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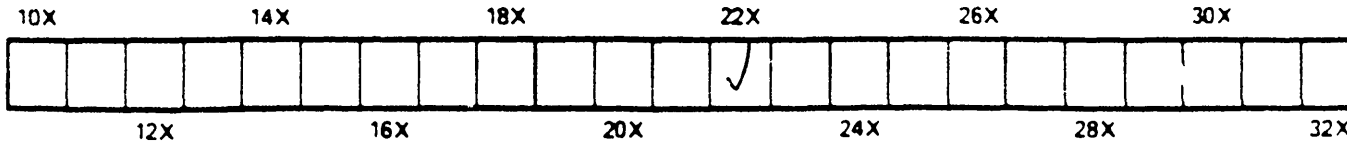

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Fig. 1, Deva (?) ornata ; 2, Basilodes Howaidi ; 3, B. territans, male ; 4, B. territans, female ; 5, Kallitrichia albavena ; 6, K. pendula ; 7, K. sagittalba.

[NOTE.—The colouring is merely approximate ; all, except No. 2, having practically white secondaries, with dusky shadows.]

The Canadian Entomologist.

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METALLIC SPECIES OF BASILODES AND NEW SPECIES OF ALLIED GENERA.

BY R. OTTOLENGUI, NEW YORK.

Among the Basilodes there are three closely allied species of very similar pattern, the fore wings being mainly solid metallic golden. These are territans, Hy. Edw., Howardi, Hy. Edw., and Arizonæ, French; Howardi and Arizonæ having been described as Plusias. The most casual examination of the front of Howardi separates it structurally from Plusia and places it with Basilodes. Arizonæ I have not seen, the only specimen known to me being the "type" in the collection of Prof. French. I, however, sent a male and female of territans to Prof. French for comparison with his "type," thinking that Edwards might have redescribed French's species. From Prof. French's reply, together with a photograph of the type which he kindly had made for me, I have little doubt that his species is a Basilodes, unless, indeed, it may belong to an allied, undescribed genus of which I have to write.

The following notes may aid in identifying these three species :

Basilodes territans, Hy. Edw.—Edwards described this by comparison with Howardi, but fails to note two differences, probably because his single type of Howardi is in indifferent condition. He speaks of two spots along the costa. This is clearly discernible in the female (see plate, fig. 4), but the male is slightly different. The ground colour persists along the median vein as far as the cell, thus dividing the metallic area and isolating a long narrow metallic spot between the costa and the vein (see plate, fig. 3.) Moreover, in territans the metallic colouring reaches quite to the fringes all along the outer margin, whilst in Howardi at the centre of the outer margin the ground colour shows as a semi-lunar blotch. This is more distinct in the female (Howardi) than in the male. In territans the secondaries of the male are clear white, while in the female a dusky shade shows along the costa and outer margin. Male expands 33 mm.; the female 35 mm. My specimens agree with the types in the Neumöegen collection.

Basilodes Howardi.—I have not seen the description, but it was made from a single specimen. It is worth recording, therefore, that both sexes are alike except in size. The male expands 35 mm., and the female 37 mm. These measurements might lead one to imagine that Howardi is but little larger than territans, which would be a gross error, Howardi being a much more robust insect, with wings much broader in proportion to their length than in territans. Both sexes have uniformly brownish secondaries. My specimens agree with the type in the Edwards collection. (Plate, fig. 2.)

Basilodes Arizonæ, French.—Of this Prof. French writes to me: "Your two specimens (territans) have the same general colour as Arizonæ, but the markings are different. Arizonæ has the posterior margin of the fore wings longer in proportion. The type of Arizonæ has a patch at posterior angle (purplish-brown), and one on the middle of the posterior margin." The original description says "hind wings whitish," but as it refers to a single male specimen, I should expect the female to show dusky margins as in territans.

SYNOPSIS.

Metallic golden fore wings, costa and markings purplish brown.

1. Two spots along costa, metallic area reaching from the base fully to the fringes at outer margin, anal angle very rounded, secondaries white with dusky border, female; or, same with median vein showing brownish and secondaries pure white, male.....*territans.*
2. As above, additional spots at anal angle and centre of posterior margin, anal angle less rounded.....*Arizonæ.*
3. Metallic area cut near the base, large triangular brownish blotch along the costa, another at the base along the posterior margin, and a smaller blotch at centre of outer margin; secondaries brownish, anal angle not rounded.....*Howardi.*

Deva ornata, nov. spec.—(See plate, fig. 1.) Head, antennæ, palpi and thorax dull yellowish-brown. Primaries brilliant metallic golden. Pattern exactly as in *Basilodes Howardi*, except that the metallic area reaches the fringes all along the outer margin. The costa is pale yellowish-brown, except at the apex, where the metallic colouring persists. An irregular triangular blotch depends from the costa, in the centre of which the reniform is plainly visible, outlined by a darker brown line, a line of similar colour crossing the blotch obliquely between the reniform

and the apex. The reniform within the brown outline is of a deeper shade than the surrounding field, and by close examination seems to show a few metallic scales. The metallic colouring is cut near the base by the t. a. line which connects the costa with a triangular blotch at the inner margin near the base as in *Basilodes Howardi*. In the proper light the t. p. line appears as a series of faint dots, invisible when the light is reflected by the metallic scales. Fringes full, alternating two shades of light brown, and divided by a fine line which parallels the outer margin, making the fringes seem double. Secondaries clear white (satiny), a hair line of brown at the extreme outer margin. Described from one specimen labeled "Hot Springs, N. Mexico, 7,000 ft. Alt." Type, male, No. 25975, National Museum, Washington. Expands 31 mm.

I must at once declare that this species is not a Deva at all, but is probably an undescribed genus, near Basilodes. I cannot risk a description of a genus, however, on account of the condition of the under side of the insect, which is badly smeared with glue. The structure of the front, however, with its long palpi, removes it from Basilodes, although I found it in the Museum collection labeled *Basilodes Howardi*, which it so closely resembles. It may rest tentatively with Deva until found again.

Kallitrichia, gen. nov. (κάλλος, τρίχες, having beautiful hair).—Antennæ simple, slightly serrate, laterally compressed. Clypeus slightly roughened, no tubercle, rounded. Palpi oblique, short, very slightly exceeding the front; first and second joints subequal, third joint half the length of the second; smoothly haired. Eyes naked. Tongue moderate. Thorax smooth. Vestiture short, hairs with a few scales intermingled. Legs: tibiæ without spines, anterior tibiæ with claw at tip. Abdomen smooth. Primaries, costa straight, wing triangular. Secondaries full and rounded.

Kallitrichia albavena, spec. nov.—Antennæ brown (white at base and perhaps throughout in fresh specimens). Head, thorax and body white. Primaries metallic green (pale pea green). Costa shows as a rigidly straight heavy white line, uniting at the apex with the white fringes, which in turn join a fine white line which borders the inner margin. Median vein white along the outer half (and perhaps throughout in some specimens, there being a faint indication of such a tendency in the specimen before me). Secondaries pure white (satiny). Described from one female which expands 30 mm. Habitat, Arizona. Type in collection of the author. (Plate, fig. 5.)

Kallitrichia pendula, spec. nov.—Similar to the last, except that all the white markings here are dusky, only a few scattering pure white scales appearing. The costal mark is not so rigid along the inner edge. The white median vein of *albavena* disappears, and in the region of the reniform we have a pendulum-shaped spot hanging from the costa. secondaries dusky. (Plate, fig. 6.)

Described from one specimen, male, which expands 30 mm. Habitat, Arizona. Type in collection of the author.

It should be noted that in this species the costa is not so rigidly straight as in the last, being slightly bent near the base. When other specimens of this are found, I should not be surprised to find in some specimens that the median vein would show brownish, separating the metallic area, as was noted in the male of *Basilodes territans*.

Kallitrichia sagittalba, spec., nov.—(Plate, fig. 7.) Antennæ brownish. Head, thorax and body white. (I have called the bodies of these three species white, because what scales seem fresh are white, but as the bodies are in poor condition and somewhat greased, when fresh they may be brownish.) Primaries: solid metallic pea green. A wide white band occupies the costa, continuing as a narrow white band all along the outer margin and around the angle, where it is gradually lost. The outer terminals of three veins reach the outer margin as faint white lines. The upper of these extends from the costal band, and thus encloses a bit of the metallic colouring near the apex. The other two are the points of a prominent white sagittate mark which occupies the centre of the wing. Fringes full and white. Secondaries dusky, more so in the female. Male expands 25 mm.; female, 28 mm. Habitat, Arizona. Types, male and female, in collection of the author.

OBITUARY.

On the 18th of February, MR. JOHNSON PETTIT died at Buffalo, N. Y., and was buried a few days later at Grimsby, Ont. For many years Mr. Pettit was a most diligent and successful collector of Coleoptera in the neighbourhood of Grimsby, and was well known amongst Entomologists both in this country and the United States. After forming a very complete collection of the beetles of Ontario, so far as known at that time, he gave up the pursuit and turned his attention to Geology. Subsequently he sold his cabinet of insects to the Entomological Society of Ontario, at a nominal price, in order that it might be kept in a place of safety and preserved from destruction. His work was characterized by remarkable neatness and painstaking accuracy.

A NEW ORCHARD PEST—THE FRINGED-WING APPLE-BUD MOTH (NOTHRIS? MALIGEMMELLA, n. sp.).

BY J. M. STEDMAN, PROFESSOR OF ENTOMOLOGY, UNIVERSITY OF MISSOURI.

GENERAL REMARKS.

