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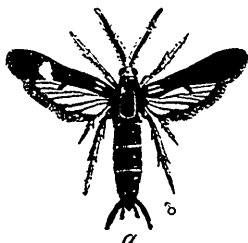
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THE CANADIAN
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VOLUME XXIII.



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No. 1.

DESCRIPTIONS OF SOME NEW CANADIAN BRACONIDÆ.

BY WM. H. ASHMEAD, BERLIN, PRUSSIA.

The interesting new species of Braconidæ described below, unless otherwise stated, were all captured by my good friend Mr. W. Hague Harrington, at Ottawa, Canada.

BRACON FABR.

(1) *Bracon brachyurus* n. sp.

♀.—Length $2\frac{1}{2}$ mm.; ovip. $\frac{1}{2}$ mm. Black, polished; mandibles, palpi and legs, except the posterior coxæ and the basal two-thirds of their femora, yellowish-brown. Tegulæ honey-yellow. The head is transverse, the cheeks rounded off posteriorly. Antennæ 22-jointed. The parapsides are not sharply defined, only indicated by slight depressions in the mesonotal surface. Metathorax finely rugose with a delicate median keel. Abdomen oval, depressed, the 1st and 2nd segments wrinkled or slightly rugose, the segments beyond smooth, shining, and all of nearly an equal length. Wings hyaline, the venation brown; the recurrent nervure is not interstitial with the 1st transverse cubital, and the 2nd branch of the radius is about twice the length of the 1st.

Described from a single specimen.

(2) *Bracon melanaspis* n. sp.

♀.—Length $2\frac{3}{4}$ mm.; ovip. $\frac{3}{4}$ m.m. Black, polished; mandibles, palpi and legs, except the posterior pair which are entirely black except the apex of the femora, and extreme apex of abdomen, brownish-yellow. The wide lateral membranous portion of 1st abdominal segment, pale yellow. The head as in the previous species. Antennæ very long 28-jointed. Tegulæ black. Parapsidal grooves not sharply defined, and fringed with long hairs. The scutellum is also sparsely pubescent. Metathorax and pleuræ smooth, shining. Abdomen oval, the 1st segment with a smooth, black shield, the sides of which are parallel and the disk

with a slight elevation. Wings greyish-hyaline, due to the pubescence, venation brown, the 1st branch of the radius more than half as long as the 2nd, the recurrent nervure not interstitial with the 1st transverse cubital.

Described from one specimen.

(3) *Bracon nigridorsum* n. sp.

♀.—Length $3\frac{1}{5}$ mm.; ovip. $\frac{4}{5}$ mm. Black, polished; mandibles, palpi, legs, including coxæ, and the abdomen, except the disk of 1st, 2nd, 3rd, 4th and 5th segments, which are black, wholly pale brownish-yellow. Tegulæ honey-yellow. Antennæ 35-jointed. Parapsides distinct. Metathorax and mesopleuræ smooth, polished, the latter with a single fovea near the posterior suture. Metapleuræ very hairy. Abdomen long oval, the shield of the 1st segment trapezoidal, finely rugose, rounded off at apex and between it and the lateral margins of the segment are two long channels; the 2nd segment is slightly shagreened at base. Wings hyaline, strongly iridescent, the venation brown; the 2nd branch of the radius is twice the length of the 1st, the recurrent nervure not interstitial.

SPATHIUS NEES.

(4) *Spathius Canadensis* n. sp.

♀.—Length $2\frac{4}{5}$ mm.; ovip. $1\frac{2}{5}$ mm. Reddish-brown, the dorsum of thorax blackish or dark fuscous, the abdomen, except the long petiole and the base of the 2nd segment, black. The antennæ are honey-yellow, very long, multiarticulate, the posterior femora and tibiæ slightly fuscous. Head perfectly smooth, polished; the thorax delicately shagreened, the parapsidal grooves very distinct, deep; the metathorax with 3 or 4 delicate longitudinal carinæ. Wings fuscous, the base and tips hyaline and with a white or hyaline band across the middle, including the basal half of the stigma.

Described from one specimen. The species comes nearest to *L. Lafammei* Prov., but is readily separated from it and other species by its smaller size, perfectly smooth head and by the brevity of the ovipositor.

CÆNOPHANES FÖRSTER.

(5) *Cænophanes borealis* n. sp.

♀.—Length $3\frac{3}{5}$ mm.; ovip. $\frac{4}{5}$ mm. Very elongate, black, finely rugose; the quadrate head is smooth, but with delicate transverse aciculations on

the vertex; the apical portion of 3, 4 and 5 abdominal segments, two-thirds of the 6th and the 7th wholly smooth and polished. Antennæ honey-yellow, long and slender. Legs brownish-yellow, the posterior coxæ black, the anterior and middle pairs more or less dusky basally. Parapsidal grooves distinct, the middle lobe with a median longitudinal furrow. Wings hyaline, the venation as usual, the 1st transverse cubital vein obliterated.

Described from one specimen.

RHOGAS NEES.

(6) *Rhogas mellipes* n. sp.

