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
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [x] Bound with other material/ Relié avec d'autres documents
- [x] 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
- [ ] 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.

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [x] Showthrough/ Transparence
- [x] Quality of print varies/ Qualité inégale de l'impression
- [x] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

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

The Canadian Entomologist.

VOL. IX. LONDON, ONT., NOVEMBER, 1877. No. 11

PIERIS VERNALIS A VARIETY OF PIERIS PROTODICE.

BY THOS. E. BEAN, GALENA, ILLINOIS.

Experiments and observations during 1874-5, supplemented by comparison of a large suite of specimens, seemed to invalidate the specific separation of *vernalis*. Submitting the facts to Mr. W. H. Edwards, he confirmed my opinion, and in the recently issued "Catalogue of the Diurnal Lepidoptera of America North of Mexico," he has placed "*vernalis*" as a variety of *P. protodice*.

The basis for my conclusion is briefly as below :

1. A BROOD FROM PROTODICE.

♀ taken August 15th, 1874. A *protodice* of normal summer form; being of large size, with ample and dark markings on upper surface of wings and gray scales at base of primaries above, and showing yellowish and rather meagre shading beneath secondaries. This deposited eggs 21st August, which produced larvæ on 25th. Resulting imagines, seven, Sept. 15th. Two of these were not noticeably variant from usual *protodice*; the remaining five were grades between *protodice* and *vernalis*, one female and four males, the female and three males approximated *protodice* in varying degrees, and one male was nearer *vernalis* than *protodice* in size and marking.

2. A SERIES FROM COLLECTED LARVÆ.

In 1874, late in September and early in October, a large number of the caterpillars in various sizes were taken from naturalized mustard.

These were brought to the pupa stage with very slight loss, during October and early in November.

No parasites were observed in any stage.

The chrysalids were wintered in a cool room, with but little mortality.*

Imagines appeared 1875, April 14th to May 19th, females more abundant than males, about two to one.

None of either sex were of full size of *largest* captured examples of *protodice*, though several were but little inferior.

The series included scarcely a half dozen of the extreme *vernalis* type, and about an equal number of pronounced *protodice;* between these extremes ranged the large majority of the series, exhibiting a progressive set of intergrades. The prevailing tendency among the grades was towards *vernalis.*

Gradation occurred in regard to every observable point of difference between *protodice* and *vernalis.*

The larvæ from which this series resulted were all practically alike in markings; if any difference it was not perceptible. This larval uniformity seemed to affirm the specific unity of the diverse forms resulting— a conclusion much strengthened by the numerous intergrades.

3. COMPARISON OF CAPTURED SPECIMENS.

My collected set consists of *protodice* chiefly, a less number which are grades, and a very few of the *vernalis* type; the intergrades are amply sufficient to connect the extreme forms.

The butterfly is very rare in spring. About mid-June a few may be seen, a larger brood in July, and an abundant flight in August and September. After the middle of August usually the sequency of broods is more or less obscured, as each successive week shows an increased army of individuals; in scarce years, however, the regular accession of broods is evident.

Captures during June, July, August and early September are almost invariably true *protodice.* In September some grades appear, and with

* The favorable result of this experiment—say 67 butterflies from about 80 larvæ —as compared with the uniform extreme scarcity of *protodice* here in spring in state of nature, suggests that the species is imperfectly inured to our climate, and finds its proper *winter* conditions further south. Out of doors very few of the pupæ seem to escape our severe winters. The butterfly is extremely rare in spring (May), becomes more frequent by July, common and abundant in succeeding months. I have reason to think neither larva nor imago hybernate in this locality.

cool weather a very few *vernalis* also—these in late September and in October until severe night frosts occur. In autumn the grades of earlier dates are nearer the type; those appearing later progressively approach *vernalis*.

I would suggest that the term "dimorphic variety" hardly applies properly to *vernalis*. The variation is multiform, and the intergrade examples largely outnumber the instances of the extreme "*vernalis*" type as described and figured. *Vernalis* is not a variety abruptly contrasting with a type form, but merely the extreme term of a series of variations departing from type.

Vol. I of Mr. Edwards' "Butterflies of N. A." contains plate with accurate and beautiful figures of *vernalis*.

AN ACCOUNT OF SOME FARTHER EXPERIMENTS UPON THE EFFECT OF COLD IN CHANGING THE FORM OF CERTAIN BUTTERFLIES.