While experimenting two years ago with the Leaf Crumpler and the Leaf Folder, a gentleman asked me to visit his apple orchard, some two miles distant, and to observe the destructive work of what he supposed was the Leaf Folder. The orchard had been in bearing for several years and covered sixty acres. The apple trees had at that time just shed their blooms (petals) and the adjacent orchards appeared green, while the infested one was very conspicuous, appearing as if a fire had swept through it.

On entering the orchard it was seen at a glance the injury was not caused by the Leaf Folder, but by a bud moth, which I at once concluded must be the Eastern Bud Moth (*Tmetocera ocellana*). However, as soon as I saw the larvæ that were doing the work, I observed that we had to deal with an entirely different species of insect, one which I had not observed or read of, and yet one that was doing a vast amount of damage, for the entire orchard was not only losing its prospective heavy crop of fruit, but also a large per cent. of the developing leaves and shoots, and as a consequence, the prospects for next year's fruit buds.

THE DISTRIBUTION OF THIS INSECT.

From inquiry, it seems this pest first made its appearance in one corner of the apple orchard two years previously, and since that time had multiplied to such an extent as to not only cover this orchard, but had spread into the edge of two adjacent apple orchards, but not into an adjacent pear orchard. The moth had its own way in this orchard, however, since the party owning it did not up to that time believe in spraying, and this enabled nature to take her course; while in most commercial orchards the pest might not have multiplied so rapidly owing to the sprayings applied for other insects.

Thus far we have seen this moth only in the apple orchards in Jackson County, although several fruit-growers have lately reported its presence in their apple orchards in other western counties of this State, but they have not as yet sent specimens for identification.*

*Since the above was written I have been reliably informed that this insect has been doing considerable damage in Kansas for the past three years.

Although we have not been able to determine, as yet, either the original locality from which this moth came, or the original food plant, it is not improbable that this insect has but lately taken to the apple, and that it existed and may now exist as an obscure insect feeding on some wild and uncultivated plant.

THE APPEARANCE AND DESCRIPTION OF THIS PEST.

The egg is very small, being only 0.6 mm.* in length, and 0.35 mm. in breadth, and is, therefore, apt to escape notice. It is of a uniform light yellow colour, oval in shape, with the surface thrown into small shallow depressions and elevations, which become larger and deeper at one end, in the centre of which there is a protuberance or very short peduncle. One of these eggs is shown in figure 8, greatly enlarged.

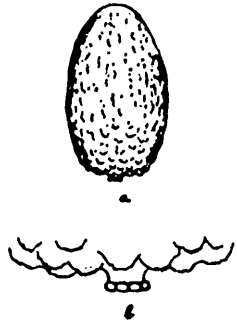

Fig. 8.—Egg of Fringed-Wing Apple-Bud Moth, Nothris? maligemmella—greatly enlarged; a, entire egg—X 30 Diam.; b, one end of same still more enlarged. (Original.)

The larva is also very small when first hatched, being less than 1 mm. in length. It is at first of a light yellow colour, with the head shining black, and the shield on the dorsal part of the first thoracic segment of a seal brown colour; the body is sparsely clothed with short light-coloured hairs arising from slight elevations, some of which have a darker coloured centre; the three pairs of true legs are brown, while the five pairs of pro-legs are of the same colour as the body, and are borne by the sixth, seventh, eighth, ninth, and last segments. As the larvæ become a little larger, the above characters remain the same except that the shield on the dorsal part of the first thoracic segment soon becomes shining black like the head, and the general colour of the body becomes more of a light greenish-yellow colour, due largely to the transparency of the body allowing the intestine, which is filled with green food, to show through somewhat. These characters

Fig. 9.—Larva of Fringed-Wing Apple-Bud Moth, Nothris? maligemmella—greatly enlarged—X 12 Diam. (Original.)

*There are about 25 mm. to an inch.

are now retained until the larva is nearly full-grown, when the colour of the true legs and of the head and shield become lighter and finally of the same colour as the general body. The full-grown larva is about 8 mm. in length. Figure 9 represents a larva 6 mm. in length, greatly enlarged, and will give one a good idea of the appearance of the larvæ of this moth throughout the greater portion of their existence. They are very conspicuous with their light greenish-yellow bodies and glossy black heads and shields.

The pupa, which stage is passed within a thin, white, silken cocoon, is 5.5 mm. in length and 2 mm. in width; of a uniform brown colour, and with a row of small, almost round depressions along each side of the sutures between the last five abdominal segments, and with indications of depressions in the form of markings along the sides of the other abdominal sutures. Figure 10 represents a lateral view of one of these pupæ greatly enlarged.

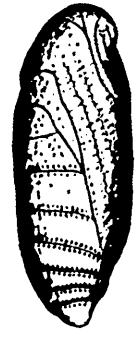

Fig. 10.—Pupa of Fringed-Wing Apple-Bud Moth, Nothris? maligemmella—much enlarged—X 7 Diam. (Original.)

The adult is represented natural size in the photograph in figure 11, while figure 12 represents a photograph of this same moth enlarged. Since this moth belongs to the group Tineina of the small moths known as Micro-Lepidoptera, and since I had failed to find a description of this species in the literature at our command, a specimen was forwarded for determination to Dr. L. O. Howard, of the Entomological Division of the United States Department of Agriculture, Washington, D. C. Dr. Howard reported that the species could not be found in the National Museum collection. Therefore, since only two entomologists in the United States have made a specialty of this group of insects, and since Miss Mary E. Murtfeldt, Kirkwood, Mo., has perhaps done more work in this group than the other entomologist, I sent her two adult moths and asked her to name this species, and if it proved to be a new one to describe it. She kindly consented to do so, and as it

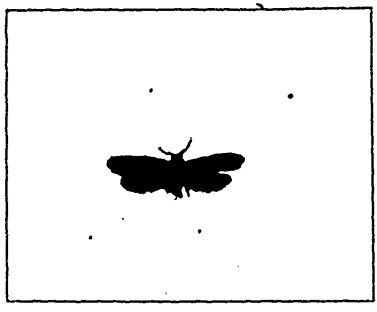

Fig. 11.—Adult Fringed-Wing Apple-Bud Moth, Nothris? maligemmella; natural size. (Original.)

proved to be a new species her description of the adult is as follows:

"Alar expanse 14 to 15 mm. General colour, satiny brownish-buff with slight opalescence, and more or less leaden shading on thorax, wings and body. Head buff, densely and somewhat shaggily scaled. Eyes prominent, purple-black. Antennæ two-thirds as long as wings; basal joint conspicuously long and stout; second joint also long with the inner side peculiarly excavated. Palpi (labial) long recurved with short almost concealed basal joint, long slightly thickened second joint and slender tapering terminal. Thorax broad; patagia rather large, all anteriorly bordered with leaden gray. Fore wings varying in colour from almost clear buff to buff so interspersed with the darker scales as to produce a 'smudged' effect; a small but distinct black discal dot and a group of five smaller, less clearly defined ones at the base of the terminal third, constitute the ornamentation. Hind wings rather broad, somewhat paler and more lustrous than the primaries. Fringes concolorous with wing surface, also varying in intensity of the dark shadings. Body, yellowish gray with bright buff anal tuft. Legs agreeing in colour with under surface, tibia especially of hinder pair, densely clothed with long but appressed hairs.

Fig. 12.—Adult Fringed-Wing Apple-Bud Moth, Nothris maligemmella; enlarged—X 3 Diam. (Original.)

"Described from two males, one perfect, the other somewhat mutilated.

"The generic location of this insect is provisional, merely. In pterygastic and palpal characters it agrees quite closely with some of the Gelechiidæ, but even from these the venation presents some differences, while the structure of the antennæ renders the erection of a new genus probable, when a more liberal supply of specimens admits of closer microscopic study of the separate organs."

DESCRIPTIONS OF NEW GENERA AND SPECIES OF THE GEOMETRINA OF NORTH AMERICA.

BY GEO. D. HULST, BROOKLYN, NEW YORK, N. Y.

PALEACRITA LONGICILIATA, n. sp.

Expands 26 mm. Palpi dark fuscous; front very broad, dark fuscous, slightly tufted; antennæ fuscous gray, subpectinate, the fascicles of hairs fine, silky, very long, some six to ten times diameter of stem; thorax dark fuscous gray; abdomen dark fuscous. Fore wings, costa strongly arched, apex quite pointed, inner angle rounded, whole wing narrow and lanceolate; colour light fuscous, generally washed over with dark fuscous, with numerous black atoms, especially on the veins, making them linearly blackish; also apically and in small indistinct shadings across the wing light gray, also light gray shading at ends of veins at margin; marginal points intervenular, blackish; fringe long; fuscous gray, and light gray; hind wings even fuscous, veins darker; fringe long, dark fuscous. Beneath even fuscous on all wings about colour of hind wings above, veins darker, the fore wings with a sprinkling of dark fuscous atoms.

Palo Alto, Cal.; from Dr. Barnes.

P. SPECIOSA, n. sp.

Expands 32 mm. Palpi black, front thorax and abdomen dark fuscous, the thorax with some black scales intermixed, the abdomen a shade lighter fuscous. Fore wings whitish-gray, with five somewhat diffuse cross lines made up of black scales not very solid, the first, subbasal, bent outward at cell; the second, just within middle, bent at costal vein, and darkest costally, thence straight across wing; the third, just beyond the black discal spot, not very distinct, except at costa, where it is distinct and black, forming the inner edge of a large suboval white spot which reaches to apex; the fourth line, broad, diffuse, subdentate, reaching to the apical spot; outer line diffuse, indistinctly dentate, following the apical spot on outer margin nearly to apex, becoming there distinct, heavy, black; between fourth and fifth, and also fifth and margin, the whitish-gray shows in a dentate or subdentate band; margin black, the black broader between veins, fringe fuscous. Hind wings light fuscous, veins more or less darker. Beneath light, smooth, fusco , the lines of fore wing faintly shadowed, especially at costa and apex; submarginal space brokenly darker, marginal line blackish.

