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The Canadian Entomologist.

VOL. XVI. LONDON, ONT., DECEMBER, 1884. No. 12

NOTES ON LARVA OF EUCHAETES EGLE, CLEM.

BY G. H. FRENCH, CARBONDALE, ILL.

On July 5th, 1884, several larvæ of this species were handed me by a neighbor, who had found them feeding on *Asclepias quadrifolia* growing in the yard. They were just ready to pass the last moult, evidently leaving the plant for the purpose of moulting, some of them being found on a fence attracted the notice of the person finding them. As found they were .55 of an inch long; body brownish black, each joint with eight tubercles from which project tufts of hairs. Those from the four dorsal, on joints 2 and 3, are long and black, part of those on joint 4 are white; the posterior three joints also supporting long tufts. The dorsal tufts between these are ochre colored, about a third as long as the anterior or posterior, and bend towards the centre from each side. The lower tufts on the anterior part of the body are gray, the rest black. Head black.

July 8, 9 and 10 quite a number more were found; both they, and those in my breeding case, had moulted and returned to the food plant. They must have gone quite a distance from the plant, as the fence and other things for several feet around were carefully examined upon finding the first, but only three or four were left feeding on the plants.

At this time they were .80 of an inch long; body velvety black, each joint with ten tubercles, from each of which arises a spreading cluster of hairs. Besides these, on the dorsal tubercles of joints 3 to 5 and 12 and 13, are pencils of finer hairs .25 of an inch long. All the hairs on joint 2 are white, short and point forward. In some specimens part of the dorsal pencils on joints 3 and 5 are white; also part of the hairs on joint 12 white, in others all are black. The dorsal pairs of tufts on joints 6 to 11 are turned towards each other so as to make a complete ridge, the others on the sides point outward. The pencils on joints 6 to 11 are about .15 of an inch long. Those on the back have the centre hairs ochre with black underneath; the laterals are black. Each one of the long hairs under the glass is seen to be covered with a soft pubescence that makes it more like a downy feather than a hair. Head jet black, base of clypeus and antennæ white; tips of prolegs pale.

On most of the specimens the lower spreading tufts of hairs on the extremities of the body are white, the rest black; but I find some with all the lateral spreading hairs white, and also the lateral pencils on joints 6 to 11. In others the spreading hairs are gray and the lateral pencils black; but these variations are the exception. Each tubercle gives rise to two sets of hairs, a short spreading bristle-like set, and in the centre a pencil of the plumose sort.

July 11 they began to spin, and by the 16th all had disappeared. They produced the imagines from July 28th to 31st, 54 coming out in all, only 6 of which were ♀. Some of the females deposited eggs, which were .025 of an inch in diameter, globular, white, smooth. These were deposited in irregular clusters, some in the roof of the cage and some partly around a twig, but all of them were covered more or less completely by hairs from the last joint of the abdomen of the female. The tufts of whitish hairs found on the tip of the abdomen of this species seems to be for that purpose. After the cluster was completed the female would rub the end of the abdomen all around it and over it, nearly denuding herself of these hairs.

These eggs were watched for a number of days, but as they did not hatch they were not noticed further, it being supposed that they would hibernate. Afterwards it was found they had hatched and the larvæ died. While in confinement the larvæ were fed on *Asclepias tuberosa*, which they ate readily, but they refused to eat *A. purpurascens*.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

(Continued from page 220.)

PAPERS READ.

The Rev. Mr. Fyles read a paper describing the habits of an insect forming galls upon *Vaccinium canadense*, and exhibited specimens and microscopic drawings of the insect.

Mr. Harrington read an abstract of a paper on the Tenthredinidæ, or saw-flies.

Mr. Fletcher gave an abstract of a paper he had prepared detailing some experiments he had made in breeding some Coliads from the egg. He said he thought that the thanks of the Society were especially due to Mr. W. H. Edwards for his most valuable papers published in the CANADIAN ENTOMOLOGIST during the past year, and he was of opinion that they could not fail to have important results. Having been induced himself by these articles to take up this fascinating branch of entomology, the results had been such that he considered them worthy to bring before the members at this meeting. He had been fortunate enough to secure a very much worn female of *Colias eurytheme*, summer form *eurytheme*, from which he had succeeded in breeding a lovely female specimen of the autumn form, *keewaydin*. Thinking it would be interesting to compare the larvæ stage by stage with *C. philodice*, he had obtained twelve eggs of that species from a typically marked yellow female, on the same day as the eggs of *C. eurytheme* were laid, and he gave a short account of the differences noted between these larvæ at the different moults, and exhibited a beautiful series of specimens of *C. philodice*, drawing attention to the different variations in the markings. The brood of twelve bred at the same time as *C. eurytheme*, were very interesting, consisting of three males, four ordinary yellow females, three albino females, and one yellow female with very dull markings; one larva was destroyed by the larva of a Tachina fly.

Rev. Mr. Fyles read an interesting paper on the Neuroptera and their relation to the fishing interests.

Also a paper on the occurrence in the Province of Quebec of the Croton Bug, *Ectobia germanica*.

The President then read an interesting paper by Mr. G. J Bowles, on ants.

The meeting decided that these papers should be submitted for insertion in the Annual Report.

