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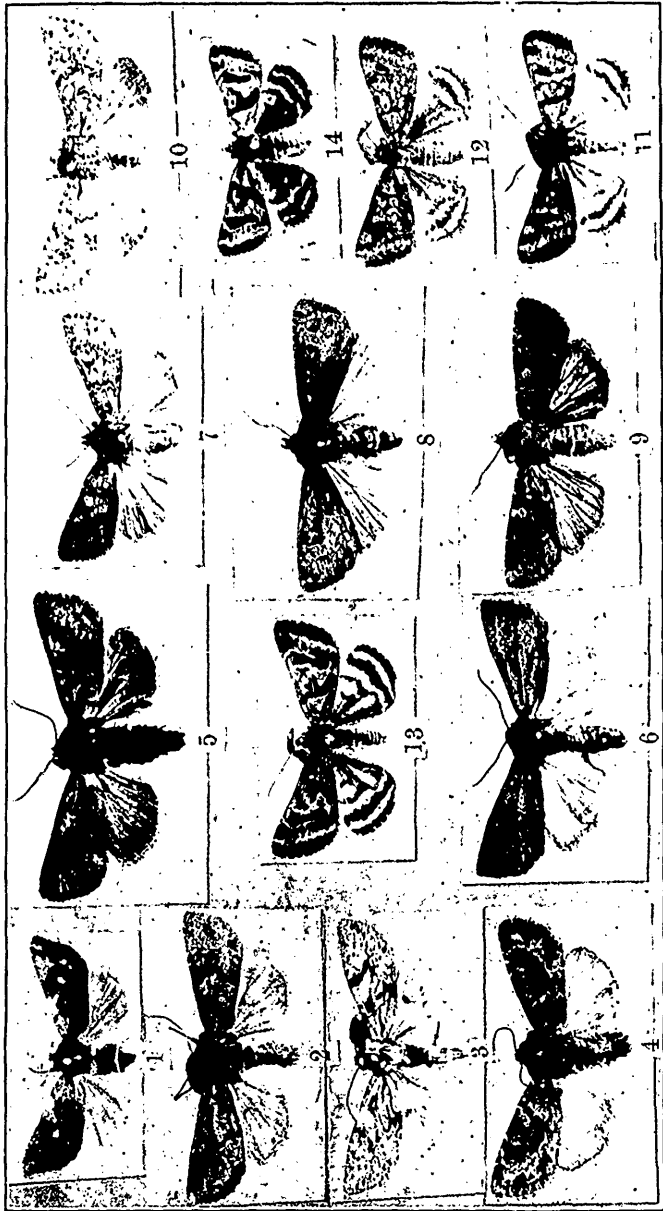
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NEW NOCTUIDS FROM BRITISH NORTH AMERICA, WITH NOTES ON SOME OTHERS.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

Of late years a few collectors have been sending material from various points in Western Canada, Manitoba and British Columbia. Mr. Dod at Calgary, Mr. Hanham at Winnipeg, and Mr. Heath at Cartwright, have collected many interesting species. Dr. Fletcher has sent me examples from other collectors in the same general region, so that we have now some little basis for a judgment as to the general character of the Noctuid fauna.

Within a comparatively small area, species from the Atlantic and from the Pacific Coast regions occur. The body of the species are of the Rocky Mountain series, but there is a strong admixture of forms occurring in Maine, in Northern New England, and even in Labrador. Extending westward, toward and into Vancouver, comes a decided Pacific Coast or Californian type, with an addition, the extent of which is yet uncertain, of characteristic forms. Quite a number of species which at first sight seem like well-known eastern forms, prove, on closer study of large series, to be distinct, and most of the new species that have of late reached me have been from this region or from the adjacent States of Washington and Oregon.

All the species here described are taken in British America, and, with one exception, have not thus far been taken in the United States.

In the accompanying plate are photo-engraved reproductions of the

new species and of a few others taken in the same general district, but elsewhere described.

Anytus obscurus, n. sp.

Deep, bluish gray, washed with smoky so as to obscure all the markings. So far as the latter are visible, they agree with *privatus*, save that the lines are much more even throughout. There are no contrasts anywhere, and the connecting streak between the median lines is not traceable in the specimen before me. The ordinary spots are barely defined. Secondaries a little smoky throughout, not unlike some female *privatus*. Beneath, dull, smoky. The thoracic tuftings are less obvious than in the other species, and the insect as a whole seems less robust.

Expands 36 mm. = 1.44 inches.

Habitat: Edge Calgary, VIII., 21 (Dod).

A single male, in fair condition. This is undoubtedly distinct from *privatus*, all the maculation being lost in the very deep ground, though retaining the characteristics of the eastern form so far as they are traceable. The male genitalia are obviously distinct from the others of the genus, though remaining of the same type.

Anytus profundus, n. sp.

In all essential points of ornamentation like *privatus*; but very much darker, blue-gray and black. Head and thorax blackish with a seal-brown tinge, the black line on the collar scarcely contrasting. The primaries have the median space blackish filled above the narrow black streak connecting the median lines, and the ordinary spots are thereby obscured and made indefinite. The t. p. line is distinctly more even, the points on the veins being much less prominent, and the inward tooth in the submedian interspace being much less marked. Terminal space almost uniformly dark smoky brown. Secondaries with clearer white and black contrasts than in the eastern species, and this difference holds also on the under side.

Expands 37-40 mm. = 1.48-1.60 inches.

Habitat: Brandon, Manitoba (Hanham).

It may be perhaps a question whether this is really a good species or a geographical race of *privatus*. They are nearly related, no doubt; but I am inclined to consider them distinct: not only because of the colour

and ornamental differences, evident though they are, but because the male genitalia show a slight, though constant, difference in form, and a very decided one in size, the eastern form having the harpes much larger and stouter.

Two males are at present before me, and Mr. Hanham has other specimens similar in appearance.

Mamestra negussa, n. sp.

Ground colour mouse-gray, varying a little in the amount of reddish shading. Head usually a little paler; but else no maculation. Primaries with the usual maculation all present; but nothing at all relieved or contrasting. Basal line geminate, included space a little paler, extends to the internal vein, inwardly toothed on the cell. T. a. line geminate, included space a little paler, inner portion often lost, outer brown or blackish, as a whole with a rather even outcurve, a very little toothed on the veins, tending to become distant from base so as to narrow the median space. S. t. line geminate in the costal region, else mainly defined by the slight contrast between median and s. t. spaces; when there is no such contrast the line is practically lost or marked by venular dots only. In course it is sinuate, incurved below the cell. S. t. line pale, a little irregular, in light specimens mainly defined by the darker terminal space. A series of very small, black, terminal lunules, which may be wanting. Fringes narrowly cut with pale and with a pale line at base in light specimens. Median shade obscure, outwardly oblique from costa between the ordinary spots, darkening the reniform inferiorly, then close to t. p. line, somewhat deepening the shade of the outer portion of median space. Claviform small, barely traceable or altogether wanting, a trifle paler in dark examples. Orbicular oval, oblique, of good size, varying a little in form, pale ringed and usually altogether a little paler. Reniform moderate, kidney-shaped, tending to enlarge a little inferiorly and there dark filled; narrowly pale ringed. Secondaries smoky, basally a little paler, with a dark discal lunule, a blackish terminal line and pale fringes. Beneath gray, powdery, with a smoky or blackish shade line hardly beyond the middle, and a discal spot on all wings.

Expands 37-40 mm. = 1.48-1.60 inches.

Habitat: Calgary, Canada, mouth of Fish Creek, on Sallows, May 1, 4 and 14 (Mr. F. H. Wolley Dod).

Two males and two females. Mr. Dod was good enough to send me these specimens because they seemed to him—justly enough, as it proved—different from *gussata*, which flies with it. The chief superficial difference is that the new species lacks all the black marks of the older form. There is no basal black streak, no black margined claviform and no black line to the t. p. line. The antennæ of the male are brush-like—*i. e.*, the joints are a little produced laterally and furnished with tufts of bristly hair.

Hadena cerivana, n. sp.

