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No. 3

DESCRIPTION OF THE PREPARATORY STAGES OF PAPHIA
TROGLODYTA, FABR. (GLYCERIUM, EDW., BUT. N. A.,
VOL. I, PL. 46; ANDRIA, SCUD.)

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

EGG.—Nearly spherical, a little higher than broad, somewhat flattened at base and slightly depressed at top; surface smooth; crossed near the top—at about one fifth distance from top to base—by two to four parallel rows of raised points, about 22 in the full circle; these seem to be placed in vertical lines; in some examples the rows are nearer together than in others, and there is often irregularity in the number or position of the points, some of the series wanting, or misplaced, in this last case lying between the rows. Color pale green. Duration of this stage four to five days.

YOUNG LARVA.—Length, at 12 hours from egg, .09 inch; cylindrical, tapering from 2 to 13 on dorsum and sides, the end of 13 rounded; color brown-green; the cross-ridges on each segment studded with small white rounded tubercles, from the top of each coming a short, fine, white hair; there are also four rows on either side of large white tubercles, one to the segment, three above spiracles, a sub-dorsal, mid-lateral, lower lateral, and one below spiracles; each with a short stiff hair; each of the basal row has a half circle of small tubercles, but larger than those over dorsum on its lower side; under side, feet and legs nearly as above, a shade more green; segments 5, 6, 11, 12 are crossed by two or three rows of tubercles; head a little broader than 2, rounded at top, the outline that of a horse-shoe, the front somewhat flattened; color yellowish; across the forehead a broad stripe of brown, within which are two little patches of the yellow ground, one on each lobe, and the stripe bends at right angle and narrowing passes down each cheek; in a curve about the top in front six small tubercles, and near the suture two others which with the second and fifth of the curved row make a cross row of four. Duration of this stage three to five days.

After First Moulting.—Length at 12 hours .18 inch; shape as before; color gray-green, the dorsum of 12, 13 discolored brown or blackish, and a sub-dorsal patch of same hue on 8 and 10; thickly covered with fine tubercles as at first stage; the rows of larger tubercles as before, ivory white, bell-shaped, the hair or process from top brown or black; the basal tubercles large, each with its crescent of smaller ones on lower side; head higher than broad, narrowing at upper part, depressed at suture; color of the upper front greenish, over mandibles yellow-white, at the back gray-green; on each vertex a low duplex black process, the outer part larger and higher than the other, each with a black short bristle at top; at back, on either side the suture, a duplex small yellow process and others down the side of face at back; over the front minute tubercles as at first stage, and in addition three large conical white tubercles on either lobe, each three in triangle with base above, so arranged that four tubercles cross the forehead in line. To next moult four to five days.

After Second Moulting.—Length at 12 hours .25 inch; shape as before; tuberculated as before; color gray-brown, discolored on posterior segments as before; head shaped as before; the processes on vertex larger, triplex, shining black, two being in line across front, the outer one larger, the third lying behind and between the others; the back and the front face armed as before. To next moult five days.

After Third Moulting.—Length at 24 hours .34 inch; shape, armature and color as before; there is much variation in the extent of the black; on one example 6 and 11 were quite black dorsally, on sides of 8, 9, 10 black patches, on sides of 3, 4, 5 paler black; another was pale black on 12, 13, a very little of same on 5 and 6, and the sides of 8, 9, 10 pale black; head as at last previous stage, the front greenish-black, the vertex processes black; of the four cones across front the outside ones were black, the others white, with brown rings at base. To next moult four and five days.

After Fourth Moulting.—Length at 24 hours .7 inch; after five days was fully grown.

MATURE LARVA.—Length 1.3 inch; stout anteriorly, thickest at 3, 4, tapering on dorsum and sides to 13; the end of 13 rounded and the dorsum much curved; color gray-green, segment 2 darker green; usually marked by patches of black on dorsum or sides of segments after 6, but some examples have little, or it is pale colored, and others have none at

all ; entire upper surface studded with low rounded tubercles varying in size, but always small, placed on the cross-ridges ; these are whiter than the ground color and from each proceeds a very short, straight white hair ; under side, feet and legs a shade lighter than the upper, 5, 6, 11, 12 crossed by tubercles ; head sub-ovate, depressed at top, the height to the breadth as 8 to 7 ; color gray-green, thickly covered with tubercles like those on body, small and large ; among these are larger ones, three on either lobe in triangle, so disposed as to make a row of four across forehead ; these are white, with a brown rim about base, or the inner pair are white, the others black ; on each vertex a triplex process as described at fourth stage, black ; along the back and sides white processes, of which a duplex or bifid one, taller than elsewhere, stands on either side suture ; ocelli black. From fourth moult to pupation ten days. Mr. French, But. East. U. S., p. 228, gives the length of mature larva as 1.55 inch, and probably wild examples are larger than my bred ones.

