



STHENOPIS THULE.

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NOTES ON THE LARVA AND PUPA OF *STHENOPIS THULE*, STRECKER.

BY J. M. SWAINE, MACDONALD COLLEGE, P. Q.

Larvæ and pupæ of this interesting species were found in a willow swamp near Macdonald College by Mr. G. Chagnon, Mr. W. Brittain and myself on June 29th, 1909. They were taken from the bases of the stems of the common swamp willow, *Salix petiolaris*, Smith.

So far as we know, the mature larva and pupa have not been previously described.

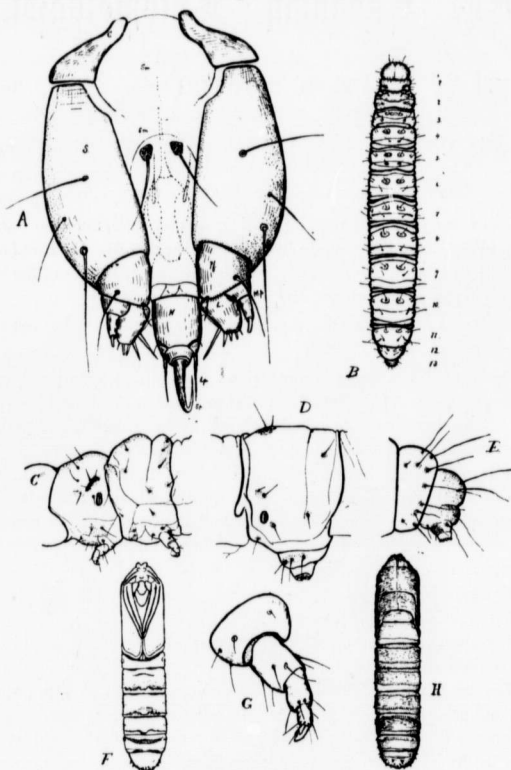
Description of a nearly-mature larva: Length (alcoholic specimen), 70 mm.; diameter at second abdominal segment, 9 mm.; width of head, 5 mm. The shape is nearly cylindrical, the thorax is slightly humped, and the last two abdominal segments are somewhat retracted ventrally. The colour is white or yellowish-white with yellow, chitinized thoracic areas and with small yellow-chitinized spots, from which arise the setæ. The setæ are sparse, dark brown, and longer and stouter on the last two abdominal segments. The body segments are much folded transversely, with a strong lateral fold on each side.

The spiracles are black, distinct, and situated on the first thoracic and first eight abdominal segments.

The abdominal feet are stout, situated on the third, fourth, fifth, sixth and last abdominal segments.

The head is reddish-brown, darker cephalad; with the labrum, mandibles and palpi black; irregular furrows radiate from the sparse, setigerous punctures. The spinneret is slender, straight, and usually held at right angles to the body, though capable of being retracted flat against the ventral wall of the head. The ocelli are six in number, and are arranged in two more or less distinct rows.

The yellowish-brown cervical shield covers the dorsum of the first thoracic segment between the spiracles. Above the spiracles on either side is a slightly-curved, elongate, brownish-black, impressed marking, bearing a black setigerous puncture at either end and one cephalad of the middle.

FIG. 10.—*Sthenopis thule*.

The anal plate is strongly chitinized, and bears stout, black setæ, as shown in figs. E and K.

The chitinized dorsal areas, arrangement of setæ, and other details, are shown in the accompanying figures.

The smallest larva differs from the above description in the relatively

longer and blacker setæ, and in having the yellow, basal plates of the setæ replaced by relatively larger, well-defined, and very distinct blackish areas.

We have obtained, since the flight of the adults ended, larvæ with the following widths of heads: 2 mm., $3\frac{1}{2}$ mm., $3\frac{3}{4}$ mm., $4\frac{1}{4}$ mm., $4\frac{3}{4}$ mm., 5 mm. The length of the smallest specimen is 19 mm., the diameter $2\frac{1}{4}$ mm. These measurements are taken from alcoholic specimens.