♂.—Length $3\frac{1}{2}$ mm. Black; Antennæ 29-jointed, brown; mandibles, palpi and apical abdominal segment white; legs, including coxæ uniformly pale honey-yellow. Head smooth, polished, the face with some sparse hairs. Thorax with parapsides distinct, the three lobes, except the middle lobe posteriorly just in front of the scutellum where it is coarsely rugose, are smooth and polished. Scutellum rufous. The upper portion of the mesopleuræ and the metathorax coarsely rugose. Abdomen, except the three basal segments which are coarsely longitudinally striated, smooth, shining; the apical edge of the 3rd segment is tinged with rufous. Wings hyaline, the venation pale brown; the second branch of the radius is only slightly longer than the 1st.

Described from one specimen.

MICROPLITIS FÖRSTER.

(7) *Microplitis cincta* n. sp.

♂.—Length $3\frac{2}{3}$ mm. Black, opaque, rugoso-punctate, and with a sparse, short pubescence; the palpi, legs, the membranous portion of the 1st, and 2nd and 3rd abdominal segments reddish-yellow; the posterior coxæ basally, a small spot at extreme tips of their femora and tarsi fuscous; the apical joints of antennæ and the middle tarsi are also fuscous. Antennæ 18-jointed, black, except as mentioned, longer than the body, the 1st two joints of flagellum of about an equal length, and slightly longer than the joints beyond. Parapsides indicated slightly posteriorly. Mesopleuræ with an oblique groove on the disk. Metathorax coarsely rugose without carinæ, except two slight ones laterally extending in the form of an indistinct channel from the rounded spiracles. Abdomen

oval, depressed, smooth and shining; the shield of the 1st segment linear, and with the posterior corners rounded off. Wings hyaline, the stigma and most of the costæ, brown-black, the other veins brown; areolet large, closed.

Described from one specimen.

This species comes nearest to *M. mamestræ* Weed.

OPIUS WESMAEL.

(8) *Opius Canadensis* n. sp.

♂.—Length $2\frac{2}{5}$ mm. Black, polished; the orbits broadly, the face wholly, the scape and two or three flagellar joints beneath, legs, including coxæ, the lateral or membranous portion of 1st and 2nd abdominal segments, and the suture between the 2nd and 3rd, all honey-yellow; the posterior tibiæ apically and their tarsi slightly dusky. Antennæ as long as the body, 35-jointed, brown. Wings hyaline, the venation brown, the recurrent nervure almost interstitial with the first transverse cubital, the median and submedian cells of an equal length. Metathorax smooth, with some sparse, long bristles scattered over its surface. The shield of the 1st abdominal segment is longer than wide, smooth, the disk impressed, the sides parallel; the 2nd and 3rd segments are slightly rugose, the following smooth, shining, sparsely hairy.

Described from one specimen.

(9) *Opius bicarinatus* n. sp.

♂.—Length $3\frac{3}{5}$ mm. Robust, black, shining and pubescent. Head broad, rugosely punctate; face with glittering pile; palpi and legs pale rufous, the posterior coxæ black. The thorax has the parapsidal grooves coarsely indicated and punctured at bottom, across the base of the scutellum is a deep broad fovea, while the pleuræ are rugoso-punctate. The metathorax is finely rugose, and there is a large fovea on each side of the post scutellum. Abdomen oval, depressed, rufous, the base and apex black; the 1st segment is the longest with two carinæ on the disk and rugose, the 2nd segment is also rugose, while the following segments are smooth and covered with fine hairs. Wings hyaline, the venation dark brown; the 2nd submarginal cell is much narrowed at apex, from an exceedingly short 2nd transverse cubital nervure, and this will be found to be a good character to distinguish the species.

Described from one specimen.

IDIASTA FÖRSTER.

(10) *Idiasta macrocera* n. sp.

♂.—Length $3\frac{2}{3}$ mm. Black, highly polished, the second abdominal segment with a rufous stain. Antennæ 40-jointed, nearly twice as long as the body, brown, the scape and 2nd joint red, the 4th about one-third longer than the 3rd. Palpi pale; mandibles and legs red. Thorax with the parapsidal grooves indicated only anteriorly by short, punctate lines, a grooved line on the shoulders and a fovea just in front of the scutellum. The scutellum has at base two large foveæ separated by a slight carina. Mesopleuræ smooth, with a broad punctate space between them and the mesopectus. Metathorax coarsely rugose. Abdomen ovate, and excepting the petiole, which is longitudinally striated, smooth and polished. Wings hyaline, the stigma very large, ovate, brown, the veins paler.

Described from one specimen.

APHIDIUS NEES.

(11) *Aphidius macrogaster*. n. sp.

♂.—Length $3\frac{1}{2}$ mm. Head, thorax and legs rufous; the anterior legs slightly yellowish. The abdomen is very long, lanceolate, slightly more than twice the length of the head and thorax combined, terminating in a small curved prong. Antennæ 20-jointed, brown, the joints of the flagellum about twice as long as thick. The mesonotum exhibits some fine longitudinal aciculations just in front of the scutellum and the parapsidal grooves are present, otherwise it is smooth and shining. Wings hyaline, the venation brown; the 2nd branch of the radius is about as long as the transverse cubital nervure.

Described from one specimen.

The species approaches nearest to *A. bicolor* Ashm.; but that species is larger, the head black, and the sculpture of the mesonotum is different.

