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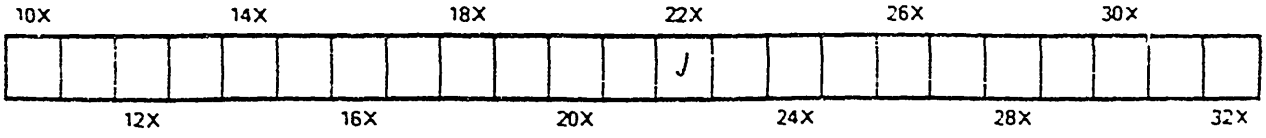

The Canadian Entomologist.

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NEW SPECIES OF FOSSORIAL HYMENOPTERA.

BY WM. J. FOX, PHILADELPHIA.

MYZINE THORACICA.

♀.—Clypeus strongly and closely punctured, carinated or angular down the middle; front with large, coarse punctures, which become sparser on the vertex and cheeks; the ocelli deeply pitted, the hind pair almost hidden; prothorax, mesopleuræ, dorsulum and scutellum with large, separated punctures, those on the dorsulum by far the largest and sparest; metathorax above and behind entirely smooth, the metapleuræ with oblique striations; legs, especially the tibiæ, coarsely punctured, the outer side of the medial and hind tibiæ covered with strong, short bristles, and in addition with a row of stout, short spines on the outer edge, the medial and hind tarsi with long bristles and spines; anterior tarsi with the spines stout, the longest equalling the length of the first joint of that tarsus; wings flavo-hyaline, somewhat fuscous apically, the nervures testaceous; abdomen with a beautiful iridescent sheen dorsally, with fine rather close punctures, the first segment and base of the following three impunctate; on the apical portion of segments 1–3 the punctures are sparse and stronger, those on the fifth segment stronger; ventral segments on apical portion with large punctures or holes, which form on segments 1–4 a transverse row, which is produced forward into an angle medially; last dorsal segment with fine longitudinal striations. Black: mandibles, except apical portion, apex of scape, base of femora beneath, apex of fore tibiæ, the remaining tibiæ above and the tarsi. Rufous: a spot at the extreme side of clypeus, a transverse mark on front behind antennæ, interrupted medially, which extends up along the inner orbits and coalesces with the mark on the vertex—this latter extends down on the cheeks; prothorax above, except two elongate, transverse marks, two large spots on mesopleuræ, middle and outer lobes of the dorsulum in part, tegulæ, scutellum, post scutellum, a large spot in middle of metanotum, a much larger one on each side of the posterior face, which extends around on the sides; the

femora and tibiæ in part, a transverse band on dorsal segments 1–5 of abdomen, all of which except the first are narrowed medially, the first and second slightly separated, that on the third segment somewhat squarely emarginate behind, and ventral segments 2–4 with a large spot, those on the second segment longitudinal, the others transverse; mandibles and labrum fringed with testaceous hairs; head, thorax, legs and abdomen beneath with long, pale hair. Length, 18–20 mm.

So. Illinois *(Chas. Robertson).* One specimen has the markings on the abdomen narrower, the band on the second segment widely divided in the middle, the third ventral segment immaculate, and the front with a longitudinal medial yellow line. Allied to *sexcincta* and *caroliniana.* From the first mentioned it is distinguished by the entirely smooth metathorax, the richer livery; from the latter by the stronger and closer punctuation of the front and ventral portion of the abdomen and larger size. It may, however, prove to be but a variety of *sexcincta.*

POMPILUS RELATIVUS.

♀.—Anterior margin of clypeus distinctly but not strongly incurved; ront with the impressed line obliterated in the middle, but very strong behind the antennæ and before the ocelli; posterior margin of prothorax subangular: metathorax rounded behind, upper surface with a rather strong, longitudinal, impressed line, which terminates at base of posterior face, the latter depressed; tibiæ and tarsi strongly spinose; tarsal claws toothed at the base; longest spur of hind tibiæ more than half as long as the first joint of hind tarsi; wings deep blackish violaceous, the apical margins even darker, third submarginal cell triangular, the second and third cubital transverse veins very contiguous at the top, second recurrent nervure sinuous, received by the third submarginal cell at about the middle; ventral abdominal segments with a few erect hairs, which are most dense and prominent on apical segment. Black, with a very slight bluish reflection, which is most obvious on the abdomen; legs and antennæ entirely black; head and anterior coxæ with numerous long, black hairs, the prothorax and dorsulum also with a very few hairs. Length, 18 mm.

Two specimens. Ocean County, N.J. *(Prof. J. B. Smith);* So. Illinois *(Chas. Robertson).* Related to *philadelphicus, æthiops* and *maurus.* The clypeus is much less incurved than in either of the first

two species, and the third submarginal cell differently shaped. From *maurus* it differs by having the tarsal claws toothed, instead of cleft. Its position is between *æthiops* and *maurus*.

POMPILUS POSTERUS.

♀.—Anterior margin of clypeus very slightly incurved; frontal impression distinct; posterior margin of prothorax bowed; metathorax not impressed above; tibiæ and tarsi very strongly spinose, the longest of those on the fore tarsi almost equalling the first joint of that tarsus in length; tarsal claws cleft; longest spur of hind tibiæ much more than two-thirds as long as the first joint of hind tarsi; wings hyaline, the apical margin broadly fuscous, nervures black; third submarginal cell narrowed about one half at the top, the second recurrent nervure received by it a little beyond the middle. Black: head, thorax, legs and first abdominal segment clothed with silvery pile which has somewhat the appearance of verdigris; hind femora and tibiæ (the spurs excepted) rufous; posterior margin of prothorax narrowly whitish; head with rather sparse, pale hair. Length, 7 mm.

♂.—More slender than the female, antennæ shorter and stouter; the tibial spurs, transverse band at base of third dorsal segment, and spot at apex of abdomen above, white. Length, 7 mm.

Camden County, N. J. (July); So. Florida (*Chas. Robertson*). Allied to *biguttatus*, from which it differs in the colour of the hind legs, the stronger armature of the legs and the greater length of the hind tibial spur.

PLANICEPS CALCARATUS.