CHRYsalis.—Length .65 inch ; breadth across mesonotum .38 inch, across abdomen .4 inch ; shape much as in *Danais Archippus*, the last segments retracted in same way, so that the abdomen is greatly shortened, and the shape that of a dome ; the head case short, narrow at top and bevelled to a sharp, slightly incurved ridge ; the sides sloping ; mesonotum prominent, carinated, rising posteriorly to a rounded point, the slope to top of head regular, and at about 45° ; the depression behind shallow and broad ; the dorsal edges of wing cases prominent, the sides excavated ; color light green granulated with whitish ; the edges of wing cases and top of head case whitish. Duration of this stage nine to twelve days.

Some stages of the larva of this species were figured in *Butterflies of N. A.*, vol. 1, 1871, under the name of *Glycerium*. The drawings were made expressly for me by the late Dr. H. K. Hayhurst, then at Sedalia, Mo. They are before me as I write. The same drawings were used by Prof. Riley, before my Plate appeared, in his paper on *P. Glycerium*, Second Ent. Report, Mo., 1870, and his wood cuts were reproduced in Prof. French's *Butterflies of the Eastern U. S.*, p. 228, 1886. These are the only published illustrations of the life history of any species of *Paphia* so far as I know, and whatever defects there may be in the figures of the larvæ are common to all three of the works mentioned. The principal figure is that of the mature larva, and in But. N. A. a fair general view of the stage is given. But the peculiar armature of the body and head is not represented, and therefore this figure has very little value. Another

figure shows the beginning of the case, and a third the completed case, and this last is best of the three. The pupa is better than the larva, but does not give the pretty green hue of nature. I intend to give a more satisfactory Plate of all the stages in Vol. 3.

By the kind aid of Prof. Rowley, of Curryville, Mo., I was able to follow the history from the egg, in 1887. Mr. Rowley not only sent eggs at different times, beginning with 15th May, and larvæ of all stages of growth and pupæ so late as August 1, but kept me supplied with the food plant, *Croton capitatum*. The eggs are laid on *Croton monanthygnum* also, and these are the only plants known to Mr. Rowley. They are laid usually singly on the under side of the leaf. The young larva, soon after emerging, constructs for itself a perch on which it rests, after the manner of a *Limenitis*. It is at the tip of the leaf, made by eating away alongside the mid-rib, and using this rib as the base, covering with silk and lengthening by chewed bits of leaf bound and held by the silk. One perch in first stage measured .28 in length, and on it the larva rested with the anterior segments arched, only the pro-legs furnishing the support. But if there be two larvæ on one leaf, the second perch may be made anywhere at the side. After the first moult the perch was lengthened and made heavier by binding it with larger pellets, so that it looked like a string of knobs, and the greatest length I observed was .4 inch. The young larva bears much resemblance in body and head to young *Limenitis Disippus*, but is more like that larva at second stage than the first, and the head with its many tubercles and processes on vertices and at back still more resembles either second or third stage of *Disippus* than the first.

After the second moult, the perch is deserted, and a case is made by covering the upper surface of the leaf with silk, and bringing the edges together. The larva lies at first quite concealed, and eats the base of the leaf. Here the next moult takes place, and the larva then builds a new case, and goes outside to feed, after the habit of the nearly mature *Papilio Troilus*. By the time the fourth moult approaches, the larva is as long as the case, and the head will be exposed at one end and tail at the other, the rounded case being a pretty good fit, rather loose. When in suspension, the attitude is almost circular, and both ends meet and touch. The pupa is often found, Mr. Rowley tells me, attached to a branch of the food plant. There are at least two broods of the imago, and it is the

latter which hibernates. Mr. Rowley calls my attention to a decided seasonal dimorphism in the two broods of the females.

Prof. French gives the localities as the Western States, from Illinois and Nebraska to Texas, the presence of the butterfly no doubt being determined by the presence of the food plant.

SOME OBSERVATIONS MADE IN 1887 ON DANAIIS ARCHIPPUS, FABR.

BY WM. D. MARSH, AMHERST COLLEGE, MASS.

Mr. Scudder, in his "Butterflies," p. 136, says of this species: "It is the longest lived of our butterflies. It leaves its winter quarters later in the season than other hibernating butterflies, and continues upon the wing until July and August, laying eggs all the time, so that the insect may be found in all its earlier stages most of the summer. . . . Whether or not there is a second brood in New England is doubtful; but the earliest butterflies which have not hibernated may be found in July, so that while the earlier stages are passed rapidly, the perfect insect often lives a full year, mingling on the wing with its own progeny, and witnessing the decay and renewed growth of the plant which nourished it; for the milk-weed dies early, and is not sufficiently grown to support the caterpillars when the first butterflies appear in the spring."

I understand that Mr. Scudder still holds substantially these views of the habits of *Archippus* in New England, and at any rate has published nothing to the contrary.