Mr. W. A. Macdonald, agricultural editor of the *Farmer's Advocate*, took the opportunity of expressing the pleasure he had derived from listening to the interesting discussions which had taken place during the meetings, and to the vast amount of information thus given. He had found these meetings so profitable that he hoped to have the pleasure of attending them another year. The Entomological Society of Ontario, he said, was doing a good work in gathering and distributing information in reference to the many insect pests which our farmers and fruit growers have to fight with, and he should be glad to render it any assistance in his power.

The meeting then adjourned.

LIST OF DIURNAL LEPIDOPTERA TAKEN IN THE NORTH-WEST AND ROCKY MTS., SEASON OF 1884, WITH LOCALITIES.

BY CAPT. GAMBLE GEDDES, A. D. C., GOVERNMENT HOUSE, TORONTO.

107. Colias Meadii, Edw.; Laggan, C. P. R.
108. " interior, Scud.; Stephen, C. P. R.
109. Anthocaris hyantis, Edw. Kicking Horse Lake.
110. Argynnis triclaris, Hüb.; Mount Lefroy.
111. Melitæa Geddesii, Edw. (nov. spec.) Canmore.
112. Phyciodes pratensis, Behr.; Kicking Horse Pass.
113. Grapta zephyrus, Edw.; Laggan, Summit.
114. Chionobas jutta, Hüb.; Emerald Lake.
115. Chrysophanus dione, Scud.; Calgary, N. W. T.
116. Lycæna shasta, Edw.; Laggan, Rocky Mts.
117. " lycea, Edw.; Stephen, Rocky Mts.
118. " orbitulus, V. Prun.; Canmore.
119. " evius, Bd.; Castle Mountain.
120. Thymelicus hylax, Edw.; Laggan.
121. Euptoieta claudia, Cram.; Calgary.
122. Grapta J-album, Bd.; Kicking Horse Lake.

These species are in addition to the list published last season, and will add considerably to the Catalogue of Br. American specimens already known; several of them have never been taken in Canada before.

Capt. Geddes will also publish a list of Heterocera taken in 1883-4, as well as Coleoptera, Neuroptera, Hymenoptera and Diptera, and, if possible, Orthoptera. This, it is hoped, will prove a useful guide to collectors in the North-West. A list of Micro-Lepidoptera will also shortly appear in the ENTOMOLOGIST.

NOTE ON CHALCOGRAPHA SCALARIS, LeConte.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

I may give an addition to my note (June, No. 6, p. 120, 1884). During the last seventeen years this beetle has never been rare in Cambridge, Mass., but never so overwhelmingly common as this year. As this elegant beetle was the first I had collected here in October, 1867, it had become my pet, and I paid some attention to it every year. This year it was very common on a long board fence in Ware St., which I have to pass four times every day. The fence surrounds a large garden with many elm trees near. When I heard that the beetle had been very destructive to elm trees in some places on the north side of the College grounds, and that it had nearly denuded some trees in Sommerville, I gave closer attention to it. Till June the leaves of the elms in Ware St. were comparatively uninjured. Then appeared the second brood of larvæ, and very soon the leaves were honeycombed with more or less round holes, and turned yellow prematurely. The larvæ were first described by Harris, Injur. Ins., 1841, and the same repeated in all following editions; the edition of 1862 gives a figure of the larva and beetles. A new and fuller description of the egg, larva and pupa is given by Dr. A. S. Packard, Insects Injurious to Forest and Shade Trees, 1881, p. 126. Harris says, Injurious Insects, 1862, p. 133, these beetles inhabit the linden and the elm. A. Fitch, Report V., p. 842, records them as injurious to the elm; common also upon willows. Packard, 1881, observed them very abundant at Brunswick, Maine. The numerous linden trees in the campus of Bowdoin College were infested to such a degree that nearly every tree, and in some cases nearly every leaf of a tree, was infested by the grubs. Packard, in Maine, had taken the beetle in coitu on the alder, where it is more common. I find no enemies mentioned, but I observed myself in August a nymph of *Podarcys spinosus*, after Mr. Uhler's determination, running after a young larva and spearing it dexterously through the anus. When I took both in a small box, they separated directly, but in opening the box ten minutes later, I found the larva again safely speared. The distribution of *C. scalaris* is very large; the Museum contains the imago and larva from the Saskatchewan River, Brit. Am., and from Lake Superior. It goes down through the Eastern and Middle States to Louisiana and Mexico, to Costa Rica (of Suffrian Stett. Ent. Zeit. 1858, p. 256). Westerly, Rogers (Proc. Ac. N. S. Phil., vol. 8, p. 32) quotes Nebraska.