We are breeding the larvæ in the greenhouse in the entire willow roots and in pieces of the roots, and hope eventually to be certain of the length of the larval life. At present, allowing for the varying size of pupæ

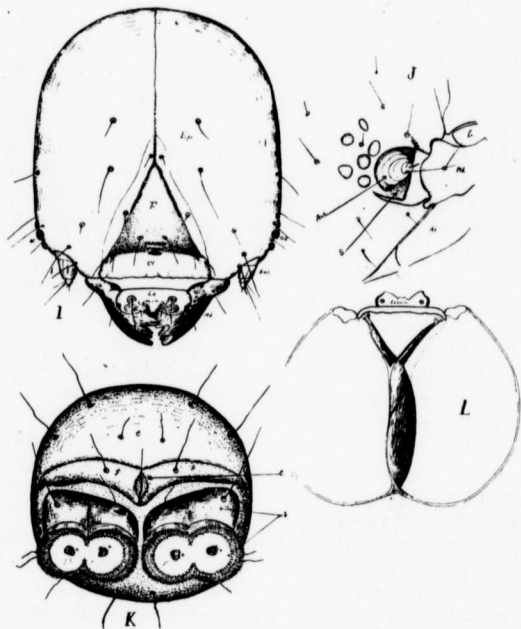


FIG. 11.—*Sthenopis thule*.

and adults, I suspect that the larval life will be found to extend over three years at least.

Habits of the Larvæ.—The early habits of the larvæ have not yet been discovered. The smallest specimens obtained by us dropped from the roots or stems, and their location could not be determined. All the larger larvæ were within the tunnels in the base of a stem, or in the main stem mass. Each larva cuts a tunnel, seldom over six or eight inches in length, nearly cylindrical, and of a diameter slightly larger than that of the larva. The tunnels of all the larger larvæ have the exit-hole, which is usually below the surface of the ground, already cut a year or more before the maturity of the larva. The tunnels end abruptly inwards, and are sharply angled just within the exit-hole.

The food of the caterpillar seems to be obtained entirely by enlarging the tunnel; short side tunnels are sometimes present. The relatively small amount of food to be obtained in cutting such a tunnel would indicate a long larval life.

The burrow seems to be kept perfectly clean until near the time of pupation. Then the larva frequently forms within the mouth of the burrow, or in the loose soil just below the surface of the ground, a cylindrical cocoon of pieces of decayed bark and roots fastened with silk, of which latter it has a copious supply. All the cocoons found were open at the ends, not over three inches in length, and usually somewhat larger at one end than the other. Several pupæ have been found within the tunnels without any trace of a cocoon.

The larvæ are extremely active, and wriggle vigorously when disturbed, emitting a large amount of dark brown saliva. They even attempt to bite one's fingers when held, and although not very successful in the attempt, their intentions are very evident. When disturbed in their burrows they move backwards or forwards very rapidly. When allowed to wander at will over a black cloth a thread of silk is seen to be spun wherever the larva goes. The head is waved from side to side, and the silk attached to the cloth at the end of each motion, thus leaving the silk attached in a zigzag line. When left in a box with fresh roots and rubbish, the latter is soon interwoven with a web of silk, and the roots are readily fed upon, an evident attempt being made to construct a tunnel.

When kept in a tin box a larva would frequently produce a sharp rattling sound, such as could be produced by a quick succession of blows

of its strongly-chitinized head against the tin. The sound invariably ceased when the box was touched, or even when one walked near it. Probably this species has the habit observed in the case of *Hepialus sequoiolus* (Williams, 1905, Ent. News, 16: 284).

The larvæ were not noticed to mutilate each other when kept together, as those of *H. sequoiolus* are known to do (Williams, 1905, Ent. News, 16: 20).

The larvæ and pupæ are to be found chiefly in the bases of healthy and dying stems, although the main mass of the stem will usually be found pierced by numbers of old tunnels. The larvæ apparently worked mainly in the younger tissue near the surface of the ground.

Several parasitized pupæ were obtained, but the ichneumons contained therein died in the pupal stage. No other parasites were found.

Description of the pupa: The length varies from 3 to 4 cm., the width from 7 to 8 mm.; colour dark reddish-brown, with head and dorsum of pro- and mesothorax black. The shape is cylindrical; the wings, legs and antennæ adhere closely, the thorax and abdomen are equal in width, and the sides are almost exactly parallel. The head tapers to a rounded point ventrally; the abdomen is broadly rounded behind. A very few inconspicuous yellow hairs are scattered over the surface. The head is very strongly chitinized, black, with flexuous corrugations, and with four irregular prominences and a median sulcus dorsally. This sulcus gives off a branch on each side which runs cephalo-ventrad behind each anterior prominence. Along these lateral sulci the cuticle splits upon transformation.