Head, thorax and abdomen a very pale dull gray, more or less tinged with red, especially in the female. Patagie with a blackish shade at base of primaries, else head and thorax immaculate. Primaries with all the normal maculation fairly well written, but not contrasting; much better marked in the female. There is a distinct, irregularly thickened black basal streak, extending about half way to the t. a. line, and this is the most contrasting bit of maculation in the wing. Basal half line geminate on costa, outer portion lost, inner brown or blackish, a little irregular. T. a. line geminate, outer portion blackish, inner tending to become lost, as a whole rather evenly outcurved, only a little drawn in on the veins. T. p. line geminate, outer portion even, smoky, tending to become lost in the outcurve over cell, inner portion blackish, tending to become lunulate, drawn in below cell, close to or actually touching inferior angle of the reniform. S. t. line irregular, concolorous, marked on costa by a darker preceding patch which fills the s. t. space, thence by a narrow, broken, brownish preceding shade, the terminal space sometimes darker in whole or in part. A series of black, distinct, terminal interspaceal lunules. Median shade line smoky, oblique between the ordinary spots, thence close to and parallel with the t. p. line, never prominent, usually obvious, rarely almost obsolete. Claviform very short, blackish or brown edged, tending to become obsolete. Orbicular large, a little paler, narrowly edged with black scales, tending to become incomplete above. Reniform rather large, kidney-shaped, tending to become a little constricted in the centre, partly black edged, incompletely pale annulate, inferiorly dusky filled. Secondaries smoky, in the female with a somewhat paler, more reddish tinge. Beneath powdery, disc of primaries a little darker, all wings with more or less obvious darker extra median lines and obvious discal spots.

Expands 34-38 mm. = 1.36-1.52 inches.

Habitat: Calgary, Canada, in June (F. H. Wolley Dod).

Four males and four females, the latter on the whole a little more reddish shaded. There is little difference between the specimens, and altogether they differ from *fruitima*, with which I was at first inclined to consider them identical, by the much paler ground and much less contrasting maculation. There is a mere shade of red and the median space is hardly darker. Antennæ a little marked in the male with small tufts of short lateral bristles.

Nephelodes pectinatus, n. sp.

Ground colour luteous, with tendency to either a greenish or a decidedly red tint. Head and thorax immaculate. Primaries without defined markings, the median space deeper in colour, all beyond it more smooth, not powdery like the basal space. T. a. line single, oblique, a little outcurved, hardly darker than ground. T. p. line single, a little better defined, outcurved over cell, evenly oblique below. S. t. line marked by a narrow, broken, obscure darker preceding shade. Orbicular an undefined, somewhat paler, round blotch. Reniform a little better marked, paler, not outlined, defined only below and outwardly. Secondaries smoky or blackish, the fringes of the palest ground colour of primaries. Beneath reddish powdered, primaries with disc smoky, secondaries with a discal lunule.

Expands 38-42 mm. = 1.52-1.68 inches.

Habitat: British Columbia; Corfield, Vancouver.

Two males (the collectors not indicated on the labels). The species resembles the common eastern form, and so I have named it for more than one of my Northwestern friends, I believe; but more careful study shows a difference in the character of the male antennæ. In *minians* the pectinations are rather short and lengthened by a curved bristle at the tip. In *pectinatus* this bristle is absent, but the branches themselves are longer and a little enlarged toward the tip. The differences are thus obvious and emphasize the rather scant superficial characters. The specimen from British Columbia has a peculiar greenish tinge to the ground which I have not seen in the eastern species. That from Vancouver is washed with red-brown. It is probable, therefore, that quite a range of colour difference will be found, as in the case of the eastern form.

Cosmia punctirena, n. sp.

Ground colour rather bright luteous, with blackish or reddish powderings, so that in some cases a specimen will be almost all smoky, and in another it will seem, and actually be, red. Head and thorax without markings. Primaries powdery, the median lines darker, single, obvious in all cases and distinct in most. Basal line single, a little diffuse, not prominent. T. a. line single, oblique from the costa, forming an obtuse, more or less rounded angle in the submedian interspace. T. p. line single, forming rather an even and not very great outcurve from costa to inner margin. Median shade obvious, sometimes prominent, usually a little diffuse; extends obliquely from middle of costa to inferior margin of the reniform, forms there a rectangle and then runs parallel with the t. p. line. S. t. line of the ground colour, more or less relieved by the powderings on each side, and by a preceding shade on the costa. Terminal space usually a little dusky. A series of more or less obvious interspaceal, terminal lunules. Orbicular round or nearly so, of good size, concolorous, ringed with darker scales, sometimes barely traceable. Reniform of good size, kidney-shaped, more or less obviously outlined by a darker line, concolorous except for a dusky spot inferiorly, which is always present, even when nothing else of the spot is traceable. Secondaries yellowish, silky, sometimes with a reddish flush, with a narrow, scarcely defined, median line. Beneath yellowish, more or less powdery, all wings with an outer line and a discal spot.

Expands 37-44 mm. = 1.48-1.76 inches.

Habitat: Glenwood Springs, Colorado, September (Dr. Barnes); Yellowstone Park, Wyoming, August (Dr. Barnes); Cartwright, Manitoba (Mr. Heath).

Four males and one female, all in fair condition, and no two alike. Taken as a whole, this is a somewhat smaller form than found in the east, and not nearly so bright nor so sharply marked. Yet its markings are practically identical, save that the new form has, in all the examples before me, a blackish spot in the reniform, inferiorly, which is not present in any examples of *palacea* (= *discolor*, Wlk., = *infumata*, Grt.) now before me. In one specimen the median space is darkened between the median and t. p. lines, making an obvious, broad band.

A male specimen from Santa Barbara Co., California (Coquillett),

may belong here; but is much undersized, as if a little crippled, and the antennæ seem a little more bristled.

Xanthia putchella, n. sp.

Head and thorax a rich yellowish brown, the patagiæ tending to a deeper, somewhat purplish tinge. Beneath, the body parts are brighter, more rusty brown. Primaries have a beautiful, velvety texture, the colour varying from purplish to yellow brown. Basal and s. t. spaces as a whole purplish, the latter more intense. S. t. space contrastingly yellowish brown, the median space reddish luteous, with an olivaceous shading which tends to a gray on the costa. The ordinary lines are distinct and are accompanied by rich, deep brown shades, the t. p. line forming a broad band. The inferior margin of the reniform is white, contrasting, and the whole wing is thus characteristically beautiful. Basal line whitish, margined each side with a deeper brown shading. T. a. line outwardly oblique, irregular, pale, outwardly margined by a distinct, broad, deep brown line, inwardly edged by somewhat darker scales. S. t. line pale marked on the costa, then lost in a broad band which fills the outer fourth or more of the median space, darkens the upper portion of the reniform, forms the usual outcurve over the cell, and is a little incurved below. S. t. line marked by the contrast between terminal and sub-terminal spaces, and preceded by a rich deep brown shade, best marked on the costa, then gradually narrowing and, in one specimen, lost before the inner margin is reached. Orbicular narrow, irregular, oblique, outlined in pale, not in any way contrasting. Reniform upright, rather narrow, the upper portion decidedly broader, filled with rusty red, the lower portion prominently outlined in white. Secondaries smoky, with a purplish or yellowish brown tinge, an outer marginal band somewhat paler, the discal spot obvious, though not prominent. Beneath rusty red, shaded with scarlet or purplish, powdery, the outer margin of primaries paler. Secondaries even or a little paler toward base, with an obvious discal lunule.

Expands 30 mm. = 1.20 inches.

Habitat: Livingston, Vancouver, IX., 14; British Columbia.

One male and two females; one of the latter defective. This is one of the prettiest of our Noctuids and utterly different from our eastern form. It is much closer to some of the European species, and belongs to

the exceptional series containing *vulpecula* and *citrago*, in which the ordinary lines are defined and the maculation is not blotchy. I have seen two or three other examples, all from the same general region, one of them in the Strecker collection.

Drasteria conspicua, n. sp.

Head, thorax and body smoky black, more or less covered with gray scales and hair; under side almost whitish. Head usually whitish in front. Collar gray or yellowish at base and tip. Patagium gray edged. Abdominal rings narrowly edged with yellowish. Primaries smoky, overlaid by bluish-white or gray scales, variable in depth, the markings smoky brown or blackish, contrasting. Basal half line marked on costa only. T. a. line outwardly oblique, inner margin nearly even, edged by paler, more yellowish scales. From the costa to the median vein the line forms a narrow band; below that point it broadens out into a blackish fascia, somewhat extended outwardly on the median vein and along the inner margin, so that the outer edge of the fascia is deeply indented. T. p. line forms a broad fascia, a little angulated on vein six, extending only to the middle of the submarginal interspace, pale edged at both margins. S. t. line of the ground colour or paler, preceded by a blackish shading, which may be partly obsolete; but is always marked on the costa, where a conspicuous, smoky patch, emphasized by two large black spots, practically fills the s. t. space. Usually the shading is also marked on the inner margin, extending a variable distance toward the costa and sometimes reaching it. There is a series of black, terminal lunules. Orbicular a small black spot in undefined paler shading. Reniform smoky, obscure, not outlined, chiefly marked by the median shade which ends there. Secondaries pale straw yellow to reddish luteous; shaded with black basally and with a black discal lunule. There is a black median band, a black s. t. band and a black terminal band which includes the white-tipped fringes. All the bands are narrow, resembling some forms of *Syneda*. Beneath whitish to straw-yellow, all wings with a black discal spot, a defined black median band, a smoky or black s. t. band which is diffuse inwardly, and a narrow black terminal band.