Glenwood Springs, Colo., May 3; from Dr. Barnes.

EUDULE HYALINA, n. sp.

This insect is of the size and shape of *E. unicolor*, Robs., from Texas, but, instead of being of its colour, is of the light straw colour of *E. mendica*, Wlk. It is apparently more hyaline than its congeners, and is very frail in its appearance. The wings are evenly unicolorous.

Senator, Ariz; from Dr. Kunze. Taken September 9th, 1896.

TEPHROCLYSTIS BOREALIS, n. sp.

Expands 16 mm. Palpi fuscous, slightly ochreous; front thorax and abdomen smooth silky fuscous, with a bluish tint. Fore wings fuscous, with cross lines fine, faint, the basal rounded, wavy, geminate, the middle wavy; the outer heaviest towards and at costa, starting straight out at costa to vein 8 just beyond cell, following it towards base the distance of the angle from costa, then turning at an angle, almost a right angle, through discal spot straight, or nearly so, to inner margin. Hind wings fuscous, even, with wavy lines very faintly showing. Beneath fuscous, darker at costa on fore wings, and with hind wings darkened and lightened into 6 or 7 rounded parallel shadings.

Winnipeg, Manitoba; from Mr. Hanham.

TEPHROCLYSTIS LATIPENNIS, n. sp.

Expands 16–18 mm. Palpi long, porrect, heavily scaled, black and fuscous mixed; front somewhat tufted, fuscous or blackish gray; thorax fuscous gray; abdomen fuscous-gray to gray, segments sometimes tinged with brownish. Fore wings broad, gray to fuscous-gray, overlaid more or less with blackish, forming an extra basal, and marginal broad darker bands; cross lines light, geminate, wavy; one basal, the second within the prominent black discal spots, the outer extradiscal, the outer considerably bent below cell and often lined with black within; a faint submarginal zigzag line, a marginal row of black dashes separated at end of veins. Hind wings broad, rounded, of ame colour as fore wings, the basal and middle lines slightly indicated, the ou :r geminate, quite distinct, bent considerably at middle, wavy, margin darker; a marginal black line; discal points black, distinct. Beneath as above, the fore wings with markings more faint, the hind wings very nearly as above.

Quebec, Canada; from Mr. Hanham.

TEPHROCLYSTIS SUBCOLORATA, n. sp.

Expands 20–23 mm. Palpi and head clear blackish; thorax blackish-gray; abdomen blackish-fuscous. Fore wings gray, overlaid with blackish; the wings narrow extended, the lines quite distinct; basal line

geminate, bent, wavy; median lines three, bent at discal spot, the middle one running through this, then bent outward at lower side of cell, curving thence around to inner margin; outer line quite broad, of the ground colour, with a fine central black line, and edged on both sides with blackish, bent around from costa to vein 6, then parallel with outer margin; discal spots large, oval, jet black. Hind wings with much less black, with two outer rounded blackish lines, and black discal spots; beneath gray, fore wings with a distinct, rounded, black, outer, rather broad line, black discal spot, blackish apex and outer margin, a blackish dot along costa near discal spot, and a blackish submarginal line; hind wings with outer line distinct, black, a submarginal fine line, black margin, and black discal spot. The markings below vary in distinctness, but are generally sharp and clear.

Arizona, without other location; also from San Francisco mountains. From Dr. Kunze. The latter taken July 20th, 1897.

TEPHROCLYSTIS NIVEIFASCIA, n. sp.

Expands 18 mm. Palpi rather long, somewhat heavy, blackish; front tufted, blackish; summit fuscous, or whitish fuscous; thorax fuscous gray; abdomen fuscous, with whitish markings dorsally on each segment; fore wings white, with black or blackish-fuscous running into wavy cross lines, mostly indeterminate and more emphasized on veins, these lighter, finer and more distinct just beyond discal spot forming a light shading in a broad white or whitish band, bent out beyond cell, and somewhat angulate below costa; outer field blackish, with fine, wavy, indistinct, whitish line. Hind wings whitish, with fuscous or black shadings, deeper and suggesting wavy lines outwardly and along inner margin; discal spots on fore wings prominent, jet black, on hind wings black but less prominent; beneath lighter, smoother, the general colours above reproduced with less fuscous shading among the black; discal spots black, distinct.

Santa Fe, N. Mex.; from Mr. Cockerell. Oregon. The latter type in National Museum collection; this being more fuscous in its shadings. Museum type No. 3920.

TEPHROCLYSTIS ACUTIPENNIS, n. sp.

Expands 26 mm. Palpi short, fuscous; front light fuscous gray; collar black; thorax fuscous, with a reddish shade; abdomen light fuscous, gray dorsally, with fine black cross line at base, and a white cross line on second segment; fore wings long, acute, fuscous, with

darker fuscous shadings running into lines, more distinct on outer half and running subparallel with outer margin, slightly wavy, merging together towards apex and reaching outer margin below apex, the inner one separating, and going to costa with a sharp angle at veins 7 and 8; discal vein lighter, preceded from base half way out with a line of black spots; a line of black spots on subdiscal, on outer cell; and beyond cell below vein 9, these latter becoming merged into a black line; a darker shading at middle of inner margin, and near dorsal angle; the whole wing with a faint brownish shading; discal spots black. Hind wings whitish, fuscous stained, marked with blackish on inner margin; marginal line black; discal spots black; beneath lighter fuscous, smooth, quite even; on fore wings a blackish outer line, angulate below costa, very indistinct, and a corresponding median line on hind wings; discal spots evident, black.

Los Angeles Co., Calif. Type in National Museum collection, No. 3954.

TEPHROCLYSTIS PERFUSCA, n. sp.

Expands 23–26 mm. Palpi moderate, porrect, end deflexed, fuscous, black on end; front fuscous, summit lighter; thorax fuscous; abdomen blackish-fuscous; all wings broad, rounded, of an even fuscous colour, squamose in appearance, faintly shaded into indeterminate wavy lines, with scattered blackish atoms, more prominent on costal space; discal spots faint; marginal lines blackish; beneath smoother fuscous, with blackish shade at apex of fore wings, and two rows of faint blackish points on hind wings; discal spots faint, marginal lines darker, broken on fore wings.

Easton, Washington; from Dr. Riley. Utah; taken in June. The latter type in National Museum collection, No. 3919.

EUCYMATOGE GILLETTEI, n. sp.

Expands 30 mm. Palpi moderate, stout, black; front tufted, black; thorax gray; abdomen fuscous gray. Fore wings slate gray with a fuscous tinge, thickly peppered with black scales; basal line black, fine, not distinct, bent at middle; outer line subparallel with outer margin, scalloped, the points on the veins pointing inward; all veins brokenly lined with black; a black marginal line; discal spot black, not very distinct; hind wings gray; darker outwardly, four or five parallel blackish lines showing along inner margin half way across the wing; margin

somewhat wavy, with a fine black line; discal spot small, black. Beneath light fuscous; outer line showing faintly on fore wings, and a faint rather broad line at middle of hind wings.

Colorado; from Dr. Gillette.

MESOLEUCA ABACTA, n. sp.

Expands 34–36 mm. Palpi not heavy, moderately long, erect, almost recurved, blackish; front thorax and abdomen fuscous, more or less stained with ochre; abdomen tufted at end; fore wings broad, light gray, more or less striated crosswise with blackish; basal line fine, distinct, some angled at middle, sharply black; one-third out another black line, turned outward from costa, sharply angled on cell, thence running broadly and heavily nearly straight to inner margin; this is followed by a finer, almost parallel line, which is somewhat broken on posterior half, a faint, much broken black line just beyond discal spot, and beyond that a quite heavy black line angled outward between 3 and 4, broken posteriorly; a clear black rounded spot costally at apex; marginal line black; discal spots prominent, black, well out on wing. Hind wings fuscous, lighter basally, becoming darker and with faint shadowy darker lines towards outer margin and parallel with it; beneath fuscous, much the colour of hind wings above, the fore wings becoming darker along costa and towards apex.

Arizona; one of the types is in National Museum, No. 3924.

HYDRIOMENA PERNOTATA, n. sp.

Expands 34 mm. Palpi rather short, sordid fuscous; front of same colour; thorax fuscous gray, with black edging to patagiæ; thorax dark fuscous, black dorsally, lighter fuscous posteriorly on segments; fore wings rather long, grayish fuscous, broken up with irregular black spots; these on the basal half very irregular, so that the lines of which they are the evidences are entirely indeterminate; a whitish fuscous band beyond discal spot, edged outwardly with a geminate broken, dentate, wavy, and angled black line running in general direction, parallel with outer margin; a submarginal incomplete row of black dashes, the space having a bluish stain. Hind wings light fuscous with an ochre reddish stain outwardly, marginal line black, finely broken on all wings; beneath rather deep broken fuscous, becoming a large blackish spot towards apex; hind wings as above, but much darker; the fore wings are also considerably ochre stained.

Fort Wrangel, Alaska.

HYDRIOMENA OCCIDENS, n. sp.

Expands 30 mm. Palpi short, fuscous; front gray; thorax light gray, intermixed with black, becoming white at middle above, and with black edge behind; abdomen gray, mixed with black, segments white lined posteriorly; fore wings white with shadings of fuscous generally evenly distributed, emphasized somewhat on veins, forming wavy, very indefinite lines, and giving a general mottled appearance. The veins are marked with fine clear black, broken into dashes of even or nearly even lengths, these showing very sharply on posterior and outer portions; marginal line black broken; costa more broken in colour than rest of wing; a rounded broken black line close to base; hind wings white with fuscous tinge; discal spots fine, black; margin black, broken; beneath light fuscous, broken into shadings. On fore wings an outer broken band of blackish spots, and one or two spots indicating another on hind wings.

