

Technical and Bibliographic Notes / Notes techniques et bibliographiques

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

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

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

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

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

Cover title missing/
Le titre de couverture manque

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

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

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

Showthrough/
Transparence

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

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

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

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

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

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

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments: /
Commentaires supplémentaires:

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

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

The Canadian Entomologist.

VOL. XIII.

LONDON, ONT., JUNE, 1881.

No. 6

ENTOMOLOGY FOR BEGINNERS.

BY THE EDITOR.

THE EYED ELATER—*Alaus oculatus*.

This is the largest of our Elaters or "spring beetles," and is found with its larva in the decaying wood of old apple and other trees. The beetle, fig. 7, is about an inch and a half—sometimes more—in length, of a black color, sprinkled with numerous whitish dots. On the thorax there are two large velvety black eye-like spots, from which has arisen the common name of the insect. The thorax is about one-third the length of the body and is powdered with whitish; the wing cases are ridged with longitudinal lines, and the under side of the body and legs thickly powdered with white. It is found in the perfect state in June and July; is active in the daytime, flying about with a loud buzzing noise.



Fig. 7.

The mature larva, which attains its full growth early in April, is about two and a half inches long, nearly four-tenths of an inch across about the middle, tapering slightly towards each extremity. The head is broad, brownish and rough above, the jaws very strong, curved and pointed, the terminal segment of the body blackish, roughened with small pointed tubercles, with a deep semi-circular notch at the end, armed at the sides with small teeth, the two hindermost of which are long, forked and curved upwards like hooks. Under this hinder segment is a large fleshy foot, armed behind with little claws, and around the sides with short spines; it has six true legs, a pair under each of the first three segments. Early in spring the larva casts its skin and becomes a chrysalis, and in due time emerges a perfect beetle.

This beetle, when placed upon its back on a flat surface, has the power of springing suddenly into the air, and while moving, turning its

body, thus recovering its natural position; this unusual movement, together with its curious prominent eye-like spots, combine to make it a constant source of wonder and interest. Since it feeds only on decaying wood, it scarcely deserves to be classed with destructive insects.

THE STAG BEETLE—Lucanus dama.

This is another very common beetle somewhat similar in its habits to the eyed Elater, but very different in appearance. It is a large and powerful insect belonging to the family called Lamellicornes, or leaf-horned beetles, from the leaf-like joints composing their antennæ. In the male, fig. 8, the upper jaws or mandibles are largely developed, curved like a sickle and furnished internally beyond the middle with a small tooth; those of the female are much shorter and also toothed. The body measures from an inch to an inch and a quarter in length, exclusive of the jaws, and is of a dull mahogany brown color. The head of the male is broad and smooth, that of the female narrow and roughened with punctures. The insect appears during the months of July and August, is very vigorous on the wing, flying with a loud buzzing sound during the evening, when it frequently enters houses to the alarm of nervous occupants. It is perhaps scarcely necessary to remark that it is not in any way venomous, and it never attempts to bite without provocation.



Fig. 8.

The female lays her eggs in the crevices of the bark of trees, especially near the roots. The larvæ live in decaying wood and are found in the trunks and roots of various kinds of trees, particularly those of old apple trees; they are also found in old cherry trees, willows and oaks. They are said to be six years in completing their growth, living all the time on the wood of the tree, reducing it to a coarse powder resembling sawdust. The mature larva is a large, thick, nearly cylindrical whitish worm, with a horny-looking head of a reddish brown color, dark mandibles and reddish legs. The body is curved when at rest, the hinder segments being brought towards the head.

When the larva has attained full size it remains in its burrow and encloses itself in an oval cocoon formed of fragments of wood and bark,

cemented together with a glue-like secretion, and within this enclosure it is transformed to a chrysalis of a yellowish white color. Through the partially transparent membrane the limbs of the future beetle are dimly seen, and in due time the beetle bursts its filmy enclosure and emerges to the light of day.

As this insect affects only old and decaying trees, it seldom does much harm. The use of alkaline washes, applied to the bark of the trees in July, would probably deter these beetles, in common with others, from depositing their eggs on the trees thus coated, and any mischief they might otherwise do be in this manner prevented.

DESCRIPTION OF THE PREPARATORY STAGES OF PAPILIO PALAMEDES, DRURY. (*Calchas*, Fab.)

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

EGG—Spherical, a little flattened at base; color greenish-yellow. Duration of this stage four to five days.

YOUNG LARVA—Length .1 inch; near the end of the stage .28 inch, and then cylindrical, greatly thickened from 3 to 6; after 6, tapering to 12, then thickening to end, the back and sides after 6 a little incurved; 2 has a thin square ridge and on each curve of same a thick fleshy process, longer than others on body, thickly beset with straight hairs; there are two rows of similar processes, sub-dorsal, smallest on the narrow segments, colored as the segment they stand on, those on 12 and 13 considerably larger than any others except on 2; besides the subdorsal rows, are two dorsal, running the whole length of body, and one row on side, another along base; all these are small, simple tuberculations with hair on end; color of body brown-yellow marked with white; a white band, not very clearly defined, especially on its lower edge, passes along the side of segments 3 to 8, turning up on 8 to edge of dorsum, the two extremities there not quite meeting; 12 and 13 are white; under side greenish-brown; feet and legs same; head obovoid, a little depressed at top, smooth, shining, color yellow-brown, a shade darker than body. To 1st moult about 4 days.