Expands 27-31 mm. = 1.08-1.24 inches.

Habitat: Calgary, Canada, May and June.

Seven examples, four males and three females, all in good condition, from Mr. F. H. Wolley Dod, who sent it as separate from *distincta*,

which also occurs there. The species is so well marked that it cannot be mistaken, and the range of variation is not great. The maculation of primaries is a reduced copy of *erechthea*, much more distinct, but, in the banded secondaries, generic habit is abandoned and the form is unique. The antennae of the male have the joints marked, laterally furnished with tuftings of ciliae. There is no difference in markings between the sexes.

EXPLANATION OF PLATE 5.

- 1.—*Xanthia pulchella*, n. sp. Vancouver, British Columbia.
- 2.—*AMESTRA negussa*, n. sp. Calgary, Canada.
- 3.—*Xylomiges pallidior*, Smith. New Westminster, B. C.
- 4.—*Anytus profundus*, n. sp. Brandon, Manitoba.
- 5.—*Nephelodes pectinatus*, n. sp. British Columbia; Corfield, Vancouver.
- 6.—*Cosmia punctirena*, n. sp. Cartwright, Manitoba; Yellowstone Park, Wyo.; Glenwood Spgs., Colo.
- 7.—*Carneades lagganæ*, Smith. Laggan, B. C.
- 8.—*Noctua inopinatus*, Smith. Brandon, Manitoba.
- 9.—*Carneades holoberba*, Smith. Calgary, Canada.
- 10.—*Hadena cerivana*, n. sp. Calgary, Can.
- 11.—*Drasteria distincta*, Neum. ♂. Calgary, Can.
- 12.—*Drasteria distincta*, Neum. ♀.
- 13.—*Drasteria conspicua*, n. sp. ♂. Calgary, Can.
- 14.—*Drasteria conspicua*, n. sp. ♀.

All the photographs were made from actual type specimens, except 11 and 12.

ERRATUM.—In Mr. Grote's article on "Types of Noctuid Genera," page 210, after line 18, insert:

Virtually, through Guenée's action in 1852, *nicitans* became the type of *Hydræcia*. Therefore there can be no question of suppressing *Helotropha*. The validity of the genus *Hydræcia* depends upon that of *nicitans*, as affording a distinct generic type. The "scientific configuration," as introduced and left by Guenée of *Hydræcia*, is most unsatisfactory. In any throwing together of the species the whole genus should be called *Gortyna*, Ochs., 1816, type *G. micacea*, as held by me from the first until the last.

NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.—It is gratifying to learn that a grant of \$25 per annum has been made to the Society by the Territorial Government "in view of the valuable services rendered to the public in directing the attention of farmers in rural communities to the economic phase of entomology." This official recognition will be a great encouragement to the members of the Society.

NEW HISTORIES IN HYDRÆCIA.

BY HENRY BIRD, RYE, N. Y.

The summer of 1899 was a remarkable one at Rye in the abundance of *Hydræcia* larvæ, as four species, never before noted in their larval state, and which do not seem to have their early histories described, were observed. Old acquaintances were to be found on every side, and some hitherto very uncommon ones were so abundant that a word in the matter of cause and effect may not be amiss. The seasonal conditions are, of course, contributive to such good results; still, the numbers in evidence every year suggest our looking a little further. Briefly, the environments are most propitious for the development of these borers, as that most important question, food supply, can be relied upon being adequate to all demands. The proximity to salt water insures a copious dew-fall, so that vegetation in the months of July and August does not suffer from the usual drought of this season in any such manner as it does farther inland. Here in late midsummer the larger *Compositæ* and other thick-stemmed plants are in full splendour, while fifty miles back from the coast all may be parched and leafless. So with a vigorous plant-growth assured, our friends are able to exercise their fondness in clinging to familiar haunts, and year after year we can be sure of finding a colony in the same particular location. While noted for their preference to certain places, there are a number of causes more or less evident which frequently make them leave the plant of their first selection, and it is under such circumstances that another stem close at hand is so important to their welfare. Water draining into their galleries may have something to do with this move; still, that cannot apply in all cases, and this trick of seeking pastures new is very general to all species. With the ordinary leaf-feeding caterpillar this might be accredited to mere instinctive vagaries of one sort or another, but for a larva to forsake a commodious burrow that has taken the greater part of its existence to make, and which still seems to offer all the requisites for its well-being, is harder to explain. However, the fact remains, and no doubt plays an important part in the mortality of a brood, so an abundance of food plant close at hand is a great factor in the ultimate results, as without it a certain percentage would surely starve. Evidences of the effect of this prodigality not only arise from the numerous forsaken galleries we encounter, but the number of dwarfed and evidently starved-out adults found when they make their flight is very

perceptible. Much attention has always been given to the fatalities affecting this group, on account of the long series of specimens desired, so that any causes frustrating this end have been regarded with apprehension, and have been investigated as far as possible. (See CAN. ENT., Vol. XXX., 126.)

In studying larval conditions, the close relationship existing between the species makes attention to minor details of structure necessary. Applying a general description to these larvæ, we would note their bodies being very cylindrical and provided with sixteen legs. The head is moderate in size, well rounded, slightly bulging, with clypeus evident; is usually a shining brown, and marked laterally with a black, somewhat oblique, line or dash. Mouth-parts are strong and compact. The thoracic shield is a conspicuous feature, often as wide as the head, and, in being a hard corneous plate, offers the protection needed here in a boring insect. The anal plate is also large, and defends this extremity. The various setæ arising from the tubercles and borders of the plates are exceedingly weak, and scarcely discernible except by using a lens. From being so minute, and not quite assured of their constancy, particular reference to them does not seem important.

In the matter of coloration, all agree in their earlier stages in having whitish dorsal, subdorsal and partial substigmatal lines contrastingly drawn on a dark brown or purplish body colour. These lines become less distinct at each subsequent moulting, and are lost, or nearly so, at maturity, when the colour becomes an undecided translucence of a slightly varying hue, which is affected somewhat by the kind of food plant eaten. With most species there is an abrupt termination to the lines, excepting usually the dorsal, on the first four abdominal segments, and sometimes on the last thoracic segment also. This gives an appearance at once noticeable, but only occurs up to the next to final change, when any contrasting colour effects are generally lost. For illustration see CAN. ENT., Vol. XXIX., pl. 6, where *purpurifascia* is shown in next to last stage.

For comparison of tubercle arrangement, these creatures form ideal subjects. These latter are large, corneous, often shining black, and always strongly defined. On thoracic joints two and three, I. a, I. b and II. a are small; II. b, III. and IV. are very large, the most conspicuous of any of the lateral ones, and are situated in the form of an equilateral

triangle. On the abdominal segments, tubercles I. and II. are placed in the usual oblique setting, with III., III. a, IV. and V. clustered about the spiracle. The eighth abdominal segment has I. and II. very large parallel to the dorsal line, and with their opposites form the corners to a conspicuous square. Preceding the anal plate on last segment is a lesser plate or tubercle that occasionally becomes merged into the borders of the former.

On the seventh abdominal segment, IV. is sometimes raised to a little above the line of the spiracles instead of lower down as is common to Noctuids generally.

Dr. Dyar has pointed out this feature as occurring in *purpurifascia*, and in theorizing on the unusual break, concludes it has been an acquisition—or, rather, a transposition—to more fully protect the spiracle. (Jour. N. Y. Soc., VII. 70.) A curious and perhaps significant fact is that this break occurs in the root-feeders alone, at least so far as observations have been made. Such larvæ, burrowing down to the extremities of roots, are at all times cramped for room, and are rarely able to turn round in their galleries when desiring to go in a reverse direction.

Can it be that this habit, which necessitates the constant backing of the larva to the ground orifice for the disposal of frass, and which practically means as much backward as forward movement, is accountable for this? With the stem borers there is generally an extended burrow of ample diameter; if they wish to go in a reverse direction there is room for turning, and we may assume a forward motion predominates. Certainly the excess of backward movement made by the former would bring an undue amount of friction behind the spiracle on joint seven, and tubercle IV. has been raised to the point of greatest efficiency, the same as it is on the other segments. This is merely a random idea, of thin air consistency perhaps, and is advanced only that attention may be directed here more fully.