♂.—Anterior margin of clypeus rounded; front strongly impressed on lower portion; anterior ocelli deeply pitted; antennæ reaching much beyond the tegulæ, the flagellum slightly tapering to the apex; hind margin of prothorax formed into a very slight angle medially; metathorax above with exceedingly fine punctures, with longitudinal, medial, impressed line; tibiæ with distinct, though not strong, spines, the tarsi scarcely or not at all spined; longest spur of hind tibiæ as long as the first joint of hind tarsi; wings sub-hyaline, iridescent, nervures fuscous, second recurrent nervure uniting with the second transverse cubital vein; black;

tibial spurs white; head and sides of thorax sparsely clothed with silvery-sericeous pile. Length, 6 mm.

So. Florida *(Chas. Robertson)*. Distinct from our only other known species, *feralis*, by the longer antennæ and hind tibial spurs, and by the white calcaria.

GORYTES DENTATUS.

♂.—Head not as broad as the thorax; ocellar region slightly raised, the ocelli forming a very low triangle; front with large, shallow, scattered punctures, the longitudinal impressed line strong; inner eye-margins slightly though distinctly converging towards the clypeus; scape but little if anything longer than the clypeus, is long in the middle, third antennal joint distinctly longer than any of the following, except the last, to which it is about equal; joints 10–12 emarginate beneath, the twelfth joint but slightly so; clypeus convex, with a few scattered, indistinct punctures, its anterior margin distinctly incurved. Thorax with strong, separated punctures, sparsest on the scutellum; in addition to the carina which runs from each shoulder tubercle around the fore edge of meso-sternum, there is behind it a transverse carina or ridge, which terminates in a stout tooth at the extreme side; enclosed space on metanotum well-marked, triangular, its sides somewhat incurved, on the basal portion it is longitudinally strongly striated, while on the apical narrow portion it is transversely striated, at the apex of the enclosure there is a strong pit; four posterior tibiæ and tarsi tolerably well furnished with spines; wings hyaline, a fuscous cloud completely fills the marginal, second and third submarginal, and the apical portion of the third discoidal cells; there is also a slight spot at apex of median and sub-median cells, stigma and costal nervure fulvous, the other nervures black. Abdomen with tolerably strong, separated punctures, strongest and more scattered ventrally, first segment at apex nearly as wide as the second, sessile with it, the second segment transversely swollen near the base, so that when viewed from the side the first and second segments are separated by a deep suture. Entirely bright ferruginous; tips of mandibles black; clypeus, front and face on sides, scape beneath, transverse line on collar, shoulder-tubercles, anterior portion of mesopleuræ, scutellum, a spot on four anterior tibiæ in front, first joint of medial tarsi at base, and apical margins of dorsal abdominal segments 1–3, pale yellow; the fascia on segments 2 and 3 narrowest

broadened at extreme sides; a broad fascia on second ventral segment and two large spots on the third, also yellowish; clypeus sparsely clothed with pale hairs. Length, 10 mm.

Grand Canon, Arizona, "70 miles North of Flagstaff." *(C. H. Tyler Townsend).* Not closely related to any of our species. It comes nearest to *G. spilopterus* and *tricolor*, but the sculpture is finer and the abdomen differently shaped. It differs from the ♂ of *tricolor* in the dentate mesosternum; the ♂ of *spilopterus* is as yet unknown, but *dentatus* differs too greatly to consider it the ♂ of that species.

MIMESA MACULIPES.

♂.—Anterior margin of clypeus subtruncate, entire; front with very fine, close punctures, which become sparse on the vertex, and strongly impressed medially; ocelli very prominent, placed in a triangle, on each side of the hind pair there is a strong depression; antennæ rather long, the flagellum clavate; first joint of flagellum about one-quarter longer than the second; dorsulum with very fine punctures, almost impunctate; suture between dorsulum and scutellum wide; scutellum impunctate, slightly impressed medially; metathorax very strongly rugose; the enclosed space at base of metanotum with numerous, somewhat oblique ridges; petiole in length distinctly shorter than the hind femora, almost straight, the upper surface with two widely separated furrows, on the sides the petiole is broadly channelled; remainder of abdomen impunctate, last dorsal segment smooth; black, the abdomen entirely so; flagellum beneath rufous; apex of four anterior femora, the tibiæ and tarsi, pale testaceous; hind tibiæ, except base and apex, black; face and clypeus with bright silvery pubescence, wings hyaline, nervures and stigma black. Length, 10 mm.

So. Florida *(Chas. Robertson).* Because of both recurrent nervures received by the second submarginal cell, I have placed this in *Mimesa.* It differs from all our species of that genus (?) by the entirely black abdomen. In my opinion *Mimesa* is but a section of *Psen.*

SYNOPSIS OF THE ASILID GENERA MALLOPHORA AND NICOCLES.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

With the exceptions of *Mallophora ardens*, Macq., and *M. fulviventris*, Macq., neither of which have been identified, the following table contains all the species belonging to this genus at present known to occur in America north of Mexico. Three species are known to me to inhabit Southern California: *fautrix*, O. S., originally described from Mexico; *Guildiana*, also found in Montana, Kansas and North Carolina; and a new species described below:—

1. Pile of abdomen light coloured, none black 2
   Pile of abdomen light coloured, many on the fourth or following segments black 5
   Pile of abdomen wholly black ..... *nigra*, Will.
2. Femora, except the extreme apex, black 3
   Femora largely or wholly red 4
3. Thorax destitute of black pile, first posterior cell broadly open ..... *megachile*, n. sp.
   Thorax with black pile, first posterior cell closed .. *clausicella*, Macq.
4. Femora wholly red, pile of legs largely black ..... *fautrix*, O. S.
   Femora marked with a distinct black spot on each, pile of legs light yellow ..... *Guildiana*, Will.
5. Pile of venter light coloured 6
   Pile of venter black ..... *orcina*, Wied.
6. Species not exceeding 15 mm. in length ..... *laphroides*, Wied.
   Species exceeding 20 mm. in length ..... *bomboides*, Wied.