After 1st Moulting—Length .33 inch; same general shape, at first the

dorsum on the thickened segments is smooth and rounded, but after a few hours becomes flattened a little, and corrugated; 2 has a thin, high, square topped ridge, the corners produced, and each bears a short thick process, pilose; on 12 are two short subconical processes, on 13 two like them but larger, and these four form part of the two subdorsal rows, which are almost suppressed on 6 to 10, but are distinct on 11; the two dorsal rows of tubercles are minute; color of body yellow-brown, darkest on posterior half, the anterior segments a little red-tinted; the white lateral band as before, but distinct, white; the dorsum and upper part of the side of 12 and 13 and a little of 11 pure white, the lower part of side less pure, the shield sordid white; over the white band, on 4, is a large sub-oval black ocellus in a narrow yellow ring; this ocellus is mostly occupied by a prominent rounded black process with many short black hairs on it; head sub-cordate, finely granulated, shining yellow-brown, with fine hairs. To next moult 2 days.

After 2nd Moult—Length .36 inch; same shape, and as before, the dorsal area on thickened segments becomes corrugated and flattened and depressed some hours after the moult, and the depression is enclosed by an elevated oval rim; 3 is a little excavated on dorsum on anterior part; 2 is a square-topped ridge, but the processes have passed away; on 12 and 13 the processes as at previous stage, but the rest of the subdorsal rows have disappeared, and in place of part of them are slight rounded elevations, like those of the dorsal rows; so that on 3 there are two dorsal and two subdorsal rows of these knobs, but two dorsal only on 4, 5, 6; on 9 and 10 are two subdorsal little round lilaceous spots; color yellow-brown to dark brown, the anterior parts having most yellow; the sides of the posterior segments of a black hue; the white side stripes as before; 12, 13 white, the shield greenish-brown above but white below, and the anal claspers white; the white extends into the sides of 11, but the brown dorsal area runs back in a sharp point nearly to 12; on 4 the eye-spot is large, flattened in front and there velvet-black, but behind this is a prominent black vitreous bead-like elevation, smooth and without hairs; instead of a complete and uniform ring there is a thickening of the yellow above and below the eye-spot, and the ends are narrowed, so that the appearance is much like that of eye-lids; head as before, and it and segment 2 are one color, honey-yellow. To next moult 3 days. But one larva, after 2nd moult, differed from all the rest, being uniform light yellow-brown, the white area on 11 and 12 yellowish.

After 3rd Moul—Length .8 inch ; same shape and general color, the anterior segments a little darker, and their surfaces finely and thickly, but indistinctly, dotted green ; the middle segments lighter colored and distinctly dotted green ; the side bands salmon color, the last segments a redder salmon ; 13 white above base at extremity ; along base of body, with and a little above the spiracles, a white macular band ; on dorsum of 13 two small conical white processes (none on 12) ; on dorsum of 5 are two abbreviated bars of red-lilac, one on each side, in the subdorsal row, and on 6 to 10 is a small rounded lilac spot on each in same row ; on the side of 8 to 10 one similar spot to each ; on 3 to 6 low rounded knobs as at previous stage ; below the basal ridge is a small indistinct blue-lilac spot on each segment from 6 to 11 ; the ocellus as at previous stage, the buff ring now open at anterior side ; head as before, but greenish-yellow.

Towards the last of this stage the brown area has a green tinge, and the green dots become quite distinct, and the side bands are greenish ; the circlet of the eye-spot changes to red-buff. Later the top of the anterior segments became olive green, the dorsum after 5 light green, edged down the sides by dark green ; the side band pale green, as are the last segments ; under side pale greenish-brown ; the lilac spots unchanged ; the spots below spiracles blue. To next moult 4 days.

After 4th Moul.—Length 1.1 inch ; 9 days after the moult reached maturity.

MATURE LARVA—Length 1.6 inch ; cylindrical, the segments 3 to 5 much thickened, arched dorsally, then tapering to last ; color dull velvety-green, on 3, 4, 5, and on 12, 13 nearly solid, but a little specked with lighter green ; the other segments light and dark green in fine markings ; the basal ridge whitish-green ; under this is a fine black line from 3 to 12, and on 6 to 11 is a subtriangular blue spot in black edging on each segment just below the line ; 2 has a narrow yellow ridge in front, nearly flat on top, the curves rounded ; on anterior side of this and next it is a black subdorsal dash on either side ; behind the ridge is a black, rough or shagreened narrow band ; the scent-organs light yellow-brown ; on the side of 4 is a black ocellus, upon which rises a rounded vitreous black process, the circlet orange-red, having a black stripe within its anterior edge, and a blue spot on its upper outer side ; on 5 to 11 are four rows of small blue-lilac spots, each in fine black ring, two of the rows

being subdorsal, two lateral ; on 12 only the two dorsals are present, on 13 neither ; on the dorsum of 5 at posterior edge is a buff spot just outside the lilac spot and touching it. Under side deep ochre buff ; feet and legs greenish-brown ; head subovoid, bilobed, granulated, with a dull gloss ; color olive-green.

Gradually the larva changes, the specks disappear on the anterior and also on the last segment, so that the extremities are solid green ; on the middle segments the specks and marks become less distinct ; the ridge at base becomes yellow, the whole under side port wine color ; all the lilac spots change to bluish, the two spots on 5 to brown-buff.

Finally, before suspension the whole surface becomes dull ochrey-yellow, like *P. Troilus* at same period, the red of lower side becomes dull and yellowish, or dull salmon, the lilac spots on back change to pale black, but the spots below the basal ridge retain their blue color, but are dull. One day after suspension the larva pupated.