(12) *Aphidius crassicornis* n. sp.

♂.—Length $2\frac{1}{8}$ mm. Black polished; clypeus piceous; mandibles, palpi, two basal antennal joints and legs, yellow, the middle and posterior tibiæ and tarsi slightly obfuscated. Antennæ 21-jointed, stouter than usual and remarkable for the shortness of the flagellar joints, which are hardly longer than wide and readily separate the species from all other described forms. The abdomen, except a rufous tinge on the 2nd seg-

ment, is black, smooth, the petiole being slightly roughened and about twice as long as wide. Wings hyaline, the venation brown.

Described from one specimen. A ♀ named in ms. *A. brevicornis*, but which I now believe to be the opposite sex of the above species, agrees with it in colour, but has unusually short, 16-jointed antennæ that do not extend beyond the apex of the metathorax, and while the flagellar joints are also short, they are yet distinctly longer than wide.

The opportunity is taken here to describe three other species in this genus, which have been long in my collection, as follows:—

(13) *Aphidius pinaphidius* n. sp.

♂ ♀.—Length $2\frac{2}{5}$ to 3 mm. Brownish-yellow; in the ♂ the occiput, disks of metathorax and abdomen are black or blackish; in the ♀ only the abdomen shows a dark blotch or shade above toward the tip, otherwise it is wholly brownish-yellow. The ♂ antennæ are 25-jointed, the ♀ 16-jointed, and in both sexes the flagellum is black, the joints being longer than wide, while the mesonotum is distinctly punctate. Wings hyaline, venation as usual brown.

Hab.—Jacksonville, Fla.

Described from several specimens reared by me many years ago from the pine aphid *Lachnus Australis*.

(14) *Aphidius bifasciatus* n. sp.

♀.—Length $2\frac{1}{5}$ mm. Brownish-yellow; the abdomen and flagellum black, the petiole yellowish.

This species has 20-jointed antennæ, a peculiar shagreened punctuation, no parapsidal grooves, two transverse brown bands on the anterior wings, and thickened or swollen posterior femora.

Hab.—Jacksonville, Fla.

Described from a single specimen reared from the pine aphid. The banded front wings and the swollen posterior thighs readily distinguish the species.

(15) *Aphidius nigriceps* n. sp.

♂.—Length $2\frac{2}{5}$ to $2\frac{1}{5}$ mm. Bright yellow testaceous, smooth and polished; the head above and the disk of the mesonotum black. Sometimes the disk of two or three of the abdominal segments also show dusky blotches or shades. The antennæ are 21 or 22-jointed, very long, black, except the two basal joints; the flagellar joints are about twice as long as

thick and delicately fluted. The mesonotal grooves are wanting. Metathorax areolated. The abdominal petiole is about two and a-half times as long as wide, finely rugose and with a slight constriction at about the middle above. The middle and posterior tarsi are slightly dusky. Wings hyaline, the venation pale, the 2nd branch of the radius longer than the transverse cubital nervure.

Described from two specimens taken by Mr. E. A. Schwarz, at Oakland, Md.

LIPOLEXIS FÖRSTER.

(16) *Lipolexis fuscicornis* n. sp.

♀.—Length $1\frac{3}{8}$ mm. Black, polished; mandibles, palpi, two basal joints of antennæ base of third, legs and petiole flavo-testaceous, the 2nd abdominal segment piceous. Face scaly. Antennæ 12-jointed, the flagellum slightly thickened toward tip, fuscous, the joints twice as long as thick. Wings hyaline, the venation brown, the radius unusually long and almost forming a closed radial cell.

Taken at Ottawa. This is the only species to be described in this genus with 12-jointed antennæ, and this character, with the long radial vein, will readily distinguish it from the several other species now placed here.

HISTEROMERUS WESMAEL.

(17) *Histeromerus Canadensis* n. sp.

♀.—Length $2\frac{1}{8}$ mm.; ovip. $\frac{2}{3}$ mm. Black, polished; collar and prosternum flavo-testaceous; legs yellowish-red. The oblong head is a little longer than wide, a little wider behind than in front, smooth and polished, except some punctures above the clypeus. Antennæ 15-jointed, and when extended backward extend only to the tegulæ. The dorsum of thorax is flattened, the parapsidal grooves indicated only anteriorly by some punctures. The abdomen is as long as the head and thorax together, compressed, black, the sutures of the ventral segments tinged with yellow. Wings subhyaline, somewhat narrowed, the veins brown; the 2nd submarginal cell is long and rather narrow, about one-third longer than the 3rd; the recurrent nervure enters the 2nd submarginal cell at its lower posterior angle.

Described from a single specimen. Its smaller size, colour and the paucity of joints in the antennæ, will at once separate it from *H. mystacinus* Wesmael.

NOTE ON THE OCCURRENCE OF *LEPISESIA FLAVO-FASCIATA*, BARNSTON.

BY H. H. LYMAN, MONTREAL.

Having been asked by Sir William Dawson to look over two collections of insects which had been sent in in competition for a prize, I was delighted to find in one of them a specimen of this very rare moth.