Dr. Horn, CAN. ENT., 1884, p. 127, states why the name *Chrysomela scalaris*, given to the beetle, Ann. Lyceum N. H. 1824, vol. 1, p. 173, pl. 7, f. 18, was changed by Stal, Monogr. p. 261, in *Chr. multiguttis*, because Olivier had described in 1807 a *Chr. scalaris*. But as this species belongs to *Doryphora*, and LeConte's species to *Chalcographa*, this latter name can stand, and is in fact accepted by Jacoby, Biol. Cent. Am. vi., pl. i., p. 197, pl. xl., f. 6. Mr. Jacoby says: "A specimen from the collection of Sturm is labeled by him *C. rufipes*." The synonym of *C. lateralis* St. given in Gemminger's Catalogue must therefore refer to another species. But there is in Sturm's Catalogues from 1826 and 1843 nowhere a *C. rufipes* mentioned, which must be a collection name. The name *C. lateralis* is put by Sturm himself, Catal. 1843, p. 288, as a synonym to *C. scalaris* Dej., which is our species. The *C. philadelphica* Kirby, Tr. Am. Soc., is considered as a synonym of our species by Rogers, Suffrian, Jacoby. But Rev. Bethune, in his edition of Kirby's Fa., 1883, p. 96, unites it with *C. philadelphica* of Linnæus.

REMARKS ON CHRYSOMELA SCALARIS, LEC., CHRYSOMELA LABYRINTHICA, LEC., AND PHYSONOTA UNIPUNCTA, SAY,

BY F. B. CAULFIELD, MONTREAL.

Chrysomela labyrinthica, Lec. This insect is, I believe, by some entomologists thought to be a variety of *C. scalaris*, Lec. I incline myself to the belief that it is a distinct species, but my knowledge of it is too limited for me to form a decided opinion. Both forms occur here; *scalaris* is common wherever basswood or elm are found; *labyrinthica* is scarce, and as far as my experience goes, is confined to one locality, viz., that portion of the Mountain Park lying between the head of Redpath Street and the road through the Park. I have only found *labyrinthica* during the early part of summer; *scalaris* occurs both in spring and fall. Mr. Moffat, who records *labyrinthica* from Hamilton (CAN. ENT., vol. xiv., page 57), took a specimen on May 23rd, and found its season to last about four weeks, during which he took over a dozen. It appears to be very rare, and is in very few lists. Mr. Pettit does not give it in his Grimsby List. Mr. D'Urban records *scalaris* common at Montreal, but does not mention *labyrinthica*. The same author, in his list from the

Valley of the River Rouge, gives *scalaris* as "abundant on alders throughout the district, from the end of June to the end of September," but says nothing of *labyrinthica*. Mr. Ritchie gives both *scalaris* and *labyrinthica* in his Montreal List, but without dates.

In September, 1883, I found *scalaris* in great numbers in the crevices of the bark of elm trees at Cote St. Paul, about a mile from the locality where I find *labyrinthica*. I examined several trees and could have taken scores of *scalaris*, but did not see a single specimen of the other form.

Physonota unipuncta, Say. In the July number of the CAN. ENT., Mr. Hamilton asks for information concerning this insect. I find the form *helianthis* Rand. (3 black spots on thorax) common on what I take to be the wild sunflower (*Helianthus*). It is double-brooded, occurring in June and again in August, but the broods when living present a very different appearance. The beetles of the first brood are entirely of a burnished gold color, and are exceedingly beautiful. The fall brood show no trace of the gold, and answer to Randall's description as quoted by Mr. Hamilton, except that I would call them blackish-green, etc. After death both broods fade to a dingy yellow, and are then exactly alike. I found what I took to be the larva common on the same plant, but did not make a description of them. As well as I can remember, they were different from those found by Mr. Hamilton. They were dark green in color, the margin not serrate or spined, and the tail, instead of being bifurcate, ended in a knot. They fed in company, and were constantly wet with semi-fluid excreta. As I did not pay much attention to them, the mature larvæ may have escaped my notice, and may have been similar to those found by Mr. Hamilton. I have not seen Randall's description, and do not know if he mentions the difference in color in the broods. In this locality all the beetles of the first brood were golden, and all of the second were blackish green, with yellowish white spots. Both beetles and larvæ were very sluggish.

[Read before the Montreal Branch, 11th Nov., 1884.]

THE PROPORTION OF THE SEXES IN CICINDELA VULGARIS, SAY, AND OTHER NOTES ON THE SPECIES.

BY C. H. T. TOWNSEND, CONSTANTINE, MICH.

The proportion of the sexes in insects often throws much light upon the habits and appearance of the species. Having had good opportunity to make observations of this kind upon *Cicindela vulgaris* Say, in collecting a large number of the beetles, I have made out the appended table, which will explain itself. The dates I give, as they will show how the sexual proportion varies at different times of the season. From my observations it would seem that when the insects first appear in spring the females are much the more numerous; but that when they first appear in fall the males outnumber the females as two to one. I have taken this species here from 3rd March (1882) to 25th October (1884).

The examination, as shown in the table, of over 1,500 specimens, as the figures stand summed up, shows the average proportion of males to females as 1.15299 + (approximately 1.153) to 1; or 115.3 males to every 100 females. The number examined being so large, the figures will be trustworthy. This is the average proportion through the whole year of those taken while out in their favorite haunts. I have also secured specimens in spring by digging them from their holes, where they had retreated on account of cloudy weather. All that I have ever taken in this manner have invariably been females. Some reference is made to this in the notes at the bottom of the table.