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

In May, of the present year, at Coalburgh, I bred a large number of larvæ from eggs laid by *tharos*, var. *marcia*; also several from eggs laid by *ajax*, var. *Walshii*; and from eggs laid by *Lyc. pseudargiolus*; and all of the chrysalids of *tharos*, and part of those of the other two species, were placed in small tin boxes as they formed, and at different intervals thereafter, 10, 20, 60 minutes up to some hours, and one and two days, were laid in the ice box on top of the ice. The box was supplied with ice once a day. I intended removing the chrysalids at irregular periods, so as to see what length of exposure to cold would suffice to change the form of the butterfly, and hoped also to ascertain how soon after the forming of the chrysalis the cold must be applied to produce the desired effect. But the *tharos* chrysalids had scarcely begun to form when I was called to New York, and had to leave charge of them and the larvæ to a member of my family, who followed my directions faithfully as to placing the chrysalids on the ice at regular intervals. On my return some had been exposed ten days, others but one or two, and I at once removed them and waited to see the result. After six or seven days (which is the usual period of the chrysalis of this species in midsummer), the *tharos* butterflies began to emerge, and as one after another came out quite unchanged, I found that the experiment with them was a failure. A week later the *ajax* chrysalids began to give butterflies, and as they had been exposed to cold some days before I left home, and while I was attending to the ice box myself, the result was better. Some were fully changed, var. *telamonides* emerging instead of *marcellus*, as would have been the case in nature; others were but partially changed, having the shape of *marcellus*, but the broad crimson anal band of *telamonides*; and others were not changed at all, but emerged *marcellus*.

Later, one butterfly only emerged from the chrysalids of *pseudargiolus*, a female, and it differs curiously from the type, and from other examples of the same brood which have emerged from the chrysalids not exposed to cold, in that the common series of extra discal spots on under side is wholly wanting, and the marginal crescents form a complete series across both wings and are very large and black, so that these crescents are more conspicuous than in any example I ever saw in the field. The other chrysalids are most of them alive, but the butterflies will not appear before next spring.

The failure of the *tharos* to change led me to test the ice box, and I found that as the ice melted the temperature rose from 45° to 55° in the top of the box. Very likely, also, in my absence, the cover had sometimes been left raised in such a way as to admit air.

Fortunately I had brought back from New York another batch of *tharos* eggs, also of var. *marcia*, obtained in the Catskills, and the larvæ from these I bred in June and July, and placed the chrysalids in the ice box at intervals as before, but this time at the bottom, under the ice, where I found the temperature to be 33°. I had scarcely gotten the last chrysalids in when I was compelled to go East again, and so lost the opportunity of determining the length of time required to effect a change of form, and being detained by the late railroad troubles, I did not return till twenty days had passed. The same day I removed all the tin boxes from the ice. They contained more or less water, and in some was enough to drown the chrysalids.

I divided the chrysalids into three lots. No. 1 contained all which were exposed to cold at from 1 to 9 hours after forming. No. 2 all at from 30 to 60 minutes after forming. No. 3 at from 10 to 30 minutes. But I discovered afterwards, by a label, that in this last lot were three chrysalids which had not been exposed till two days after forming.

The butterflies began to emerge on the seventh day, and by the ninth all had emerged that were alive. Fully one-half of the chrysalids were either dead or had just life enough to allow the bursting of the case without any expansion of the wings; and of the butterflies several were cripples. No doubt this loss and maiming was in part owing to the water in the boxes, but I think more largely to the tender age of the chrysalids when exposed, their surfaces yet unhardened being liable to injury. But the general result was satisfactory.

Of lot 1 (exposure 1 to 9 hours after forming) there emerged 9 perfect butterflies, 5 ♂, 4 ♀, every one changed. The males were what I call var. D of *marcia*, and though varying much in their under surfaces, were all like examples of the over-wintering brood (*marcia*) taken in the Catskills. Of the 4 females, 2 are good examples of var. C, *marcia*, and vary between themselves considerably, as is usual with that variety. But the other 2 are fine examples of "suffusion," the colors on either side blending, and the definite markings characteristic of the species being lost; also the black color of hind margins of upper side is hoary or griseous. These are such examples as collectors prize as the gems of their collections when taken in the field.

Of lot 2 (exposure 30 to 60 minutes) emerged 5 females, no males. Three are very little, if at all changed, but the other two are very pretty examples of suffusion, though to a less degree than the two before mentioned from lot 1, and the running of the colors is mostly restricted to the under side. The black margins on upper side are, however, much broader than in the normal form, running into and absorbing the extra discal round black spots.

Of lot 3 (exposure 10 to 30 minutes after forming, but with three chrysalids two days after) there emerged two females, no males. One of these I cannot distinguish from the summer *tharos*, and I presume this was from one of the three chrysalids spoken of, though of course I have no certainty of it. But the other is a beautiful example of var. B, *marcia*, the under side of the hind wings being largely melanized.