Oregon. Type in National Museum, No. 3922. Another specimen in my own collection.

HYDRIOMENA GRANDIOSA, n. sp.

Expands 36 mm. Palpi moderate, blackish fuscous; front fuscous; thorax fuscous gray, marked with reddish on anterior part and on posterior tufting; abdomen light gray in front, more blackish posteriorly, segments whitish lined, with more or less of reddish dorsally; fore wings strongly pointed at apex, with posterior angle stronger than usual, marked with dentate wavy even bands, subparallel to each other and outer margin; the middle rather broader, inclosing discal spot, whitish, those on either side of it darker than the rest of wing; three more basally, the middle one somewhat darker than the two others; the whole wing with more or less of reddish, more especially evident on outer dark band and outer space; a submarginal row of black points on veins; marginal line black, broken somewhat, wavy; fringe interlined; hind wings whitish, fuscous stained two faint median lines, outer shadings and black wavy marginal line; beneath even fuscous, two lines showing on all wings beyond black discal points, on hind wing the outer emphasized with black points on veins.

Fort Yuma, Ariz., April 4th. Belonging near *H. neo-mexicana*, Hulst. Type in National Museum at Washington, D. C., No. 3927. Another specimen taken at light in April is smaller, somewhat darker, and without reddish on fore wings.

ERSEPHILA INDISTINCTA, n. sp.

Expands 35–40 mm. Some time since, Trans. Am. Ento. Soc., Vol. XXIII., p. 291, I described *Ersephila grandipennis*. I am convinced I have two species under that name, and now separate them, calling one of the forms *E. indistincta*. The two species approach each other very closely, but *E. indistincta* is smaller as a rule, and has the darker colour of the wings forming into two bands, one basal and the other beyond the cell, both quite even in width. *E. grandipennis* is much more diffuse, the bands not shown, the cross lines more angulated, and the lines themselves more distinctly outlined. *E. indistincta* has the antennæ of the ♂ more distinctly bipectinate than *E. grandipennis*, and the wings are generally somewhat tinged with browish.

The specimens of *E. indistincta* are from Colorado and Washington; those of *E. grandipennis* from Colorado only.

XANTHORHOE GLACIALIS, n. sp.

Expands 34–36 mm. Very much resembling *X. nemorella*, Hulst, and quite possibly a variation of that northern species. The ground colour of the fore wings is, however, ochreous stained with fuscous, the cross band is broader, especially at inner margin, and the outer edge, with a large angle strongly projected outward at space between veins 4 and 5, and there is a submarginal row of fuscous spots somewhat triangular in shape, and intervenular in position. There is a faintly showing broad central band on hind wings. Below dull ochreous, with the lines bordering bands showing distinctly on all wings.

Alaska. The Museum type number is 3925.

XANTHORHOE LONGULA, n. sp.

Expands 34–36 mm. Close to *X. glacialis*, Hulst. Fore wings pointed, even light ochre, or buff ochre with the colour deepening into a faint broad central band with faint ochre shadings and fine lighter cross lines, the band reaching out more prominently between 3 and 4, and between 4 and 5; the apex and margin somewhat fuscous stained, and a blackish marginal line. Hind wings fuscous ochre, or becoming bright ochre outwardly. Beneath almost even, light fuscous ochre varying to more or less ochre.

"Berring Island." My specimens are females, but the relationship seems to be so close to *X. glacialis*, Hulst, that I have little doubt as to generic oneness. I would not be at all surprised if they were ascertained finally to be variations of one species. The Museum type number 3926.

MONOTAXIS, n. gen.

Palpi moderate, porrect, end member very small; tongue strong; front scaled, quadrate, slightly protuberant; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with two pairs of spurs, not swollen, without hair pencil in ♂; antennæ unipectinate in ♂, pectinations long, end simple, in ♀ unidentate; fore wings even, rounded, without fovea in ♂ below, 2 accessory cells, 12 veins, 3 and 4 widely separate, 5 near middle of cell, 6 at a point with 7 at end of cell; hind wings 8 veins, without fovea, vein 5 near middle of cell, 6 and 7 stemmed, 8 joined with cell nearly its whole length.

So far as I know the first American Geometer with unipectinate antennæ, though these are found in the Australian regions. But there the form with 8 joining the cell in hind wings is extremely rare. I do not consider it in anywise but as one of the *Hydriomenidæ*, though it may be placed in a subfamily by itself.

MONOTAXIS SEMIPECTINATA, n. sp.

Expands 35–40 mm. Palpi and front dull black; thorax dark mouse colour; abdomen lighter; fore wings of a quite even dark fuscous, with a mouse colour tinge, this deepening into a rather broad median band, faintly indicating parallel wavy lines; beyond this, first a white and then four dark lines are indicated by fine dots of these colours on veins; an outer faint whitish line, mostly evident between veins, wavy; marginal line broken, blackish; discal spots faint; hind wings even mouse colour fuscous, deepening outwardly. In the ♀ all the colours are the same, but lighter fuscous, and without the mouse colour shading, but the single specimen has an appearance as if faded. Beneath even mouse colour fuscous, blackish on basal half along costa on fore wings, with some ochre tinging near apex; ♀ lighter. The whole insect has much the markings of *Philereme californiata*, Pack., and much the colour of that species with the mouse colour shading added.

Fort Grant, Ariz., July 23. In National Museum, No. 3928. The female in my own collection from Arizona without definite locality, but probably from either Prescott or Phœnix.

MYCTEROPHORA SLOSSONIÆ, n. sp.

Expands 24 mm. Palpi black and fuscous mixed, nearly black towards end; front black tufted; thorax fuscous ochre, mixed with black in front, blackish behind; abdomen blackish, interlined with fuscous; fore wings fuscous gray to fuscous, with a slight ochre tinge more or less

heavily overlaid with black; the ground colour shows in a broad costal band, reaching nearly to apex, and extending posteriorly to cell; the extreme edge of costa being checkered with blackish; the whole space of the wing covered with blackish has the fuscous ground colour showing more or less distinctly in numerous scalloped parallel lines, a basal, extra discal, and outer being more especially distinct; a scalloped marginal line, black; hind wings corresponding in colours and lines with fore wings, the discal line forming a row of dentate black lunules; beneath in general appearance as above, the lines less distinct or obsolete, the blackish emphasized in a middle and outer rather broad band.

White Mountains, N. H.; from Mrs. Slosson. Winnipeg, Man.; from Mr. Hanham. The insect has superficially the appearance of a small *Homoptera*.

SYNELYS NIGROCANDIDA, n. sp.

Expands 25 mm. Palpi and front black; summit pure white; collar narrowly blackish; antennæ white, somewhat blackish stained above, especially towards end; thorax pure white; abdomen white, faintly stained with blackish. Wings pure snow white; fore wings with black specks at cell and at inner margin, suggesting a basal line; outer line well out, fine, jet black, much waved and angled, obsolete at costa; beyond this on posterior half, jet black scales forming four incomplete black spots; hind wings without basal line; outer line corresponding to line on fore wings with corresponding submarginal black scales and dots; discal spots distinct, jet black on all wings; margin with jet black intervenular points; hind wings with black scales along inner margin. Front wings rounded; hind wings slightly wavy, scarcely angled. Beneath dull white; a row of black points on veins in place of outer lines, these more faint on hind wings; discal joints and margin as above, not so distinct on hind wings.

Ormond, Florida; from Mrs. Slosson. A very pretty insect with sharply contrasting black and white, much suggesting *S. alabastaria*, Hubn., but slighter, with colours more vivid, and hind wings less angled. I have seen the ♀ only.

ROYAL SOCIETY OF CANADA.—The seventeenth general meeting of this Society will be held at Ottawa, in the Normal School Building, on the 25th of May, beginning at 10 o'clock a. m. The Presidential address by the Hon. F. G. Marchand, Prime Minister of Quebec, will be delivered that evening. Mr. J. D. Evans, of Trenton, is the delegate from the Entomological Society of Ontario.

NOTES ON SOME ONTARIO ACRIDIIDÆ.

BY E. M. WALKER, TORONTO.

As so little is known of the Orthoptera of Canada, the following notes on the species of Acridiidæ, which I have taken in Ontario, may prove of some value. They are by no means intended to form a complete list of the species found in Ontario, but only of those which have come under my own observation.

The great majority of my specimens were taken from but two localities—Toronto, and the vicinity of DeGrassi Pt., Lake Simcoe, about fifty miles farther north. Although so near each other, the entomological fauna in these two localities differs somewhat; many forms common on the Niagara peninsula and southward being found as far north as Toronto, but not extending to Lake Simcoe, while several northern forms have their southern limits, at least in Ontario, about Lake Simcoe. But although the collecting grounds in both these places are very rich and varied, there are no doubt a number of Ontario species not represented in either. The great Archæan region forming the northern and greater part of Ontario has been but little explored from an entomologist's standpoint, and possibly many interesting species occur there, while there are doubtless southern forms not yet recorded from Canada whose range extends into the Niagara peninsula.

My thanks are due to Mr. S. H. Scudder, Mr. A. P. Morse, and Mr. W. S. Blatchley for the determination of doubtful species.

I.—TETTIGINÆ.