During the past few seasons I have amassed quite a stock of notes on this species, referring to many random observations on the perfect insects, the more important of which I will here give. As to variation in the elytral markings, many of the smaller specimens (generally ♂) have the bands narrowed into mere threads, being very much slighter than usual. The markings in both sexes vary from the full, broad bands or lunules to thin threads, and are sometimes partly defaced, as it were, at each end. Occasionally robust specimens (generally ♀) are found, which vary from the typical form by having the ground color of the upper parts very dark, approaching to black. In size there is also much variation; large males and small females occur, though, as is well known, the reverse is the general rule. Small specimens with well developed lunules also occur, and large ones sometimes have them narrowed and fainter than common. The male sexual character of the creamy fronts of the mandibulæ is well known, but I have taken females with this character nearly as well developed as in the males.

The pleasant-scented fluid which is so copiously emitted from the mouth is generally of a brownish color; however, in one specimen that I have noticed it was of a dirty greenish, while in another it was of a brick-red color. This fluid probably serves to soften the parts of insects to be devoured, for I have noticed that where it comes in contact with the net, holes will appear much sooner than elsewhere. This also explains its sweet, honey-like smell, and probably taste, which it would need in order to make the insects' food agreeable to it. Undoubtedly this fluid helps much in digestion. When one of the beetles is held in the fingers, it will attempt to bite with its mandibles; but, finding it is unable to pierce the skin, it emits an abundance of the fluid upon it. Though it may not really intend to eat a person, this may be a mechanical action, which is performed whenever the insect feels a desire to use its jaws effectively.

When the female sexual organ is forced out, it is often found covered with a pure white milky fluid, but sometimes this fluid is of a drab color.

This species assimilates well in color with its surroundings, but of this I will speak more fully elsewhere. I have several times noticed specimens alight on old rail fences, and also on stumps in the edge of woods; these are variations from their usual habits. As to their flight, it is sometimes very irregular, continuing so for a considerable distance; and they even occasionally hover (just for a moment, apparently in uncertainty) preparatory to alighting. I have often observed quite long flights in this species, though generally not above a certain height. However, I noticed one which was unusually high. The specimen having flown up from the sand, rose higher and higher in the air, sailing continually from me, until I lost sight of it from the distance. It must have risen fifteen feet at the least, and continued sailing at this height (flight while rising also included) for sixty or seventy feet, and was still rising and sailing on when I could no longer distinguish it on account of the distance. This flight out-does all I have ever observed in this species. The wind probably aided it some, but there was only a moderate breeze at the time.

I witnessed some curious actions one day on the part of one of these tiger beetles. A male specimen rushed several times at a large wasp which was making a hole in the sand near by; and once it ran into the hole (which was in the side of a bank), but immediately reappeared, whereupon I captured it. The beetle was perhaps anxious to secure the egg, which it knew the wasp would deposit in the sand; or, still more likely, was in quest of the insect victims with which many of the Hymenoptera stock their nests.

I have often noticed specimens of this species, which are unable to fly, but are very active on their legs, running extremely fast and dodging one's fingers repeatedly. They are of both sexes. Individuals occur which connect these runners with the flyers, inasmuch as they are able to make very short leaps while running, using the wings to assist them at these times. Of all of these specimens unable to fly that I have examined (and I have examined nearly all I came across), I have succeeded in finding alar defects in but one; in this one the marginal nervure of one of the wings was broken, where the wing folds to be laid under the elytron. In all the others the wings were to all appearances as well formed as in any specimens of the species. This peculiarity is no doubt due to a weakness of the muscles which control the wings, tending towards a form incapable of flight and in which the elytra are connate.

Specimens are often taken mutilated; and these, though in the majority of cases males, are quite often females. So it would appear that in this species the females have some fighting to do, as well as the males. In one instance I took a male which was lying on the sand right side up, apparently lifeless, but unmutilated; it had just enough life left to move its mandibles as I picked it up. Others are taken with their antennæ, legs or elytra injured, or even wholly wanting. I have taken one specimen which had lost both elytra. Mutilated ones seem to occur in the greatest proportion towards the last of the season, and then they are in general most badly mutilated. On 13th October, of the nine specimens taken, six were males, and all of these but one mutilated; one had its left elytron half nipped off, and the others a sad state of the legs, many being entirely gone. One of the females also had a leg missing.

I have observed a deformity in this species in a female taken with one elytron imperfectly developed, there being a wrinkle or plait taken across it near the extremity. This female was a small one, and in addition to the deformity had the tarsi of two of the legs missing.

It may be well to add what effect the cyanide of potassium has upon these beetles. They generally seem anxious to have something in their jaws when they die under the influence of this chemical. If they cannot get a leg or an antenna of some fellow beetle in their grasp, they will often die with one of their own legs clasped tightly in their mandibles. Several specimens were taken out after having been about forty-five minutes in the cyanide bottle. The only parts that showed life were the posterior tarsi; there was a frequent twitching of the final joints in these. After being out some time, some of the other tarsi were similarly affected, and probably the insects would have gradually recovered their full powers, had I not replaced them in the bottle, where the action of the cyanide slowly extinguished the remaining sparks of life.

TABLE SHOWING THE PROPORTION OF THE SEXES IN CICINDELA VULGARIS, SAY.