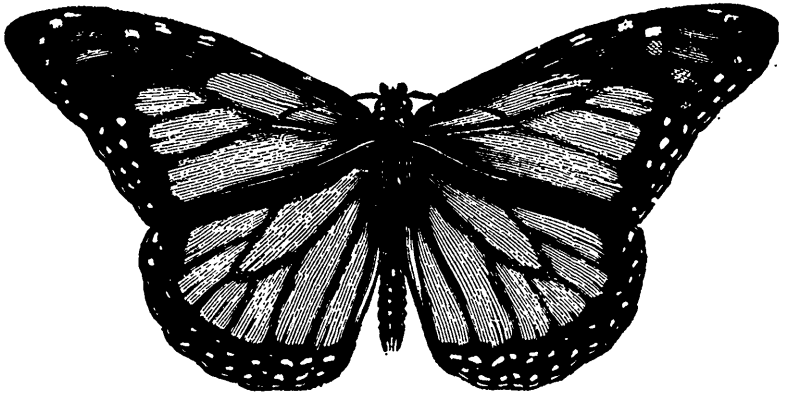
Early in the summer of 1887, Mr. W. H. Edwards wrote me with the request that I would make a study of *Archippus*. As my college term did not close till June 25th, all my observations before that date were made at Amherst; from June 25th to August 12th, at Randolph, Vt., a hill-town, 37 miles N. W. from White River Junction.

1. Hibernated *Archippus* were observed at Amherst, May 15 and May 21, and recognised as such by their faded and ragged condition. I searched for eggs, but found none. I may say here that at no time after

this, either in Mass. or Vt., did I see an imago that could have been a hibernator.

2. A fresh ♀ was taken at Randolph, July 4th, and another perfectly fresh was seen the same day. This would be the first generation in descent from the hibernator. On 20th July, a larva two thirds grown was taken, raised to pupa, and sent to Mr. Edwards, Aug. 1st. On August 11th, 2 ♂ 1 ♀, perfectly fresh, were taken, plainly of same generation as was the larva of July 20—the pupal period being then but 9 or 10 days. These imagos were in the second generation from the hibernators.

3. On 5th Aug., found a fresh egg at Amherst, where the season would be a week or ten days in advance of Randolph; on 17th and 18th



Aug., two larvæ, evidently by their size of the same generation as the egg of 5th. Continued to find larvæ all through September, the last one on 30th, in all 34 larvæ.

4. From 30th Sept. to 15th Oct., butterflies from pupæ bred from said larvæ emerge. And besides, many pupæ were found in the fields, and the imagos came from them. These butterflies were then the third generation from the hibernators, and individuals were seen on the wing into November. Giving the above facts in a table, thus:

1. May 15th, hibernating female seen, Amherst.
2. July 1st to 7th, imagos of 1st brood from hibernator, Randolph.
3. Aug. 11th to 19th, " 2nd " " " Amherst.
4. Oct. 1st to Nov. 4th, " 3rd " " " Amherst.

I communicated these facts to Mr. Edwards as they were noticed. I cannot see wherein the behavior of *Archippus* is different from that of

any other hibernating butterfly. Nor have I found any evidence of exceptionally long life, or of the old hibernating females being about all summer, laying eggs with their progeny. And of course they do not witness the decay of the food plant, for the milk-weed does not die early, but lasts till frost in October, and will stand pretty severe frost. On 28th Sept., I wrote Mr. Edwards: "We have had two pretty heavy frosts within a week, but the *Archippus* larvæ and more than half the milk-weeds are fresh and vigorous." On 30th Sept., I wrote: "Found the 34th larva this morning. Frosts have not been severe enough to kill larvæ. Most of the 34 have been on young milk-weeds, after the first mowing. Now the fields have been mowed the second time, and this explains why the late brood of the larva and imago may be scarce in some parts of N. England."

On 26th Oct., I wrote: "I now have four pupæ, of which one should give imago to-morrow, and three will wait a week. The pupal period in October, the pupæ being kept in a cool room, is about three weeks. In September, it was of about 15 days duration. Larvæ taken 2nd Sept., pupated 9th to 12th Sept., and the imagos came out 25th to 30th Sept."

I wrote 29th Oct.: "The one pupa has given imago." On 4th Nov., I wrote: "Another imago out this morning, a fine female. I have two pupæ left, and send you them by this mail."

It is plain to be seen why imagos are rare in the fall, and therefore more rare in spring, for there must be more or less loss of them in the winter. In New England quite generally the fields are mowed the second time, and that very late. Thus, while on Sept. 9th were taken nine larvæ in a field near my house from a group of milk-weeds, before larvæ of the same generation could have completed their stages, all the food plants were cut down. So myriads of larvæ must be annually destroyed in New England.

I saw wild *Archippus* flying on the 5th of Oct., again on 13th, in both cases after some frosts, as I have before mentioned. Of course these late flying ones are the hibernators, and liable to be caught any day at that season by cold that would compel them to seek hiding places or else become torpid out of doors.

DESCRIPTIONS OF SOME NEW GENERA AND SPECIES OF CANADIAN PROCTOTRUPIDÆ.

BY WM. H. ASHMEAD, JACKSONVILLE, FLORIDA.

The following paper is devoted to the description of new genera and species of parasitic Hymenoptera belonging to the family Proctotrupidæ, collected at Ottawa, Canada, by my esteemed friend, Mr. W. Hague Harrington, to whose liberality I am deeply indebted for sending me these and many other interesting forms in this family now in my collection.

Sub-family CERAPHRONINÆ.

The following table will be found useful to separate some forms closely allied to the genus *Megaspilus* Westwood.

Eyes hairy.

Metathorax spined *Megaspilodes* Ashm.

Metathorax not spined.