Knowing that everything in connection with the capture of such a rarity would be of interest, I asked Sir William to ascertain from Mr. R. McDougall, the collector, all the facts that he could furnish in connection with such an interesting event, and I duly received, through Sir William, a letter about it, from which I extract the following account:—

“The moth was caught at Ormstown, Chateauguay County, and was the only one observed during the summer. If I remember aright, it was captured on the wing, about three o'clock one bright sunny afternoon. It was hovering over a garden, where many kinds of flowers were growing side by side. The capture was made, I believe, about the middle of June.”

This species has been taken sparingly at widely separated localities. It was described by Barnston from a specimen taken at St. Martin's Falls, on the Albany River, Hudson's Bay Territory. Grote and Robinson gave its habitat as the Atlantic district. Strecker figured it on Plate XIII., fig. 4, of his “Lepidoptera,” but in nature the yellow of the hind wings is brighter, and with a good deal more orange in it than would be supposed from Strecker's figure. Strecker gave the localities as Canada; Holyoke, Mass.

Prof. Fernald says of this species:—“The early stages and food plant of this exceedingly rare moth are unknown. It has been taken in Canada, Massachusetts, Belfast and Orono, Maine. Mr. Thaxter informs me that he saw one at Kittery, Maine, flying around the flowers of Larkspur in June. It flies in the middle of the day in the hot sunshine around the flowers of apple, lilac, shad-bush, etc. It appears to be one of our earliest day-flying sphinx moths.”

THE HABITS OF A GROUND-HORNET.

BY WM. T. DAVIS, TOMPKINSVILLE, STATEN ISLAND, N. Y.

Stizus speciosus is the largest native ground-hornet, and its formidable appearance and great activity generally secure it undisputed possession of the square rod where it happens to alight. It is from an inch to an inch and one-half in length; the head and thorax are brown, and the abdomen is black with six irregular yellow blotches. These markings are discernible as it flies swiftly about its business, and give it a particularly tiger-like appearance. It seems to be afraid of nothing, and if you walk near its burrow it flies with a menacing buzz in circles about you, and its brown, black and yellow body gleams in the sunlight.

In constructing its burrows, it usually selects a country roadside or a dry, barren hill, where a freedom from roots makes digging less laborious.

On the hill back of Richmond village, on Staten Island, I have seen them carrying heavy harvest-flies to these burrows, several of which are dug there nearly every summer. The task of carrying so great a burden as a *Cicada* is a particularly laborious one, and they do not fly very fast when thus heavily laden. Sometimes they drag the harvest-flies a distance along the ground, and sometimes they resort to an ingenious method to finally get them to their burrows.

In August, 1889, I observed a *Stizus* carrying a *Cicada*, and flying slowly up a hillside. It lit at the base of a black birch on the hill-top, and dragged the harvest-fly, holding the smooth dorsal surface to the bark, to the topmost branches, finally disappearing among the leaves. I did not see it leave the tree, for I was unable to command a view on all sides at the same time, and then there was a neighboring birch whose branches interlocked with the one where the hornet was. I satisfied myself that it did leave, by climbing up and violently shaking the branches and tree top. *Stizus* employs this method of transporting the heavy *Cicada*; it climbs the tree with the insect, and then flies from the branches, the excessive weight gradually bringing it to the ground again, but nearer to its burrow.

Professor Morse, in his annual address before the American Association in 1887, notices the following:—"Dr. Thomas Meehan describes a hornet that was gifted with great intelligence. He saw this insect struggling with a large locust in unsuccessful attempts to fly away with it. After several fruitless efforts to fly up from the ground with his victim, he

finally dragged it fully thirty feet to a tree, to the top of which he laboriously ascended, still clinging to his burden, and having attained this elevated position he flew off in a horizontal direction with the locust."

Commenting upon this, Mr. C. G. Rockwood, jr., in Science for August 19th, 1887, gives an account of "a large insect evidently of the wasp family," that carried a *Cicada* for a distance of twenty feet up a maple tree and then flew away with it as described above.

Wishing to ascertain the relative weights of these insects, I had dried specimens, including pins, weighed in a druggist's scales. *Cicada tibicen* weighed thirteen grains and *Stizus speciosus* seven and one-half.

LIST OF LEPIDOPTERA TAKEN AT LITTLE METIS (RIMOUSKI CO.), P. QUE.

BY ALBERT F. WINN, MONTREAL.

My collecting at Little Metis having been confined to July and August, my knowledge of the forms occurring there is necessarily very incomplete; but as the insect fauna of the Lower St. Lawrence seems to differ considerably from that of Ontario and the western part of Quebec, I venture to give a list of the species I know to occur there, and hope that in the event of my not going there again, some other entomologist will give us a list of additions.

1. *Papilo turnus* Linn. Common inland; rarer on the shore; July.
2. " *asterias* Fabr. Rare; July; larva in August.
3. *Pieris oleracea* Bd. Very common; July and August.
4. " *rapa* Linn. Very common; July and August.
5. *Colias philodice* Godt. Very common; July and August; Albino females sometimes as common as yellow ones, though not usually.
6. *Danais archippus* Fabr. Very rare; 1 specimen, August.
7. *Argynnis cybele* Fabr. Females common; July; no ♂'s seen.
8. " *atlantis* Edw. Very common; July and August.
9. " *myrina* Cram. Rare; July (commoner, no doubt, in June.)
10. " *bellona* Fabr. Very rare; July, in a swampy field.