The prothorax is very strongly chitinized, black, and strongly, longitudinally corrugated dorsally, with a distinct median carina, more strongly marked cephalad. This carina is a continuation of the line of the dorsal sulcus of the head, and is continued as a narrow smooth line across the meso- and metathorax. The cuticle splits along this line at transformation. The mesothorax and metathorax are also strongly chitinized and corrugated dorsally, more strongly on the sides of the disc. The corrugations are transverse on the middle of the disc and irregular on the sides. The colour becomes lighter behind. The wings extend less than one-half (17/39) the length of the pupa. The tips of the third pair of legs project caudad between the tips of the wings. The first six abdominal segments are transversely and finely corrugated, more strongly cephalad. The

corrugations of the last two segments are faint and irregular. The spiracles are distinct at the sides of all the abdominal segments excepting the first.

The abdominal segments from the third to the seventh bear each two parallel and toothed carinæ across the dorsum. The anterior of these is situated at a short distance from the anterior margin of the segment, and begins (see 7th) on each side immediately cephalad and slightly ventrad of the spiracle. The posterior carina is parallel with the first, on the fourth, fifth and sixth segments, and extends in an irregular line across the venter. It is bent strongly caudad and considerably raised on the mid-ventral line. On the third and seventh segments the posterior carina is indistinct. The anterior carina of the seventh segment is continued across the venter, bent strongly caudad and strongly raised. The last segment is hemispherical, marked by several more or less distinct, concentric carinæ, scattered tubercles, and a slit-like protuberance at the tip. The armature just described is undoubtedly of great assistance to the remarkably active pupa in working its way from the burrow or from the cocoon previous to transformation. The pupal skins are usually found projecting amongst leaves and rubbish on the surface of the ground near the mouth of the burrow, which is usually at or slightly below the surface. Sometimes, however, the pupal skins are found within the mouth of the tunnel.

During transformation the cuticle splits along the Y-shaped sulci on the dorsal surface of the head and along the line mentioned before as extending across the head and thorax. The split ends at the first abdominal segment. On the venter the cuticle usually splits on the middle line as far as the middle of the fourth abdominal segment. The somewhat triangular portion of the cuticle covering the antennæ, eyes and bases of the palpi is invariably broken off.

The length of the pupal period is at least twelve days. A pupa, apparently recently pupated, was obtained June 28th, 1909. The adult emerged twelve days later at 5 p.m.

We frequently collect the adults in the early evening (6 to 8 p.m.) by picking them from the bases of the willow stems, where they rest, head upwards, about six inches from the ground. Very often a number of wings, usually perfect, will be found at the base of the clump of willows, with the body completely vanished. The pupal skin is usually nearby. The robbers were not discovered, but doubtless mice are responsible.

EXPLANATION OF FIGURES 10 AND 11.

- Fig. A.—Maxillæ and labium seen from behind: C, cardo; L, lobe of maxilla; Lp, labial palpi; M, mentum; Mp, maxillary palpi; Pf, palpifer; S, stipes; Sm, submentum; Sp, spinneret, usually held straight.
- Fig. B.—Dorsum of larva.
- Fig. C.—Setæ of first and second thoracic segments.
- Fig. D.—Setæ of sixth abdominal segment.
- Fig. E.—Setæ of last two abdominal segments.
- Fig. F.—Venter of pupa.
- Fig. G.—Right mesothoracic leg.
- Fig. H.—Dorsum of pupa.
- Fig. I.—Head of larva from the front: Ant, antenna; Cl, clypeus; Epi, epicranium; F, front; La, labrum; Md, mandible; Oc, ocelli.
- Fig. J.—Ocelli, antennæ, etc., of larva: Ant, antennæ; La, labrum; Md, mandible; Mx, maxilla; S, indication of an antennal sclerite.
- Fig. K.—Last abdominal segment of larva seen from behind: A, central hooks; B, anal prolegs; C, anus; E, anal plate; F, movable chitinized plates.
- Fig. L.—Dorsal apodeme.
- PLATE 10.
- Fig. M.—Adult in natural position, reduced.
- Fig. N.—Pupa and last larval skin in burrow.
- Fig. O.—Larva.
- Fig. P.—Tunnels in the main stem-mass.

INTERNATIONAL CONGRESS OF ENTOMOLOGY.

The following local committee for the Dominion of Canada has been formed to co-operate with the International Executive Committee in the preliminary work of arranging for the first meeting of the proposed Congress of Entomology:

Prof. C. J. S. Bethune, Editor of "THE CANADIAN ENTOMOLOGIST,"
Ontario Agricultural College, Guelph, Chairman.