Wingless, or with rudimentary wings 2

Winged; a large semi-circular stigma and a stigmal vein.

Mesothorax with three grooves; ♂ antennæ filiform, ♂ flagellate *Megaspilus* Westw.

2. ♀ antennæ sub-clavate; ♂ unknown *Eumegaspilus*, n. g.

Mesothorax with only a median groove *Megaspilidea*, n. g.

Megaspilodes Ashm.

The writer has recently characterized this genus elsewhere. It is at once distinguished from *Megaspilus* Westw. by having a blunt spine, or a bi-forked spine, in the middle of the metathorax. Two species pertain to it, viz., *Megaspilodes armatus* Say, and *M. fuscipennis* Ashm.

Megaspilus Westwood.

(1) *Megaspilus Harringtoni*, n. sp.

Male and female. Length .07 to .10 inch. Black; head and thorax finely reticulately sculptured; abdomen polished black. Antennæ 11-jointed, the scape and pedicel dull honey-yellow, the flagellum brown-black. Legs dull honey-yellow, the posterior femora obfuscated, the anterior and middle coxæ honey-yellow at apex, while the large posterior coxæ are black. Wings sub-hyaline, heavily pubescent, the large stigma and stigmal vein brown. The male differs from the female only in its smaller size, and is readily distinguished by its long, filiform antennæ, the

scape of which at apex and the flagellum, brown ; the joints of the latter are about four times as long as thick.

Described from two specimens, male and female.

Eumegaspilus, n. g.

This genus is distinguished from *Megaspilus* Westwood in being entirely wingless or then with rudimentary wings, and by the shape of the flagellum, which is sub-clavate. In *Megaspilus* it is flagellate, i. e., tapers gradually to a point at apex.

(2) *Eumegaspilus Canadensis*, n. sp.

Female. Length .09 inch. Polished black ; the head and thorax only showing a delicate, reticulated sculpture under a high power lens. On the head are a few large punctures, particularly on the vertex, two small foveæ or depressions on each side of front ocellus ; occiput prominently margined ; eyes pubescent. The antennæ are 11-jointed, wholly brown-black ; flagellum sub-clavate, the first funicular joint longer than the pedicel, the others sub-equal but gradually widened, the terminal joint being the longest and thickest. Mesothorax with three grooves. Legs, including coxæ, of a uniform brownish-yellow. Abdomen highly polished with a depression near the base.

Described from one specimen.

(3) *Eumegaspilus Ottawensis*, n. sp.

This species is much like that just described, but it is more slender and more highly polished ; the head is impunctured, while the scape at base, the pedicel, the 2nd, 3rd and 4th flagellar joints, and the legs, including the coxæ, are honey-yellow. The rudimentary wings are linear and reach not quite to the middle of the abdomen.

Described from one specimen.

Megaspilidea, n. g.

This genus is at once distinguished from the others by having but one groove on the mesothorax—the median one, the parapsidal grooves not being present ; also by the difference in the flagellar joints.

(4) *Megaspilidea minuta*, n. sp.

Female. Length .04 inch. Head and thorax shining black, microscopically, reticulately sculptured. Eyes large oval, pubescent. Antennæ 11-jointed, scape ob-clavate, more than half the length of the flagellum ; flagellum sub-clavate, first joint hardly half the length of pedicel, others

short, gradually widened toward tips, terminal joint very large and as long as the three preceding joints combined; scape yellowish at base and beneath, flagellum brown-black. Legs, including coxæ, brownish-yellow. Abdomen highly polished, smooth, excepting a few longitudinal lines near the base; the color above is black, excepting a large orange-colored blotch across the base; beneath, it is wholly brownish-yellow.

Described from two specimens.

Sub-family SCELIONINÆ.

Acolus Forster.

(5) *Acolus Canadensis*, n. sp.

Female. Length less than .03 inch. Black, shining, sparsely pubescent. Antennæ black, excepting the scape at base; the first and second funicular joints are about as long as thick, third and fourth smaller and not as long as wide, club very large, joints not well separated. Scutellum sub-lunate. The legs, excepting the honey-yellow knees, are dark red. Abdomen broadly oval, the second segment occupying most of its surface, first segment with a transverse depression occupying nearly its whole width, striated and with a fringe of white hairs at base.

Described from one specimen.

(6) *Acolus borealis*, n. sp.

Female. Length .03 to .04 inch. Differs from *A. Canadensis* only in being relatively more robust, and in being distinctly, finely, confluent punctate; the lower part of face and the abdomen alone being smooth and shining. The antennæ are dark reddish brown. Legs uniformly red, while the abdomen is striated at base.

Described from four specimens.

Prosacantha Nees.

(7) *Prosacantha brachyptera*, n. sp.

♀. Length .03 inch. Black, shining. Thorax sub-opaque, microscopically punctate; metathorax with an acute spine on its disk. Antennæ brown-black. Legs red. Abdomen broadly oval, black, excepting the first segment, which is red and striated. Wings short, narrow, somewhat spatulate, not ciliated; the marginal vein long, black, the stigmal short, post-marginal vein wanting.

Described from three specimens.

This species comes nearest to *P. minutissima* Ashm., from which it is,

however, readily distinguished by the narrow, non-ciliated wings, and the color of the first abdominal segment.