In dealing further with larval characteristics, it may be noted that there is a tendency on thoracic segments two and three for the skin to assume a puckered or roughened aspect, most notable in immature stages, especially when the head is retracted. Inflated examples show this invariably when but little air-pressure has been exerted in drying.

The extensile, glandular process that exudes from the under side of joint one does not seem to have been mentioned previously. It consists

of a cylindrical sack, slightly bulbous at the extremity, and in length equals or exceeds the thoracic feet. Just what function it may fulfil is at present uncertain.

For brevity in treating the following species, the application of these points on larval structure is implied; the variations from the usual form will alone be noted.

I have lately had the pleasure of examining the allied European *micacea* and *Ochria flavago* in various stages of their larval existence. The former is a counterpart of our *immanis*, and shows some typical departures from the larvæ here considered. *Flavago* is very near in general appearance to *cataphracta*, and the larval similarity is closer still. That the clypeal structure of the moth should differ so much seems odd, and may be due to the borer not displaying sufficient instinct to make an exit aperture, so that the moth must necessarily develop a clypeal spur to pierce its way out through the epidermis of the food-plant in some such manner as do the similarly armed *Nonagria*. It will be a matter of some interest when our *Gortyua (Ochria) Buffaloensis* is again located, and its history worked out so that comparisons may be made here.

If *Hydræcia* are so given to acquiring peculiarities due to special wants or differing environments, it becomes evident the more light we can throw on their full histories the better we shall be able to ultimately associate them.

The following early histories do not appear to be published:

Hydræcia marginidens, Gn.

Late in June this species was found boring in *Cicuta maculata*, the first specimen noted being high up in the plant, three feet or more above ground. Its discovery happened through a little of that detective work one learns in this branch, and which adds such a charm to the labour that might otherwise seem rather arduous. For it is with clues and not the culprits we have first to deal, and as these creatures are concealed at all times, it is no easy matter locating them. A suspiciously broken twig or withering stem, a knotty swelling, or a ventilating aperture, is usually the evidence we have to work upon; hence the satisfaction when a well-directed search, prompted by some slight symptom, discloses an *Hydræcia*. Attention was drawn to the *Cicuta* through a few inches of the top having fallen down to one side, hanging black and withered. The larva had worked upward so far that the diameter of the stem was wholly

disproportionate to its appetite, and the thin walls had finally collapsed. At all times a voracious feeder, it at last finishes its career at the base of the plant, often boring down and out through the tuberous roots. These latter are said to be the most poisonous productions of our local flora, yet *marginidens* flourish upon them to a surprising degree, becoming at maturity fat, uncanny "grubs," we might almost say, from which it would be little expected that such beautiful moths should ultimately result. Then, too, there is the unfortunate, unnecessary habit of leaving the burrow and pupating in the ground. There is a tinge of regret connected with this statement, as it recalls the slip given me by the scores of larvæ that had been located after a great amount of patient searching. The harvest of pupæ, upon which it was anticipated a finger could be placed at the proper time, was not to be mine; in its stead, experience of the usual expensive nature.

A note of August 4 reads: "After examining dozens of plants that had contained larvæ, but which had now left for pupation, one chrysalid, evidently stung, is found in a burrow, an irregular opening for the moth to get out having been made. Nearly all seem to have eaten down through the roots, going out at the lower end and apparently burrowing downward still, as though impelled by a desire of making some celestial acquaintances. No pupæ being found in the vicinity of the roots or elsewhere, we shall have to reserve our revenge for the brood of next year."

On June 30, larvæ were in the second stage from the last. The colour is a light brown, with a decided pinkish tinge. The first four abdominal segments are much the darkest by reason of the subdorsal and substigmatal lines being here discontinued. The dorsal line is very evident on all segments; these lines yellowish white; tubercle arrangement already very conspicuous and normal; on all abdominal joints I. exceeds II. rather more than it does later. Lateral tubercles darker and more contrasting than the dorsal. Head, shield and plate pale, testaceous; the shield as wide as head, and edged with black at the side. Length 1.2 inches. Next to last stage: A marked gain in length is noted, the colour has faded, head and shield are more shining and conspicuous. Length 1.5 inches; duration of stage ten to twelve days.

Last stage: All colour contrasts lost, and appearance anything but prepossessing. The soiled translucent colouring, which darkens perceptibly on first four abdominal segments, seems due to the internal fluids.

Head is shining russet, showing the black oblique side line; width .12 inch. Thoracic shield rather exceeds the head in width, very noticeable. Anal plate is not large for this group. Tubercles moderate, and being dark or blackish, are easily definable. On seventh abdominal joint IV. is low down as is customary with larvæ not strictly root-feeders. Full-fed examples attain a length of 2 inches. Duration of stage, thirteen days, with the one specimen noted. Although *Cicuta* is unquestionably the preferred food plant in this locality, note has been made of an odd specimen found in *Rumex*, and it has been found boring *Cosmos* in Maryland.

The pupa is robust for the group; colour a dark shining chestnut. Viewed dorsally, a slight constriction is seen at the base of the wing-covers. Between the segments the shell is minutely pitted. The usual delineations of head, legs, etc., are ordinary. Length one inch; duration of period about twenty days.

Hydræcia cerussata, Grt.

For a number of years past the knowledge of early history and food plant of this species had been a coveted bit of information. Like the good things that are said to come to those who patiently wait, this finally came our way, and quite extended observations were made of the last two larval stages as well as the subsequent transformations.

The species had been taken at light years ago, but seemed only periodic in appearance and altogether to be classed as a rarity. Last season was certainly not an "off year" with them, as there were a great abundance of larvæ, but they unfortunately left their burrows for pupation. This habit, shared with the preceding and some others, is a serious drawback to the collector and may merit investigation.

Can we call this a departure from the usual habit of the group—that of changing in their burrows, or is it only the retention of the more normal hereditary condition—that of a transformation in the ground? The roaming period so noticeable in full-fed larvæ immediately before the pupal change begins, must with *Hydræcia* be limited, for the season is drawing to a close and quick transformations are imperative. We may assume they become early influenced by the lethargy of the approaching change, and if this comes on so quickly that they succumb to its influence before the roaming tendency predominates, it is only natural that the galleries, as being the first place at hand, should serve as sufficiently safe

quarters for the change. In this case an exit aperture for the moth must be made and the provisional instinct here called forth is certainly a departure from the usual preparatory action taken by larvæ. The ample orifice through the plant-stock and the lid at the epidermis to screen against intruders are good examples indeed of insect forethought. That *cerussata* and *marginidens* do not undergo their changes in conditions which bring out such a display of instinct would hardly place them on a lower plane, and we may look for a cause from some other source, being anxious to find an excuse for these beauties.

Having a habitat that extends further southward than the other local species gives them a longer season, so that on becoming full-fed there may seem less haste for the change to a chrysalis, and they might indulge in a little roaming. After once leaving their burrows, we cannot expect them to find their way back again, so refuge is sought in another earth.

Upon encountering the larva of *cerussata*, it is easy to see at once that we have to deal with a species differing greatly from the conventional form. The head is larger, the plates stronger and the tubercles seem more clustered, together with a parchment-like cuticle, giving the insect quite an armoured appearance. And it is needed! The food-plant is *Vernonia noveboracensis*, and if anyone doubts the aptness of the common name "ironweed" as applied to this plant, it would be well for them to investigate the roots, for it is here the borer works. It would be well to take some heavier tool than a penknife or garden trowel when undertaking the task.

Larvæ in next to the last stage were found July 15. The plants had been entered a few inches up from the base and a gallery started downward into the roots. Progress was slow on account of the extreme toughness of the stem. A very noticeable swelling is produced, but instead of increasing in diameter as the plant continues to grow, finally bursts open for its entire length, making an ugly scar, at once furnishing a clue for the hunter. From this time on that part of the burrow offers no shelter whatever and the workings below ground proceed slowly. Often the borer misses the centre of the stem, for be it known there is no pith to guide it, and eats its way through to the outside. Then the gallery is continued through the soil and tangle of fibrous rootlets; but this does not occur until near maturity.