1. Tettix ornatus, Say.

Acrydium ornatum, Say; Amer. Entom., 1824, I., pl. V.
Tettix ornata, Say; Scudd., Mat. Mon. of N. A. Orth., 1862, 474.
" *dorsalis*, Harr.; Ins. Inj. to Veg., 1862, 186.
" *quadrimaculata*, Harr.; loc. cit., 186.
" *bilineata*, Harr.; loc. cit., 186.
" *ornatus*, Say; Fernald, Orth. N. E., 1888, 46.
Form, *triangularis*, Scudd.
Tettix triangularis, Scudd.; Mat. Mon. N. A. Orth., 1862, 475.

This species is the commonest member of the subfamily occurring about Toronto and Lake Simcoe. It frequents the damper parts of pastures, wet ditches, etc., and is also found, especially the short-winged form, *triangularis*, in quite dry, sandy or gravelly uplands. Though generally found in the neighbourhood of woodlands, it does not seem to

penetrate into their depths, where *T. granulatus* frequently occurs. The short-winged form is generally found in drier places than the long-winged form. In fact, I do not remember ever to have taken the former in boggy places at DeGrassi Pt., although the long-winged form is quite common in such spots. On the other hand, in a certain dry, sandy pasture at DeGrassi Pt., *triangularis* is quite numerous, whereas the long-winged variety is scarcely ever met with.

My Toronto specimens were taken between April 20th and June 17th, and again in September; while those captured at Lake Simcoe were captured between August 15th and September 25th, and also a few on May 2nd, 1896.

2. Tettix granulatus, Kirby.

Acrydium granulatum, Kirby; Faun. Bor. Am. Ins., 1837, 251.
Tettix granulata, Kirby; Scudd., Mat. Mon., 1862, 474.
Tetrix ornata, Harr.; Ins. Inj., 1862, 186.
Tettix granulatus, Kirby; Fernald, Orth. N. E., 1888, 46.

Though less common than the preceding species, this form is frequently met with, and, as a rule, is found in more thickly wooded places, often a considerable distance from any clearing. It is also common on the boggy margins of slow streams, and a favourite haunt at Lake Simcoe is the swampier parts of the shore where a large amount of decayed wood collects. It is not often found in damper portions of otherwise dry pastures, where *T. ornatus* frequently abounds. It is common both at Toronto and Lake Simcoe, and also in the Muskoka district, and probably ranges a long distance northward and westward in Ontario, as I have taken it at Winnipeg, Man. I have captured full-grown specimens in every month from April till September, but mostly in April, May and August.

3. Paratettix cucullatus, Burm.

Tetrix cucullata, Burm., 1838, Handbuch, II., 658.
Tettix cucullatus, Scudd.; Fernald, Orth. N. E., 47, 1888.
Paratettix cucullatus, Morse; Psyche, Vol. VII., 163, 1894.

This species is somewhat local, though sometimes very abundant where it occurs. I have found it on the sandy margins of streams near Toronto, and it is but seldom seen away from such situations. I have never seen it at Lake Simcoe. My specimens, with one exception, were taken in the months of May and June, most of them in the latter. The exception referred to was a male taken on a wet clay bank, on February 18th, 1897, which was an unusually warm, spring-like day for the season.

4. Tettigidea parvipennis, Harr.

Tetrix parvipennis, Harr.; Ins. Inj., 1862, 187.
Tettigidea polymorpha, Burm.; Scudd., Mat. Mon., 1862, 477.
" *parvipennis*, Harr.; Morse, Psyche, VII., 1896, 324.
Form, *pennata*, Morse.
Tetrix lateralis, Say; Harr., Ins. Inj., 1862, 187.
Tettigidea lateralis, Say; Scudd., Mat. Mon., 1862, 477.
" *parvipennis pennata*, Morse; Psyche, VII., 1896, 325.

A common species in Ontario and has similar haunts to those of Tettix granulatus. The edges of roads cut through swampy woodlands are favourite resorts, but it is frequently found in other wet places. Like Tettix granulatus, it is also often found in deep woods, when these are of a more or less damp character.

The short-winged form is more often seen than the long-winged form, but both are quite common. On April 12, 1895, I found a ♀ *pennata* hibernating in a beetle-boring in a log. The hole was completely concealed by the bark.

My specimens were taken between the beginning of April and June 21, and again in August and September.

II.—Truxalinæ.

5. Chloealtis conspersa, Harris.

Locusta (Chloealtis) conspersa, Harr.; Ins. Inj., 1862, 184.
" " *abortiva*, Harr.; loc cit., 184.
Stenobothrus melanopleurus, Scudd.; Bost. Jour. Nat. Hist., 1862, Vol. VII., 456.
Chrysochraon conspersum, Harr.; Thos., Syn. Acrid., 1873. 76.
Chloealtis conspersa, Harr.; Thos., Ninth Rep. State Ent., Ill., 1880, 99.

This species is rather common on the borders of woods in summer, the males hopping about on the dead leaves, with which their colour closely harmonizes, and the females squatting on logs and old fences upon which they deposit their eggs. Mr. C. T. Hills gave me a short stick of dead, though sound, sumac, upon the end of which he found a female in the act of boring. The hole was 16 mm. deep, but no eggs had been deposited.

It first appears in the imago state late in June, or early in July, and continues through the summer till September. In the earlier part of the

season the males seem to be more abundant than the females, but during the latter part of the season the reverse is the case.

I have two females of the full-winged form, *prima*, Morse (Psyche, VII., 1896, 420). In one specimen the tegmina project beyond the tip of the hind femora by about one-fourth their length, and the wings are quite ample; in the other they just reach the tip. Both were taken at Lake Simcoe.

I have specimens from Nepigon, Lake Superior, Aug. 27, 1897; Kingsville, Aug. 24, 1897 (C. T. Hills); Clear Lake, Peterborough Co., July 7, 1897; Toronto, and DeGrassi Pt., Lake Simcoe.

6. Orphula aequalis, Scudd.

Stenobothrus aequalis, Scudd.; Bost. Jour. Nat. Hist., 1862, Vol. VII., 459.
Stenobothrus bilineatus, Scudd.; loc. cit., 460.
Orphula aequalis, Morse; Psyche, VII., 1896, 409.

This is a very local species with us, though plentiful enough where it occurs. I have taken it in dry, sandy pastures at Toronto, and DeGrassi Pt., Lake Simcoe. The males are for the most part of the brown form, the females of the green; but the proportion seems to vary according to the locality. For instance, at DeGrassi Pt. about one-third of the males seen have more or less green in their coloration, while only very few brown females are found; whereas at Toronto the proportion of brown individuals in both sexes is much greater.

It appears in the perfect state from the latter part of July until the beginning of October.

7. Mecostethus lineatus, Scudd.*

This large, handsome insect is quite plentiful in Ontario in low, wet, sedgy meadows bordering lakes and slow streams, but is very shy and difficult to approach, and does not generally remain where it alights, but moves quickly through the reeds and sedges to another spot some distance away.

It is quite common about Lake Simcoe, less so at Toronto. I found it in great abundance on the borders of a small lake near Aurora, Ont.

It appears in the perfect state from about the middle of July until late in September.

*For Synonymy see page 55.

8. Mecostethus gracilis, Scudd.

Arcyptera gracilis, Scudd.; Bost. Jour. Nat. Hist., 1862, VII., 463.

Stethophyma gracilis, Thos.; Syn. Acrid., 1873, 99.

This species is found in precisely the same habitats as the preceding in Ontario, but in the West, at Winnipeg, Man., I have also taken it in prairies which were quite dry. It is not a very common species here, though by no means rare.

All my specimens were taken in August, though it is probably found throughout the season in which M. lineatus occurs. I have seen it at DeGrassi Pt. and at Aurora.

9. Stenobothrus curtipennis, Harris.

Locusta (Chlocaltis) curtipennis, Harr.; Ins. Inj., 1862, 184.

Stenobothrus longipennis, Scudd.; Bost. Jour. Nat. Hist., 1862, Vol. VII., 457.

Stenobothrus curtipennis, Harr.; Thos., Syn. Acrid., 1873, 91.

A very common grasshopper in low, wet meadows, clearings in swampy woods, etc. Probably found throughout the whole of or at least by far the greater part of Ontario. Both the long- and short-winged forms are common.

It comes to maturity about the first of July, or in some seasons a little later, and is found until about the beginning of October.

NOTES ON THE NOCTUID GENUS HYDRŒCIA.

BY HENRY BIRD, RYE, N. Y.

Descriptions of several *Hydræcia* larvæ have appeared in this magazine at various times, but as they were instances when the insects were infesting cultivated plants, the following notes are submitted to show their life history when found in more natural environments, and to assist the student in obtaining sufficient material in some of the species for comparative work. From the paucity of examples in collections and from the close relationship existing between most of the species, it is necessary to resort to breeding, or at least to have such a knowledge of their early habits as to secure extended series, before a very correct idea may be had of the representatives of this genus.

Since Mr. Grote worked over the group [*Hydræcia*, Guen.; *Gortyna*, Ochs.], describing as new many of the species, very little practical work has been done. He described from scanty material, and although his writings seem sufficiently lucid, the construction given some of his

species to-day points to a very mixed condition of opinions. Hence, an opportunity offers where a little light may be shed, and at the same time most interesting work afforded the student.

It is not necessary to go into all the details of the breeding cage in order to get a quantity of specimens in perfect condition. A knowledge of food plant and a few exact dates save much of this bother. *Hydræcia* larvæ bore in the stems and roots of annual and perennial plants and having once located in a plant attain their full growth and pupate in their burrows. True, they are at all times concealed, but a little experience soon enables one to locate them, and if the pupal change has occurred, a section of the plant enclosing the pupa may be removed, and can be placed in some convenient box to await the emergence of the imago. The waiting time will not overtax one either, being for the species here mentioned, a period of from fourteen to thirty days.