Pentacantha, n. g.

This genus is closely related to *Prosacantha* Nees and *Trisacantha* Ashm.; but is at once separated from them by having five spines on the metathorax, three short ones on the disk and one long one on each side; and besides, there is a short, smooth, blunt horn at the base of first segment, partly prolonged over the metathorax. Its other characters are exactly as in *Prosacantha*. The blunt horn issuing from the base of first segment would seem to indicate a relationship with *Inostemma* Haliday, but that genus is in another sub-family.

(8) *Pentacantha Canadensis*, n. sp.

Female. Length .08 inch. Polished black; thorax opaque. Head smooth, except some lines back of eyes and on occiput. Antennæ 12-jointed, brown; first funicular joint twice as long as the pedicel; second two thirds the length of first; third about as long as wide; fourth shorter than wide; club large, six-jointed. Thorax and scutellum rather coarsely rugose; no parapsidal grooves. Legs, including anterior coxæ, honey-yellow, middle of femora and tibiæ obfuscated. Abdomen polished black, the third segment longest and widest; first and second segments, and the third excepting on its disk, longitudinally striated. Wings dusky-hyaline, venation as in *Prosacantha*, veins rufo-piceous.

Described from one specimen.

Sub-family PLATYGASTERINÆ.

Metaclisis Forster.

(9) *Metaclisis erythropus*, n. sp.

Female. Length .08 inch. Black. Head opaque, coarsely rugose on vertex and back of eyes. Antennæ 10-jointed, the terminal joints of funicle enlarged into an irregularly rounded club; club six-jointed, fili-form. Thorax shining, finely reticulated or scaly; parapsidal grooves distinct, converging and meeting at the base of the scutellum. Legs red. Abdomen polished black. Wings dusky hyaline.

Described from one specimen.

Ectadius Forster.

(10) *Ectadius Canadensis*, n. sp.

Female. Length .12 inch. Polished black. The head is delicately

transversely striated on vertex back of the ocelli and on the lower portion of the face. Antennæ reddish brown. Legs red, tarsi paler, yellowish. The thorax has two distinct parapsidal grooves and is delicately microscopically punctate. Metathorax, metapleuræ and base of abdomen densely pubescent. Abdomen polished black and prolonged into a long point posteriorly, being more than twice the length of the head and thorax combined. Wings hyaline.

Described from one specimen.

Sactogaster Forster.

(11) *Sactogaster Howardii*, n. sp.

Female. Length .07 inch. Polished black, impunctured. Antennæ and legs dark red, the posterior femora obfuscated, tarsi paler. The scutellum is convexly high, striated and ends in a spine. The tail is nearly twice the length of the inflated venter. Metathorax and metapleuræ wrinkled. Wings hyaline. Hab.—Washington, D. C.

This species is described from one specimen taken by myself last summer, on the outskirts of Washington. It is dedicated to my friend, Mr. L. O. Howard, of the U. S. Dept. of Agriculture. Its much larger size, striated scutellum and longer tail will at once distinguish it from *S. anomaliventris*, described from Florida. In that species the scutellum is smooth, while the tail is not as long as the inflated venter.

Sub-family DIAPRIINÆ.

Ancurhynchus Westwood.

(12) *Ancurhynchus mellipes*, n. sp.

Female. Length .10 inch. Black, shining, sparsely pubescent. Antennæ 12-jointed, red, stout, clavate; the scape is greatly thickened, a little shorter than half the length of the flagellum; pedicel thicker, but not half as long as the first funicular joint; second shorter than the first, and the third shorter than the second; from thence the joints are shorter than wide and well separated. Parapsidal grooves distinct. Legs, including the coxæ, honey-yellow. Abdomen polished black, petiole rugose. Wings sub-hyaline, pubescent; the submarginal vein ends in a callosity and a short stigmal vein, but it does not reach the costal margin; the sub-marginal vein is very pale.

Described from one specimen.

Paramesius Westwood.(13) *Paramesius clavipes*, n. sp.

Female. Length .08 inch. Polished black, covered with some long, sparse hairs on head, thorax and surrounding apex of abdomen; the metathorax, metapleuræ and abdominal petiole densely pubescent. Antennæ 13-jointed, red, gradually incrassated toward tips; first funicular joint very slightly shorter than pedicel, following joints to fifth, sub-equal, from thence moniliform, slightly pedicellated, the terminal joint more than twice the length of the preceding joint, fusiform. Thorax without grooves, somewhat flat, sides compressed; collar red at sides. The abdomen is pointed ovate, a deep depression above near base, while the ovipositor is exerted between two short valves, probably unnaturally so. Legs red, the femora strongly clavate, the tarsi very long, the anterior and middle pairs being longer than their tibiæ. Wings sub-hyaline, the marginal vein but slightly developed, not longer than the very short stigmal vein.

Described from one specimen.

Loxotropa Forster.(14) *Loxotropa pezomachoides*, n. sp.

Female. Length .04 to .05 inch. A small, highly polished, black, apterous species, sparsely covered with some long hairs. The antennæ and legs dark red. Antennæ 12-jointed, moniliform, the four terminal joints being much widened and slightly pedicellated, the last joint of which is large, fusiform.