It would appear not to be necessary that cold should be applied before the newly formed chrysalis has fully hardened to effect a change of form in case of *tharos*. Last year I found that chrysalids which were exposed at 9 hours after forming changed fully as much as those exposed at 6 and 3 hours. The temperature then was maintained at about 40°, and for 7 days only, and the changes were complete in nearly all the examples treated, but there was no case of suffusion, as has appeared in the present experiment at temp. 33° continued for 20 days; though probably the length of this last period had little to do with the matter, and a much shorter time would have produced the same result. Even with the first experiment this season as related, with an irregular temperature ranging from 45° to 55° and perhaps higher, though no change of form resulted, the cold completely retarded the development of the imago, as the butterflies did not emerge till their full period had passed after removal from the ice.

I think the facts I have stated throw light upon the cause, or a cause, of the phenomena of suffusion, instances of which are recorded in books and are occasionally seen in the field. Severe cold, as, for example, the enveloping of a chrysalis newly formed with ice or snow as it lies under a rock or on the ground, would apparently suffice to cause a blending of the colors in the butterfly.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ADELA.

A. biviella Zell.

I have received both sexes of this species from Prof. Feraud, of Orona, Maine. It is a prettier species than *A. bella* Cham., with the fascia 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, darker 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. Schlaegeri 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. biviella, trigrapha, bella,* &c. 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.

Incurvaria mediostriatella Clem., Proc. Acad. Nat. Sci., Jan'y, 1860, p. 5.

Tinea auristrigella Cham., CAN. ENT., v. 5, p. 86.

I am satisfied that in *T. auristrigella* I have re-described Dr. Clemens' species, though I see no sufficient reason for separating it from *Tinea*. *T. iridella* Cham. will probably also be referred to *Incurvaria.*

PITYS.

P. fasciella, v. 5, p. 111, ante.

The former description of this species is not satisfactory. I therefore re-describe it as follows :

Palpi silvery white; the second joint of the labial pair has a narrow brown line extending along its outer surface; face white; vertex rufous; antennæ pale fuscous. Thorax golden brown above and with a golden brown streak or spot beneath the fore wings, which are golden tinged with brown, and the costal and dorsal margins are brown; before the middle are two large tufts of raised scales opposite to each other, the inner one brown and the outer one whitish or silvery gray, margined all around with brown, and there are two similar tufts in the apical part of the wing. There are seven small silvery white costal streaks, one before the first pair of tufts and another just behind it, and both pointing obliquely backwards. The third is smaller and placed just before the last two tufts, and is nearly perpendicular to the margin, and the other four are in the apical part of the wing; there are also seven small dorsal silvery white streaks nearly opposite the costal ones, the third dorsal one (from the apex) connected faintly with its opposite costal one. Ciliæ pale fulvous. *Al. ex.* a little over ½ inch. Kentucky.

XYLESTHIA.

X. Clemensella Cham.

The larva of this species bores in dead locust timber. It may be found abundantly emerging (as imago) from locust fence posts, about the middle of June, and is not uncommon as late as the first of August.

SEMELE.

S. cristatella Cham.

I find that I have occasionally referred to this species as *S. bifasciella*, by which name some of my specimens were labeled before it was published as *S. cristatella*. Probably there is not sufficient reason for separating it generically from the species placed by me in the genus *Pitys*. I am not sure but that two related species are confounded under this specific name, as in some of the species the wings seem a little narrower than in others, and, besides, have a golden spot or longitudinal streak within the costa near the base, and the tufts in the apical part of the wing margined with sordid white or yellow.

NOTE ON LARVAL VARIATION.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

In a paper on the Noctuidæ of North America (6th Ann. Rep. Peabody Acad. Sci.) I have stated that we should rather expect the acquirements of fresh character to be more apparent during the period of growth of the Lepidoptera. I have elsewhere (Bull. Buff. Soc., 1, 130) shown that there is proof in the excessive variation in the larvæ of a genus where the adults of the species are remarkably uniform in color and ornamentation, that the larva submits to independent and wide modification from the circumstances of its environment. Under this head I have suggested that all the cases in the Noctuidæ where the larvæ are very different and the imagos very similar of any two forms distinguished by geographical distribution (e. g., *Apatela psi* from Europe and *Apatela occidentalis* from America) may be ranked. And here the numerous cases cited by Guenée from Abbot's drawings of the larva must probably be included. The case of these "representative" species is especially interesting and will receive in time a more thorough working out when we come to know the immature forms of more of our species.

In this first phase of larval variation we have the difference associated with a separate habitat.