There seems a decided indifference to food plant expressed by the common species; almost any thick-stemmed plant coming in their way is accepted. Possibly it is as much a case of necessity as of choice, for it seems probable that oviposition must be somewhat broadcast, at least when the annuals are infested. The female moth appearing in September certainly could not apprehend the site of an annual of the following summer, and it follows that the larvæ must in a measure look out for themselves. The characteristic points of the species here enumerated are compiled from my notes covering half a dozen years' observation. Of the other species taken in this locality my observations are less complete.

Hydræcia nitela, Gn.—This is the most familiarly known species, by reason of its wide distribution, and its larval history has been well worked out by the economic entomologists. It flies willingly to light, and is by far the commonest species that one may obtain from this source at Rye. Its food plants are numerous. The most preferred seems to be ragweed. The larva may be located by examining the plant stalk for one or more small holes through which the excrements fall to the ground, and by the presence of the latter around the base of the plant. The larvæ work upward twenty inches or more according to the size of the plant, and as occasion requires make several small holes in the stalk. If full growth is attained, a larger opening, one-quarter of an inch in diameter, will be made for the moth to escape. This is their last act before changing. Occasionally two larvæ are found in a plant. It seem very prone to parasitic attack. For convenience of comparison I give a description of

larva. Mature larva: Length, 1.6 inches; very cylindrical. Colour livid, mars brown; darkest on first four and last three segments. Head shining, brown; mandibles black, as are the true legs. On side of head is a black line which has a continuation on the thoracic shield. The latter a lighter shade of brown than the head and merges into black where it meets the line mentioned. A dirty white stripe extends along dorsum. A similar stripe on subdorsum, but is lacking on first four abdominal segments. On either side of this line on each segment are two minute black dots, and two more near each spiracle that are also black. Anal shield shining; dark brown. Begins to pupate August 16; to emerge, September 12. There seems a variation in the larva of the form *nebris*, but I am not prepared to speak with certainty concerning it at present.

Pupa is cylindrical, longer than usual compared with its diameter, varies greatly in size according to sex; the average is about .75 inch in length. Cremaster not prominent, composed of two divergent spines. Wing-cases slightly creased, moderately prominent. Colour light brown. Pupa is always found below opening for moth's emergence, frequently down at the bottom of burrow.

Hydræcia cataphracta, Grt.—In the search for larvæ here at Rye this species is everywhere found in numbers. At light the imago would be classed a rarity. Preferred food plants are burdock and thistle. Two or three specimens are often found in the former plant, as the branches, as well as the main stalk, offer sufficient substance for their work. When working in thistle but one will be found. The presence of larva in burdock can be detected quite easily by the unhealthy appearance of the plant and by the evidence at the base of stalk. When in thistle the larva keeps well up to near the top, for the plant becomes hollow from the ground up to the main branches, but is solid above. Infested plants may be detected from afar by the top part of the plant having died and fallen down to one side, the walls of the plant being so thin that the larva's work has caused a collapse of the portion above it. Pupa will be found near this break; of course, always below.

When a hole is made for the moth to escape, the inner substance is eaten away to the cuticle. When this skin that is left dries it shrinks and pulls away on one side, but still hangs as a screen against intruders.

Besides ichneumon enemies, there are other casualties that affect the mortality of this species to a considerable extent. When feeding in burdock the plant frequently dies prematurely, and becoming dried, shrinks

and pinches the chrysalis so as to kill it. In thistle the pupa is more exposed from having the stalk broken off above, and suffers from the attack of those species of ants that are always ascending plants in search of aphides.

One will frequently find in thistle, under conditions similar to those produced by *cataphracta*, a weevil, whose workings will require no little experience to distinguish from the caterpillar's by a first glance at the plant.

Mature larva: Length, 1.5 to 1.7 inches. Bodily anatomy and marking almost identical with *nitela*, but is much lighter in colour and more mottled. Is very active when disturbed in its burrow, and can go backward as rapidly as forward.

Begins to pupate Aug. 19; to emerge, Sept. 17. Pupa similar to *nitela*, but as a rule somewhat larger.

Hydræcia purpurifascia, G. & R.

Mr. Slingerland's article in CANADIAN ENTOMOLOGIST, Vol. XXIX., 161, relative to finding this species boring in cultivated Columbine, suggested to me that the wild variety might be a more natural food plant. An investigation showed my theory to be correct. But it is the root in this instance that is attacked, the plant stalk not offering a sufficient substance. The roots are surprisingly large and tuberous where the plant grows in favourable locations. The larvæ consume the inner part of the root completely, leaving only the outer skin tissue, which resembles the wrapper of a small cigar when they get through with it. These empty root skins are the only evidence one has to work upon in locating the pupa, as the plant shows no outward sign, and to find this evidence it is necessary to dig. That is all there is to it—one must dig. It is useless to mind soiled hands and frequent disappointments; if proof against poison ivy, it is a large factor in one's favour. Having once located a larva, the surrounding leaf mould must be examined carefully, as they seldom pupate in their burrows, and if the search has been thorough you may find a pupa or you may not. The latter often in the majority. It frequently happens there have been visitors before. Ground moles are early callers after the caterpillar has transformed, and fragments of the pupa shell where they have tunnelled under a plant tell how the spoils always fall to the lot of the earliest bird. Fortunately for the collector, Columbine grows in all sorts of seams and clefts of rocks, and it is here, where the plants are inaccessible to the mole, that one may search with

profit. In one locality examined it was estimated the moles had eaten seventy-five per cent. of the pupæ, but to appreciate their skill fully one should see a place where they have been at work. It would almost seem unnecessary for any ichneumon enemies to infest this species to keep it in check, but there are a good percentage notwithstanding. Fifteen pupæ out of probably three hundred plants examined last summer, produced five hymenopterous parasites, so that at this rate one-third the number passing all other casualties are still doomed. No wonder that *purpurifascia* is rarely seen!

The description of the imago (Trans. Am. Ent. Soc., I., 341) is admirably drawn. Had Mr. Grote been familiar with its early history, he might have hesitated before applying a new name, or at least would have made a change in the synonymy relative to *Gortyna leucostigma*, Harris. As his opinions changed he cited *leucostigma* under *cataphracta*, *rutila* and *Harrisii*. Harris describes the entire life history of *leucostigma* (Ins. Inj. to Veg., 440), and in the sense of a superficial description it tallies with *purpurifascia* in description of larva and moth, date of emergence, and food plant, so as to leave scarcely a questionable doubt but that the two are identical. *Leucostigma* has priority, but will have to fall from being a preoccupied name in the European fauna. All this may seem of little importance with us, as it can make no change in the lists, but to the student it is essential to know just what the early writers had before them when describing.

This is shown in that so able an authority as Mr. Grote must have repeatedly puzzled over the matter in making so many changes of synonymy.

Mature larva: Length, 1.3 to 1.5 inches; very cylindrical, flesh-colour, no stripes or mottlings. Head and shield concolorous, testaceous, shining. Shield edged on side with black. There are a number of shiny black dots, placed as in the preceding species, but are a trifle more conspicuous by reason of the lighter ground colour. Anal shield prominent, black. Spiracles black, as is an accompanying row of dots. Pupates from Aug. 15 to 21; emerges, Sept. 10 to 24.

Pupa: Length, .8 inch; active, shiny, light brown. Becomes darker at hatching time, and the white spots on primaries, typical of *Hydræcia*, may be plainly seen through the pupa shell. Moderate spur at anal extremity. Under a glass this spur is seen to be made up of two separate projections. Tapers posteriorly rather more than in preceding species.

Hydræcia necopina, Grt.

The early history of this species seems never to have been worked up, and the mature insect is rarely seen in collections. It has never been taken at light or sugar during thirty years that lepidopterists have collected here. In passing it may be remarked that there has been no instance in my experience where a *Hydræcia* (from *inquæsita* to the end of the list) has been taken at sugar. The insignificant tongue would indicate a limited food supply being taken, and should offer an argument that they are not hibernators. Some years ago the insect was met in its early stages. Fifty or more pupæ have been gathered each succeeding year, but it still remains for me to see the moth in flight.

The food plant is wild sunflower (*Helianthus* ———), which grows in abundance at Rye. This plant thrives where the uplands and salt marshes meet, growing up many successive years from the same root, so that a locality once infested may be counted on to furnish examples for many seasons still to come. As this species of sunflower, which is quite close to the artichoke, grows six or seven feet high, there is ample opportunity for extended mining. The insect, however, only operates at the base of the stalk, and its work causes a gall-like excrescence to form that is about twice the diameter of the plant. This does not affect the growth, however, and one must examine for the galls, which is an easy matter in searching for this species. If the time for pupation has arrived an opening for the moth's exit will have been made. This is the caterpillar's last act preparatory to changing, and the presence or absence of this exit aperture, if after the time pupal change should occur, indicates whether you are dealing with a healthy or an ichneumonized example. If the larva has become a prey to some of its parasitic enemies its life will have ended before it reached full growth and no exit opening will be made. *Necopina* is a better artisan than *cataphracta* in hanging a protective lid at the exit door. This opening has to be of good proportions, and the larva eats away the substance of the stalk to the epidermis, making slight perforations through the latter around the edge. The epidermis on drying shrinks and hangs hinged at the top where no perforations were made. As a matter of fact, you will seldom find this lid intact, especially if it is much after the pupal change; the reason for this being the host of visitors that seek shelter within these burrows. Those ubiquitous myriapods which pass muster under the common name "sow bug" are the most numerous. To these may be added leeches,

ants and snails. It is not unusual to find upon opening a gall that the pupa is wriggling about in a mass of myriapods to the number of thirty or more, but as they do not attack the chrysalis their presence does not seem to be especially detrimental. As *purpurifascia* has a destructive enemy in the mole, so *necopina* has a chief foe in the field mouse. The mice dexterously tear out the side of the gall, eat the pupa, and hurry on to another, going over a large territory in a single night. It is only a pupa diet that suits them. The galls are never disturbed until after the pupal change. They are experts too at their trade. I have examined scores of demolished galls, but not once was a gall broken open that did not have the exit aperture made for the moth; in other words, never a gall that was parasitized.