Described from six specimens.

(15) *Loxotropa Harringtoni*, n. sp.

Female. Length .04 inch. Black, polished, covered with some long, sparse hairs. The collar at sides, metathorax and abdominal petiole well covered with dense, white pubescence. Antennæ 12-jointed, dark red, the four terminal joints abruptly larger than the preceding, and the species may be readily known by this character, and by the last funicular joint being a little longer and more slender than the preceding one. The legs, including all coxæ, red. Abdomen clavate, the ovipositor slightly exerted. Wings dusky-hyaline, heavily pubescent and ciliate; the marginal vein hardly developed, thickened.

Described from one specimen.

(16) *Loxotropa armata*, n. sp.

Female. Length .07 inch. This species is very closely related to

L. Harringtoni, agreeing with it in color, wing characters, etc., but it is much larger, the antennæ much more incrassated toward apex, the terminal joint being very large and thick, and as long as the three preceding joints combined; these four terminal joints, which constitute the club, are as usual slightly pedicellate. Another character which will readily distinguish it from all other species is a short conical spine in the centre of the metathorax.

Described from one specimen.

(17) *Loxotropa abrupta* Thompson.

This European species must now be added to our fauna, Mr. Harrington having taken a specimen in Canada which I am unable to separate from types from Europe in my collection.

Monelata Forster.

(18) *Monelata hirticollis*, n. sp.

Stature and size of *M. mellicollis* Ashm., but differs in being entirely black; the collar, metathorax and petiole densely pubescent; antennæ dark red, the very large terminal joint nearly black, while the legs are reddish-yellow. Wings hyaline, ciliate.

Described from one specimen.

Sub-family BELYTINÆ.

Zygota Forster.

(19) *Zygota Americana*, n. sp.

Female. Length .14 inch. Polished black, covered with a fulvous pubescence. Antennæ 15-jointed, filiform-moniliform; first funicular joint twice longer than the pedicel, other joints almost round, sub-pedicellate. Parapsidal grooves of mesonotum broad, distinct. Scutellum with a deep depression at base. Metathorax carinated. Legs, including all coxæ, honey-yellow; first tarsal joint of anterior legs long, deeply emarginate at base. Abdomen ovate, black, a lateral streak on the apex of sixth segment red; venter densely pubescent; petiole twice as long as wide, fluted. Wings fusco-hyaline, pubescent; veins brown, the marginal cell not quite closed.

Male. Length .12 inch. This may be distinguished from the female principally by the antennæ. They are 14-jointed, long, filiform, pubescent, pedicel rounded, the first funicular joint about five times as long as thick, excised at base, the following joints about four times as long as

thick. There is a tooth beneath anterior femora, near the base; while the anterior tibiæ are peculiarly twisted, the twisted part ending in a spine, besides the apical tibial spine. Otherwise as in the female.

Described from one male and one female specimen.

AN INTERESTING NEW CHALCID FROM CANADA.

BY WM. H. ASHMEAD, JACKSONVILLE, FLA.

Among a small collection of parasitic Hymenoptera sent me by Mr. James Fletcher, the Dominion Entomologist, for names, I found an interesting Chalcid belonging to that remarkable Pteromalid genus *Caratomus* Dalman, no species of which has as yet been described as occurring in our fauna; and as the present species seems to be distinct from the European species, *Caratomus megacephalus* Dalm., I believe it to be undescribed, and submit herewith the following description:

Caratomus leucophthalmus, n. sp.

Male. Length .10 inch. Robust, blue-black, confluent, granulately punctate. The head is very large, its breadth being nearly twice the width of the thorax when measured from eye to eye; its front is deeply, broadly emarginated, and there is a deep emargination or broad groove extending from the eye obliquely towards the mouth, the upper edge of which forms an acute tubercle, while the lower edge forms an acute ridge. The eyes are satiny white, finely pubescent. The antennæ are 13-jointed, clavate; scape, the long pedicel, and first and second funicular joints brownish-yellow, the following joints brown. The legs are red, excepting the trochanters, extreme tips of femora and tibiæ and the anterior tibiæ, which are wholly brownish-yellow. The abdomen is oval, with a dull bronzy tinge; petiole short, yellow. The wings are hyaline with a large fuscous blotch across the middle; veins thick, rufo-piceous; the submarginal vein is distant from costal edge and nearly three times as long as the marginal vein; the stigmal vein is about as long as the marginal, curved; while the post-marginal is distinctly longer than the stigmal vein.

Described from one male specimen taken on a window at Ottawa, in 1885, by Mr. James Fletcher.

MOTHS NEW TO OUR FAUNA.

BY JOHN B. SMITH, WASHINGTON, D. C.