Tennyson D. Jarvis, President of the Entomological Society of
Ontario, Lecturer in Entomology and Zoology, O. A. College, Guelph.

Dr. E. M. Walker, Lecturer in Biology, University of Toronto, Vice-President of the Entomological Society of Ontario, 99 St. George street, Toronto.

Prof. W. Lochhead, Biological Department, Macdonald College, Ste. Anne de Bellevue, P. Q.

Henry H. Lyman, 74 McTavish street, Montreal.

John D. Evans, Trenton, Ont.

W. Hague Harrington, Post-office Department, Ottawa.

Dr. C. Gordon Hewitt, Entomologist, Dominion Experimental Farms, Ottawa.

Arthur Gibson, Assistant Entomologist, Dominion Experimental Farms, Ottawa.

A. R. M. Boulton, President of the Quebec Branch of the Entomological Society of Ontario, Morrin College Court, Quebec.

L'Abbé V. A. Huard, Editor of "Le Naturaliste Canadien," a l'Archeveche, Quebec.

Dr. A. H. Mackay, Superintendent of Education, Halifax, Nova Scotia.

T. N. Willing, Department of Agriculture, Regina, Saskatchewan.

F. H. Wolley Dod, Millarville, Alberta.

G. W. Taylor, Dominion Biological Station, Nanaimo, British Columbia.

R. V. Harvey, University School, Victoria, British Columbia.

A meeting of the committee will be held at the Ontario Agricultural College, Guelph, on Friday afternoon, Nov. 5th.

The principal objects of the Congress are set forth in the circular which is enclosed in this number of the CANADIAN ENTOMOLOGIST.

The meeting is to be held at Brussels, from the 1st to the 6th of August, 1910, at which time the International Exposition will be open there. About a fortnight later the Eighth International Congress of Zoology will be held at Graz, in the Austrian Alps, a beautiful country little visited by ordinary tourists. The last triennial meeting was held at Boston, Mass., in 1907, and was much enjoyed by all those who were able to be present. These varied attractions will, it is hoped, induce many Entomologists from various parts of the world to be present at the first Congress in Brussels.

A NEW GENUS AND SOME NEW SPECIES OF
TENTHREDINIDÆ.

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

PHLEBATROPHIA, n. gen.

Antennæ with more than ten segments; front wings with the radial cross-vein, the radio medial cross-vein, and the free parts of R_4 and R_5 present; the medio-cubital cross-vein and the free part of M_{3+4} strongly divergent behind; the radial sector atrophied adjacent to the stigma; the free part of $M_4 + Cu_1$ arising near the middle of the cell M_4 ; the first and second anal cells present and separated by the free part of 2nd A; the hind wings with the vein forming the front margin of the cell R_{1+2} atrophied; the free part of R_4 and the transverse part of M_4 wanting, and therefore without middle cells; the anal cells petiolated for one-third their length; the tarsal claws cleft at apex and appendiculately toothed at base. Type *Phlebatrophia Mathesoni*, n. sp.

This genus will fall next to *Phyllotoma*, Fallen, from which it is readily separated by the atrophy of the base of the radial sector, a character which, so far as I am aware, does not occur elsewhere in the family Tenthredinidæ. If Herr Snellen van Vollenhoven's figure be correct, *Phyllotoma nemorata*, Fall., would have to be referred to this genus.

Phlebatrophia Mathesoni, n. sp.—Body black, with the inner orbits, the malar spaces, a spot above the base of each antenna, the hypoclypeal area, the clypeus, the labrum, the tegulæ, the collar and extending onto the sides below the tegulæ the legs beyond the coxæ, except the femora, which are pale at base and apex, and these areas frequently joined by a narrow band along the upper anterior margin, in some individuals expanding until it covers a half or more of the femora, and the posterior margin of the abdominal segments at sides, yellow or whitish; the antennæ with ten segments, the tenth transversely marked and an eleventh faintly indicated, the third segment distinctly longer than the fourth; the clypeus appearing six-sided, longest transversely, truncate at apex; the labrum broadly rounded at the apex; the hypoclypeal area flat, quadrangular, longer than broad; the middle fovea deep, extending from the hypoclypeal area to, and surrounding, the anterior ocellus; the antennal furrows distinct as far as the lateral ocelli; the postocular area elevated, short, three or four times, as broad as long, and bounded in front by an

irregular postocular furrow; the posterior orbits flat and polished; the thorax polished throughout; the metatarsus about as long as all the other segments together; the claws cleft, the inner ray much shorter than the outer; the wings more or less infuscated, with a transverse fascia below the stigma; front wings with the base of the radial section atrophied and the radio-medial cross-vein hyaline; the saw-guides long, straight, and slightly slanting above, straight on the basal half below, gradually convexly narrowing and bluntly rounding to the apex, the upper apical angle rounded, the apex and lower margin densely fringed with setæ as long as the width of the saw-guides. Length, 5 mm.