Mallophora megachile, n. sp., ♂ ♀. Black, tibiæ and extreme apices of the four anterior femora yellow. Pile of entire body grayish-white, more yellow on the tibiæ, a few black ones on the antennæ, front, tips of posterior femora above, and many on apices of the posterior tibiæ and on all the tarsi; that on the hypopygium of the male rather dense, white, appressed and parted in the middle. A few black bristles at apex of each of the four posterior femora above, also on the under side of the posterior femora and on the posterior tibiæ. Halteres brown. Wings grayish-hyaline, costal and marginal cells darker; first posterior cell broadly open; apices of the fourth and of the three following veins nearly colourless. Antennal style less than three-fourths as long as the third joint.

Length, 12 mm. Los Angeles County, Cal. Four males and one female.

The following table contains all the species of *Nicocles* known to occur in America north of Mexico; of these, *rufus* and *scitulus* may belong to *Blacodes*:—

1. Third and fourth abdominal segments wholly black.....3
   Third and fourth segments largely or wholly red.....2
2. Body red, a black spot on the second abdominal segment.....*rufus*, Will.
   Body black, abdominal segments three to six largely red.....*abdominalis*, Will.
3. Wings hyaline, a brown cloud at base of each submarginal, posterior and of the discal cell.....*scitulus*, Will.
   Wings marked with brown in other places than these.....4
4. Antennal style one-half as long as the third joint.....5
   Antennal style only one-fourth as long as the slender third joint; eastern species.....*pictus*, Lw.
5. Fifth abdominal segment in the male more than three times as wide as long.....6
   Fifth segment less than three times as wide as long; California species.....7
6. Inhabits the Atlantic States.....*politus*, Say.
   Inhabits California.....*dives*, Lw.
7. Brown spot at tip of wing not crossing the first and second posterior cells; posterior tibiæ and tarsi of the male densely silvery within.....*argentatus*, n. sp.
   Brown spot at tip of wing crosses the first and second posterior cells; posterior tibiæ and tarsi of the male not silvery.....*æmulator*, Lw.

Nicocles argentatus, n. sp., ♂. Black, the tibiæ and apex of the sixth and sometimes of the fifth abdominal segment red. Front grayish-brown pollinose, face nearly flat, white pollinose and sparse whitish pilose, mystax on oral margin consisting of a few long yellowish hairs interspersed among about fourteen stout yellow bristles; pile of palpi and of occiput white, bristles of the latter yellowish. First joint of antennæ

slightly longer than the second, the third one and three-fourth times as long as the first two taken together, of nearly an equal width, the style nearly half as long as the third joint. Thorax marked with a broad median black stripe not extending on the posterior fourth, and on each side of it is a large brown pollinose spot divided by the suture and bounded in front by a black spot, also a brown spot on the humeri, elsewhere the pollen is grayish-white, the pile very sparse, white, the bristles brown; pleura brown pollinose in front, grayish-white pollinose behind, the fan-like row of hairs in front of the halteres white. Scutellum brown pollinose, a black spot at the base each side; bearing two brown bristles. Abdomen smooth, sparse grayish-black pollinose, that at base and sides of segments two to four gray, the fifth and sixth segments wholly silvery pollinose; second segment longer than wide, the others wider than long, the fifth being two and a-half times as wide as long; venter gray pollinose and with a median brown pollinose stripe, its pile and that of the legs white, the bristles of the latter white and yellowish; posterior tibiæ within, and the underside of their tarsi, densely silvery-white pollinose and pubescent. Wings hyaline, an indefinite pale brown spot extends from the tip of the auxiliary vein to the base of the fifth posterior cell, darkest in the marginal and interrupted in the first submarginal cell; a second brown spot covers the veins at bases of the first, second and third posterior cells; a scarcely apparent brown spot at base of second submarginal cell, and a large one filling apices of the marginal, first and second submarginal and of the first posterior cell, extending from one-half to three-fourths the distance from the tip to the base of the second submarginal cell, and sometimes connected with the first mentioned brown spot by a brown streak extending through the middle of the marginal cell; all posterior cells open, the anal cell closed.

♀.—Same as the ♂, except that the apices of the fifth and sixth abdominal segments are never red, the pollen covering these segments is never silvery, and the posterior tibiæ and tarsi are destitute of silvery pollen and pubescence.

Length, 8 to 10 mm. Los Angeles and San Bernardino Counties, Cal. Nine males and eight females in April.

DESCRIPTIONS OF CERTAIN NEW FORMS OF LEPIDOPTERA.

BY B. NEUMOEGEN AND HARRISON G. DYAR.

Family LAGOIDÆ.

Vein 1a of primaries present; median, 4-branched; vein 8 of secondaries arising from the subcostal, more than half the length of cell from base; ♂ antennæ pectinated to the tip.

Synopsis of genera :—

Antennæ long; body parts robust.

Veins 3 and 4 of secondaries stalked.. ..... *Carama.*

Veins 3 and 4 separate, arising from the median..... *Lagoa.*

Antennæ very short; body more slender..... *Dalcerides.*

Genus DALCERIDES, *n. gen.*

Head very small, but with large eyes; palpi slender, antennæ *very* short hardly as long as the thorax, finely bipectinated. Vein 1 of primaries free, unbranched; 1a present; median vein 4-branched, vein 2 arising beyond the middle, veins 3–5 from near together; cell broad, closed, with false discal vein; 6 from the middle of the retracted upper half of the cross vein, a small rounded accessory cell; 7–8 on a stalk from the pointed end of the accessory cell; 9 from the same point; 10 apparently absent; 11 from top of accessory cell, appearing to join 12, which is free from base. The secondaries have two internal veins; veins 2-6 as on primaries; 7 a continuation of the subcostal; 8 from subcostal on middle of cell, not diverging till end of cell; a discal false vein runs to the angulation of the cross vein between the origins of veins 5 and 6.

Type, *Artaxa ingenita*, Hy. Edw.

Family NOTODONTIDÆ.

Median vein of primaries 3-branched; 8 of secondaries from base, close to subcostal for a large part of its length; veins 3 and 4 not stalked.

Partial synopsis of genera :—

Outer margin of primaries entire.