Next to last stage: Very cylindrical, the skin more roughened and

drawn on the thoracic joints than with other species. The colour is a purplish brown, showing very dark on first four abdominal segments. The ordinary lines on the thoracic joints are a pure white, their continuation on the last four joints show as soiled and yellowish. Head is large, very finely granulated, of a chestnut colour; width .13 inches. The cervical shield is larger than usual in this stage, a hard shining plate of a shade lighter than the head, and has the ordinary black edging. The anal plate is at once unique, and offers perhaps the strongest point of specific distinction. Instead of being similar in texture and colour to the shield, its surface is plainly roughened or granulated; colour deep black, and its area consumes about all of the dorsal space on the last segment. What is usually a separate plate preceding the anal one on this segment, is in this case one confused area. The few setæ that arise from the borders of this plate are stouter than with other species. The tubercle arrangement is of the conventional form, the lateral ones clustered around the spiracles, and all, together with the last-named organs, are intensely black. Special mention may be made of IV. on abdominal joint seven as being raised a little above the line of the spiracles, a feature that holds with all that are strictly root-borers. On the next to last joint I. and II. are very large and with their opposites are merged into a conspicuous quadrate patch, which, preceding the unusual anal plate, gives a very protected look to this extremity. Length of insect 1.6 inches; duration of stage uncertain, perhaps fourteen days.

Final stage: The bulk and diameter now greatly increase; colours become more translucent; head and shield become heavier and darker, the former now measuring .17 inches across. Thoracic legs stout and shining black. The crochets of the abdominal feet are very strong, and although no microscopic comparisons have been made here, it is safe to say these are better developed than in the other species treated.

Tubercle arrangement remains the same, though I. and II. are perhaps less conspicuous. Large examples measure slightly over two inches in length. When full-fed they become very restless, in captivity at any rate, boring in and then out of the earth at frequent intervals, for a couple of days prior to the final rest.

The pupa is correspondingly large and robust, of a dark brown, much less shining than ordinary. The shell appears thicker, as there seems no difference in hue even when the imago is ready to burst forth. Cremaster

is blunt and hardly shows bifidate. Extreme length 1.1 inches. Moths appear Sept. 5 to 12.

It certainly means a great deal of work bringing through examples of this species, but the thrill of delight and admiration experienced when beholding the freshly-emerged insect will, we predict, be an ample compensation. Unfortunately, the beautiful plum-bloom purple of the two species so far discussed, fades more or less brownish after awhile, no matter what pains be taken to keep the specimens from any exposure to light, so that it is really necessary to breed them in order to fully appreciate these insects.

Cerussata is very fond of leaving its burrow when in the larval state, which may be explained in part by the curious splitting that the stem undergoes and which makes a kind of trough leading any dew or water directly in on the insect below. So there is cause, perhaps, for a change; but in case of isolated plants it means a serious fast and probably the substitution of some other plant as food. Such an instance had surely occurred with my first example from pupa secured some years ago, when an exceedingly dwarfed specimen emerged from a random lot of pupæ gathered in *Rumex* and all supposed to be common *cataphracta*.

[TO BE CONTINUED]

SOME NOTES ON "THE CAMBRIDGE NATURAL HISTORY, VOL. VI."

BY O. W. BARRETT, MUSEO C. G. E., TACUBAYA, MEXICO.

On page 365, Dr. Sharp states that the Hesperid larva "frequently forms a rudimentary cocoon." It does not appear to be generally known that *Doberes Mexicanus*, Feld., a Hesperid (near *Eantis*) common to Central Mexico, makes a decidedly complicated cocoon. Constructed of tough gray silk, and very closely woven, the cocoon is formed between two leaves (or, rarely, two sides of one folded leaf) of the "zapote blanco" (*Casimiroa* sp.), and suspended from a twig by a strong silk thread 70 mm. to 90 mm. in length. The mouth is closed by an exceptionally well made *chevaux-de-frise* and turned at nearly right angles to the axis of the cocoon, which is 33 mm. in length, and at the middle, 13 mm. in breadth by 9 mm. in thickness.

The larva, after entering the cocoon, as well as the pupa during its

entire existence, has the habit of frequently turning and shaking itself so as to produce a rattling noise, which has given it the popular name of "campanita" (little bell); on opening one side of the cocoon the large head of the larva or the front portion of the pupa may be seen in rapid vibration striking the walls of its chamber.

In several dozens of these cocoons I can observe no variation in the plan. No parasites noticed. Am ready to furnish specimens to those who desire a real "butterfly cocoon."

On page 397 it is remarked that "we believe they (Hepialidæ) never fly to light." I have taken *Phassus triangularis*, H. Edw.; *P. argentiferus* Walk., and a species of *Hepialus* at light, though rarely. As the body of *Phassus* is commonly 65 mm. in length, and the wings proportionately narrow and clumsy, I would suggest that the large Hepialids may venture on only short flights.

The eggs of *Phassus triangularis* are minute (0.3-0.5 mm.), very numerous, and of a gray or blue colour at first, turning to brown or black; and since they appear to be devoid of any glutinous coating, it is probable that the female merely drops them among the underbrush, trusting in the safety of numbers.

Under the new family Eupterotidæ (p. 376), the author touches on the irritating properties of the larval hairs, and on the habit of nest-building. The hairs of *Metanastris psidii*, Sallé, are barbed at the tip and very irritating, in the same way as those of *Halisidota propinqua*, H. Edw., but contain no poison. The nests of this Eupterotid on *Quercus jalapensis* are conspicuous objects in some districts, being frequently 3 to 5 feet in length. No true cocoon is made, the larva pupating in a suitable space in the home-nest. The larva is nocturnal in habits, and yet it is parasitised by an Ichneumon.

Under the Saturniidæ (p. 372), Dr. Sharp mentions the ocellate marks on the secondaries of species of the genus *Automeris*. It appears that these markings have a protective value, as all the species with which I am acquainted have the habit, when disturbed, of raising the primaries (so as to expose the large glaring "eyes"), and holding the secondaries at "present arms" until the fright is over.

The cocoon of at least several species of *Automeris* has a quasi-hinged grating in its front portion, which opens only outwardly; the front is closed, but with very weak (brittle) silk,

The author also speaks of the beautiful colours and the spine-bearing tubercles of the Saturniian larvæ. The larva of *Copaxa multifenestrata*, H. Sch., is the most strikingly beautiful I have seen. In *Automeris janus*, Cr., the spine defense system is carried to an extreme; the length of the profusely branching spines is 15 mm. to 25 mm., or twice the diameter of the body, and so abundant that the larva looks like a bunch of moss a few yards away; while the quantity of poison contained in these spines is so great that during the process of inflating, the fumes which are driven off with the vapour are positively dangerous to the operator.

ON THE NORTH AMERICAN SPECIES OF CHOREUTIS AND ITS ALLIES.

BY PROF. C. H. FERNALD, AMHERST, MASS.

About fifteen years ago I obtained from Dr. O. Staudinger a series of all the species placed under the Choreutidæ in his Catalogue of the Lepidoptera of the European Fauna (1871), and made a critical study of their structure to aid in the arrangement of our North American species. This study also led me to look up the nomenclature of these insects, and the results are given in this paper.

There has been a growing tendency for some time to use the generic names proposed by Hübner, and while at first I was not inclined to adopt the genera in his Tentamen, I now feel compelled to do so. It is not necessary to argue this question, since both sides were so ably presented years ago in this journal.

Hübner, in his Tentamen published in 1806, proposed the name *Hemerophila* with *pariana* the only species under it, and we must therefore consider it the type. The genus *Simethis* was established by Leach in the article "Entomology," published in Brewster's Edinburgh Encyclopedia in 1815, with *dentana*, Hüb., for the type. This Encyclopedia was re-published in Philadelphia in 1816. I have not seen the Edinburgh edition, but understand that the American edition now before me is a reprint, at least so far as the article "Entomology" is concerned. *Dentana*, Hüb., which is a synonym of *oxyacanthella*, L., is congeneric with *pariana*, Cl. Ic., and therefore *Simethis* must fall as a synonym of *Hemerophila*. Hübner published the genus *Guaris* in his Verzeichniss, p. 374, with *albertiana*, Cram., *swederiana*, Stoll., and *kleemanniana*, Cram., under it. As *albertiana* seems to have been the only one of these

species known to Hübner, I am of the opinion that it should be regarded as the type of *Gauris*. Hübner has given an excellent figure of this species under the name of *Hemerophila perlata Albertiana* in his *Sammlung exotischer Schmetterlinge*, Vol. I., pl. 213 (1823). Zeller, who studied several examples of this species with his usual care, placed it in the genus *Simethis*. We may therefore regard *Gauris* as a synonym of *Hemerophila*.