In the next phase we have what Mr. Walsh calls a *phytophagic* variation of the larva. He has shown such to exist with *Hal. tessellaris*, and Mr. Hy. Edwards has shown it with regard to the Californian *H. Agassizii.*

Mr. Walsh's observations on *Sphingicampa distigma* and *Anisota bicolor* I have discussed some years ago, giving good reason to show that an error happened in the matter; the larva of his "*bicolor*" (♀ imagos) not having in reality produced the perfect insects with which he associated them. Hence the "generic" differences in the larvæ associated with "specific" identity in the imagos in this case assumed by Mr. Walsh do not in reality exist. But the phytophagic variation in *Halesidota* is not associated with a difference of habitat; and Mr. Walsh ascribes it to the food plant as the determining condition of the larval environment inducing the variation. The imagos cannot be distinguished.

We have again a third phase in the "species" of *Datana*. Here the variation in the larva is strong in the last moults, and the imagos though almost are not quite identical. The species may be separated without knowing the larva. The two nearest allied forms, *ministra* and *integerrima*, have the one uneven, the other even fore wings. The larva of the latter is black with long silky white hairs, wanting in the former, which remains striped. It must be remembered that in an allied genus, *Nadata*, the two species are also separable by the differing margin in the imago; the larvæ are yet unknown. In *Catocala* we have two forms, *C. crataegi* Saund. and *C. polygama* Guen., quite distinct in the larval and very near in the perfect state.

I have briefly brought these facts together here to show that larvæ are independently subject to variation. The small differences in the imagos are usually attended by much greater differences in the larvæ in the case of closely allied "species." An analogy in the differences between closely allied species in different genera is shown in *Nadata* and *Datana*. We may expect similar facts when the history of our *Ceruræ* becomes known, all bearing on the objective basis for all our "genera" and "species," although certain lepidopterists continue to insist on real distinctions between certain of these artificial divisions. The conceptions of one class of naturalists are treated as corresponding with Nature, the other, not; but with insufficient reason.

NOTES ON THE EGG, LARVA AND PUPA OF SMERINTHUS MODESTA.

BY ROBERT BUNKER, ROCHESTER, N. Y.

Egg—1/15 in. diameter; light green, translucent, smooth, circular, oblate or depressed. Hatched in nine days from extrusion. Larva—1/4 in. long; light green, slender; head large, round, slightly depressed medially; face pink, with a purplish tinge; extremity of the body dark sea-green, with a large wart or tubercle, pyramidal in form, upon which rests the horn.

1st moult—$\frac{1}{2}$ in. long, apple green, with a light yellow longitudinal stripe below the dorsal ridge; diagonal lines yellowish white; horn purple, straight, very short. 2nd moult—$\frac{7}{8}$ in. long; $\frac{3}{16}$ in. diam.; rich dark green, finely granulated, giving it a beautiful velvety appearance; thorax adorned with two transverse crests or collars, studded with fine points tipped with white. 3rd moult—1$\frac{1}{4}$ in. long; $\frac{3}{8}$ in. diam., thickest medially; light green, otherwise unchanged. 4th moult—1$\frac{7}{8}$ in. long; $\frac{9}{16}$ in. diam.; light green, coarsely granulated, granules studded with fine white points, giving the skin a frosted appearance; crests on thorax much reduced in size. 5th moult—3 in. long; $\frac{3}{4}$ in. diam.; hind crest lost, anterior one much reduced; spiracles small, rust red; true legs brown; pro-legs brownish yellow; horn lost, except a mere rudiment; yellow longitudinal stripes very obscure.

Pupa 2 in. long; $\frac{5}{8}$ in. diam.; dark chestnut brown, cylindrical, holding its size well to the sixth segment, thence tapering abruptly and ending in a point or thorn; head obtuse, thoracic portion round, not angular.

The habits of the larva are singular; before the 1st moult it is much inclined to wander, and goes looping along after the manner of the Geometers; after the 2nd moult it becomes sluggish. It is a voracious eater—in short, an accomplished gastronome. Its manner of feeding differs from that of any larva I have had the pleasure of rearing. It rests with its body stretched out at right angles to the edge of the leaf, and eats with its feet fixed on the side of the leaf, and as the food is consumed moves backward, and when the leaf is consumed to the mid-rib, leaves it to try its gormandizing propensities on a fresh one. As the worm, while feeding, rests as above mentioned, the reason of its leaving the leaf half consumed will be obvious; it would otherwise have no surface to hold on to.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Fourth Annual General Meeting of this Branch was held on Tuesday, 1st May, at 8 o'clock p. m., at the residence of H. H. Lyman, Esq., the President in the chair.

The following report was read and adopted :

REPORT.

Your Council beg to present the Fourth Annual Report of the Society's operations.