11. *Phyciodes tharos* Drury. Common ; July.
12. *Grapta faunus* Edw. Rare ; August.
13. " *gracilis* G. & R. Common ; August, but hard to catch.
14. " *progne* Cram. Very rare ; 1 specimen, Aug. 18th.
15. " *fulvum* Bd. Very rare ; 1 specimen, Aug. 12th.
16. *Vanessa antiopa* Linn. Common ; August ; larvæ on poplar, July.
17. " *Milberti* Godt. Very rare ; 1 specimen, August.
18. *Pyrameis atalanta* Linn. Very rare ; August.
19. " *huntera* Dru. Rather common ; August.
20. " *cardui* Linn. Abundant in 1884 and 1889 ; none seen other years.
21. *Limenitis arthemis* Dru. Local, but common where found ; July.
22. " *disippus* Godt. Rare ; July.
23. *Satyrus alope*, dim *nephele* Kirby. Very rare ; 1 specimen (♂), August, 1884.
24. *Chrysophanus americana* D'Urban. Abundant ; July and August.
25. *Lycæna Couperi* Grt. Very rare ; 2 specimens, July 8th and Aug. 18th.
26. *Pamphila Peckius* Kirby. Common ; July.
27. " *manitoba* Scud. Common ; end of July and August ; very fond of buttercup flowers.

ZYGÆNIDÆ.

28. *Ctenucha virginica* Charp. Local, but abundant in places ; July.

BOMBYCIDÆ.

29. *Deiopeia bella* Linn. Very rare ; 1 specimen, August.
30. *Arctia virgo* Linn. Rather common at light ; July.
31. " *Saundersii* Grt. Common ; July and August ; light.
32. *Spilosoma virginica* Fabr.)
33. *Leucartia acraea* Pack.) Larvæ common in August ; moths,
34. *Halesidota caryæ* Harr.) probably about in June.
35. " *maculata* Harr.)
36. *Orgyia nova* Fitch. Common ; August.
37. " *leucostigma* A. & S. Rare ; August.
38. *Ichthyura albosigma* Fabr. Rare ; July, 1 specimen ; light.
39. *Pheosia rimosa* Pack. Rare ; July ; light.
40. *Glisiocampa americana* Harr. Rare ; July, 1 specimen.
41. *Hepialus 4-guttatus* Pack. Very rare ; August ; light.

NOCTUIDÆ.

42. *Gonophora scripta* Gosse. Rare ; July and August.
 43. *Raphia frater* Grt. Rare ; July.
 44. *Bryophila lepidula* Grt. Rare ; July and August.
 45. *Microcœlia fragilis* Guen. Common ; July.
 46. *Agrotis baja* S. V. Common ; July.
 47. " *C-nigrum* Linn. Common ; August ; light ; treacle, and in fields by day.
 48. *Agrotis haruspica* Grt. Very common ; July and August.
 49. " *fennica* Tausch. Very common ; July and August.
 50. " *subgothica* Haw. Common ; July.
 51. " *plecta* Linn. Rare ; July.
 52. " *clandestina* Harr. Common ; July and August.
 53. " *ypsilon* Rott. Rare ; August.
 54. " *occulta* Linn. Rare ; July.
 55. *Mamestra lorea* Steph. }
 56. " *renigera* Steph. } Common ; July.
 57. *Hadena devastatrix* Brace }
 58. " *arctica* Bd. } Common ; July and August ; by light,
 59. " *dubitans* Walk. (?) } and treacle.
 60. " *sputatrix* Grt. }
 61. " *verbascoides* (?) Guen. Rare ; 1 specimen, July.
 62. " *lignicolor* Guen. Rare ; July.
 63. " *impulsa* Guen. Rare ; July and August.
 64. " *mactata* Guen. Rare ; July.
 65. *Hyppa xylinoides* Guen. Rare ; July.
 66. *Trigonophora periculosa* Guen. Rare ; July, 2 specimens.
 67. " *V-brunneum* Grt. Common ; July and August.
 68. *Euplexia lucipara* Linn. Rare ; July.
 69. *Apamea nictitans* Esp. Rare ; August.
 70. *Heliophila pallens* Linn. Abundant ; July.
 71. " *adonea* Grt. Rare ; July.
 72. *Amphipyra tragopogonis* Linn. Rare ; August.
 73. *Caradrina multifera* Walk. Rare ; July, 1 specimen.
 74. *Orthosia helva* Grt. Abundant ; July and August.
 75. *Cucullia intermedia* Spey. Rare ; July, 1 specimen found on a poplar.

76. *Abrostola urentis* Guen. Very rare; July, 1 specimen.
 77. *Plusia cereoides* Grt. Common; July; light.
 78. " *cerea* Guen. Common; August.
 79. " *mappa* G. & R. Rare; August; light.
 80. " *bimaculata* Steph. Abundant; July and August; light.
 81. " *viridisignata* Grt. Common; August; day flier.
 82. " *brassicæ* Riley. Common; July; light.
 83. " *ampla* Walk. Rare; July; light.
 84. " *simplex* Guen. Common; August; day flier.
 85. *Pyrrhia exprimens* Walk. Common; August; light.
 86. *Drasteria erectea* Hübn. Common; July.
 87. *Hypena humuli* Harr. Rare; August, 1 specimen.