Mr. Hy. Edwards, on p. 12 of vol. xx. of the CAN. ENT., records three species of moths as additions to our fauna—two of them *Sphingidæ*, viz., *Pseudosphinx tetrio* and *Philampelus typhon*. Mr. Edwards is undoubtedly correct in the record of localities, and in calling attention to their capture within our faunal limits; but, with all due respect, I do not think that these species should be added to our faunal list. *Erebus odora* has been found in Canada, yet it would be an absurdity to cite it as a Canadian insect. The mere fact that an insect well known and abundant in one faunal region is occasionally found in another, does not authorize its addition to the latter fauna unless it breeds in or regularly migrates to it. *Sphinx tetrio* is a very common species which we have from Mexico, South America and the islands of the Carribean Sea. It is essentially a tropical and sub-tropical insect, and does not come into the temperate fauna except accidentally. It is undoubtedly true that political boundaries cannot limit faunal regions, and yet the southern boundary of the United States very nearly accords with the faunal line separating the temperate from the sub-tropical fauna. Species occurring near this faunal border, especially species of strong flight like the *Sphingidæ*, will often cross the line; but this does not make them members of both sides. The rule should be that only insects which breed within the faunal limits should be considered as forming parts of it. Ordinarily the presumption is that an insect breeds where found. This presumption fails where the insect is known to breed in a different fauna, and then positive proof should be required of its right. On this view I must dissent from Mr. Edwards's idea that these particular species should be added to our fauna. In a monograph of the *Sphingidæ* now ready for the press, I have excluded these species, and in addition *Diludia brontes* and *D. leucophaata*—both species possibly occasional visitants to our fauna, but really members of the next, or sub-tropical.

Southern Florida has a peculiar fauna, and one that perhaps should not be classed within the temperate limit. It really in many respects should be classed with the West Indian fauna, but on this point I make only the suggestion. It seems to me that Mr. W. H. Edwards, in the Rhopalocera, has followed the wiser plan of separately calling attention to species occasionally found in but not really belonging to our fauna.

 DESCRIPTION OF THE PREPARATORY STAGES OF DATANA DREXELII, Hy. EDW.

BY WM. BEUTENMULLER, NEW YORK.

EGG.—Similar to *D. ministra*; cannot be distinguished from it. Laid in masses on the under side of leaf.

YOUNG LARVA, after First and Second Moults.—Cannot be distinguished from *D. ministra*.

After Third Moults.—Little change except in size. The stripes are now confluent about the anal segments. Length 30 m.m.

After Fourth Moults.—Head jet black, cervical shield now chestnut brown instead of black; otherwise as in *D. ministra*. Length 40 m.m.

MATURE LARVA.—Head jet black, shining, slightly punctured; cervical shield and neck wholly golden yellow. Body black, with four equidistant stripes of citron yellow on each side, and three on the under side. Abdominal legs and bases of thoracic feet orange. The stripes all become conjoined at the posterior extremity. The anal plates jet black, *very shiny and nearly smooth, and not roughly punctured*, as in *D. ministra*. The hairs over the body are sordid white. Length 55 m.m.

PUPA.—Cannot be distinguished from *D. ministra*.

FOOD PLANTS.—Huckleberry (*Vaccinium*), and Witch Hazel (*Hamelis*). Single brooded.

 STRAY NOTES ON MYRMELEONIDÆ, PART 4.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from vol. xix., page 38.)

 4. *Brachynemurus abdominalis*.

Myrm. abdominalis Say, Godm. West. Quart. Rep. ii., 163—Edit. LeConte, I., 173.

M. juvenus Hag., Syn. N. Am. Neur., 234, 21 (var. with longer spurs).

Yellowish, slender, faintly villous; face yellow; between the antennæ and a little above, a longitudinal median line, connected with a transversal one on the epistom, all black; palpi equal, pale, the apical joint of maxillary and this of labial, which is very little thickened in the basal half, somewhat brownish; antennæ longer than head and prothorax, in the male

fuscous annulated with luteous, especially before the tip, which is clavate ; shorter, more clavate in female ; the two basal joints brown, shining ; vertex elevated, rounded, yellowish with two blackish dots ; prothorax little longer than broad, yellowish, with two dorsal black lines, ending on the anterior transversal sulcus ; sometimes a darker spot in front of the lines ; on each side and nearly below a black band connected with the lateral one of the thorax ; two black maculose bands including yellow spots on the thorax ; mesothorax before wings black, with yellow spots ; abdomen of male much longer than wings, faintly villous yellow, with a fine black median line, apical part blackish, yellow on articulation and some lateral marks ; appendages less than half the length of last segment, cylindrical, yellowish, brown at base, densely clothed with black hairs ; below and between them a small triangular yellow plate ; abdomen of female as long as wings ; coloration similar, but the dorsal yellow band divided by a black line reaches the apex ; genital parts yellow, the superior part split, with many black spines ; below two short yellow appendages. Wings hyaline with a faint yellowish tint ; veins pale interrupted with brown, which covers in front wings most of base of the small forks and the base and apex of the transversals ; therefore the wing is faintly sprinkled, more densely along the mediana and submediana ; hind wing similar but less and more faintly sprinkled ; pterostigma white, larger in the female ; wing around and on the venation faintly villous ; apical half of costal space with forked veins. Legs short, pale, sprinkled with black, with black hairs ; tip of tibiæ and of joints of tarsi black, fourth joint entirely black ; spurs as long as three basal joints, or at least longer than two, brown. Length of body, male, 30 to 37 m.m. ; female, 28 to 30 m.m. Exp. al., 36 to 54 m.m.