They would refer with pleasure to the satisfactory progress of the Society in the study of our science, evinced by the steadiness with which the monthly meetings have been kept up, and the interesting and valuable papers read at these meetings. Solid progress has been made in the identification and classification of the insects of Montreal, and much preliminary work has been accomplished, the value of which will appear hereafter. The only cause for regret is that our number continues so small, but the zeal and perseverance of the present members go far to compensate for their paucity in number. Your Council entertain the hope that at no distant day our membership will be augmented by the addition of at least a few more students of our useful and interesting branch of natural history.

Twelve meetings were held during the year, at which the following papers were read and presented to the Society :

G. J. Bowles—" List of Eggs and Larvæ Described in the Seven Volumes of the CANADIAN ENTOMOLOGIST."

H. H. Lyman—" Notes on the Occurrence of *Argynnis idalia.*"

F. B. Caulfeild—" List of the Geometridæ of Montreal."

W. Couper—" On *Phyciodes tharos.*"

H. H. Lyman—" List of Some of the Geometridæ of Montreal."

F. B. Caulfeild—" Notes on Some Species of *Chrysomelidæ* Occurring on the Island of Montreal."

F. B. Caulfeild—" Notes on the Species of *Meloe* in Canada."

H. H. Lyman—" Entomological Rambles, Including Notes on Entomology at the Centennial Exhibition."

G. J. Bowles—" The Noctuidæ of Quebec."

G. J. Bowles—" Notes on D'Urban's Paper in the *Canadian Naturalist*, Vol. v., with Identifications of the Species."

Some progress has been made during the year in the compilation of the " Montreal Catalogue," and the names of 790 identified species are now entered on the list, comprising 385 Lepidoptera, 367 Coleoptera, 4 Diptera, 15 Orthoptera, 16 Hymenoptera and 3 Hemiptera. The earnest co-operation of the members is requested by your Council in this work. There is no doubt but that it will be of immense value to future students and will form a lasting memorial of our labors.

The finances of the Society have engaged the earnest attention of your Council. They would recommend that the cash on hand be expended in books for our Library, under the direction of the new Council.

The whole respectfully submitted.

GEO. JNO. BOWLES, President.

Montreal, 1st May, 1877.

The following were then elected to office for the ensuing year:

G. J. Bowles, President (re-elected); H. H. Lyman, Vice-President; G. B. Pearson, jr., Secretary and Treasurer (re-elected); C. W. Pearson, Curator (re-elected); Council—F. B. Caulfeild, Robert Jack, W. Hibbins, jr.

After a pleasant conversation on Entomological subjects, and the examination of numerous specimens, the meeting adjourned.

G. B. PEARSON, JR., Secretary.

NOTES ON LEPIDOPTERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Scopelosoma Pettiti.

I have received from Mr. Fred. Tepper a fine and well marked specimen of this species, originally described by me (CAN. ENT., 7, 188) from specimens received from Mr. J. Pettit, of Grimsby, Ont. The new specimen, from Iowa, shows the continuous, even, diffuse and broad median shade very distinctly, running just inside the large reniform and absorbing its exterior orange annulet. The t. p. line has a costal angulation and is otherwise even; it shows black venular points; the line itself is double and these black points contrasted with the pale yellow included space. The pale yellow s. t. line is thrice waved. This species is allied to *S. Graefiana*, from which it may be distinguished by its smaller size, its more even wings, which want the terminal festooned line, its paler ground color, straighter median shade, smaller orbicular spot and more prominent subterminal shade. The hind wings are very pale yellow and show a faint subterminal reddish shade in addition to the faint and more irregular mesial line. Beneath this subterminal shade is indicated by fragmentary reddish scales superiorly on both wings. In *Pettiti* the mesial line on secondaries beneath is more flexuous centrally.

Californian Hepiali.

Although Mr. Stretch, in his "Bombycidæ of North America," gives *Behrensii* (fig. 6) as distinct from *montana* (fig. 7), large material, sent by Mr. Behrens, makes me believe that they are opposite sexes of the same species, which should retain the name *Behrensii.* The orange salmon-colored *Behrensii* seem to me the males, and specimens vary from the form described by Mr. Stretch, in which the insect is nearly concolorous, to the more usual form where two silvery fasciæ break the monotony of the wing. The bands composed of light colored spots are more or less visible in the males; in the females (= *montana*) with fuscous wings, they are more evident. One intermediate specimen (♀) is faintly tinged with reddish. The hind wings have the margins and veins orange in *Behrensii;* in the ♀ *(montana)* the wing is all fuscous, but this latter tint can be seen in the ♂ on the interspaces.