Hübner established the genus *Choreutis* in his *Verzeichniss*, p. 373, with five species under it, all of which, except *diana* and *scintilulana*, Hüb. (a synonym of *myllerana*, Fab.), are congeneric with *pariana*, and have been placed with it under *Simethis*, which may now be replaced by *Hemerophila*. The last species, *myllerana*, has been taken as the type of *Simethis*, while *diana* has been placed with *oxyacanthella*, L., and its allies, but its structural characters differ so much from the others that I feel justified in following Guenee, who separated it and established the genus *Orchemia* for its reception.

Immediately following *Choreutis*, on the same page of the *Verzeichniss*, Hübner established the genus *Porpe*, with only one species under it, *fibrana* (a misprint for *vibrana*, Hüb.), and as this species is congeneric with *myllerana*, *Porpe* must fall as a synonym of *Choreutis*.

It was shown by Dr. Scudder in his "Historical Sketch of the Generic Names Proposed for Butterflies," p. 96 (1875), that although the title page of Hübner's *Verzeichniss* bears the date of 1816, there was internal evidence sufficient to prove that it was not all published at that time. I have only concerned myself with the time of publication of the part containing the Microlepidoptera. There is a reference on page 312 to the Third Century of the *Zutrage*, the introduction to which is dated Aug. 27, 1825, but this page is in a signature which begins on page 305. The Third Century of the *Zutrage*, on page 34, makes reference to page 294 of the *Verzeichniss*, but this page is in a signature which ends with page 304. I therefore conclude that the first 304 pages of the *Verzeichniss* were published *before* Aug. 27, 1825, and the pages following, *between* this date and the time of Hübner's death, which occurred Sept. 13, 1826. It is barely possible that this part of the *Verzeichniss* may have been published late in 1825, but as Hübner himself made no reference to it in August, it seems more probable that it could not have been prepared and published before Jan., 1826, and therefore I have adopted

1826 as the date of publication of that part of the Verzeichniss occurring after page 304, the part including the Microlepidoptera.

SYNOPSIS OF THE GENERA.

- | | | | |
|----|---|---|-----------------------|
| 1. | { | Veins 7 and 8 of fore wings forked | <i>Orchemia</i> . |
| | { | Veins 7 and 8 of fore wings not forked | 2. |
| 2. | { | Third segment of palpi short and blunt | <i>Hemerophila</i> . |
| | { | Third segment of palpi long and pointed | 3. |
| 3. | { | Second segment of palpi with long bristles beneath | <i>Choreutis</i> . |
| | { | Second segment of palpi without long bristles beneath | 4. |
| 4. | { | Antennæ thickened with scales along the middle | |
| | { | above | <i>Walsinghamia</i> . |
| | { | Antennæ not thickened with scales | 5. |
| 5. | { | Palpi slightly curved up | <i>Brenthia</i> . |
| | { | Palpi curved up close to the front | <i>Sctiostoma</i> . |

Genus ORCHEMIA, Guen., Ind. Meth., p. 58 (1845).

Head smooth, scarcely rounded in front; labial palpi medium, slightly curving up in front, second segment a little roughened beneath, the scales at the end forming a tooth pointing obliquely down and forward; third segment enlarged with scales at the outer end similar to the second segment; proboscis short and scaled basally; ocelli present; antennæ about half the length of the costa, ciliate in the male, simple in the female; thorax smooth; hind tibiæ with long scales along the upper side and middle, and hind tibiæ thickened with scales at the middle and end.

Fore wings ovate or somewhat triangular, with twelve veins, 1 with a long fork at the base, 7 and 8 forked, the others separate. Hind wings a little wider than the fore wings, with 1 b forked at the base, 3 and 4 forked or from one point, 7 and 8 connected by an oblique vein near the basal fourth of the wing. Median vein not pectinate towards the base above.

ORCHEMIA DIANA, Hüb.

Tortrix diana, Hüb. Sam. Eur. Schm. Tort., Pl. 44, Fig. 247 (1823).

Choreutis diana, Hüb. Verz. Schm., p. 373 (1826).

Simæthis diana, H.-S. Sch. Eur., Vol. V., p. 94, Pl. 38, Figs. 257-261 (1839).

Coccyx decorana, Zett. Ins. Lap., 982 (1840).

Simathis diana, Zell. Isis, Vol. 30, p. 208 (1846).

Amphisa luridana, Walk. Cat. Lep. Hct., 28, p. 318 (1863).

Expanse of wings, 15-17 mm. Head, thorax and fore wings green, the latter with the first cross line dark brown or black, much thicker on the costa and giving off two outward angles. Second line gives off an acute angle beyond the cell and another on vein 2. Both of these lines are bordered more or less widely with white or greenish-white and more or less diffused. The median shade is represented by a dark brown angulated line from the cell to the hind border, but this is often obscured by the white shade on this part of the wing. Hind wings uniformly dark fuscous. All the fringes dark fuscous, but with a lighter streak through the middle.

I have long had this species in my collection from American localities, having received it from Halifax, N. S.; White Mts., N. H., and I also took several specimens in June, 1877, at Orono, Me., in an open pasture. Walker described it from St. Martin's Falls, under the name of *Amphisa luridana*. I have also a dark variety of this species from Prof. C. P. Gillette, taken in Colorado.

The early stages and food plant are unknown, but Hartmann states that he found it on the wing near Munich in June and July between a pine forest and a juniper. The pasture in Orono where it was taken had more or less juniper (*Juniperus communis*) scattered over it, and was by the side of woods containing pine, spruce and other evergreen trees, but as there were many other kinds of plants in the immediate vicinity, I do not think this at all conclusive or even hardly suggestive concerning the food plant of this insect.

Genus HEMEROPHILA, Hüb., Tentamen (1806).

Head smooth and rounded; labial palpi medium, slightly curving up in front, strongly roughened beneath, third segment short and blunt; proboscis present, short and scaled at the base; ocelli present; antennæ half the length of the costa or a little more, simple in the female, ciliated in the male. Thorax smooth, hind tibiæ hairy along the upper side, middle and hind tibiæ thickened with scales at the middle and end.

Fore wings ovate or somewhat triangular, with acute apex and twelve separate veins: 1 with a long fork at the base; 2 arises from the outer third of the median vein, 3 to 10 arise at nearly equal distances from each

other, 7 ends in the outer margin and 8 in the costa a little before the apex, 11 arises from near the basal fourth of the subcostal vein; cell closed and with the superior and inferior cellular veins both present, but difficult to distinguish. Hind wings ovate, with eight veins, three internal veins present, 1 b forked at the base, 2 beyond outer fourth of median, 3 and 4 stalked, base of stalk and 5 and 6 arising nearly equidistant, 8 free from the base of wing, cell closed, with two cellular veins very indistinct, median not hairy above towards the base.

The only species under this genus occurring in North America so far as known at present is *vicarialis*, which Zeller described and published in the *Verhandlungen der k.k. zoologisch-botanischen Gesellschaft*, p. 322 (1875), giving the habitat "Maine or Massachusetts." This species is unknown to me.

Genus CHOREUTIS, Hüb., *Verz.*, p. 373 (1826).

Head smooth, with the front sloping; labial palpi with the first and second segments armed beneath with long bristles, those of the second segment collected into four tufts nearly as long as the segment itself, the third segment slim and pointed, about as long and but little larger than the tufts on the under side of the second segment; proboscis short; eyes medium, hemispherical; ocelli present; antennæ about two-thirds as long as the costa, ciliate in the male, simple in the female; thorax smooth, hind tibiæ hairy along the upper and lower sides; middle and hind tibiæ thickened with scales at the middle and end; abdomen untufted; uncus present, claspers large.

Fore wings oblong ovate, with metallic markings; twelve separate veins, 1 with a fork at the base about one-third of the length of the vein, 2 arises from the outer fourth of the median, 3 to 5 usually arise nearly equidistant from each other, though in some species 3 and 4 arise from one point or very near each other, and 5 and 6 are more remote than the others, 11 arises from the basal third of the subcostal, superior and inferior cellular veins generally visible. Hind wings ovate, with eight veins, 1 b forked at the base, 2 arises from the outer fourth of the median, 3 and 4 stalked or coalesced, 5, 6 and 7 arise nearly equidistant, 7 from the upper angle of the cell, 8 free, from the base of the wing; cell closed, with two very indistinct cellular veins, median not hairy above towards the base.

SYNOPSIS OF THE NORTH AMERICAN SPECIES.

1. { Basal third of fore wings white *leucobasis*.
 { Basal third of fore wings not white 2.
2. { Fore wings with metallic markings green *inflatella*.
 { Fore wings with metallic markings not green 3.
3. { Two yellowish stripes across the outer part of fore wing . . . *virginiella*.
 { No yellow on outer part of fore wings 4.
4. { Two clear white stripes across the fore wings *ouustana*.
 { Without clear white stripes across the fore wings 5.
5. { Base of fore wings marked more or less with yellow . . . *bjerkandrella*.
 { Base of fore wings not marked with yellow *occidentella*.