Mr. Grote's description of *necopina* (CAN. ENT., VIII., 25) is rather limited by reason that there is so little of pattern to dwell upon, and his material was not plentiful. All that may be added is that the transverse posterior line on primaries may be traced on fresh specimen. It is most plainly seen at the internal margin, and can be seen in some examples extending to the costa. There is a slight sexual difference in colour, the male shading more slightly olivaceous than the female. There seems to be very little difference in size between the sexes, the usual disparity so generally shown in *Hydræcia* has not been noticed in my experience with this species. *Necopina* reminds one slightly of some of the genera which follow, *Bellura*, for instance, but there is no indication of a clypeal projection. The thoracic tuft behind collar is very prominent, and when at rest is projected forward at times, reminding one of *Cucullia*. On emergence from the pupa it is, of course, of the most importance that an exit be made at once before the wings have expanded, and for some time afterwards the moth exhibits the greatest restlessness, crawling in nervous haste from one point to another, always toward the light if in darkened quarters.

Mature larva: Length, 1.7 inches, smooth and of the greasy appearance common to boring larvæ. Body thicker perceptibly in the middle, and is a more robust larva than the preceding. Colour, dirty white. Head and shields testaceous, dark at the sides. Spiracles black; true legs dark brown, pro-legs concolorous with body. On each segment are a number of testaceous dots, larger and more conspicuous on the fourth, fifth, and last segments. Under a glass a few minute hairs may be seen. Along the dorsum beneath the skin may plainly be seen the internal

fluids pulsating through their canal, giving the appearance of a faint stripe extending the length of the body. Begins to pupate Aug. 24; to emerge, Sept. 22.

Pupa is 1.1 inches long, very active, and is able to move the anal segments to a greater angle with axis of the body than the preceding species. Slightly larger in the middle, tapering quite sharply to extremity, where the cremaster is made up of a two-pointed spur. Antennæ, eyes, and legs show out prominently; wing-cases faintly corrugated. There is a distinct prominence on front of thorax indicative of the large tuft; this is a strong specific character. Directly below, between the antennæ, is a much smaller projection, consisting of two separate points, that shows an approach to the striking clypeal armature of the *Nonagria* pupæ. Colour is brown, wing-cases a shade darker, becoming almost black at time for emergence. It is well to let a moth remain a day after hatching before mounting on the setting-board. *Necopina*, in common with the imagoes of most boring species, is prone to become greasy; in fact, this species is "up head" in this respect, oftentimes being an unsightly object before dry enough to be placed in the cabinet.

Larvæ begin to pupate Aug. 23; the first emergence out of forty pupæ was Sept. 23.

To sum up the factors for success with these species, we may sift from the foregoing notes the following:

Locate the larvæ or an infested locality, and by a reference to the dates given, a diligent search at the proper time will meet with its reward. It may be hard to get ahead of ichneumon and other insect enemies, but we can be the first *vertebrate* on the scene, which will mean a great deal in the aggregate of the specimens obtained.

A representation of this genus in any near degree to completeness will be an addition to any collection of Noctuidæ most pleasing to the owner, and doubly so if that addition is the fruit of individual labour in the field.

THE COTTONWOOD SNOW-SCALE OF NEBRASKA.

CHIONASPIS ORTHOLOBIS BRUNERI, subsp. nov.

Chionaspis orthlobis, Ckll.; Canad. Entom., 1894, pp. 189–190.

The *Chionaspis* from Nebraska, sent to me by Prof. Bruner, was named in MS. in 1894 *C. Bruneri*, but for reasons stated at the place cited the name was suppressed. Mr. R. A. Cooley, who is doing such good work in *Chionaspis*, now confirms my original opinion as to the distinctness of *Bruneri*, except that it is still an open question whether it is a good species or only a subspecies. For the present the insect may stand as above named.

T. D. A. COCKERELL.

NEW SPECIES OF NORTH AMERICAN MYRMELIONIDÆ.—II.

BY ROLLA P. CURRIE, WASHINGTON, D. C.

Brachynemurus niger, new species.

Female.—Length, 29 mm.; expanse of wings, 56 mm.; greatest width of anterior wing, 7 mm.; length of antenna, 4 mm. Black, marked on head and thorax with luteous; sparsely hairy, more distinctly so on prothorax and abdomen.

Face scarcely convex, luteous, a transverse, shining black band above which extends upward so as to cover the inter-antennal area; this band is notched below, a black line extending from the notch almost to the clypeus; on either side, between face, clypeus and inner orbit of the eye, a triangular black dot. Circumocular area mostly luteous, except along vertex, where it is piceous. Clypeus luteous, on each side anteriorly an impressed dot. Labrum transverse, rounded laterally, emarginate in front, luteous, darker on emargination where it is sparsely clothed with black hairs. Mandibles piceous, black at tips.

Maxillary palpi of moderate length, piceous, with luteous articulations; first two joints short, about as broad as long, subequal, pale; third joint a little longer than first and second together, somewhat curved; fourth joint a little shorter than third; apical joint as long as third, subcylindrical (a little enlarged before apex), black, its tip truncate, luteous.

Labial palpi much longer than maxillary, piceous, with pale luteous articulations; first joint short, about as broad as long; second joint nearly three times as long as first, curved in basal half; apical half darker, widened and flattened, concave on inner side; apical joint greatly enlarged, fusiform, clothed with black hairs, shining black on inflated portion, the sharply-pointed tip luteous; an ocellus-shaped organ* on apical third of inflated portion externally.

Maxillary palpigers† piceous, the anterior joint interrupted in the middle with luteous. Labium luteous, piceous at base. Labial palpigers luteous, each with a black semicircle. Mentum luteous, with a transverse black line or series of dots, behind which rises a long black bristle. Gula luteous.

Antennæ clavate, somewhat shorter than head and thorax, black,

*This organ is present in all American Myrmelionidæ I have seen.

†I apply this term to the angular, elevated pieces from which the maxillary palpi spring.

paler at articulations, clothed with very short dark hairs or bristles; two basal joints piceous, margined apically with luteous; basal joint set in a luteous ring.

Vertex elevated behind, rounded, luteous; post-antennal area fuscous, thinly clothed with white and black hairs; elevated portion marked by two transverse black bands, the anterior of which is narrow and shining, forming a ridge on each side, posterior band spread out each side to form two large, somewhat triangular spots, and connected with the anterior band by the black longitudinal median furrow; behind this furrow is a median oval black spot, longitudinally divided by a faint luteous line.

Pronotum as broad as long at base, narrowed anteriorly, truncate in front, sparsely clothed with white and black hairs, especially on margins; black, a narrow longitudinal median line, which is enlarged at the transverse furrow, and one each side, luteous. Lateral carinæ luteous. Beneath luteous, margined on each side with black.

Mesonotum black, lobes not strongly elevated; anterior lobe with a spot each side near front margin and a longitudinal median line, luteous; this line is interrupted before the posterior lobe, but continued upon the latter; another longitudinal luteous line each side (probably a continuation of the spots on anterior lobe) extending to the posterior margin, which is also luteous; a few spots of similar colour on each lateral lobe; posterior lobe shining black, except where marked by luteous as mentioned above. Below black, marked with luteous, especially on sides; sparsely clothed with white hairs.

Metathorax black, with luteous markings similar to those of mesothorax, but no median line on posterior lobe and fewer spots on lateral lobes; posterior lobe not shining.

Abdomen shorter than wings, rather slender, clothed with white hairs, more thickly at base. Black; segments (except one or two basal ones) marked on dorsum each side, in middle and at apices, with a luteous spot; these spots are more pronounced on the apical segments.

Tip clothed with long black hairs; below a transverse double row of coarse black spines and two short, cylindrical, brown appendages clothed with long black hairs; a short brownish plate between the latter at their base.

Legs of moderate length, yellow, thickly sprinkled with black; beset with many black and white spines. Posterior femora almost entirely

black. Tibiæ black at their apices, posterior ones also with a transverse black line of confluent spots externally; spurs slightly curved, a little longer than first tarsal joint, rufo-piceous. Tarsal joints black at apices, the third and fourth entirely so; claws moderately curved, a little more than half the length of last tarsal joint, rufo-piceous.

Wings hyaline; posterior margins slightly sinuate near apices. Pterostigma luteous, black on inner half; before it, several intercostals of anterior wings and a few of posterior, forked. Veins clothed with dark hairs; the costa mostly luteous, the other veins fuscous; the subcosta of both wings and median vein of anterior interrupted, between transversals, with luteous; some other veins, including transversals, also interrupted with luteous.

Anterior wings with a few apical transversals behind median vein clouded with fuscous, especially the one nearest the pterostigma; along basal portion of submedian vein a series of small fuscous spots forming an irregular, somewhat serrate line; an oblique fuscous streak, about 5 mm. to 7 mm. in length, runs from tip of submedian vein to near apex; half way between lower end of this latter streak and outer end of basal streak of submedian vein, an irregular fuscous spot; another fuscous spot or short streak runs obliquely upward from where the post-costal vein joins the hind margin; small forks near tip and hind margin fumose; posterior wings a little shorter than anterior, almost immaculate, except for a fuscous clouding on the extreme apical transversal below median vein, before pterostigma. Posterior borders of both wings fringed with dark hairs.