I have examined the species described by Mr. Behrens (CAN. ENT., viii., 174). I think that the specimen alluded to but not separately named under the description of *sequoiolus* is the female of that species, following out the idea that the sexes differ more than usual in *Behrensii*, to which *sequoiolus* is allied. The form described by Mr. Behrens as *Baroni* seems to me distinct and not the opposite sex of *mendocinolus.* It may be known by the bands remaining grayish fuscous, while the interspaces are shaded with red, not orange. But if the silver bands are a male character this opinion may need revision. The small species *Lenzi*, and the larger *sequoiolus*, can be readily recognised from Mr. Behrens' description of them; while *mendocinolus* seems to differ from ♂ *Behrensii* by the smaller size, fuscous hind wings and less brilliant color of the primaries.

Lithophane viridipallens, *n. s.*.

♂. Very pale gray green; allied to *querquera*. Thorax and head immaculate pale green with a central black thoracic dot, as in its ally. Lines on primaries faint. Basal dash obsolete. Lines double. Median shade continued, blackish. Reniform smaller than in *querquera*, more constricted, with a less conspicuous interior ring. Subterminal line much as in *querquera*, but without the median and submedian black marks of that species. Terminal series of dots reduced. Fringes concolorous. Hind wings fuscous with whitish fringes. Beneath pale with common line and discal marks, and an almost imperceptible flush. Abdomen pale fuscous, beneath very faintly ruddy. Hab. Mass. (Mr. Roland Thaxter). Size of *querquera*, but differing in the fainter markings, the narrower reniform, while the hind wings are less ruddy.

Syneda Alleni, *n. s.*

♂. A beautiful species allied to *graphica*, but distinct by the orange yellow secondaries and under surface. Band on hind wings narrow, twice deeply scalloped, angulated on vein 2, where it is joined to the base by black scales along the vein; thick discal lunule. Primaries like *graphica* but more brown; the median shade brown and diffuse; the t. p. line notched below costa; the t. a. line running down to internal margin, slightly projected outwardly on submedian vein. Beneath bright orange yellow, with deep black bands joined and forming Y-marks on both wings. Larger than *graphica*, and a more striking species. *Expanse* 32 mil. Orono, Maine, Mr. Anson Allen, to whom the species is respectfully dedicated.

CATOCALÆ TAKEN AT SUGAR AT CENTER, N. Y.

BY JAMES S. BAILEY, M. D., ALBANY, N. Y.

The following list will show the order in which Catocalæ were taken during July and August, 1877, at sugar, and the number taken each day of each variety, in this particular locality. Center has proven itself rich in Diurnals, and now especially so in Catocalæ. It is singular, after working up the field thoroughly for several years, not a vestige of a Catocala has before this year been seen by the writer. In fact their presence was doubted, until this season a caterpillar was seen. June 28th the first Catocala was captured *(C. Clintonii)*, and now, Sept. 12th, worn specimens of *antinympha* are seen, and good specimens of *relicta*, *amatrix*, *unijuga*, *habilis* and *cerogama*. The 10th of this month I took 22 *relicta* and 12 *unijuga*.

JULY.

23rd, 5; 25th, 1; 28th, 22; 30th, 4; 31st, 20.

1. C. Clintonii—2nd, 1; 10th, 2; 19th, 2; 21st, 1.
2. " polygama—7th, 1; 11th, 1; 16th, 2; 17th, 2; 18th, 3; 20th, 1; 21st, 2; 23rd, 1; 30th, 1.
3. " *var.* pretiosa—3rd, 3; 4th, 4; 5th, 1; 9th, 1; 10th, 5; 11th, 1; 12th, 2; 14th, 1; 16th, 7; 17th, 1; 18th, 3; 19th, 3; 20th, 1; 23rd, 2; 25th, 4.
4. " gracilis—2nd, 3; 3rd, 8; 4th, 2; 5th, 13; 11th, 49; 12th, 45; 13th, 35; 14th, 30; 16th, 40. Abundant from 17th to 31st.
5. " *var.* similis—13th, 5; 14th, 12; 16th, 28; 18th, 18; 19th, 31; 20th, 30; 21st, 52. Abundant from 23rd to 31st.
6. " ilia—7th, 1; 9th, 1; 10th, 3; 11th, 1; 14th, 4; 16th, 2; 17th, 1; 18th, 6; 19th, 3; 20th, 6; 21st, 7; 23rd, 1; 25th, 1; 28th, 3; 30th, 2; 31st, 2.
7. " unijuga—7th, 1; 12th, 2; 17th, 1; 18th, 2; 19th, 1; 20th, 4; 21st, 1; 25th, 2.
8. " epione—9th, 1; 19th, 2; 20th, 1; 21st, 1; 28th, 2; 30th, 1.
9. " briseis—11th, 2; 12th, 2; 13th, 4; 14th, 4; 16th, 1; 18th, 5; 19th, 4; 20th, 15; 21st, 21; 23rd, 13; 25th, 4; 30th, 8; 31st, 5.
10. " antinympha—11th, 1; 12th, 2; 13th, 4; 14th, 6; 16th, 3; 18th, 4; 19th, 13; 20th, 12; 21st, 33; 23rd, 27; 25th, 56; 28th, 4; 30th, 93.
11. " concumbens—14th, 1; 20th, 5; 21st, 6; 23rd, 2; 25th, 7; 28th, 1; 30th, 57.
12. " ultronia—11th, 1; 12th, 1; 14th, 1; 16th, 1; 18th, 5; 19th, 1; 20th, 2; 21st, 5; 23rd, 3; 25th, 5; 30th, 6; 31st, 2.
13. " praeclara—12th, 1; 13th, 1; 14th, 1; 18th, 1; 19th, 2; 20th, 1; 21st, 1; 23rd, 7; 25th, 12; 30th, 16.
14. " crataegi—12th, 1; 14th, 1; 17th, 1; 21st, 2.
15. " relicta—12, 2; 17th, 1; 18th, 3; 19th, 4; 20th, 6; 21st, 4;