CHRYSLIS—Length 1.4 inch ; greatest breadth .38 inch ; the ventral side highly arched, the dorsum much incurved, the former narrow at summit, particularly on the thoracic segments, rounded, the sides sloping ; the dorsum rounded, the sides somewhat flattened to the lateral ridge, which is prominent, carinated, and extends from end to end ; head-case long, flattened transversely and about equally on the two sides, narrowest at base and widening gradually to the tips of the ocellar prominences ; these are long, subpyramidal, divergent, the space between excavated roundly ; mesonotum low, the sides very little convex, on the top a very small pyramidal elevation ; surface all finely granulated ; color variable ; one phase shows the whole dorsal side a delicate green, with a darker green medio-dorsal stripe from mesonotum to last segment ; below mesonotum two sub-dorsal low red tubercles, one on either side ; on either side of the abdominal segments two rows of dull lilac points, forming a cross row of four to each segment ; whole ventral side one shade of green, a little darker than dorsum and less yellow ; the lateral ridge cream-color, more or less marked by a red line, which broadens on the process of head ; on the ventral side below the head two red dots near the middle line ; a series of white dots along the margins of wing cases ; below the ridge, on last segments, are traces of blue spots.

Another resembles the above described, except that there is a yellow shade over the dorsal elevation and the medio-dorsal stripe is red.

Others are quite unlike these; the head case and mesonotum are yellow brown, and the rest of the dorsal side is yellow-brown with a pink tint; the stripe and the ridge brown; the dorsal spots blue, and dull blue spots below the ridge; whole under side light yellow-brown.

No butterflies from my larvæ emerged the same season. But of four chrysalids found in Florida 11th to 13th Sept., 1880, two gave butterflies 25th and 27th Sept., and two over-wintered, the butterflies emerging 2nd and 3rd Feb.

I received 24th August, 1880, from Dr. Wm. Wissfeld, Indian River, Fla., about a dozen larvæ of *Palamedes* in 1st and 2nd stages. My correspondent wrote: "On 15th I confined 2 ♀ in bag over limb of *Persea carolina*, or Red Bay. One began to lay eggs within a short time, and in an hour had laid 26. The other was heavy with eggs but would not lay till to-day, and has laid 7 eggs." These were sent me with leaves of the food plant, in a tin box per mail, and I received them 24th, the leaves still fresh, and the larvæ, which had hatched on the road, feeding. As this food plant is not found here I tried the larvæ with leaves of orange and lemon, to no purpose. But sassafras they took to at once. This is the food plant of *P. Troilus*, a species belonging to same sub-group as *Palamedes*. I had no difficulty in raising the larvæ to chrysalis. They are sluggish, like the larvæ of *Troilus*, and in general behave in same way, at all stages resting on a lining of silk which they had spun on middle of the leaf, whereby the leaf is curled or drawn together so as to afford a concealment. This they rarely leave, and then only when hungry, feeding on the end of the leaf until it becomes too small for a hiding place, after which they betake themselves to another leaf. But these larvæ do not cut into the side of the leaf and fold down the cut portion, as *Troilus* does. This Dr. Wissfeld states in reply to my inquiries. He farther says: "*Palamedes* roosts on the highest tree it can find, oak or palmetto. I have seen four to six near sundown fluttering about the tree, where they finally settled and remained. Sometimes three or four so roost on one large palmetto leaf."

DIFFERENCES WITHOUT DISTINCTIONS.

BY C. E. WORTHINGTON, CHICAGO, ILL.

If there is one thing more than another that fills the brain of an amateur Entomologist with despair, when he first makes the acquaintance

of the long lists of largely incongruous and incomprehensible names that he is expected to master, it is the utter absence of anything in the system of nomenclature tending to show the relations of various forms to each other, or of varieties to the parent or more abundant form. There is nothing to show at a glance the results of the experience of others and to attain any idea of the true relationship of allied forms. The student must either acquire the knowledge by slow and persevering experiment, or oftentimes forego the acquisition altogether, because time and the rarity of books will not permit him to gain it. We cannot start where others left off, but must follow their paths step by step, only hoping to gain the point they reached soon enough to be able to penetrate a little further.

Most conspicuously is this the case as regards the so-called varieties of variable species. Let a student in England, for instance, take up Mr. Edwards' Catalogue of North American Butterflies, and the first species is listed with three "dimorphic" varieties and one "sub-variety." The theory of their origin is well known, and the facts regarding their appearance at certain seasons, but this cannot be learned from the list, and must be gained from various contributions on the subject written at many times and distributed through many books—a comparatively easy task as regards *Papilio ajax*, though less easy were the researches of some species in question conducted by an obscure author and published in some rare book in a foreign language.

Under the present system *Papilio Walshii*, *Pieris pallida* and *Grapta umbrosa* are designated dimorphic varieties, although no two of them bear the same or similar relations to the species to which they belong.

It is hardly to be expected that we can arrive at an exact and universally acceptable definition of a species, or that the time will soon come when extremists for the sake of advertisement or other reasons will not persist in declaring accepted species as mere varieties or *vice versa*, or that such persons will cease to set dictum above experiment; but it does not seem impossible to adopt some system that shall indicate to a certain extent the relations of many forms, and at the same time elastic enough to be acceptable to all.

For the purposes of this article, however, I consider it necessary to submit a brief description of what I hold to constitute a species, in the hope that it will substantially agree with the conceptions of others in the main.

We may define a species as an aggregation of individual forms of life

having the same general characteristics, but exhibiting definite, transmittable structural differences from all other forms of life—a definition which does not touch the construction of genera.

