.	Pamphila cernes.
Lycæna pseudargiolus.	" verna.
" comyntas.	Amblyscirtes vialis.
Ancyloxypha numitor.	Thanaos brizo.
Pamphila zabulon.	" juvenalis.
" " var. pochahontas.	Pholisora catullus.
" huron.	Eudamus pylades.
" otho var. egremet.	" tityrus.
" Peckius.	

CORRESPONDENCE.

Eburia quadrigeninata Say has been considered by me a rare beetle in this locality until within the last two years. I have taken it very abundantly in July and August while sugaring for moths in an old apple orchard in Kendall Co., Illinois.

Dorcaschema alternatum Say abounds in July and August on hedges of Osage Orange, and is found more abundantly on the shaded rather than on the sunny side of the hedge.

Deces spinosus Say is very abundant in July on what is usually known as rag-weed—*Ambrosia artemisiæfolia* Linn.

I have in cabinet eleven ♀ examples of *Rhyssa lunator* Fabr., and seven ♀ examples of *Rhyssa atrata* Fabr. One *lunator* presents some peculiarities that seem worth recording. Ten of the ♀ *lunator* have the supporters of the ovipositor uniformly a trifle shorter than the ovipositor itself, but the eleventh is to me somewhat of a monstrosity. What should be the ovipositor consists of three exceedingly fine hair-like projections, not more than three-fourths the length of the semi-cylindrical supporters. These hairs are of a yellowish color, the tip of each one, for about one-sixteenth of an inch, being black, the usual color of the ovipositor in *lunator*, or at least the color of the ovipositor in ten of my eleven examples. Will some hymenopterist please explain the matter?

O. S. WESTCOTT, Racine, Wis.

I have to record the capture of *Macroglossa tantalus*, June 2nd. It was taken on Mr. Erastus Comings's farm, at Kenwood, Albany Co., N. Y. In same locality I have also taken in former years *Deilephila tersa*, *Chorotampa versicolor*, *Sphinx cingulata*, *Plusia formosa*, *P. mortuorum*, *Abrostola ovalis*, etc.

R. M. GREY.