Date of Capture.	*Whole No. Taken.*	*No. of ♂.*	*No. of ♀.*
* 19 March, 1882	5	1	4
† 28 " "			
22 August, 1883	6		
23 " "	4		
31 " "	54		
2 Sept. "	121		
3 " "	127		
19 Oct. "	25		
Date unknown	195		
	——532	268	264
26 August, 1884	26	17	9
29 " "	132	72	60
30 " "	3	2	1
4 Sept. "	29	18	11
6 " "	255	124	131
8 " "	120	68	52
15 " "	1	1	
16 " "	73	44	29
17 " "	273	159	114
‡23 " "	6	2	4
25 " "	50	26	24
6 Oct. "	33	20	13
13 " "	9	6	3
25 " "	1	1	
Summary	1548	829	719

* Of 17 taken from their holes, all were females.

† Of all taken, both in holes and out, there were 45; 14 males and 31 females. In those that were out the two sexes were about equal in number. But all of the dozen or more taken in their holes were females.

‡ Were taken under rails on a sandy piece of plowed ground, the weather being cloudy and threatening rain.

FURTHER EXPERIMENTS UPON THE EFFECT OF COLD APPLIED TO THE CHRYSALIDS OF BUTTERFLIES.

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

In CAN. ENT., vii., p. 236-240, I gave an account of experiments with *P. Ajax*, placing the chrysalids on ice. In vol. ix., 4 and 203, of *Ajax*, *P. Tharos* and *L. Pseudargiolus*. In Psyche, iii., 6 and 15, these were all brought together, and additional observations on *G. Interrogationis* were given; also p. 174, on *L. Disippus*. In the case of the seasonally-dimorphic *Ajax*, the conclusion was reached, Psyche, iii., 18, that the longer the exposure the more decided the change, but changes had been produced at 11 to 30 days; at and under 8 days no change was perceptible. That 30° to 40° Far. seemed to be the proper temperature for the purpose. That the effect of the cold was to albinize the butterfly, the black area being constantly reduced.

That with *G. Interrogationis*, after the chrysalids had hardened, i. e., about 12 hours after pupation, 14 days exposure, temp. 35° to 45°, had been found sufficient to produce marked changes in coloration. That with different species the degree of temperature required to produce the most decided change varies; the experiments best succeeding with *P. Tharos* at 40°, *Ajax* 32° to 40°. At 32° had destroyed many Grapta *Interrogationis* chrysalids. The effect of the cold was to melanize the butterfly in certain parts of the fore wings.

In the case of *P. Tharos* a complete change of form was brought about, the butterflies which naturally would have come out the summer form, in every case coming out the winter form. Some chrysalids exposed before they had hardened, at 30 to 60 minutes after pupation, were not changed in form, but the colors had run, making what is called "suffused" specimens; but the butterflies from chrysalids which had been from 1 to 9 hours old, were completely changed. *Tharos* was the only species in which it did not seem necessary that the cold should be applied only after the chrysalis had hardened, in order to change the form. In other words, this species was very susceptible to change either of form or color, and at 32° to 40°.

This year, 1884, I have continued the experiments as follows, using same treatment.

1. MELITÆA HARRISII, Scud. In all cases the tin boxes containing the chrysalids were laid on the surface of the ice in ice-house, where the

temperature was found to be 32°. On 19th May, exposed one chrysalis (A) at 5 hours from pupation, and one (B) at 14 hours. These were left for 18 days, being taken off the ice 7th June. On 14th June emerged 1 ♂, 1 ♀, both suffused on under side of hind wings, and in same manner. The male came from the chrysalis B, exposed at 14 hours, and is very melanic on whole upper surface, the fulvous areas being restricted to narrow bands. In the female (A) exposed at 5 hours, the fulvous area is not different from that of some examples not exposed to cold. Both these, on under side, have the buff spots of discal band in the costal and subcostal interspaces lengthened so as to connect and become confluent with the buff marginal spots. In the male the two wings are not equally affected, the left wing having three of these spots confluent, the other only one completely, and one nearly. Another male (C) exposed at 18 hours old, and for 9 days, is melanized on upper side, but to a less extent than the male (A). On the under side of hind wing the buff spots are largely reduced in size, and often obliterated; of the 5 spots next base, 3 are represented only by black (that is, the buff has passed away), and the other 2 are reduced to less than half the usual size; the discal band is reduced to small, disconnected spots. In the normal examples this band is cut by two black lines running across the wing, leaving the middle section broad, and the two outer sections made up of small spots. There is a little irregularity in the course of these black lines, but the result is that on the 4 interspaces next costal margin there are 3 buff spots to each, 2 each to the next two interspaces, and 3 on the last interspace (or sub-median). In the example under view the whole of the anterior row of buff spots is wanting. In the normal example there is also a complete sub-marginal row of pretty large buff lunules; in this other all are wanting except two narrow crescents in the median interspaces and a streak in the discoidal interspace.

A ♀ (D) exposed at 24 hours, and for 9 days, is not changed on upper side, but on under hind wing the buff discal band is nearly obliterated, the whole of the inside (and longest) spots being lost. The spots about base are not changed, nor are the submarginal crescents. Another ♀ (E) exposed at 24 hours and for 9 days, is not changed on upper side, but on under hind wing the submarginal crescents are lost, excepting in the two median interspaces, and there they are reduced to narrow bars; all the buff of both wings is changed to yellow.