Type.—No. 3812, U. S National Museum. One specimen collected at Fort Grant, Arizona, July 20, 1897, by Mr. H. G. Hubbard.

This species is readily distinguishable from others of similar size, colour and wing-markings by the length and size of the labial palpi. These latter, though not as greatly lengthened as in *B. longipalpis*, are considerably more so than in any other species of this genus that I have examined.

Brachynemurus quadripunctatus, new species.

Female.—Length, 24 mm.; expanse of wings, 49 mm.; greatest width of anterior wing, 6.6 mm.; length of antenna, 5.5 mm. Luteous, marked with dark fuscous; clothed with white and some black hairs, more distinctly so on abdomen.

Face scarcely convex, luteous; above, a pitchy-black band separating the antennæ; this band sends a median acute prolongation from the anterior border toward the clypeus; furrow, between face and inner orbit of the eye, fuscous. Circumocular area luteous, except along the depressed portion of the vertex. Clypeus subhexagonal, luteous, on each side anteriorly an impressed dot. Labrum transverse, rounded laterally and narrowed anteriorly, emarginate in front, luteous, a few hairs on emargination. Mandibles piceous.

Maxillary palpi luteous; first two joints short, about as broad as long, subequal in length, the first somewhat stouter than the second; third joint somewhat longer than the first and second together, a very little curved, enlarged at apex; fourth joint straight, a little shorter than third; apical joint a little longer than third, rufo-piceous (except at articulation, where it is luteous); truncate and notched at tip.

Labial palpi somewhat longer than maxillary, luteous; first joint short, not quite twice as long as broad, enlarged apically; second joint about three times as long as first, somewhat curved, strongly widened and thickened apically, sparsely clothed with dark hairs; on inner side at apex a perceptible concavity; apical joint about same length as second, swollen, fusiform, luteous, clothed with dark hairs; on the outer side, surrounding the ocellus-like spot, rufo-piceous; apex narrowed, tinged with rufous; tip truncate, slightly notched.

Maxillary palpigers luteous, clouded with darker. Maxillæ luteous, tinged with rufous. Labium, labial palpigers, mentum and gula, luteous; each side, next anterior portion of maxillary palpigers, a brownish area with some dark hairs.

Antennæ clavate, shorter than head and thorax; luteous, darker apically; clothed with very short dark bristles or hairs; first and second antennal joints luteous, shining, a piceous spot or two at their bases. Between the antennæ posteriorly, a narrow, transverse luteous band.

Vertex elevated behind, rounded, luteous; in front, just behind antennæ, a transverse, pitchy-black band; in front, on elevated portion, a transverse, shining-yellow ridge; behind this, four black dots in a transverse row.

Pronotum as broad as long at base, somewhat narrowed anteriorly, luteous; anterior angles rounded, front margin truncate; a longitudinal dark fuscous stripe each side near middle line; on the outer side of each of these stripes another irregular dark fuscous stripe extending forward to

the transverse furrow; in front of each of these latter stripes, near anterior margin, a fuscous spot. Lateral carinæ luteous. Below luteous, on either side, next carinæ, a dark fuscous streak, extending nearly as far forward as the dorsal transverse furrow.

Mesonotum luteous, with anterior, posterior and lateral lobes very strongly elevated; anterior lobe with a broad, dark fuscous stripe each side near middle line; anteriorly each of these stripes extends outward, then backward along the furrow, separating anterior and lateral lobes, thus forming an inverted U-shaped marking; each lateral lobe has an elongate spot near middorsal line, and on the outer side of this an inverted "U," the ends of which nearly meet; posterior lobe with a longitudinal dark fuscous stripe each side and a rather faint median one (sometimes wanting), the posterior margin with a dark dot medially; posterior angles each marked by two longitudinal, dark fuscous stripes; a few fuscous dots at place of attachment of anterior wings. Sides and beneath luteous, marked with fuscous.

Metanotum luteous; the lobes distinctly elevated, but less so than those of mesonotum; anterior lobe with a U-shaped, dark fuscous marking; lateral lobes marked similarly to those of mesonotum; posterior lobe with an inverted, heart-shaped, dark fuscous spot; posterior angles fuscous, margined with luteous. Sides and beneath luteous, marked with fuscous.

Abdomen shorter than wings, luteous, a longitudinal median dark fuscous stripe above, narrowed or interrupted at articulations; a similar stripe bounds the dorsum each side; beneath luteous, a fuscous line each side and a good-sized fuscous spot in the middle of all but the basal segments.

Tip of abdomen luteous, above with long dark hairs; superior part split, a transverse row of black spines at base; inferior part beset with black spines; below, two small cylindrical or slightly clavate luteous appendages, twice as long as broad and armed with dark spines or bristles, project from apex of last segment.

Legs of moderate length, luteous; armed with some long, and numerous short, black and pale spines; somewhat hairy. Tibial spurs as long or slightly longer than first tarsal joint, somewhat curved, rufo-piceous. Tarsal joints sometimes rufo-piceous at their apices, third and fourth especially so; claws somewhat more than half the length of last tarsal joint, moderately curved, rufo-piceous.

Wings hyaline. Pterostigma luteous, on inner side and below margined with fuscous; before it, a few intercostals in anterior wings and a less number in posterior, forked. Veins hairy; costal veins luteous; the other principal longitudinal veins luteous, interrupted with fuscous at junctures of transversals; smaller longitudinal veins luteous, interrupted irregularly with fuscous; transverse veins of costal series and some of the others luteous, the rest fuscous.

Anterior wings with a series of small fuscous spots on basal portion of submedian vein above, at junctures with transversals; three larger fuscous spots at intervals along the apical two-thirds of this vein; bases of a few small apical forks sometimes slightly fumose; posterior wings a little shorter than anterior, unspotted. Posterior borders of both wings fringed with fine hairs.

Male.—Length, 36 mm.; expanse of wings, 49 mm.; greatest width of anterior wing, 6.5 mm.; length of antenna, 6 mm.

Antennæ less clavate than in female. Abdomen one-fifth longer than anterior wings; the markings on the apical segments heavy and more or less confluent; appendages short, half as broad as long, one-half length of seventh segment (viewed from below), subcylindrical, obtuse on tip, luteous, sometimes clouded with, or almost entirely, fuscous; clothed with coarse black spines; between the appendages below, a very short, triangular, luteous plate.

Type—No. 3813, U. S. National Museum. One female specimen collected in San Bernardino County, California, by Mr. D. W. Coquillett.

No. 3813a, U. S. National Museum. One male, taken at Phœnix, Arizona, June 1, 1897; from the collection of Mr. Chas. C. Adams.

Co-types.—One hundred and one females and seventy-two males taken at Phœnix, Arizona, in June, July and August, 1897, kindly loaned me for study by Mr. Chas. C. Adams, of Urbana, Illinois.

This unusually large and fine series of specimens exhibits some variations. In two of the females, and about the same number of males, the face and vertex are suffused with fusco-ferruginous, so that the fuscous markings are less apparent; in a few specimens the band on upper part of face and its prolongation toward the clypeus are subobsolete; in one male the face and clypeus have scattered fuscous spots in place of the usual markings. Small extra spots sometimes occur in the transverse row on the vertex, and two short longitudinal lines or spots are some-

times present behind the two middle dots of the row; the dots are occasionally connected by a narrow transverse fuscous line.

In a few specimens the third and fourth joints of the mixillary palpi are tinged with rufo-piceous, the second joint of the labial palpi is piceous apically, and the third entirely so.

The outer fuscous stripes of pronotum are in some specimens continuous to anterior margin, in others they end at the transverse furrow and are *not* indicated by spots in front of this furrow.

The inverted U-shaped markings on lateral lobes of mesonotum sometimes have their ends joined so as to form circles.

The tarsal joints are not always rufo-piceous at their apices.

CATOCALA ILLECTA, WALK.

In March last, Mr. E. N. Laing, of Essex, Ont., one of our young collectors, whilst on a visit to London availed himself of the opportunity to obtain the names of his captures. Whilst I was looking over his collection, a Catocala, with something quite unusual in its appearance to me, arrested my attention; and on comparing it with those in the Society's possession I found it was not there represented. Upon turning up Mr. Strecker's "Lep. Rhop. Et. Het." I found it therein vividly portrayed on Plate XI., fig. 9, and named by him *Catocala magdalena*. Not finding that name in Smith's list of 1891, I had to turn up the Synonymy, and found that it was known as *C. Illecta* of Walker.

It is a particularly attractive moth. Mr. Grote, in Trans. Am. Ent. Soc., Vol. IV., p. 13, says of it: "A broad-winged, moderately stout species, recalling *C. concumbens* in appearance and colour of primaries." This resemblance to concumbens is very striking, and has attracted the attention of nearly all of the describers. Walker gives the colour of the secondaries as "bright luteous, abdomen luteous"; Hulst., "bright yellow"; and Grote as "bright golden-yellow," which last seems to me to express it exactly. The yellow upper surface of the abdomen, corresponding to the colour of the hind wings, instead of the gray of the front ones, is very noticeable. Walker gives the habitat as "United States." Mr. Strecker's figure was drawn from an example taken at Indianapolis in 1874, but he afterwards received specimens from Texas. Dr. Hulst, writing in 1885, gives Ill. Neb. to Texas as its habitat; and Dr. Smith, as late as 1893, gives the same. So this discovery of *C. Illecta* is of some importance as considerably extending its range. Mr. Laing took his specimen of it in the season of 1896, at electric light.

J. ALSTON MOFFAT.

Mailed May 6th, 1898.