♂ Antennæ pectinated to the tip, the pectinations as long or longer than their cilia.

Primaries without accessory cell.

Internal margin entire.

Vein 5 of secondaries weak or absent.

Tip of abdomen with a brush-like tuft... *Melalopha.*

Genus MELALOPHA, Hübn (= *Ichthyura*, Hübn.)

M. ALETHE, *n. sp.*

We have before us a ♀ specimen from Truckee, California, which seems to be undescribed. It is possible that we have to do with *M. apicalis*, though the description of Walker does not fit. It is allied to *M. multnoma*, Dyar, and *M. brucei*, Hy. Edw.

Colour, obscure gray or drab, with the usual deep brown thoracic mark. Fore wings slightly purplish ("ecru drab," Ridgway's nomenclature of colours, plate III., fig. 21), the lines as in *brucei* and *multnoma*, but white and narrower, more as in *pigra*, powdery, obsolescent, under the lens narrowly broken here and there, the fourth forming a distinct, somewhat S-shaped bend at costa, where it is slightly widened and distinctly white. The wing is very uniform in colour, without the contrasting shades of *brucei* and *multnoma*; there is no subapical rusty patch except the merest trace outside the 4th line, but a moderately distinct deep brown shade overspreads the whole apical portion of the wing from the third line outward, reaching downward to vein 3, and being most strongly marked in the region of the 4th line. It recalls the ornamentation of *M. anachoreta*, Fabr.; but is far from being as distinct as in that species. This shading is present in *M. var. ornata* and *M. brucei* and others, but these have also the shade bordering the 3rd line, so that the resemblance to *anachoreta* is obscured. Subterminal series of interspaceal dots nearly straight, very uniform, and not obscured by the shading.

Hind wings drab (Ridgway, plate, III., fig. 18), immaculate. Expanse, 28 mm.

The following table will serve to separate the North American forms of Melalopha. Omitted names are referred to the synonymy:—

Lines not anastomosing, the 3rd running free from internal margin to costa.

Only the 4th line present (?)..... *apicalis*, Walk.

Lines all present.

Size large, basal line straight.

Colour dark, with black subapical patch. *albosigma*, Fitch.

Colour paler, patch brown..... *var. specifica*, Dyar.

Size smaller, basal line angulated and curved.

Of uniform tint, subapical rusty patch very obscure..... *alethe*, Neum. and Dyar.

Of contrasting shades with distinct subapical rusty patch.
Colour very dark, obscured.....*multnoma*, Dyar.
Colour pale, shades contrasted....*brucei*, Hy. Edw.

Lines anastomosing, the 2nd and 3rd joining at or about the median vein.

Lines all waved, the basal one both angulated and curved.
Size medium, ornamentation distinct.
Size moderate with the usual thoracic patch.
Colour dark, a waved paler band on secondaries.
Subapical shade rusty red.....*vau*. Fitch.
Subapical shade brownish-red.*var. ornata*,G.&R.
Colour pale, line on secondaries lost.
Of a pale purplish shade.... *var. bifiria*, H. E.
Pale, almost "sordid white"...*var. astoriæ*,H. E.
Larger, thoracic patch absent.....*inornata*, Neum.
Size small, longitudinal streaks more or less evident.
An obscure thoracic mark.....*strigosa*, Grt.
Without any thoracic mark..... *var. luculenta*, H. E.

Lines comparatively rigid, the basal dislocated on median vein, not toothed.
4th line white on costa.
Subapical patch distinct, yellowish, divided by the veins.....*inclusa*, Hüb.
Subapical patch darker, obscured....*var. inversa*, Pack.
4th line not white on costa.....*jocosa*, Hy. Edw.

Family SATURNIIDÆ.

Median vein of primaries 3-branched, 8 of secondaries curved, free from base, and remote from subcostal; ♂ antennæ pectinated to the tip, often doubly bipectinated; secondaries with one or two internal veins; size large to very large. Genus AUTOMERIS, Hübn (= ‖*Hyperchiria* p., Walk).

A. Io Fabr., *var.* ARGUS, *n. var.*

♂.—Head, thorax, body, legs and wings light yellow. Both wings uniform in colour, with some darker basal tints. On secondaries a prominent blackish-blue ocellus with white central lunule, surrounded by an outer semi-circular black line.

Below a large black discal spot, with white central kernel on primaries, and faint traces of the transverse lines on both wings.

This aberration, which seems extremely rare, is immediately recognized by its immaculate wings, showing only the large ocellus on secondaries.

Caught at Hoboken, N. J.

Family LITHOSIIDÆ.

Genus HYPOPREPIA, Hübn.

H. MINIATA, Kirby, *var.* SUBORNATA, n. var.

♂.—The red colour of thorax, body and primaries of a lighter shade than in the typical form. The black coating on upper surface of abdomen entirely wanting.

Secondaries immaculate, light rose colour, fading towards anal margin, with a faint grayish, apical tinge.

A striking variation, easily determined by the delicate shade of its immaculate secondaries.

Habitat: Texas.

We do not regard *H. miniata* as a synonym or variety of *H. fucosa*, Hübn, but as a valid species. The following table will serve to distinguish the described forms:—

Wings brightly coloured, with three longitudinal mouse-gray bands.
Ground colour of primaries entirely red.
Hind wings with broad mouse-gray border....*miniata*, Kby.
This border lacking.....*var. subornata*, N. and D.
Ground colour partly yellow, partly red.
Bands on primaries normal.....*fucosa*, Hübn.
Bands extensive, predominating and largely obscuring the ground colour.....*var. plumbea*, Hy. Ed.
Ground colour entirely yellowish.....*cadaverosa*, Strk.
Wings obscure gray, thinly scaled, the secondaries pink. *inculta*, Hy. Edw.

Family HEPIALIDÆ.

Genus STHENOPIS, Pack.

S. ARGENTEOMACULATUS, Har., *var.* SEMIAURATUS, *n. var.*

Antennæ light brown. Head, thorax and body, bright salmon colour. Legs pink, tufted with yellowish hair. Ground colour of primaries pinkish salmon. All the maculations, transverse bands, as well as the subterminal space, of a peculiar brownish yellow, which in

fresh specimens has the lustre of pale gold. The two silver dots near origin of cell, in primaries, prominent, varying in shape from subovate to subtriangular.