From each species are given off from time to time individuals in greater or less numbers differing from the parent form and from any other species; these forms sometimes exhibit transmittable differences, sometimes not transmittable, but in nearly every case are connected by almost imperceptible gradations or known circumstances of origin with the form from which they sprung, the extremes of variation being sometimes so great that in the absence of knowledge of intergrades or attendant circumstances, they would readily be declared distinct species.

In the case of those species where the departures from the normal form appear at all seasons and in all broods without restriction to locality and with satisfactory intergrades, it seems to me that a good end would be served by ceasing to consider them "varieties," but merely terming them "variations" and designating the extremes of variation by letter, as Variation A, or by name, if the practice be more agreeable, as in the case of *Catocala scintillans*, a name given to an extreme variation of *C. innubens*, which occurs in all broods without restriction to locality and with perfectly satisfactory intergrades, which would thus become Variation *scintillans*—a name that would at once express its relation to *C. innubens*.

Thus relieved of an embarrassing number of forms whose title to the dignity of varieties is, to say the least, dubious, we might classify actual varieties as follows:

Seasonal—Where a certain variation of form appears only or mainly in certain broods of many brooded species, disappearing in following broods only to reappear in the succeeding year at its proper season, as *Papilio Walshii*.

Climatic—Where varieties occupy considerable habitats, often to all appearance distinct species when viewed at the extremes, but having common ground where intergrades occur or either form is produced indiscriminately, as in the varieties of *S. alope*.

Dimorphic—Where well marked varieties do not thoroughly intergrade, but appear in all broods and are produced indiscriminately regardless of sex, as in *Grapta comma*.

Occasional—When aberrant forms are produced in both sexes rarely and at irregular intervals, as *Papilio Calverleyii*.

Melanic or Albinic—Male or female, or local, the names of which are sufficient definition.

This would not preclude the use of the term sub-variety as now used, but would open the way for the use of the still more expressive term of "sub-species," applicable to varieties highly differentiated, and especially when the differentiation has so far progressed as to begin in the larval state.

Would not the application of some such system to the catalogues be of much aid in study and designate approximately the relations of many forms to each other?

I offer this as a suggestion; the subject will certainly bear discussion, and some permanent good may come of it surely. If the result of the discussion is the adoption of the system herein indicated, after elaboration and revision, or of some other system that will in some way indicate the relationship of forms in their names, my end will be attained. That some reform is necessary I am convinced.

THE NORTH AMERICAN SPECIES OF MAMESTRA, OCHS.

BY A. R. GROTE.

The species of this genus have hairy eyes, unarmed tibiae and a tufted thorax. The dorsum of the abdomen is more or less tufted, but in some species the tuftings are not noticeable. Several species which seem to me to belong to *Graphiphora* (*Taeniocampa*) have been referred to this genus; among these I may mention *orobia* of Harvey, *modesta*, *incincta* and *thecata* of Morrison, and the species described by me as *rufula* and *puerilis*. I also take out the *curta* and *promulsa* of Morrison, which I believe to be species of *Anarta*. The species included under *Dianthoccia* differ from *Mamestra* by the extruded ovipositor. But they appear to arrange themselves naturally among the species of *Mamestra*, and perhaps do not really differ in a generic sense. They are here included.

purpurissata Grote, P. Ent. S. Phil. 3, 82. Can.; Eastern and Middle States.

nimbosa Guen., Noct. 2, 77; Speyer, Ent. Can.; Zeit. 142. Eastern and Middle States.

discalis Grote, Bull. U. S. Geol. Surv., 3, 797. Colorado.

imbrifera *Guen.*, Noct. 2, 76. Can.; Eastern and Middle States.

latex *Guen.*, Noct. 2, 78. Can.; Eastern and Middle States.

† condita *Guen.*, Noct. 2, 78, pl. 8, fig. 5. "New York."

N. B.—This species is not known to me. In some collections I have found *Dianth. lustralis* determined as "condita." But from his figure and description, which latter I here translate, Guenee's species must be quite different.

"♀ 35 m. m. The smallest of the genus (i. e. *Aplecta*). Wings slightly elongate, the primaries nearly entire, rather wide, of a grayish white much powdered with blackish, which makes them griseous; except the edges of the lines and the two ordinary spots which remain white and empty. These latter are very regular; the orbicular longitudinally ovate. The three first lines very distinct, dentate, black; the t. p. line sending a sharper tooth in the sinus of the reniform. The subterminal very nebulous, pale, margined anteriorly by a vague shade of pale ferruginous; the upper edge of the claviform alone visible. The two median spots separated by a dark shade surrounded by black. A basal black ray crosses the half-line. Secondaries dirty yellowish white, with traces of a discal spot, of a much twisted median line and of a sub-anal blackish spot. Terminal marks thick, contiguous and better marked. Beneath with the spot and line well indicated, blackish, thick, the line continuous on the primaries. Abdomen short, with small crests. Palpi ascending, slighter than in the other species (i. e. of *Aplecta*)."

This description and the figure of Guenee differ throughout from *lustralis*. In my List I originally transferred Guenee's *Aplectas* to this genus.

adjuncta *Boisd.*; *Guen.* Ind. 243; Noct. 1, 199. Can.; Eastern and Middle States.

lubens *Grote*, Tr. Am. Ent. Soc., 113, 1875; *rufula* *Morr.*, P. A. N. S. P. 62, 1875; *lubens* *Morr.*, P. B. S. N. H. 119, 1875. Can.; Eastern and Middle States.