GEOMETRIDÆ.

88. *Endropia obtusaria* Hübn. Rare; July.
 89. *Metrocampa perlaria* Guen. Very common; July and August.
 90. *Sicya macularia* Harr. Common; July; light.
 91. *Amphidasys cognataria* Guen. Rare; August, 1 specimen.
 92. *Deilinia variolaria* Guen. Common; July; light.
 93. *Semiothisa enotata* Guen. Rare; July, 1 specimen.
 94. *Thamnonoma subcessaria* Walk. Common; July and August.
 95. *Lozogramma defluata* Walk. Common; July.
 96. *Hydria undulata* Linn. Rare; August.
 97. *Rheumaptera hastata* Linn. Common; July; by light.
 98. " *lacustrata* Pack. Rare; July; by light.
 99. *Hydriomena trifasciata* Bork. Rare; August.
 100. *Petrophora diversilineata* Hübn. Common; August.
 101. " *hersiliata* Guen. Rare; July.
 102. " *populata* Linn. Common; July; by light.
 103. " *prunata* Linn. Rare; July.
 104. *Glaucopteryx cæsiata* Bork. Not rare; July.
 105. *Eupithecia* ——— sp. Rare; 1 specimen, July.

PYRALIDÆ.

106. *Nomophila noctuella* S. V. Very common; August.
 107. *Crambus girardellus* Clem. Rare; 1 specimen, August.

DESCRIPTIONS OF THE PREPARATORY STAGES OF
SMERINTHUS EXCÆCATUS, A. & S.

BY WM. BEUTENMULLER, NEW YORK.

EGG.—Oval; pale apple green, smooth, shining; slightly flattened above and below. Width, 2 mm.; height, 1.50 mm.

Clemens, in his Synopsis of North American Sphingidæ, p. 182 (Journ. Ac. Nat. Sci., Phil., 1859), describes the egg as being "smooth, white, with an equatorial reddish-brown band, having a slender central white line." All the eggs, about one hundred and fifty in number, which I examined were entirely green, with no indications whatever of the bands mentioned by Clemens.

Duration of this stage, six days.

YOUNG LARVA.—Head rather large, subglobose, dull pale green; mouth parts pitchy black. Body above and beneath uniformly yellowish-green, with the caudal horn very long and reddish-brown. As the larva advances in age there gradually appears along each side a series of eight lateral oblique yellowish bands, and a subdorsal longitudinal stripe of the same colour. The caudal horn also becomes somewhat brighter, and the head concolorous to the body. Length, 6 mm. Length, when ready to moult, 10 mm. Duration of this stage, about four days.

AFTER FIRST MOULT.—The head is now covered with yellow granulations, and the caudal horn is somewhat longer and more prominent, with a yellow band near the apex. The body has also now some few granulations on the anterior segments. The oblique lateral bands are brighter in colour, and the longitudinal subdorsal stripes are broken by the bands. Length, 13 mm. Duration of this stage, about six days.

AFTER SECOND MOULT.—Little difference from the previous moult, except in shape of the head, which now assumes a triangular form, and the granulations and markings are also somewhat more distinct, and the tips of the thoracic feet reddish-brown, with their bases green. Length, 16 mm. Duration of this stage, about four days.

AFTER THIRD MOULT.—The body in colour now is apple green, and is much stouter. The caudal horn is tipped with reddish-brown at the apex, and is covered with granulations, as is also the body, especially along the dorsal region on the first to the fourth segments. On each side of the head is an oblique band which meet at the vertex. Length, 23 mm. Duration of this stage, about six days.

AFTER FOURTH MOULT.—The body in colour is the same as in the preceding moult, and the caudal horn lacks the reddish-brown colour at the apex. The thoracic feet are now yellow, tipped with reddish-brown, and the abdominal legs have on the outer side of each a small patch of the same colour. The mandibles are pitchy black, and the labrum pink. Length, 34 mm. Duration of this stage, about seven days.

AFTER FIFTH MOULT.—No perceptible difference from the previous moult, except that the elevated granulations which cover the body are more distinct. The thoracic feet are reddish-brown with their bases yellow. Spiracles white with black margins. Length, about 55 mm.

FOOD PLANTS.*—Wisteria, cherry, spiræa, blackberry, apple, rose, plum, elm, oak, hazel, hornbeam, birch, willow and poplar.

The eggs were kindly sent to me from Cotuit, Mass., by Mr. Henry F. Crosby, of New York. Double brooded.

CORRESPONDENCE.

HYBERNIA DEFOLIARIA LINN., IN VANCOUVER ISLAND.

Sir,—In 1887 I took a specimen of *Hybernia defoliaria* at rest on an oak near Victoria. Mr. G. Hulst, who kindly looked over my *Geometra* in 1888, expressed a doubt as to the correctness of the locality, as *defoliaria*, though so common in England, had not been noticed by any American entomologists. Since the first capture I have several times seen larvæ which I am almost certain were of this species, for in the Old Country ten years ago I was familiar with the insect in all its stages. To-day, however (Nov. 18), I have satisfied myself by the capture of two males and one female of typical *defoliaria*. They were all at rest on fences in the City of Victoria, and two or three miles away from the locality where I first observed the species. Possibly this moth is an importation, and, if so, not a very desirable one, as in some parts of England it is considered quite a pest.