C. BJERKANDRELLA (Thunb.). Dis. Ent. Ins. Suec., I, p. 24, Pl. 3, Figs. 23, 24 (1784).

silphiella, Grote, Pap., I, p. 40 (1881).

gemmalis, Hulst, Tr. Am. Ent. Soc., Vol 13, p. 148 (1886).

soroculella, Dyar, CAN. ENT., Vol. 32, p. 86 (1900).

Var. a. *pretiosana*, Dup., Hist. Nat., IV., p. 182, Pl. 65, Fig. 9.

australis, Zell., Isis (1847).

Habitat.—Ill., Mo., Tex., Cal., Ore., and Europe.

Food.—In Europe, *Inula salicina*, *Inula dysenterica*; *Helenium*; *Carduus crispus*; *Carlina acaulis*; *Veronica*. In America, *Silphium interrifolium* (Coquillett).

Miss Murtfeldt sent me the following notes on this species :

"The larva is found late in June (in Missouri), and again in October, mining and webbing the leaves of *Gnaphalium polycephalum*. When small it works chiefly between the cuticles of the leaves, but later feeds externally, spinning quantities of somewhat viscid web, among which the black powdery frass is profusely scattered.

"The mature larva is 6 mm. in length by 1.5 in diameter across middle segments, from which it tapers very slightly in both directions; form cylindrical, sub-moniliform. Colour translucent, whitish green, immaculate. Head oblique, same colour as body, but horny and polished. Collar inconspicuous. Legs concolorous with general surface. Before the first transformation it becomes gregarious, the larvæ spinning their dense white sticky cocoons, something to the number of a dozen in close proximity in the general web.

"Pupa pale golden brown, 4 mm. in length, and rather stout, with no especially marked characters.

"Imagines in seven or eight days after pupation.

"In Central Missouri the species is rather rare, and, within the limits of my observation, has only occurred three times within the last dozen years, although careful watch for it has been maintained upon its food plant. So far it has not been found upon any *Gnaphalium* or *Antennaria*, except *G. POLYCEPHALUM*. I have never taken this species at light."

C. INFLATELLA (Clem.), Proc. Ent. Soc. Ph., Vol. II., p. 5 (1863);
Tineina of N. A., p. 209 (1872).

Dr. Clemens states that he described this species from a "single specimen taken on the wing in July," presumably at Easton, Pennsylvania. The type of this species has probably been lost, as I could not find it in the collection of Dr. Clemens, now owned by the Am. Ent. Soc. I would not be greatly surprised if it should prove to be a variety of *hjerkandrella*.

C. OCCIDENTELLA, Dyar, CAN. ENT., Vol. 32, p. 86 (1900).

I have long had this species in my collection under the name of *Choreutis coloradella*, and had so named it for others, but had not published a description of it, so that Mr. Dyar's name will hold. His type is in poor condition, else he would probably have recognized that it was the same as my *C. coloradella*, specimens of which I had sent to the National Museum.

Choreutis extrinsicella, Dyar, seems to be a badly-faded specimen of the above. After a careful examination and comparison of the single type specimen with all the material before me, I should not feel justified in considering it a distinct species.

C. ONUSTANA (Walk.). Cat. Lep. Het., 30, p. 996 (1864).

Habitat.—Nova Scotia; Amherst, Mass.

C. LEUCOBASIS, n. sp.

Expanse of wings 10 to 12 mm. Head, thorax and base of fore wings pure white. Outer two-thirds of fore wings dark fuscous or reddish brown, with an oblique, white costal streak before the apex, and two others of the same colour, but much smaller, on the costa between this and the white base of the wing. Outer part of the wing more or less overlaid with white scales, so dense beyond the cell as to fuse and form a distinct whitish patch. There are numerous clusters of metallic scales

scattered over the outer part of the wing, some of which form a curved line around the apex on the border, and there are two large clusters of them resting on a black ground between the white patch and the fold. Fringes reddish brown.

Hind wings and upper side of abdomen fuscous. Under side of all the wings fuscous, with the white costal spots reproduced, and there are several whitish cross lines on the under side of the hind wings. Under side of the body white. Legs white, annulate with black.

Described from four specimens, two from London, Ontario, and two from Massachusetts. This species was figured by the late Townend Glover in his unpublished work on N. A. Lepidoptera, Pl. 83, Fig. 21.

C. VIRGINIELLA (Clem.). Proc. Ent. Soc. Ph., 3, p. 505 (1864); *Tineina* of N. A., p. 257 (1872).

Habitat.—Va., W. Va., Penn.

BRENTHIA, Clem. Proc. Ac. Sci., I., p. 172 (1860).

Head smooth and rounded; labial palpi moderately longer, slender, smooth and pointed, slightly curving up in front, the terminal segment being shorter than the second. Proboscis very short and slightly scaled. Eyes oval and rather prominent; ocelli present, large. Antennæ simple in the female, but rather densely ciliated in the male, about half the length of the costa.

Fore wings ovate, with rounded apex and twelve separate veins: 1 with a long fork at the base, 2 from very near the angle of the cell, which is closed and extends to near the middle of the wing; cross vein convex on the outside; 10 arises from the upper angle of the cell and 11 from the subcostal before the middle. Hind wings somewhat triangular, with eight veins: 1 b furcate at the base, 2 from near the end of the cell, which is closed and scarcely reaches to the middle of the wing; 3 and 4 from a stem which arises from the lower angle of the cell, 5, 6 and 7 nearly equidistant and parallel, 8 arises free from the base of the wing.

B. PAVONICELLA, Clem. Proc. Phil. Ac. Sci., p. 172 (1860); *Tineina* of N. A., p. 134 (1872).

Microethia amphicarpeana, Cham. CAN. ENT., Vol. X., p. 76 (1878.)

Habitat.—Penn., Ill., Kan., Tex., W. I., Panama ; Brazil.

Food.—*Amphicarpæa monoica* (Chambers).

WALSINGHAMIA, Riley. Proc. Ent. Soc., Wash., I., p. 157 (1888).

W. DIVA, Riley. Proc. Ent. Soc., Wash., I, p. 158.

Habitat.—Florida.

Food.—*Ficus*.

W. SLOSSONIA, n. sp.

Expanse of wings, 15 mm. Head, palpi, antennæ and thorax dark brown, with metallic reflection in certain lights. Fore wings dark brown, with a straight band across the middle, on each side of which a considerable portion of the wing is abundantly sprinkled with whitish scales, which are arranged into very fine cross lines near the band, but more irregularly toward the outer edge, which is more oblique than the outer margin of the wing. The basal and outer portion of the wing beyond the white sprinkled area, and the cross band except a black edge on each side, are changeable in colour when seen at different oblique angles, from deep violet to bright metallic red or flame colour, or golden yellow ; in fact, the play of colours under a lens is quite remarkable. Fringe at the base concolorous with the adjacent part of the wing, dark fuscous on the outer part. Hind wings and abdomen above and beneath, and the under side of the fore wings, dark fuscous brown. Legs dark fuscous brown, with the first three segments of all the tarsi white at the base.

Collected at Biscayne Bay, Florida, by Mrs. Anna T. Slosson, for whom I take very great pleasure in naming this insect.

SETIOSTOMA, Zell. Verh. der k. k. Zool.-Bot., Ges., p. 324 (1875).

Head smooth and rounded ; labial palpi curving up in front, closely scaled, third segment quite long, smooth and pointed. Proboscis short and scaled at the base. Ocelli present. Antennæ simple in the female, a little more than half the length of the costa.

Fore wings oblong ovate, with twelve separate veins, the cell extending three-fourths the length of the wing : 1 with a long fork at the base, 2 and 3 from before the end of the cell, 4 and 8 from the two angles of the cell, 5, 6 and 7 arise from the cross vein about equidistant from each other. Hind wings somewhat triangular, with 7 veins : 1 b furcate at the base, 2 from the outer fourth of the cell, 3 from the lower angle, 4 wanting, 6 and

7 forked, the stem of which arises from the upper angle ; 8 free, from the base of the wing.

S. XANTHOBASIS, Zell. Verh. der k. k. Zool.-Bot., Ges., p. 325 (1875).

Habitat.—Fla., Tex., Ill.