Beanii *Grote*, Can. Ent. 9, 87; N. Am. Ent. 1, 12. Texas; Illinois.

legitima *Grote*, Proc. Ent. Soc. Phil. 3, 82. Can.; Middle, Western and Eastern States.

liquida *Grote*, Papilio, 1. Washington Territory.

lilacina *Harvey*, Eull. B. S. N. S. 2, 119. Middle States.

illabefacta *Morr.*, P. B. S. N. H. 141, 1874. Eastern and Middle States.

N. B.—This is in my opinion a more obscurely colored grayish-brown form of the preceding.

noverca *Grote*, Can. Ent., 10, 236. Nebraska; Cal.; Col.

Goodellii *Grote*, Can. Ent., 7, 223. Eastern and Middle States.

assimilis *Morr.*, Bull. B. S. N. S. 2, 119. Eastern and Middle States.

rosea *Harvey*, Bull. B. S. N. S. 2, 119. Can.; Eastern and Middle States.

congermana *Morr.*, Can. Ent. 6, 106. Eastern and Middle States.

vindemialis *Guen.*, Noct. 1, 344; *Grote* Proc. Ac. N. S. 418, 1875; *Ceramica rubefacta* *Morr.* Can.; Eastern and Middle States.

† w-album *Guen.*, Noct. 1, 345. "Florida."

picta *Harris*, Ins. Inj. Veg., 329; *Ceramica exusta* *Guen.*, Noct. 1, 344. Can.; Eastern and Middle States.

N. B.—I am indebted to Prof. Fernald for a bred specimen of *picta*; there is a slight divided thoracic crest and I do not see the necessity for disturbing the original generic reference of Harris. The following seven species have the typical markings of the genus.

Farnhamii *Grote*, Bull. B. S. N. S. 1, 138, pl. 3, fig. 2. Colorado.

grandis *Boisd.*, Gen. 950; Led. Noct. 90; *Guen.* Noct. 2, 105, pl. 8, fig. 10. "Greenland;" Can. to Middle States.

nevadae *Grote*, Bull. B. S. N. S. 3, 84. Nevada.

subjuncta *G. & R.*, Tr. Am. Ent. S. 2, 198, pl. 3, fig. 71; *Grote* B. B. S. N. S. 2, 12. Can.; Eastern and Middle States.

atlantica *Grote*, B. B. S. N. S. 2, 12; *Grote* Check List 6; var. *discolor* *Speyer*, S. E. Z. 142.

N. B.—This may be = the European *dissimilis*.

Dimmockii *Grote*, Proc. A. N. S. Phil., 420, 1875. Eastern and Middle States.

distincta *Hubn.* Samml.; *G. & R.* Tr. Am. Ent. Soc. 2, 197, pl. 3, fig. 72; *Grote*, B. B. S. N. S. 2, 156 (*Mamestra*); *Dicopis vitis* *French*, Can. Ent. 11, 76. Middle and Western States to Tex.

mucens *Hubn.* Zutr. 515-16; *Grote* Can. Ent. 11, 206. Same localities as preceding.

confusa *Hubn.*, Zutr. 495-6; *Grote* Bull. B. S. N. S. 2, 12. Same localities as preceding.

trifolii *Rott.* Nat. 9 & 131; *albifusa* *Walk.* B. M. Cat.; *chenopodii* *S. V.*; *Speyer* S. E. z. 138. New York to Oregon.

N. B.—The Oregon specimens are more concolorous, without the prominent W-mark of the s. t. line relieved by darker preceding dashes.

Speyer, who calls the N. Am. spec. from N. Y. var. *major*, says that *trifolii* is found on the old continents from Spain to Peking.

chartaria Grote, Bull. B. S. N. S. 1, 138, pl. 4, fig. 12. California.

defessa " Can. Ent. 12, 88. California.

pensilis " P. A. N. S. P. 199, 1874. Vancouver; Sauzalito, Cal.

vicina " Bull. B. S. N. S. 2, 119; *teligera* Morr. New York to Texas.

N. B.—To this form *pensilis* is nearly allied; the extension of the ovipositor does not seem to be a constant feature. I have a specimen from California, "Shasta," which seems to be the same as the Eastern *vicina*. Again I have an Illinois specimen which indicates a closely allied but probably distinct species from the East.

anguina Grote, n. s.

♂. Allied to *vicina*, but with the t. p. line drawn in below the reniform, narrowing the median space below the vein. No red or brown tints. Median space shaded with blackish. The general color is gray; the stigmata pale, much as in *vicina*, except the claviform, which is much larger and wider, while it also extends across to t. p. line. A distinct black dash at internal angle to s. t. line at its sinus on submedian fold. Hind wings white with soiled borders. No dark dashes before the subterminal line which are in both *pensilis* and *vicina*. *Expanse* 28 mil. Illinois, Dr. Nason, May 31.

acutipennis Grote, Can. Ent. 12, 214. Nevada; Arizona.

N. B.—Also closely allied to *vicina*. The fore wings appear more elongate and sharper.

capsularis Guen., Noct. 2, 22, pl. 8, fig. 3; *Paphia propulsa* Walk. 529. Middle States.

detracta Walk. C. B. M. 732; *claviplena* Grote, B. B. S. N. S. 1, 194. Can.; Eastern and Middle States.

cuneata Grote, B. B. S. N. S. 1, 139, pl. 4, fig. 9. California; Wash. Territory.

brachiolum Harvey, Can. Ent. 8, 6. Texas.

marinitincta " Bull. B. S. N. S. 2, 273. Texas.

laudabilis Guen., Noct. 2, 30, pl. 8, fig. 4. *Var. illaudabilis* Grote, Can. Ent. 7, 127. Alabama, Tex. to California.