GEO. W. TAYLOR.

The specimen mentioned above by Mr. Taylor, as taken in 1887, is now in my collection, and is, I should say, certainly a typical *H. defoliaria*.

J. FLETCHER, Ottawa.

* See Food Plants of Lepidoptera, No. 2, Ent. Am., 1, p. 196.

CHIONOBAS BORE.

Sir,—We have in Colorado a butterfly identical, according to the determination of Dr. Staudinger (see C. E. XVIII., 15), with *Chionobas Bore* Lehn. and Hübner, and by the aid of Mr. David Bruce I have been able the past season to rear the larvæ from egg to adult stage, soon after reaching which hibernation took place. This has led me to inquire into Sandberg's history of *Bore* of Lapland, referred to by Mr. Scudder (Butt. N. E., p. 126), and on writing Dr. Holland on the subject, he very kindly looked up Sandberg's paper, and has sent me a translation of it. So far as I know no translation into English has been published, and I suggest that you print it in full, so that when the history of the American form is published—as it will be after pupation is reached—the habits on the two continents can be compared. It is already clear that our form does not hibernate through two winters. The larval stages began on 16th July, and the fourth (and last) moult was reached 9th September, so that their duration to last moult was but about nine weeks. I hope to see pupæ soon after the winter passes, and shall then fully illustrate the species in "Butterflies of North America."

W. H. EDWARDS.

Sandberg's article is contained in the Berliner Entomologische Zeitschrift, Vol. XXIX., 1885, Part II., pp. 245-265. It is entitled "Beobachtungen ueber Metamorphosen der Arktischen Falter."—*Anglice*. Observations upon the Metamorphoses of Arctic Lepidoptera. I gather from the preliminary pages that the author was for twelve years an official residing in Norwegian Finmark, and that he there made the observations which he records in his paper.

I send you a translation hurriedly made of what he has to say concerning *Oeneis Bore* at p. 247 *et seq* as follows :

1. *Oeneis Bore* Schn.

Egg cylindrical, marble-white, longitudinally ribbed.

Caterpillar clothed with fine hairs, bright brownish-yellow, ornamented by a narrow dark dorsal line, which terminates abruptly, and two broader dark lines, one upon either side. The head is globular, small in proportion to the body, greenish-yellow, with six dark lateral stripes, and black

eyes. The spiracles are of the same colour as the body. The latter is round, tapering posteriorly and with the back arched. The anus is two-pointed. (Zweispitzig.) Length 35 mm.

The caterpillar feeds upon different grasses, and is of an exceedingly sluggish disposition. When disturbed it curls up and remains for a long time without motion. It hibernates twice, and pupates in the month of May in its winter quarters among the roots of grass just below the surface of the ground. It is greatly subject to the attacks of ichneumon-wasps.

The handsomely coloured chrysalis is short and thick, provided with long and broad wing-sheaths, which, as well as the thorax, are of a bright green colour. The abdomen is bright reddish-yellow, with dark spots and a bright green line upon the dorsal aspect, together with a darker line of the same colour upon either side; the spots in the vicinity of the middle line are arranged in pairs upon each segment; the cremaster is short and blunt; the region of the head is adorned on each side by a coal-black, shining streak, which is bent into the form of a half-moon.

The chrysalis, which, as in the case of all Satyrids, is stiff and incapable of motion, and when moved gives no evidence of life, is attacked by parasites of a larger species of ichneumon than attacks the caterpillar. The imago is disclosed after the lapse of from three to six weeks from the date of pupation. The transformations have been hitherto unknown.

This thoroughly Arctic species, which hitherto has not been found south of Lat. 68-69 N., was first detected by Dr. Staudinger upon Norwegian territory in the year 1860, by a pair of specimens coming from Kautokeine in Finmark. Later, in the year 1875, the butterfly was taken by me in numbers upon the sandy meadows near Jacobsely, close to the margin of the Arctic Ocean, in profusion in the interior at Neijden, at Skogerönes ten Kilm, nearer to the sea, and in scattering examples upon the crags at Kirkenes. In Russian Lapland, upon the stretch of country lying between Jacobsely and Kola, this species of butterfly is of very common occurrence. Upon the Norwegian coast, west of Warangerfjord, it has, nevertheless, not been as yet observed.

The caterpillar was found for the first time upon May 15th, 1880.

A single hibernating example, about 10 mm. (about four-tenths of an inch, which would be after second moult), was detected in withered grass upon the barren sand-banks near Jacobsely, and here later in the year a second almost thoroughly matured specimen of the same species was captured. As was to be surmised from the abundance of the butterfly in grassy spots, the larva feeds upon different species of grasses, especially *Festuca ovina*, with which the level reaches about Jacobsely are everywhere overgrown. The theory broached by W. M. Schöyen in his "Oversigt over de i Norges arktiske Region hidtil fundne Lepidoptere, Kristiania, 1879," and which is founded upon the observations made by Prof. C. Berg, of Buenos Ayres, in the case of another species of the genus, viz., *Oen. Gutta* Hb., viz., that the larva feeds upon lichens, has, in consequence, not been established.