Secondaries light pink, fading into salmon-coloured tinges along anal margin and in basal area.

Wings below pinkish, veins prominently so, fading into lighter shades in basal areas. Pink subterminal lines.

Habitat: White Mountains of New Hampshire.

This well-known form has never really been described. It figured for decades in collections as *Sth. var. quadriguttatus*, Gr., which latter name, however, is a synonym of the typical insect. The type form, as a generality, is not as large as this variety, of which some specimens measure as much as 85.–90. mm. in expanse.

Described from several examples of both sexes.

HEPIALUS ROSEICAPUT, *nov. sp.*

One ♂. Antennæ light brown.

Front of head and palpi pinkish. Interspace between antennæ red. Prothorax, thorax, body, legs and wings of luteous stone colour.

Primaries with minimal granules of the very faintest pink. Two lines of irregular, blackish dots. One from base along median vein to near centre of cell, where it turns down to internal margin, meeting an oblique transverse line of dots from apex. Subterminal line blackish.

Secondaries blackish gray with luteous fringes.

Below, both wings blackish gray, with luteous costa and fringes. Legs with an outside tinge of pink. A slight anal tuft of the faintest pink.

Expanse of wings: 33 mm.

Length of body: 6 mm.

Habitat: Cascade Range near Lytton, British Columbia.

This insect belongs to the group of small sized, dull coloured Hepialidæ of our western continent. The peculiarity of the pinkish tint of the palpi and parts of the head makes it easily recognizable.

The types of all the new forms here described are in Mr. Neumoegen's collection.

UNIDENTIFIED NAMES.

In going over the literature of the North American Bombyces, we have been unable to apply the following names. A number of them are types of genera of which the original descriptions are inadequate. In-

formation respecting any of them will be most welcome, especially structural notes, to supplement the imperfect descriptions of the authors :–

Pseudalypia Crotchii, Hy. Edw.
Erruca Pertyi, H. S.
Thia extranea, Hy. Edw.
Earias obliquata, Hy. Edw.
Cisthene lactea, Str.
Alexicles aspersa, Grt.
Cingilia humeralis, Walk.
Limacodes (Semyra) Beutenmuelleri, Hy. Edw.
Limacodes (Tortricidia) ferrigera, Walk.
Kronæa minuta, Reak.
Dioptis megæra, Fabr.
Psyche fragmentella, Hy. Edw. (case only).
Psyche coniferella, Hy. Edw. "
Pseudopsyche (Oedonia) exigua, Hy. Edw.
Sapinella (Eutheca) mora, Grt.
Oiketicus Davidsonii, Hy. Edw. (case only).
Chalia Rileyi, Heyl.*
Brachionycha barometrica, Goossens.
Dasychira clandestina, Walk.
Ichthyura apicalis, Walk.
Gluphisia septentrionalis, Walk.
Notodonta plagiata, Walk.
Edema obliqua, Walk.
Edema plagiata, Walk.
Certila flexuosa, Walk.
Saligena personata, Walk.
Heterocampa thyatiroides, Walk.
" mollis, Walk.
" nigrosignata, Walk.
" umbrata, Walk.
Artace albicans, Walk.
Rhagonis bicolor, Walk.
Cossus nanus, Strk.

*This name is not included because we regard the description as inadequate, but because we do not know the species and have seen no reference to it in American literature.

NORTH AMERICAN THYSANURA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Smynthurus spinatus, n. sp.

Olive. Head tinted with purple, lighter on the sides, olive around the mouth and eyes; coarsely and sparsely punctuate, punctures light olive, each bearing a white hair. Antennæ purplish, basal joint lighter, as long as the body; apical segment with from seventeen to twenty subsegments. Abdomen fuscous with lighter spots; the apical part with an olivaceous cloud, the remainder fuscous with whitish or olivaceous blotches; on the middle of the back a number of groups of circular white spots, and on the posterior part of each side a row of white spots, varying from four to ten. Underneath olive. Anal papillæ large, distinct, with numerous bristles; the upper part and the sides purplish or fuscous, the remainder olive with darker spots. Legs long and slender, purplish or fuscous, mottled with variously formed olive or whitish blotches; apex of the tibiæ and base of the larger claw blackish purple. Claws long and slender, inner claw indistinct; apex of the tibiæ with a few clubbed hairs. Spring long, broad and flat, reaching the mouth; second joint broad, each side with a row of long stiff bristles; bristles twice as long as the spring is broad; third joint long, broad, bluntly rounded.

Length, 2 mm. (.078 inch).

Habitat: Ithaca, New York.

A very variable species, in young specimens the back is pea-green, and in some specimens there is a broad olive band down the middle of the back. The color varies from pea-green to purplish and fuscous. Collected on the surface of standing water. The species can be easily recognized by the row of stiff hairs on each side of the spring.

Smynthurus floridanus, n. sp.

Black, sides lighter, hairy. Head black, with lighter lines, mouth olive. Antennæ long, slender, as long as the body, basal joint black, remainder olive. Thorax and abdomen with a triangular black spot, the base of the triangle at the apex of the thorax and its apex at the apex of the abdomen. Sides of the abdomen olive mottled with light brown. Underneath olive. Anal papillæ with its front and upper part black, the remainder olive mottled with brown. At the median two-thirds of the back, a stout porrect spine; spine as broad at base and higher than anal papillæ; concolorous with the black triangle, except a small olive spot on each side. Legs slender, pale olive; inner claw two-thirds the length of

outer, stout and blunt. Spring short, slender; third joint elongate with an apical and two smaller inner teeth.

Length, 1.5 mm. (.058 inch).

Habitat: Florida.

I am indebted to Mr. Nathan Banks for this unique specimen and species. Easily recognized by the abdominal spine, the stout inner claw, and the black dorsal triangle.