N. B.—The typical *laudabilis* has the median space shaded with reddish. The var. *illaudabilis* from Cal. and Texas has it filled with black, and the base of the wing and thorax often shaded with black. Another

interesting Californian specimen has the fore wings concolorous dusky greenish, but I do not think is a different species, though this is possible. Guenee refers the species to *Hecatera*, but I have classified it as a *Mamestra*; it is allied to the species with which I here associate it.

- 4-lineata *Grote*, Bull. B. S. N. S. 1, 140, pl. 4, fig. 15. California.
 olivacea *Morr.*, Proc. B. S. N. H. 143, 1874. Can. to Vancouver.
 alboguttata *Grote*, Bull. B. S. N. S. 3, 85. Oregon.
 comis " " " Vancouver.
 sutrina " *Papilio* 1, 5. Colorado.
 lustralis " Can. Ent. 7, 223. Middle and Western States.
 meditata " Bull. B. S. N. S. 1, 104. Eastern and Middle States.
 innexa " " 2, 123. Texas.

N. B.—Mr. Morrison has referred this species to *Mamestra*, in correction of my original determination.

- renigera *Steph.* 2, 16; *Grote*, Can. Ent. 6, 132 (*Mamestra*); *herbimacula*
 Guen. Noct. 1, 133. Can.; Eastern and Middle States.
 cinnabarina *Grote*, P. B. S. N. H. 241, 1874. *Var. ferrea Grote.*

N. B.—This species is allied to the European *M. strigilis* and *fasciuncula*. The var. *ferrea* occurs in Vancouver Island (Can. Ent. 7, 25) and Washington Territory (Morrison leg.) The fore wings are different shades of yellowish ferruginous, while they are more brownish in the typical form from California.

- lorea *Guen.*, Noct. 1, 126. Can.; Eastern and Middle States.
 niveiguttata *Grote*, B. B. S. N. S. 1, 194, pl. 4, fig. 16. California.
 leucogramma " " 1, 140. California.
 palilis *Harvey*, " 2, 273. Texas.
 † repentina *Morr* P. B. S. N. H. 118, 1875. "New Jersey."
 † ectypa " " " "West Virginia."
 insolens *Grote*, Bull. B. S. N. S. 2, 65. California.
 arietis " Bull. U. S. Geol. Surv. 5, 207. California.

N. B.—This may be the ♂ of *insolens*; it is very different in appearance from the more distinct markings.

- ? quadrannulata *Morr.*, P. A. N. S. P. 430, 1875. Nebraska.
 ? rugosa " Proc. B. S. N. H. 119, 1875. Maine.
 † Rogenhoferi *Moeschl.*, S. E. Z. 269, 1870. "Labrador."
 † subdita " W. E. M. 363, 1860, T. 9, fig. 7. "Labrador."
 † phoca " " 197, 1864, T. 5, fig. 15. "Labrador."

NEW NOCTUIDÆ, WITH LIST OF THE SPECIES OF PERIGRAPHA.

BY A. R. GROTE.

Agrotis nanalis, n. s.

♀. The smallest species known to me. All the tibiæ spinose; eyes naked; body untufted. A slender species which may be compared with *opaca*. The fore wings are blackish with the lines lost. The stigmata are concolorous, difficult to make out. The orbicular is elongate, the reniform vague, upright, broad; the spots are picked out by a brown shading which fills the cell and marks the subcostal and median veins. S. t. line a vague blackish even shade. Hind wings concolorous fuscous griseous, with the veins soiled and a faint discal mark. Beneath griseous, the primaries a little brownish. The costal preapical dots visible beneath and to be made out on the upper surface. Abdomen like hind wings. Head brownish; tegulæ blackish, disc of thorax paler. *Expanse* 26 mil. Nevada.

Agrotis esurialis, n. s.

This species has all the tibiæ spinose. In color it is like *perconflua*, being of a pale ruddy brown over ochrey. The stigmata are concolorous, and as in *Normaniana*, set in a black spot. The orbicular nearly touches the reniform inferiorly, leaving a blackish brown v-shaped space between the stigmata. The orbicular is open to costa, oblique, widening above, preceded by a narrow black shade on the cell. Reniform widening inferiorly, constricted, upright. Lines dark; t. a. line single, marked on costa above the orbicular, sinuate, incomplete. T. p. line indicated by venular dots, as also the s. t. line, which is followed by a faint narrow pale shade and is inaugurated on costa by a curved mark. The species seems to belong to the series of *rubifera*, *perconflua*, *Hilliana*, *conchis*, *Normaniana*. Hind wings pale fuscous with the fringes and outer edge colored like primaries. Head a little paler than thorax, with the palpi darker at the sides. Abdomen at the sides and beneath tinged with rosy brown. Wings beneath tinged with ruddy, especially on the margins and outside of the extra-mesial fuscous line. Discal marks indicated. *Expanse* 31 mil. Washington Territory, coll. by H. K. Morrison.

Agrotis colata, n. s.

♀. Like *Versipellis*, but a little larger and without the white lines on

the veins. Entirely dark purply brown; thorax and head reddish brown. Stigmata a little hoary; orbicular large, open; reniform wide; claviform indicated. Lines very faint; an indistinct paler shade following the t. p. line; the terminal space also indistinctly paler. Hind wings concolorous, dark fuscous. Mount Hood; one fresh female specimen. Cannot be confounded with any other species from the color and its affinity with *versipellis*.