16. C. androphila—16th, 1; 18th, 4; 19th, 6; 20th, 6; 21st, 20; 23rd, 9; 25th, 16; 28th, 24; 30th, 30; 31st, 45.
17. " grynea—17th, 1; 18th, 3; 19th, 4; 20th, 1; 21st, 1; 25th, 2; 28th, 6; 31st, 2.
18. " minuta—18th, 2; 21st, 1.
19. " *var.* parvula—19th, 1.
20. " Meskei—18th, 2; 20th, 1.
21. " coccinata—18th, 1; 20th, 1; 21st, 1; 28th, 1.
22. " parta—19th, 1; 20th, 1; 28th, 1; 30th, 1; 31st, 2.
23. " tristis—20th, 1.
24. " insolabilis—20th, 1.
25. " fratercula—20th, 1; 23rd, 2; 25th, 2; 28th, 3; 30th, 1; 31st, 1.
26. " *var.* " (suffused)—20th, 1; 23rd, 1.
27. " palaeogama—20th, 1.
28. " *var.* phalanga—20th, 1.
29. " cerogama—25th, 1; 28th, 1; 30th, 3.
30. " residua—25th, 1; 28th, 2; 30th, 2.
31. " piatrix—28th, 1.
32. " retecta—30th, 1.
33. " habilis—30th, 2.
34. " *var.*—31st, 1.
35. " faustina—31st, 1.
36. " cara—31st, 1.

AUGUST.

1. C. concumbens—1st, 3. Abundant from 3rd to 31st.
2. " androphila—Abundant throughout the month.
3. " antinympha " " "
4. " ilia—1st, 1; 7th, 1; 10th, 1.
5. " habilis—1st, 1; 3rd, 2; 4th, 1; 7th, 6; 8th, 8; 10th, 6; 13th, 8; 18th, 2; 20th, 11; 22nd, 4; 24th, 3; 27th, 5; 29th, 3; 31st, 6.
6. " ultronia—1st, 1; 3rd, 1; 6th, 1; 7th, 1; 10th, 1.
7. " polygama—1st 1; 3rd, 2; 20th, 1.
8. " residua—1st, 2; 3rd, 2; 4th, 2; 7th, 2; 10th, 6; 13th, 1; 20th, 2; 24th, 1.
9. " piatrix—3rd, 1; 7th, 1; 18th, 3.

10. C. relicta—3rd, 2; 4th, 1; 6th, 8; 7th, 13; 8th, 7; 10th, 42; 13th, 28; 18th, 11; 20th, 17; 22nd, 26; 24th, 43; 27th, 30; 29th, 37; 31st, 34.
11. " briseis—3rd, 1; 6th, 1; 7th, 3; 8th, 1; 10th, 4; 13th, 1; 18th, 3; 22nd, 3; 31st, 2.
12. " cerogama—3rd, 2; 4th, 3; 7th, 6; 8th, 1; 10th, 14. Abundant from 13th to 31st.
13. " cara—3rd, 1; 4th, 1; 7th, 2; 8th, 2; 10th, 7; 13th, 1, 27th, 5; 29th, 1; 30th, 1.
14. " amatrix *var.* nurus—4th, 1; 6th, 1; 22nd, 1.
15. " unijuga—6th, 1; 7th, 1; 10th, 1; 22nd, 3; 31st, 13.
16. " epione—6th, 1; 10th, 1.
17. " praeclara—6th, 8; 10th, 6; 22nd, 3; 29th, 1.
18. " palaeogama—7th, 1; 13th, 1; 29th, 2.
19. " *var.* phalanga—7th, 2; 27th, 2.
20. " retecta—10th, 2; 13th, 1; 18th, 2; 27th, 4; 29th, 7; 31st, 5.
21. " amatrix—18th, 1.
22. " desperata—18th, 3; 20th, 4.
23. " obscura—20th, 1.
24. " subnata—20th, 1.