The only characters offered by Lubbock, in his Collembola and Thysanura, for separating *Smynthurus* and *Papirius*, is the form of the antennæ and the presence or absence of tracheæ. In my studies of these interesting insects I have found two other characters valuable in separating these genera. These differences may be stated as follows:—

Terminal segment of the antennæ long, ringed; larger claw unidentate; apical segment of the spring simple..... *Smynthurus.*

Terminal segment of the antennæ short, with a whorl of hairs; larger claw bidentate; apical segment of the spring serrate on the under side..... *Papirius.*

Anoura magna, n. sp.

Body short, broad, one-half as broad as long, finely granulated. Each segment with four dorsal and two lateral globular tubercles, except the last, which is deeply divided, having at its apex two immense globular tubercles. On the anterior part of the anterior margin of each segment another smaller tubercle. From each tubercle there arise from four to eight short, stiff, yellow bristles. On the dorsal part of the head the number of tubercles is the same, but the two median tubercles are placed on the caudal portion of a large quadrangular tubercle, which reaches from between the bases of the antennæ to the caudal part of the head. The ground colour is a light steel blue, with lighter spots between the darker tubercles. Antennæ very short, not reaching the lateral margin of the body by at least a quarter of its width, segments subequal, indistinctly marked. Eyes at the side of the base of the quadrangular tubercle, postantennal organs wanting. Buccal orifice blunt, short and white. Legs short, with a single strong claw.

Length, 5 mm. (.20 inch).

Habitat: Salineville, Ohio.

This species can be recognized by its size, colour, and the globular tubercles; from *gigantea* Tullb., its nearest ally, from Siberia, by the absence of the postantennal organ.

NOMOPHILA NOCTUELLA, SCHIFF.

ORDER LEPIDOPTERA. FAMILY PYRALIDINA.

BY E. P. FELT, CORNELL UNIVERSITY, ITHACA, N. Y.

This is one of the most common insects that flies throughout the summer months. It is also widely distributed; adults have been taken in widely separated parts of Europe, in Algeria, Caffraria, Bengal, Pondicherry, Brazil, and in the eastern and western parts of the United States. Packard writes of the species thus:—"Such cosmopolitan forms give rise to the suspicion that they are relics of a past geologic age, which is borne out by the fact that quite a gap separates it from its nearest allies." In spite of its wide distribution, this insect seems to be one of these common species that has escaped observation, very little having been published on its life history.

On the 15th of last September the writer found among the grass and clover in a pasture several pale greenish larvæ (Fig. 2, b) with black heads and numerous black tubercles. Upon being disturbed they quickly disappear, with a peculiar wriggling, jerking motion, under the grass; they seem to move with equal facility either backward or forward. When not feeding the larvæ can be found under a slight web in the centre of a clump of grass. Later observations show that the larvæ live almost wholly upon clover leaves, eating out the soft parenchyma and leaving the veins; they will eat grass if clover is not within reach, and one larva was observed to seize an Aphid and devour it, though there was plenty of food within reach. J. H. Leach in his "British Pyralids" gives *Polygonum aviculare* (knot grass) as the food-plant in Scotland. As the larvæ become full grown they may be seen wandering around and slowly assembling under chips, stones, etc., where they pupate; when in pastures, dried cow dung seems to be the favourite resort. On the 21st of September both larvæ and pupæ were abundant in these retreats; ten pupæ (Fig. 1, c, d) were taken from a piece of cow dung one-fourth the size of a man's hand. Before pupating the larvæ spin around them a thin, white, loose cocoon.

After remaining in the pupa state about ten days the insects emerge. The adults (Fig. 1, e) are of a sombre brown and a tawny yellow colour, with black markings. They have a peculiar jerky flight, and when disturbed they fly up suddenly about four feet, and usually alight within two rods of where they started. When at rest (Fig. 2, f) they are usually on a leaf with the wings folded flat over the back and the antennæ extend-

ing forwards. Within a few days after emerging the adults pair and oviposition begins. The eggs (Fig. 2, a) are not all laid at once, but are deposited in clusters of from three to ten or more, usually being laid side by side in a row. The period of oviposition probably extends over two weeks or more, as the adults can live seven weeks, though most of them die within a month One female was dissected; she contained over eighty eggs, which is probably about the average. When first laid the egg-shell is quite soft and readily flattens upon contact with other eggs, or the leaf upon which it is laid, so that it is usually flattened upon several sides to a greater or less degree. At first the egg is a pearly white, but it gradually turns to a slate colour.

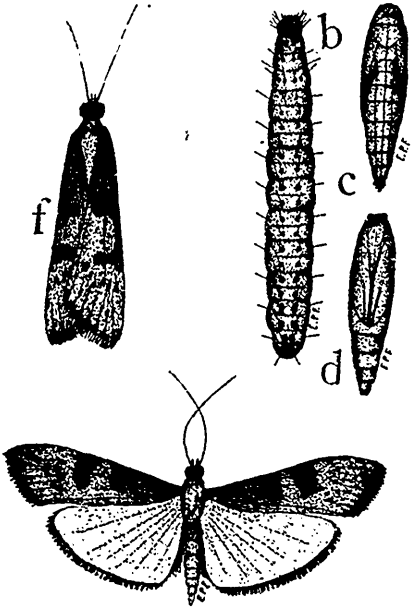

FIG. 1.

Nomophila noctuella: *b*, larva; *c*, pupa (dorsal aspect); *d*, pupa (ventral aspect); *e*, adult; *f*, adult (at rest). (All these figures are twice the natural size.)

The eggs hatch in about ten days, and the larva begins to feed upon the soft parenchyma of the leaf. The young larva has a brownish head and a straw coloured body, the tubercles are very small and the hairs longer proportionally than in the full grown larva. About a week after

hatching the larva moults; the skin ruptures between the head and the cervical shield and also splits a little ways along the back, and through this opening the larva crawls out of its old skin. Just after moulting the head and tubercles are a pale straw colour, later they become darker, and in the last stages of the larva they are almost black. The observed differences between the stages are a gradual increase in the size and depth of colouring of the tubercles, and a decrease in the relative length of the hairs. Before reaching its full growth the larva probably moults five times. In the fall, as the cold weather advances, the larvæ begin to spin nests in the axils of the leaves, where they retire when not feeding and in which grass is allowed to collect and around which the remains of partially devoured leaves are drawn, making a very complete hiding place. Later the nests in the axils of the leaves are deserted and similar nests are constructed upon the surface of the soil. These nests are lined with a thick layer of silk and are covered with a thick coating of particles of soil or bits of dried grass, making a thick, warm nest in which the larvæ pass the winter.