Agrotis semiclarata, n. s.

♂ ♀. Allied to *gravis* and *Vancouverensis*, smaller than the latter and without the pale cast of *gravis*. A thick dark brown basal dash extending into the claviform, and faintly cut by the t. a. line. Rich brown with the costal region (especially in the ♂) suffused with darker. Spots concolorous; cell shaded with black. S. t. line pale, without the small teeth at the middle and below apices of its allies. Head and collar rich yellow brown; tegulae shaded with pale, but not so pale as in *gravis*. Beneath the costal half of secondaries is fuscous, leaving the lower portion of the wing including the border pale; a spot and common line. Above the hind wings are fuscous and rather dark in both sexes. This species may be known by the hind wings beneath being half pale, including the lower portion of the border, which is usually darker. The three species, *gravis*, *vancouverensis* and *semiclarata*, are nearly allied; their Eastern allies seem to be *volubilis*, *venerabilis* and *stigmosa*.

Xylomiges perlubens, n. s.

♂. Allied to *rubrica*. Fore wings variegated with reddish and gray. Lines double, brownish, marked on costa by blackish dots. Orbicular pale, with brown centre and blackish annulus, upright; reniform with an inferior stain, a curved reddish inner streak, indistinct outwardly. Veins blackish. T. p. line followed by white venular points. S. t. line preceded by a deep reddish shade marked opposite the cell and again below vein 3. Terminal space blackish with a gray apical patch. External margin dentate; fringes cut with pale. Hind wings and fringes pure white; a broken terminal line; beneath with a dotted extra-mesial line and discal spot. Primaries beneath with the terminal space whitish; subterminal space stained with brownish; a discal mark very near the dotted extra-mesial line which hardly reaches the margin. Eyes hairy; tibiae unarmed; antennae brush-like; abdomen tufted at base. Wings elongate. Thorax and head reddish brown; collar edged with gray; abdomen pale reddish

fuscous. *Expanse* 39 mil. Washington Territory, collected by H. K. Morrison.

Perigrapha Led.

The North American species which I refer to this genus differ from *Graphiphora* (*Taeniocampa*) by the thorax having a sharp ridge of scales. The stigmata are usually large and confluent. The eyes are hairy; tibiae unarmed. The genus *Stretchia* of Mr. Hy. Edwards is based on a species of *Perigrapha*. I had made one Californian species the type of the genus *Acerra*; but I believe this now well-known species (*normalis*) is not generically distinct from the European species.

normalis Grote, Bull. B. S. N. S. 2, 162; Check List fig. 4. California.

muricina " " 3, 85. Oregon.

Behrensiana " Can. Ent. 7, 71. California.

plusiiformis Hy. Edw., Pac. Coast Lep. 4, 3. Nevada.

erythrolita Grote, Can. Ent. 11, 208. California.

Bomolocha fecialis, n. s.

♀. Similar to *bijugalis*; the basal half of the primaries is of an even rich but comparatively pale brown, not blackish brown as in its ally. It encloses a discal dot and is limited inferiorly by a white flexed oblique line which does not attain the margin. The brown portion of the wing is limited by the white upright and undulate t. p. line, which is not so sharply produced at median vein as in its ally. Subterminal line very faint and the usual apical streak quite undecided. Outside of the t. p. line the wing is paler, but not so white as in its ally. The expanse is the same. New York. This may be a variety of *bijugalis*, but it looks quite different. It cannot be a sexual form as I compare it with ♀ *bijugalis*.

Bomolocha? incusalis, n. s.

♀. A slender bodied form with the wings a little narrower than in our Eastern species; the palpi a little shorter; the abdomen smooth. The entire insect is faded dusty ochrey with the median space of primaries dark brown and contrasting. It is bounded by the two median lines, the first even, upright, nearly straight, a little oblique. The outer line curves inwardly below median vein, forming an arcuation to internal margin; it is followed by a faint line, sometimes not noticeable. S. t. line darker than the wing, irregular, vague. Hind wings with faint traces of lines. The comparatively narrow dark median space of primaries above shows a

discal mark. *Expanse* 23 mil. Colorado Rio (Prof. Glover); Arizona (Mr. Hy. Edwards). The shorter labial palpi and the wings narrower at base may distinguish this species generically. I regret not to know the male, which would decide the genus.

Deilinia glomeraria Grote.

In a letter, with regard to the species of *Deilinia* described in the March number of *Papilio*, Mr. G. R. Pilate says: "I have the male of *glomeraria* and it is not different from the female, the antennae are not pectinated. I find I have no males of *septemfluaria*. They are both common insects early in the spring, before the leaves are out, but are difficult to catch, as they are disturbed by the slightest noise and fly with the wind, which generally blows pretty hard at that time of the year. I have seen them go up out of sight." Dr. Packard, to whom I submitted these species, stated that he thought he had seen specimens of *glomeraria* from a different locality, but neither species is apparently included in his work on the family.

ON SOME NEW SPECIES OF CHALCIDIDÆ FROM FLORIDA.

BY WM. H. ASHMEAD, JACKSONVILLE, FLORIDA.

Group Eurytomides.