Habit., New Jersey, Uhler ; Pennsylvania ; Georgia, Morrison ; Washington, O. Sacken ; Rock Island, Ill., Walsh ; Utah, Lake City, O. Sacken, August 1, and Packard, August 13 ; Colorado, Golden City, Boulder, July 3, Packard ; Texas, Dallas, Boll ; Waco, Belfrage, June, July, Sept., Oct. ; San Antonio, A. Agassiz ; Carrizo Spring ; New Mexico, Zuni, Hayden's Exped., July ; Umatilla, Washington Territory, S. Henshaw, June 28 ; California, Vulcane Mts., Stinking River, H. Edwards.

The size of the specimens is rather variable in the same locality ; there are before me now more than 50 of both sexes, but I have seen more. The species seems very common in Texas, Colorado and New Mexico.

There is not much variation. Texas specimens have on the front part of the prothorax two brownish spots, and younger specimens are more bright in colors; a number of specimens have the spurs longer, equal to the three basal joints, though others of the same locality have spurs two joints long. *M. juvenus* Hag. is *Myrm. abdominalis* Say.

5. *Brachynemurus peregrinus*.

Myrmeleon peregrinus Hag., Syn. N. Am. Neur., 234, 20.

Face yellow, with a short black band above, surrounding the antennæ below; sending a faint black median line on the upper part of the face, not reaching the clypeus; mouth yellow; palpi yellow, the maxillary with the last joint cylindrical fuscous; labials a little longer, last joint shining black, extreme base and tip yellowish, seen from above strongly fusiform with a kind of ocellus-like transparent median spot; seen from beside the joint is less bulky, the third apical part strongly narrowed, conical. Antennæ longer than head and thorax, strong, clavate, black, scabrous, dull, the two basal joints below shining brown; the base and apex of the antennæ sometimes pale brown, and very faintly annulated; vertex elevated, rounded, yellow; black in front with three not well defined yellow dots and two black transversal bands, the last one interrupted in the middle, and arcuated; prothorax scarcely longer than broad, yellow on the dorsum, with four longitudinal black lines, and beneath on each side with a black stripe; the pattern of the dorsum and its many variations is better to be understood in describing it as black, divided by a narrow yellow line and each part divided again by a yellow line not reaching the front; broken in the middle and forming two elongate spots, of which the inferior ones may disappear; mesothorax black with yellow dots near the prothorax; after this yellow with three black forks; metathorax yellow with a black cross; sides of thorax black with some yellow bent stripes. Abdomen faintly villous; above yellow with three longitudinal black bands, the median much finer on the male, which has the three last segments black; venter fuscous; abdomen of male much longer than wings; appendages light brown with very long black hairs and bristles, very short, blunt pyramidal, divergent; between them and below a small plate of the shape of a leaf, which can be folded in the aperture between the appendages; abdomen of female as long as the wings, dilated and compressed to the apex; genitals light brown, the superiors split, below with a transversal row of very strong black spines; below two short cylindri-

cal appendages, brown with black hairs; they are retractible into the abdomen, and so often not visible. Legs yellow, sprinkled with black, and with black hairs; hind femurs sometimes fuscous in middle; tip of tibiae and of the joints of tarsi blackish; spurs brown, as long as the two basal joints. Wings long, broad, hyaline; pterostigma yellowish; veins fuscous interrupted by pale yellowish; transversals along the median and submedian pointed with fuscous; the points above the submediana are larger and more numerous, forming nearly a serrated black line; also the gradate veins going from the end of the submediana upwards and outwards to the tip of wing form often a brown line, more or less visible; the smaller forks along the hind margin dark; costal space of front wings only with a few forked transversals before the pterostigma; hind wings a little shorter, narrower, nearly hyaline.

Length of body, male, 42 to 51 m.m.; female, 30 to 36 m.m. Exp. al., 60 to 75 m.m.

Hab., Washington Terr., Ainsworth, July 20, very common; opposite Umatilla, June 27; Oregon, Umatilla, June 24-25; all these coll. by S. Henshaw, 1882. California, Fort Tejon, by Xanthus de Vesey; San Francisco, 1865. Nevada, Humboldt Station, July 29; O. Sacken. Colorado, Pueblo. New Mexico (formerly W. Texas), Pecos River, July 7; and Matamoras, Mexico, Exped. of Capt. Pope.

There are 40 specimens before me of both sexes. In the small town Ainsworth, in the middle of a sandy desert, the windows of the office in the little inn where we had to stay the night, were literally covered with specimens. This species belongs to the west of the Rocky Mts. The specimens from Mexico—Matamoras—are smaller than the others, but not different.

THE BUTTERFLIES OF NORTH AMERICA, by W. H. Edwards. Part iv. of the Third Series has recently been issued. It contains the usual three magnificent plates; the first represents both sexes and several varieties of *Colias Chrysomelas*, the second the upper and under surfaces of both sexes of the lovely *Argynnis Nausicaa*, and the third fully illustrates all the stages of *Cænonympha Galactinus*, form *California*. The letter-press contains much interesting matter on the life histories, in addition to the descriptions of the species.