There seem to be three broods a year. In September of 1892 the simultaneous pupation of a large number of larvæ was very noticeable. The pupa state lasted about ten days, the adults emerged, eggs were laid and the larvæ moulted three or four times before cold weather forced them to retire for the winter. These hibernating larvæ come forth in the spring, complete their growth, pupate and the adults probably emerge in the first half of May. The second brood flies in the latter part of June, and the third brood, as already observed, flies the latter part of September. If the adult stage lasts four weeks or more, it would not be strange if the broods overlapped a little, especially the second and third broods, and this is borne out by a reliable record. During the year of 1889 the Entomological Department of the Agricultural Experiment Station, at Ithaca, N.Y., ran six trap lanterns from May 1 to October 20. *Nomophila noctuella* was picked out, the sexes determined and the results tabulated.

TIME OF FLIGHT OF NOMOPHILA NOCTUELLA, 1889.

	MAY.							JUNE.					JULY.													
Date.	5	6	7	8	11	19	20	3	5	16	28	30	1	6	11	15	18	19	20	21	24	25	26	27	31	Totals.
♂	1	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	3	3	2	5	40
♀	1						1																2	1		4

	AUGUST.																SEPTEMBER.									
Date.	1	2	3	4	5	6	7	9	15	16	17	18	21	23	24	25	26	29	4	6	8	18	19	21	25	29	30	Totals.
♂	2	3	1	3	4	0	2	3	1	1	1	0	1	1	2	1	1	1	2	1	1	0	1	0	1	1	1	36
♀					2	4		2	1			2										2	2	1		1		17

This table shows that the adults fly in greater or less numbers from May to the last of September. From May 20th to June 3rd none were taken, which pretty sharply defines the first brood. And, as might be expected, the second and third broods are separated by no such distinct line, and yet there is an indication of two later broods, though the table would seem to indicate that those taken in September might be the last of the second brood and not individuals of a third brood, which is contrary to observed facts. For during the last year a trap lantern was run with practically the same results as were obtained in 1889, but a third brood was observed to emerge in large numbers after September 20th. Probably the cool evenings prevented many moths from flying at night, and consequently from being taken in the trap lanterns.

Preventive Methods.—The above table shows that four-fifths of moths taken are males. If we assume that there are enough males left to fertilize the females, which is quite probable, the trap lanterns are almost useless as a means to check the increase of this insect, because the females escape, oviposit, and thus provide for the propagation of the species. As the larvæ and the adults incline to remain near one place, it is possible to materially reduce their numbers on limited areas. In large fields where plowing is not objectionable, many might be destroyed by thorough plowing in the latter part of November, after the larvæ have retired for the winter. Should this insect become very destructive in the summer, deep plowing in the middle of July, followed by harrowing, might destroy many pupæ. On lawns and other small areas advantage might be taken of the larva's habit of retiring under chips, etc., to pupate. If chips, etc., be placed on the lawn and firmly pressed down in the middle of July or of September, and allowed to remain a week and then collected and burned, many pupæ will be destroyed.

Technical Descriptions.

Egg (Fig. 2, a), pearly white when first laid, changing to a glistening slate colour within a few days. Shell finely reticulated; egg usually flattened upon several sides. Size, .69 mm. by .32 mm.

Larva (first stage), head diameter, .25 mm.; body, diameter, .15 mm.;

length, 1.05 mm. Clypeus, labrum and thoracic shield a tawny olive colour; head a seal brown; body a sordid straw colour. The tubercles proportionately smaller and the hairs longer than in the full grown larva.

Larva (Fig. 1, b), (last stage) length, 2 cm.; head, diameter, .32 mm. body, diameter, 3.7 mm. Head and thoracic shield black; scattering hairs occur on the head. Dorsal surface of body pale green with black tubercles. There are four tubercles on each side of the third and fourth segments, three in a row extending ventro cephalad and the fourth caudad of the last one in the row. The dorsum of the remaining segments i

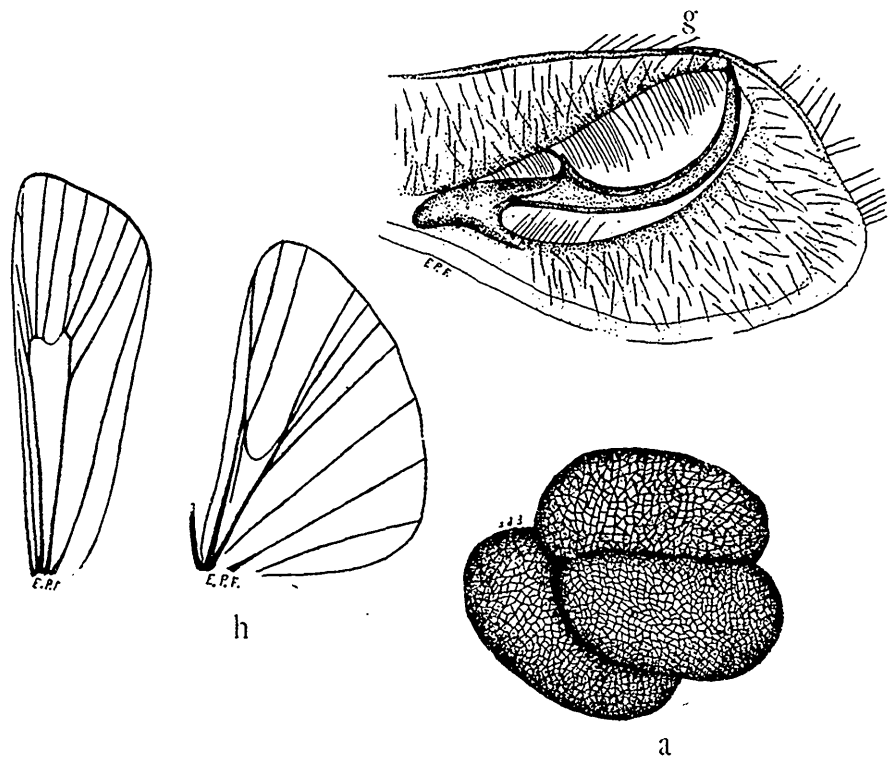

FIG. 2.