On 13th June, I placed 10 chrysalids on ice, at 6 to 24 hours old; on

14th, 7 more, from 15 to 24 hours old; on 17th, two at 12 and 24 hours, in all 19 chrysalids. These were left till July 13th, or from 26 to 30 days. But three survived the exposure, one of which (F) gave ♀ 23rd June (chrysalis on ice 26 days). This example was in some respects more changed than either of those before mentioned. One hind wing was smaller than the other, and was free from all fulvous above; the other had the fulvous restricted to a narrow band on disk, with a row of minute spots posterior to it; the fulvous on the disks of each fore wing was also reduced to a narrow band. Beneath, the colors of fore wings were all dull, the black changed to brown; the submarginal buff spots were much enlarged and extended quite across the wing; the smaller hind wing, which had lost color on upper side, had no fulvous or buff on the outer half, but the discal buff band was present, though greatly narrowed, and nearly obsolete. The other wing had the discal band narrowed but distinct, the spots which constitute it separated instead of confluent, and the small spots outside the black lines which cut this band are entirely wanting; but the two spots of this band next costa were lengthened and confluent with the submarginal buff spots; also the fulvous ocelli which go to make the third band from the margin are nearly obliterated. The other two butterflies which came from this lot of chrysalids, one at 28, one at 29 days, were both cripples, the wings twisted, but as they were expanded to nearly full size, it can be seen that they are greatly altered, the colors more or less suffused, and the markings indefinite. As I have indicated, 16 out of the 19 chrysalids of this lot were killed outright, and no doubt by the length of the exposure to so severe a degree of cold; two emerged cripples, and the other partly crippled, one wing being affected.

But several of the chrysalids experimented with were not affected, viz., 4 at 6 hours old, for 9 days, 1 at 6 hours old, for 10 days. These all gave butterflies in no way differing from those not iced.

Thus it appears that

1 chrysalis, 5 hours from pupation, exposed 18 days,
1 " 14 " " " " 18 "

were much changed, the fulvous area in one, A, restricted on upper side, and both have the colors considerably suffused on under side.

1 chrysalis, 18 hours old, exposed 9 days,
? " 24 " " " 9 "

were much changed, but in a different way from those first mentioned, chiefly by the restriction or obliteration of the buff bands and spots on under surface.

One chrysalis (F), 12 hours old, exposed 26 days, still more changed, and that on both surfaces, by restriction and obliteration of the fulvous on upper side, and the obliteration of both buff and fulvous on lower side, besides being partially crippled.

Two chrysalids exposed 28, 29 days, were changed in same manner as F, but were wholly crippled.

In all, I obtained 14 butterflies from these iced chrysalids, 8 of them changed materially, 6 not at all.

In all cases the emergence of the butterfly was retarded by the full period of the exposure to cold. The butterflies appeared at from 5 to 7 days after the chrysalids were removed from the ice. At same time others, not iced, were coming out at from 5 to 8 days, according as the weather was clear or otherwise. *Harrisii* is a single-brooded species, and therefore there could be no such change of form as was brought about in *Tharos;* any changes would be limited to color or shape of markings, and would not be uniform.

2. Melitæa Phaeton.—I had a large number of chrysalids from hibernating larvæ which I had raised the year before, and 39 of them were placed on ice (temp. 32°), at various periods from 2 to 34 hours after pupation, and exposed from 10 to 27 days. The emergence of the butterflies was in all cases retarded, so that the length of the chrysalis stage after removal from the ice was the same as after pupation normally. But no perceptible changes were made in color, nor were any chrysalids killed by the cold. I fully expected to see suffusion and other marked changes in this species. Beautiful variations occur in *Phaeton*, as in other Melitæas, in nature, and I cannot but think that another series of experiments, with perhaps a longer exposure to cold, might serve to produce similar variations in the house.

3. Melitæa Chalcedon. I had but one chrysalis, which came from a hibernating larva fed by me the previous year. This at 25 hours old was on ice 27 days. The imago died just when ready to emerge, and so far as could be discovered the colors were not affected. This species also is subject to sports, and suffused examples are to be found in nearly every collection of butterflies.

4. Grapta Comma. On 1st June I placed on ice 2 chrysalids less

than 1 hour old, and 2 at 6. They were removed 22nd June, and all were dead and shrivelled.

5. Apatura Clyton. Similar exposure to that of *Comma*, but at 12 to 24 hours gave similar results, all being killed. I had reason to expect as much in the case of *Comma*, as I had in former years lost all or nearly all Grapta chrysalids which were exposed before they had fully hardened. But I thought I would try severe measures once more, relying on obtaining further larvæ of *Comma* for milder treatment. Unfortunately I could find no more larvæ. This species being seasonally-dimorphic, it would seem as if there should be a change of form under these experiments, if tried in a proper manner.

6. Papilio Philenor. Nine chrysalids, at 6 to 36 hours old, left for 23 days on ice, were all killed but one, which gave butterfly unchanged.