CORRESPONDENCE.

WHAT IS THE FUNCTION OF THE FORCEPS IN FORFICULA?

DEAR SIR,—

In looking at the authorities upon this subject, I find that Westwood says "they are weapons of offence and defence," but he gives no proofs. De Geer tells us "quand quelqu' autre insect approche du Perceoreille, il tache de le pincer avec cet instrument en courbant le ventra en haut ou vers le côté, *mais sans produire beacoup d'effet.*" That I can readily believe. Serville says "cette pince lui sert d' arme defensive, *quoique peu redoutable!*" That is also true—*peu redoutable—tres peu!* The consistence of the forceps renders them by no means a formidable weapon. But De Geer also says, "Le male s' approche à reculons de la femelle dont il tâte le ventre avec sa pince pour rencontrer l'endroit par ou il doit s'unir à elle, &c." This is a more reasonable use of the instrument, but not the only nor most important one.

Last summer I had a good opportunity of observing the habits of this insect, for every night numbers of them came into my study window in the country, and lighted very conveniently upon the table at which I was writing. Each one of them, before he took flight, for they were active, would bend his body back and *lift up the short elytra with his forceps before the wings would expand*, and this they did invariably. They would do this a dozen times in as many minutes, and not one of them ever took flight without performing this manouvre. The forceps were not used to fold the semicircular wings, but only to elevate the wing covers before flying. I have examined a number of writers upon *Forficula*, but not one of them mentions this remarkable fact, which I observed for many consecutive nights, and I have no doubt of the truth of it. This, then, I believe is the real and perhaps only function of the instrument.

JNO. G. MORRIS, Baltimore.

EREBUS ZENOBIA.

DEAR SIR,—

On the night of the 6th of September, 1877, George C. Thomas took near Racine, Wis., a fine male *Erebus zenobia* Cram. On the night of the 15th of September I captured, in similar condition, a female of the same species. So far as I can learn, there is but one other instance of this species being taken in North America. H. Strecker says that one specimen was taken at or near Davenport, Iowa, several years since. The taking of this West Indian species at Racine is but adding another to the numerous instances where Southern forms visit us. I have repeatedly called attention to this peculiarity of the Racine fauna. Southern forms go much further north than they do east of the great lakes; especially is this true of birds and insects.

I send a photograph of the ♂. Expands 5 inch; ♀ 7 inch.

P. A. HOY, M. D., Racine, Wisconsin.

[We are greatly indebted to Dr. Hoy for the photograph of this rare and very interesting insect.—ED. C. E.]

FOOD PLANTS OF H. MAIA.

DEAR SIR,

I am reminded by Robert Bunker's remarks on the food plant of *Hemileuca maia* (p. 119 of current volume of CAN. ENT.) that in 1874, in a circular issued from the Department of Public Instruction of the State of Illinois, I wrote the following:

"Our savants in Entomological lore give Oak, Willow and Spiraea as usual food plants for the larvae of *Hemileuca maia*, but here, on or near these spacious marshes [along Calumet River, south of Chicago] these plants are scarcely abundant enough to warrant so numerous an array of the perfect insect. The unavoidable inference, therefore, is that either some other food plant is specially abundant in the locality, or else some other feature of the neighborhood which, perhaps, has hitherto escaped the attention of Entomologists, constitutes to them a strong attraction."

The tract of country alluded to is just such a swampy locality as Mr. Bunker speaks of in his communication. No doubt the list of food plants for these larvae is yet far from complete.

O. S. WESTCOTT, Racine, Wis.

DEAR SIR,—

From among numerous fine captures during this last season I mention the following as being of especial interest to many collectors, as they were taken in the Township of Roselle, New Jersey:

Sept. 1st—*Catocala marmorata*, *relicta* and *unijuga*. The former was resting upon a white oak.

The following Sphingidæ in larval form are secured; the first is of exceeding great rarity: *Smerinthus astylus* and *myops*; *Cressonia juglandis*; *Darapsa versicolor*.

GEO. W. PECK, 226 Pearl St., New York.

DEAR SIR,

I would suggest that the "seeming growth" observed by Mr. Aaron on the eye of *P. philenor* is nothing but the pollen of the flowers visited for honey by the butterfly. In this way Darwinists believe that cross-fertilization is effected in many plants, and they show also that such cross-fertilization is beneficial to plants.

A. R. GROTE, Buffalo, N. Y.