The following notes on this species were kindly sent to me by Miss Mary E. Murtfeldt, who bred it at her home in Kirkwood, Missouri:

“The larva of *Setiostoma xanthobasis* was collected September 27th, 1890, on a variety of *Quercus stellata*. It fastened two leaves together flatly, but not with the surfaces closely applied—the web under which it was feeding, which was irregularly circular and about $\frac{3}{4}$ of an inch in diameter, being curiously ‘boxed’ on the margin, 1.5 inch in height where the two leaves were furthest apart. Within this fence it was feeding upon the parenchyma of the under surface of the leaf, rejecting even the smallest veins.

“At the date mentioned it seemed to be about full-grown, and may be characterized as follows: Length 15 mm., diameter 3 mm.; form sub-depressed, broadest across thoracic segments. Colour, a dull, watery, somewhat livid green, mottled with dull crimson—ventrally as well as dorsally. Abdominal segments marked on dorsum with two broad, irregularly outlined, longitudinal streaks, connected by a transverse, slightly curved crimson line. Piliferous spots and hairs inconspicuous.

“Head short, thick, pale brown, with central spot of dark brown. Cervical collar narrow, covering only one half of the first segment, horny, pale brown.

“Anal plate triangular, horny, pale brown. Thoracic legs pale brown. Prolegs similar in colour to general surface.

“On Oct. 15th, after a period of ten days’ quiescence, this larva left its neat case between the leaves and spun up in an inconspicuous, tough little cocoon under the folded edge of one of the leaves.

“Imago appeared May 15th, 1891.”

S. FERNALDELLA, Riley. Proc. Ent. Soc., Wash., I, p. 155 (1888).

Habitat.—Los Angeles, Cal.

Food.—*Quercus agrifolia*.

NEW NORTH AMERICAN ORTALIDÆ.

BY CHAS. W. JOHNSON, PHILADELPHIA, PA.

Pyrgota Chagnoni, n. sp.

♂.—Head reddish, vertex reticulated with brown, cheeks and occiput yellowish, antennal foveæ brown; antennæ yellow, thorax and scutellum red; numerous fine brown specks are so arranged as to form two obsolete dorsal lines and two spots on each side divided by the suture; this character is especially noticeable when looking from the head toward the scutellum, and gives the disc of the thorax a rugose appearance. Abdomen narrow, brownish, shining, posterior margins of the second, third, fourth and sides of the fifth segment more or less blackish. Halteres yellow. Legs variable in colour, with thick black hairs, especially on tibiæ, anterior and middle coxæ, basal half of all the femora and tibiæ, and all except the terminal joint of the tarsi yellow; posterior coxæ and the terminal portion of the femora reddish; outer half of all the tibiæ and the terminal joint of the tarsi blackish; the outer portion of the posterior tibiæ is intensely black, while the black of the anterior tibiæ is due largely to long thick hairs. The wings can best be described by reversing that of *P. valida*, Harris, given by Loew (Monog., Pt. III., p. 75). The whole surface of the wing has a rather uniform yellowish-gray tinge, variegated by numerous irregular, more or less confluent, maculations of a dark brown colour; at the apical portion of the wing the markings become more united, forming a noticeably darker area; the dark markings are also more prominent at the junction of the second and third longitudinal veins and along the small cross veins; in the costal and marginal cells the markings are larger and subquadrate; the costal, auxiliary and basal half of the first and second longitudinal veins, yellow, the others dark brown. Length 14 mill.

One specimen of this handsome species was collected by Mr. Gustave Chagnon, on Montreal Island, Canada.

Stenopterina bicolor, n. sp.

(*Stenopterina*, n. sp., Proc. Acad. Nat. Sci., Phila., 1895, p. 337.)

Head reddish brown, with short yellow pile; above the base of the antennæ, the bottom of the antennal foveæ and mouth-parts, blackish; orbits narrowly margined with light yellow pubescence; vertical triangle surrounding the ocelli reddish-yellow; antennæ reddish. Thorax dark metallic blue, with short yellow pile; humeri and the area extending from

the antealar protuberance around the base of the wings to the posterior angle and across the posterior portion of the mesonotum, and the scutellum, reddish; metanotum bluish, but on each side reddish. Abdomen metallic blue, with short yellowish pile. Halteres and legs reddish-yellow. Wings brownish, costal cells, the middle portion of the submarginal cell along the third longitudinal vein, basal third of the large basal cell, and the two smaller basal cells, yellowish; a small spot near the outer end and a line near the base of the discal cell, central portion of the first and all of the second and third posterior cells, the anal cell and alula brownish hyaline. Length 13 mill.

Two specimens, one of which is in the collection of the University of Kansas, were collected by the writer, at St. Augustine, Florida.

Rivellia floridana, n. sp.

(*Rivellia*, n. sp., Proc. Acad. Nat. Sci., Phila., 1895, p. 337.)

Head reddish, orbits narrowly margined with silvery-white; antennæ yellow. Thorax and scutellum red. Abdomen, first and second segments reddish, the others black; halteres reddish; legs yellow. Wings hyaline, veins yellow; crossbands brown or brownish-yellow, and wider than *R. variabilis* and allied species; the first and second bands are very narrowly connected at the junction of the auxiliary and first longitudinal vein, second and third coalesce at or just below the fourth longitudinal vein (in the latter case there is a very small hyaline triangle, formed by the two bands and fourth longitudinal vein), and end in a point at the posterior margin near the junction of the fifth longitudinal and transverse vein; here also the first band obscurely coalesces with the first and second; the fourth or apical band narrowly separated or more narrowly connected with the third at the tip of the second longitudinal vein. Length 5 mill.

Four specimens were collected by the writer on Dayton Island, Lake George, Florida, May 9, 1894.

DESCRIPTION OF TWO NEW SPECIES OF TABANIDÆ.

BY JAMES S. HINE, OHIO STATE UNIVERSITY.

The limits of the subgenus *Atylotus* as restricted by Osten-Sacken are not easy to determine. The presence or absence of the ocelligerous tubercle is the character which gives most trouble, for in some species it seems to be absent in the female and present in the male, and one could convince himself without a great amount of imagination that in some species it is present in one specimen and absent in another of the same sex. The type of the subgenus is *bicolor*, and associated with it are other equally peculiar species whose characters place them at once in *Atylotus*. They are small forms in which the usual banding of the eyes is lacking, as are also the frontal callosity and subcallous. The wings are glassy, transparent, resembling those of some other Tabanids when teneral.

The following species of the group appear to be undescribed :

Tabanus pruinosus, n. sp.

Length 10 mm. Colour black, opaque, the whole body having a pruinose appearance.

Female.—Front yellowish pollinose, clothed with rather short yellowish hair; frontal callosity, subcallous and ocelligerous tubercle wanting; face and cheeks yellowish pollinose and clothed with long white hairs; palpi whitish; antennæ yellowish, the first section of the third joint of medium width, gently convex below and prominent above; eyes pubescent, unicolorous; thorax dull black, clothed with long white hairs; wings hyaline, marginal cell dilute yellowish; coxæ and bases of all the femora black, tips of tarsi brown, remainder of legs yellowish; dark hairs on all the legs have a tendency to make the legs appear dusky; abdomen black, very sparingly red on the sides of the first two segments, and clothed with light hair, which usually is shorter than on the thorax.

Male.—Differs from the female in having the abdomen more broadly red on the sides—extending back on to the third segment.

Five males and three females taken in central and northern Ohio in June.

Tabanus thoracicus, n. sp.

Length 9 mm. Thorax gray pollinose, abdomen piceous, yellow on the sides.

Female.—Front yellowish pollinose, clothed with short yellow hairs; frontal callosity and subcallous absent, occiput gray, face and cheeks yellowish gray pollinose, clothed with rather short hairs, some of which appear dark, almost black from some views; antennæ yellow, first section of third joint narrow, as compared with *bicolor*, gently convex below, prominent above; thorax gray, clothed with white hairs; legs yellow; all the femora darker at base, but this colouring is most apparent in the middle pair; last joint of all the tarsi brown, tibiæ and tarsi clothed with dark hairs, wings transparent, marginal cell and some of the longitudinal veins yellow; abdomen above piceous, yellow on sides of the first four segments; below a narrow, piceous stripe is present on the first three segments, on each side of this stripe the first two segments are plain yellow, and the apical part of the abdomen is variegated with piceous and yellow.

Male.—Differs from the female in having the basal half of all the femora dark, and less yellow on the venter of the abdomen.

Two females and a male collected at Oswego, N. Y., in August; the property of the National Museum.

This species differs from *bicolor*, to which it is most closely related, in its colour, smaller size and more slender form, and in the striking difference in the form and width of the third antennal joint of the female.