Nomophila noctuella: *a*, eggs, x 40; *g*, male genitalia (mesal aspect of right harpe and clasper), x 80; *h*, venation of wings, female, x 4.

divided by a slight transverse constriction into a cephalic and caudal part; the cephalic part of each segment bears three tubercles in a row, extending ventrad and forming with the tubercles of the third and fourth

segments a lateral, a super and a sub-stigmatal row of tubercles; the caudal part of each segment bears one tubercle, which is in the lateral row. The tubercles in the lateral rows on the thirteenth segment coalesce mesally. One or more hairs grow from each tubercle. Ventral surface sordid white with brownish tubercles. On the ventral surface there is a lateral row of brownish lunate tubercles, and on those segments not bearing legs there are transverse rows of four tubercles, those laterad being the larger. True legs brown with blackish tips. Five pairs of prolegs, occurring upon the seventh to the tenth and thirteenth segments inclusive. Prolegs short with brownish tips.

Pupa (Fig. 1, c, d), length 13 mm.; 3 mm. across the thorax. General colour light brown, venter lighter. Eyes prominent and usually dark coloured. The cephalic part of the pupal case is divided by sutures. Several of these unite at the base of the wing covers, where the chitine is thickened, darker coloured and pushed out into minute ear-like processes, which appear like dark spots. On the dorsum of the abdominal segments there are three dark stripes, extending from the thorax to the tip of the abdomen; one on the meson and the others, one on each side, just mesad of the spiracles. Abdominal sutures darker, darkest on the dorsum. Spiracles dark brown.

Adult (Fig. 1, e, f).

Male Genitalia.

Harpe (Fig. 2, g), membraneous; size 1.55 mm. by .81 mm.; mesal surface concave.

Clasper (Fig. 2, g), chitinous; fulvo-ferruginous; sickel-shaped.

Venation of wings (Fig. 2, h). Frenulum of ♂ a single spine, of ♀ two spines.

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FURTHER ON THE DIPTERA CONSIDERED AS THE HIGHEST INSECTS.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In my article in CANADIAN ENTOMOLOGIST, 1893, pp. 7-8, as also in my previous note in *Science*, Vol. XIX., 1882, p. 320, I stated that Hyatt and Arms were the first to point out that the Diptera were the most highly specialized insects, and consequently to be considered the highest in rank. It should be noted, however, that the same idea was advanced at the same time by the renowned insect anatomist, Mr. B. T. Lowne, well known for his work on the anatomy, etc., of the blow-fly. In part I. of this work, Oct., 1890, p. 25, Lowne says:—"The blow-flies belong to the family *Muscidæ*, one of the most highly specialized groups of the Diptera, the most highly specialized order of the class Insecta."

On pp 26-7, he further says:—"Just as all discussion would be futile as to whether a bird or a mammal is the higher type, so it is useless to consider whether the Diptera or the Hymenoptera have the higher organization; but there can be no question as to which of these orders departs most from the more generalized form. The Diptera are far more remarkable in their developmental history, and in the modification of structure which they present in the adult or imago form. In this relation the strong tendency of many to produce their young alive, and the fact that some have a capacious matrix, or uterus, in which the larvæ are hatched, or even attain the pupa form, before birth, is not without interest, presenting as it does some analogy with the viviparous character of the mammalia amongst vertebrates—whilst the nest-building instincts are more manifest in Hymenoptera and in birds. [This is an important analogy, and well pointed out.—C. H. T. T.] It is true that the flies, and more especially the heavy forms, with a comparatively tardy flight, like the blow-fly, have been regarded as 'stupid'—Sprengel called them 'die dummen Fliegen'—and do not excite our sympathy and curiosity to the same extent as the social Hymenoptera; but it is impossible to judge of the intellectual functions of an insect. The manner in which the blow-flies and their near allies, the house-flies, have made themselves at home

with man, speaks for their power of adapting themselves to new and varied conditions. They are cunning, wary, and easily alarmed, and, except when benumbed with cold or heavy with eggs, know well how to avoid danger. They appear to me far more clever in this respect than the bees and wasps."

My article in the CAN. ENT. was written before I saw the above quoted passages in Lowne's work. In his first edition of the anatomy of the blow-fly (1870), Lowne does not advance any ideas with regard to the systematic position of the Diptera.

The real credit for the original discovery and correct interpretation of the extreme specialization of the Diptera belongs to Weismann, who published a paper upon the development of the Muscidæ,* in 1864. Later, in 1876, Ganin sustained in the main the investigations of Weismann. Lowne first presented these views in English, at least in the Old Country, while Hyatt and Arms were the first to call attention to them in America.

The consensus of facts bears out the statement that the Diptera are the most highly specialized, and therefore the most highly organized order of insects. While they possess ancient as well as recent forms, they have, in the muscid families, reached a higher plane of development than any group in any other order. It is by no means contended that the Nemocerous Diptera are as highly organized as some groups in other orders, since they comprise the most ancient living forms of Diptera.

The Diptera probably find their culmination in the Tachinidæ, and of this family doubtless the Phasiidæ stand first. *Trichopoda*, *Phasia*, and *Hyalomyia* may therefore be considered as probably representing the highest forms of insect life.

ROYAL SOCIETY OF CANADA.

The next annual meeting of the Royal Society of Canada will be held in the City of Ottawa, on the 23rd, 24th and 25th of May. The Society will be represented by Mr. Hague Harrington, our Vice President. We notice by the programme that Mr. Harrington is to read a paper on Canadian Uroceridæ, a subject to which he has given much attention.

*Die nachembryonale Entwicklung der Musciden nach Beobachtungen an *Musca vomitoria* und *Sarcophaga carnaria*. Zeit. f. Wiss. Zool, XIV., 187 (1864).

Mailed May 18th.