7. Papilio Troilus. One chrysalis exposed 15 days gave butterfly unchanged.

8. Limenitis Ursula. I placed one chrysalis at 4 hours old on the ice and kept it there 13 days. From this came a large ♀ after 9 days, or at the period usual for this species. This shows some peculiarities which may or may not have been owing to the exposure. One cannot decide from a single example. The *Ursulas* taken in this region have the metallic spots and the metallic area on disk of hind wing either all green or all blue; and the discal area spoken of is separated from the submarginal green or blue spots by a pretty wide black space, forming a band from costal to anal margin. In this iced example the black band is narrowed to one half that of any other in my collection, and instead of being uninterrupted, it is crossed next costal margin by three of the discal spots (or in three interspaces), which become confluent with the submarginal spots. The spots and bands are green, except that on one wing the spaces on disk lying between the branches of the median nervure are purplish-blue. The same distinction holds on the under side.

9. Lycaena Pseudargiolus. On ice 4 chrysalids, 24 hours old, and kept there 23 days. By oversight a nearly mature larva of same species had been shut in with the chrysalids, and had eaten into one of them. But the larva and the other chrysalids were dead.

THE CRANBERRY FRUIT WORM.* (*Acrobasis vaccinii.* N. sp.)

BY PROF. C. V. RILEY.

Acrobasis vaccinii, n. s.—General color and appearance of *A. indiginella* Zell. (*nebulo* Walsh) but a somewhat smaller species, with primaries usually narrower. It may be distinguished by the following differences as compared with *indiginella:*

Average expanse, 15 mm. Colors of a colder gray with less reddish-brown or tawny on the inner portions of primaries, and with the pale costal parts nearly pure white, so as to contrast more fully with the dark shades, and to more fully relieve the basal branch of the forked shade on inner part of first or basal line, this basal branch being also usually darker than the outer or posterior branch. The triangular costal patch from the basal line is obsolete. The transverse pale lines are less clearly defined and the terminal is nearer the posterior border of the wing, *i. e.*, the median field is wider. The geminate discal dots are always well separated and the inner one well relieved by the white which extends around it on the darker ground and often forms an annulus. The oblique shade from apex is less clearly defined.

Described from 16 specimens of both sexes, reared from cranberries.

EGG.—About 0.4 mm. long, and 0.3 mm. broad; ovate or almost circular, and flattened or plano-convex, the form varying with the surface of attachment to which, while plastic, it partly conforms. Color, olive-green or brown.

LARVA.—Average length when full grown 10 mm. Convex above, flattened beneath. Surface of body minutely granulate with a dull, somewhat greasy appearance. Color varying from greenish-yellow to olive-green, reddish or brownish, being generally darkest towards the anal end. Head yellow, polished, somewhat lighter towards the mouth, with the sutures of the clypeus slightly brown, and the anterior angles of the head distinctly so; labrum, antennae and palpi white; mandibles yellowish at base, becoming blackish toward tip; ocelli black. Cervical shield somewhat paler than the head, almost colorless anteriorly, its median line scarcely paler, without any markings, except a brownish or blackish wart a little in front, above the stigma. Anal plate of same color. Stigmata extremely small, except first and last pair, oval and pale brown. Pili-

* From advance copy from the forthcoming Annual Report of the U. S. Entomologist.

ferous warts only about half the size of stigmata, very pale brown and polished, each supporting a fine hair of a faintly yellowish color, of which those on the posterior row of warts are much the longest and are directed forward. Similar long hairs are also on the head, thorax, around the margin of the anal plate and along the sides of the body. Legs concolorous with body.

PUPA.—Average length 7 mm. Brownish-yellow. Stigmata brown. A dorsal, dark brown, transverse band, anteriorly on last joint. Tip broad, almost straight, having a small tooth at each angle, and along its inferior edge four fine yellowish-brown bristles, twisted and directed forward. Abdomen shallowly punctate.

In the series of American Phycids, this species naturally follows *indiginella*, and it is at once distinguished from this, from *juglandis* LeBaron, and from *fallouella* Ragonot—its nearest European ally—by the obsolescence of the triangular costal patch.

Mr. Grote in his last "Check list of N. A. Moths," has suppressed *Acrobasis* Zeller, and referred this little group of Phycids to "*Phycis* Haw." He has also made *juglandis* a variety of *indiginella*. These changes I regard as unjustifiable. *Phycis* as a genus was founded by Fabricius, and Haworth's *Phycis* comprised nearly all the species of the family, and the name has long been abandoned in modern more exact classifications; while the full descriptions, figures and larval histories of *indiginella* and *juglandis* in my 4th Rep. on the Insects of Mo. (pp. 38-43) prove beyond all question the specific value of both.

There is a *Nephopteryx vacciniella* Zeller on *Vaccinium uliginosum* in Europe, and for this reason I have dropped the conventional termination in the name of our species.

NOTE ON INEQUALITY OF THE ELYTRA IN ALAUS OCULATUS.

BY C. H. T. TOWNSEND, CONSTANTINE, MICH.