EURYTOMA VAGABUNDA, n. sp. — ♀. Length .10 inch. Deep black. Head and thorax coarsely punctate; antennæ 8-jointed, black and pubescent; eyes black; thorax black, very coarsely punctate, collare transverse quadrate, parapsidal grooves indistinct, scutellum hardly separated from the praescutellum, convex, narrowing but rounded posteriorly; metathorax coarsely punctate; abdomen black, smooth, and highly polished, peduncle short, a series of very fine punctures along the basal margin of 2nd, 3rd and 4th segments, only perceptible with a high power, tip pubescent; wings hyaline, iridescent; veins slightly yellowish, no stigmal spot; legs reddish yellow, tibiæ slightly paler, feet pale.

Captured on Spanish Bayonet (*Yucca* sp.)

DECATOMA FLAVA, n. sp. — ♂ and ♀. Length .12 to .15 inch. Head, thorax, abdomen, antennæ and legs a bright greenish yellow; head and thorax rather coarsely punctured; ocelli brown, eyes light brown with

darker spots; 2nd antennal joint slightly reddish; tips of mandibles brown, palpi whitish; wings hyaline, iridescent, ligaments of wings brown, stigma brown black, a large dark blotch extending from stigma across to near the hind margin, and in some specimens a slight indication of another blotch between this and base of the wing; abdomen smooth and shining, very slightly infuscated on dorsum; a brown spot at base of posterior coxæ; outer surface of posterior femora dark brown excepting at base and tip, inner surface more of a reddish brown.

Described from 8 specimens, 2 ♀ and 6 ♂, bred from an oak gall (*Cynips q. ficus* Fitch?)

DECATOMA QUERCI, n. sp.—♂. Length .12 inch. Head green, slightly yellowish and coarsely punctate, vertex enclosing ocelli brownish black, mandibles tridentate, tipped with black, gula black; eyes greenish brown with darker spots; antennæ 7-jointed, pubescent, greenish yellow, 3rd joint dark; thorax coarsely punctate and slightly hairy; collare transverse quadrate, but broader than mesonotum, greenish yellow, with a slight darker transverse band of brown in centre; mesonotum, scutellum and metathorax dark reddish brown; parapsidal grooves indistinct; scutellum longer than broad and posteriorly rounded; abdomen smooth, shining black or brownish black, more or less of a reddish brown anteriorly, peduncle two-thirds as long as abdomen, black; wings hyaline, veins hyaline, stigma black, with a brownish black blotch extending from it to more than half way across the wing; legs, anterior pair greenish yellow, middle tibiæ infuscated, posterior tibiæ brownish black, tarsi black.

Raised from a dipterous gall on *Quercus Catesbæi*.

DECATOMA LANÆ, n. sp.—♀. Length .08 to .10 inch. Honey yellow. Head finely punctate, thorax coarsely punctate; a small black spot on vertex hardly enclosing ocelli, the latter yellowish; tip of mandibles black; antennæ 8-jointed, honey yellow and gradually increasing in size to tip; collare narrow; scutellum somewhat oval, narrowed anteriorly and with the disk brown; abdomen yellowish red, dorsum infuscated, peduncle short, posteriorly brown or black; wings hyaline, stigma black and the blotch smoky and hardly extending half way across the wing; legs yellowish, posterior tibiæ only black or brownish black.

♂. Differs very little from above excepting in size, a longer peduncle and in antennæ being but 7-jointed.

Described from numerous specimens raised from a woolly gall (*Cynips q. Turnerii* Ashmead) on *Quercus aquatica*.

DECATOM, PHELLOS, n. sp.—♂. Length .10 inch. Head brown black, finely punctate; eyes greenish brown; antennæ 7-jointed, scape and joints 3 and 4 dark, balance rufous, thorax dark brown, coarsely punctate; collare broader than mesonotum, beneath reddish brown, parapsidal grooves almost obliterated; scutellum convex, coarsely punctate; abdomen smooth, black and shining, peduncle brownish, hardly the length of abdomen; wings hyaline, veins slightly yellowish; stigma black, smoky blotch beneath extending more than two-thirds across the wing; legs honey yellow, coxæ dark, middle femora and tibiæ slightly darker, posterior femora and tibiæ brown black.

Raised from gall on *Quercus phellos*.

DECATOMA FOLIATÆ.—♀. Length .10 inch. Head black, coarsely punctate; eyes brown; antennæ 9-jointed, brownish, sparsely pubescent; scape yellowish, last three joints somewhat connate; thorax coarsely punctate, collare attenuated and a beautiful orange yellow; some specimens have only the corners so colored; abdomen brownish black, smooth and shining; wings hyaline, veins almost hyaline, slightly yellowish, a large black circular stigma with tip of stigmal vein protruding, iridescence strongly defined on hinder wings, the whole outer margin sometimes being a beautiful violaceous; legs a beautiful bright orange yellow, with tarsi and feet slightly paler and posterior coxæ black.

♂. Length .08 inch; 2nd joint antennæ larger, scape black, corners of collare orange yellow, peduncle two-thirds as long as abdomen, coxæ black, stigma spot somewhat triangular; palpi and labrum yellowish white; otherwise same as ♀.

Described from numerous specimens raised from leafy live oak gall, *Cynips q. foliata* Ashmead.

DECATOMA BATATOIDES, n. sp.—Length .15 of an inch. This species in punctuation and shape very much resembles *D. foliatæ*, but may be easily distinguished by the following differences: In size; eyes, face and antennæ brown, mouth parts and palpi yellowish, coxæ and legs a uniform lemon yellow, collare and mesothorax lemon yellow, sternum black, sutures of parapsides yellowish, posterior margin of scutellum yellowish and stigma a mere dot.

Described from several specimens bred from the live oak potato gall, *Cynips q. batatoïdes* Ashmead.