The caterpillars which had been collected attained their full development about the end of August, and ceased then to feed, and sank into a lethargic condition. As they gave no evidence of a disposition to pupate, I buried them toward winter, at the end of September, in the ground. On the 15th May of the following year their winter quarters were opened, and one of the caterpillars was found to be dead, the other, on the contrary, appeared to be in a very healthy condition, and crept around lustily without, however, taking any nourishment. Its good health was unfortunately only apparent, for the little creature in a former stage of its larval existence had been stung by an ichneumon-wasp, the larvæ of which were ready to pupate upon May 23rd, and in the end, as they broke through the outer integuments of their host and emerged into freedom, gave the deathblow to the unfortunate victim of misplaced hospitality. These little larvæ transformed speedily, and presently the caterpillar was enveloped by about fifty greyish-white cocoons, which, after the lapse of five weeks in the latter days of June, disclosed the imagines. Thus all the hopes I had built upon these larvæ were brought to an end, and it was not my good fortune until in the spring of the following year, when I again visited Jacobsely, to find fresh specimens. The caterpillars at this time appeared in numbers scattered throughout the grass, so that in the course of a few hours I succeeded in collecting about fifty full-grown examples, among them, unfortunately, not a single example which could be used, inasmuch as they all appeared to have harbored guests during the winter, and were all decorated with from forty-

six to fifty-four parasitic cocoons of the same species as that before observed. Some of the hosts had died during the process, others were still alive; but all further development was at an end in the case of the latter, and at the end of eight days the last one died. Inasmuch as not a single uninjured specimen was to be found among so many caterpillars, I reached the conclusion that the place to look for the chrysalids was under the ground, and that only these caterpillars which were forced by the pressure of the circumstances which I have related, made excursions to the upper world.

The parasitic cocoons which I had collected disclosed the first wasps on the 20th day of June, and pupation, therefore, must have occurred about the middle of May. Their hosts must, therefore, have awakened from their winter's sleep at the beginning of May, and, therefore, their pupation, if everything had progressed favorably, would have taken place probably in the course of the two following weeks. My diligent search for pupæ was for a long while fruitless, until at last on the 25th of May I succeeded in digging up one. It was lying free in the sand concealed under the roots of grass. The transformation had just taken place, as was shown by the skin of the caterpillar, which was quite fresh and still clinging to the anal extremity. The chrysalis on the 24th of June disclosed the butterfly of *Cœnis Bore* in a beautiful male example. From four to six days before the butterfly emerged from the chrysalis the wing-sheaths had assumed a dark yellowish-grey, and at last quite bluish-black colour. On the 31st day of May I found still another chrysalis of the same species lying in the grass, but brown in colour. This produced no butterfly, but, upon the 17th and 18th of June following, three specimens of ichneumon-wasps of another much larger species than that which had infested the caterpillar.

In the spring of the year 1883, which, for our high latitudes, was unusually early and warm, this butterfly was observed as early as the middle of June upon the crag at Südwaranger Prestegaarde. At Jacobsely I found on the 15th and 20th of May, under moss in barren spots, concealed among the roots of grass, two caterpillars, which both transformed five days later, and on the 10th and 13th of June following disclosed the imagines (two ♂♂). The duration of the chrysalis stage of existence was, therefore, scarcely three weeks.

W. J. HOLLAND.

BOOK NOTICE.

INSECTA : By Alpheus Hyatt and J. N. Arms. Boston : D. C. Heath & Co.

This handy volume forms the eighth of the series of the "Guides for Science Teaching" issued by these well-known publishers of educational works. The series is intended for the use of teachers who wish to give practical instruction to their classes in Natural History. The volume before us forms a marked advance upon those previously issued, inasmuch as it consists of 300 pages, with over 200 illustrations, while none of the others were more than a fourth of these dimensions. This great enlargement is due, no doubt, to the growing popularity of entomology as a subject for the teaching of observation in schools, as well as for intelligent recreation and serious study on the part of individuals.

The volume before us is an admirable manual for teachers who wish to instruct their pupils in the science of entomology, and will be found most useful also by private students. It is full of admirable diagrams and illustrations, for the most part original, and it takes up for discussion some of the commonest insects in the different orders that can be readily procured by anyone. For instance, the external structure and the internal anatomy of insects are first taught by means of the common Locust (*Caloptenus*), which can be taken in quantities anywhere, a May-fly (*Ephemera*), a Dragon-fly, a Cockroach, a May-beetle, the *Archippus* butterfly, etc., are used to illustrate the different orders. No teacher or student need be at a loss for material with which to follow out the instructions in the book. The whole work is excellent, and we have no doubt that it will be found most valuable in the various agricultural colleges especially, as well as in other educational institutions.

We may quote the following advice from the opening chapter:—
"Encourage children to watch living locusts. . . . Better a child should learn to handle one animal, to see and know its structure and how it lives and moves, than to go through the whole animal kingdom with the best text-book, under the best teacher, aided by the best charts ever made. The former would have learned what real knowledge is, and how to get it, while the latter would have simply learned how to pass at his school examination."

Mailed January 6th.