On 19th October, 1884, I took from a decaying hickory stump a specimen of *Alaus oculatus* (Linn.), which had its left elytron .75 mm. shorter than its right. This seemed to me a curious and very noticeable deformity, and one I had never before observed. But on 13th December ensuing I discovered that a fine, robust specimen which I had taken from decaying hickory the day previous had its left elytron .25 mm. shorter than its right, this time the difference being much less, but still noticeable. I then examined fifteen other specimens of this species in my collection, with the following result: One with left elytron .25 mm. shorter than right; one with left .20 mm. shorter than right; one with left shorter than right, but the difference hardly appreciable; one (small specimen) with right .20 mm. shorter than left; and one in which the right was so slightly less than the left that the difference could scarcely be seen. The remaining ten showed no appreciable differences in this respect. So of seventeen specimens examined, seven had the elytra unequal in length in a considerable degree, one being especially prominent thereby. And it is noticeable that in five of the seven specimens it was the left elytron that was the shorter, these also being the cases in which the inequality was most prominent. I believe all of my specimens, with one exception, were taken from their cells in the wood, as they are found after having assumed the imago. I have no doubt that if others would examine the specimens of this species in their collections, many more such examples would be found which have been overlooked. It would be interesting to know the result of such examinations. It is probable that the elytra, being organs not of strictly primary value to the insect—elytral invariability in this direction not being absolutely essential when within certain limits—have thus been permitted to vary without the variations being struck out by natural selection. I have not observed this elytral inequality in any other Coleoptera as yet.

A form of this species, which is less robust, I occasionally find; it is slightly narrower in proportion and more delicately marked, but upon sending specimens of the two to Dr. Horn, he informs me that they do not differ appreciably, but are both *oculatus*.

CORRESPONDENCE.

NOTE ON THE HABITAT OF XYLORYCTES SATYRUS.

Dear Sir: Mr. W. F. Robinson, of Bridgeton, N. J., sent, Oct. 28, 1884, a specimen of this beetle, with the remark that it is being dug up around the roots of trees there in abundance by his school boys. The collections here contain it not farther to the north than Pennsylvania. Not being able to find it recorded from N. J., or farther to the north, I should like to hear if its occurrence north of Pa. is known. I may add that Mr. Robinson gave to the collection a very small specimen of *Strategus antaeus* collected by him in Nantucket, Mass., Aug. 24, 1884.

DR. H. A. HAGEN, Cambridge, Mass.

Dear Sir: In reference to your article in the August number, allow me to add as injured by *Pulvinaria innumerabilis*, the following: No. 1, *Acer saccharinum;* 2, *A. rubrum;* 3, *Negundo aceroides;* 4, *Ulmus fulva;* 5, *U. americana,* 6, *Celtis occidentalis;* 7, *Morus rubra;* 8, *Fraxinus sambucifolia;* 9, *Populus balsamifera;* 10, *Juglans cinerea;* 11, *J. nigra;* 12, *Rhus toxicodendron.* *Tilia americana* I have not seen affected here; our cultivated grape (*Vitis*) very seldom, and sparsely, if at all, while our wild grape seems perfectly free from the pest. This insect, better known here as the Maple-slug, has been found by me on all the above, never taking note unless I found it at least six times on the same kind of trees, growing far apart and in quantities as follows: On No. 1, sparsely; 2, soft maple, very full; 3, ash-leaved maple, better known as box-elder, very full, equal to No. 2; 4, 5 and 6 less affected but alike; 7, 8 and 9 sparsely; 10 and 11 least affected, while 12 (being our poison ivy) only when the tree to which this parasitic plant was attached was affected. I had made my observations in Peoria, Tazwell and Livingston Counties, and have noticed in the City of Peoria especially the stone pavements sprinkled with the so-called honey dew in patches here and there, so thick that any passer-by would look up wonderingly unless familiar with the cause. As such articles are of interest to farmers and to growers of shade trees, they will be glad to get such information as experience can give them through some observation. The last visit of this insect in great numbers was about five or six years ago. The question here has frequently been asked with some anxiety: How will they appear next season, etc.? Their natural enemies and wet weather, especially when the rains come frequently during hatching, as well as other causes, are among the agencies which limit their increase.

A. H. MUNDT, Fairbury, Ills.

August	No.	Mailed	Nov.	17,	1884.
Sept.	"	"	Dec.	1,	"
Oct.	"	"	"	17,	"
Nov.	"	"	"	24,	"

INDEX TO VOLUME XVI.

ERRATA.

Page 227—8 lines from top, for "unipuncta" read "unipunctata."
" 213—11 lines from bottom, also 3 lines from bottom, for "J. W. Fyles" read "T. W. Fyles."
" 214—10 lines from bottom, for "fungus" read "fungous."
" 214—4 lines from bottom, for "ovæ" read "ova," and for "Tachnia" read "Tachina."
" 214—5 lines from top, for "Smyth" read "Smith."
" 214—2 lines from bottom, for "Homopteron" read "Hemipteron."
" 217—16 lines from top, for "Nepigon" read "Nipigon."
" 217—2 lines from bottom, for "nigricornis" read "nigrirostris."
" 218—12 lines from bottom, for "Vespa?" read "Vespa—?"
" 218—10 lines from bottom, for "Pieris" read "Pamphila."
" 218—9 lines from bottom, for "P. centaurea" read "Pyrgus centaurea."
" 219—2 lines from top, for "A. Macoun" read "W. Macoun," and for "Nepigon" read "Nipigon."
" 219—7 lines from top, for "Ptinidæ" read "Ptinus."
" 219—22 lines and 12 lines from bottom, for "S. W. Taylor" read "G. W. Taylor."