Described from a number of females received from Mr. Robert Matheson, of Brookings, S. D., after whom the species is named, who bred the adults from larvæ received from New Glasgow, Nova Scotia. The larvæ are leaf-miners on birch.

This species appears to be very close to the European *nemorata*, Fall., and may prove later to be the same species. It agrees very well with Cameron's imperfect description of that species. My specimens all have the abdominal segments margined at sides with yellow or white, while Herr Snellen van Vollenhoven figures *nemorata* with rounded spots. He also figures the seventh segment of the antennæ as shorter than either the sixth or eighth, while the Nova Scotian specimens have all three segments subequal.

ENDELOMYIA, Ashm.

This genus was erected for *Monostegia rosæ*, Harr. The characters used by Ashmead for differentiating this genus are common to *Caliroa*, and therefore useless for this purpose. The genus is a good one, and can be separated from *Phyllotoma* and *Phlebotrophia* by having the antennæ nine-segmented, and from *Caliroa*, as generally considered, by having the clypeus truncate and the second segment of the antennæ only about half as long as the first and about as broad as long. In *Caliroa*, the first and the second segments of the antennæ are subequal in length and the second segment is therefore much longer than broad, the clypeus is always more or less emarginate.

The single species of *Endelomyia* occurring in this country is identical with the European species infesting the rose, and Harris's name of *rosæ* will have to give away to the Fabrician name of *athiops*.

CALIROA, Costa.

Konow makes the following remark in the Genera Insectorum under the genus *Eriocampoides*, Konow, regarding the genus *Caliroa*. "The name *Caliroa*, Costa, is not fit for use as a generic name because it was erected for a single male, and because the characters ascribed to it do not by far fit the genus." Konow erected his genus *Eriocampoides* in 1890. He placed in it the following species: *testaceipes*, Cam., which he now considers as a synonym of *athlops*, Fab.; *cinxia*, Klg.; *varipes*, Klg.; *annulipes*, Klg., and *limacina*, Retz. So far as I am aware a type has not been indicated for Konow's genus, and I would therefore indicate *limacina*, Retz., as type. In the Genera Insectorum, Konow uses his name *Eriocampoides* for these same species, places *Caliroa*, Costa, described in 1859, as a synonym, and makes the statement quoted above. Why his name should be any more worthy, it is hard to imagine other than that it has Knw. after it.

The American species of *Caliroa*, Costa, known to me can be separated by means of the following table:

1. Clypeus roundly emarginate at middle 2.
 Clypeus broadly, angularly emarginate at middle 14.

2. Front wings with the radial cross-vein and the free part of R_4 interstitial or very nearly so; body black, with the front and middle legs below the knees white; the walls of the pentagonal area distinct, a V-shaped furrow behind the median ocellus, line-like in width, with perpendicular walls, the lateral walls of the pentagonal area continued almost to the bases of the antennæ, somewhat S-shaped on the top of the ridge, distinctly swollen at their ventral ends and separated at middle by a deeply-impressed more or less triangular middle fovea; the antennal furrow represented on each side of the front by a large pit slightly above the ventral ends of the walls of the pentagonal area, and not connected with the antennal fovea; the hypoclypeal area triangular in outline, flat; the post-ocular area twice as wide as long, the portion of the antennal furrow on the vertex narrow, deep, and extending from the lateral ocelli to the occiput; the interocular furrow wanting; antennæ with the first and second segments together six-sevenths of the length of the third, the third segment over twice as long as the fourth, each succeeding segment slightly shorter than the preceding, except the eighth and

ninth, which are subequal, the ninth bluntly pointed at tip; the dorsum of the thorax polished; the scutellum finely and sparsely punctured beyond the middle; front wings with the free part of R_4 strongly bowed, the greatest length of the cell R_4 one third greater than the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus shorter than all the following segments together, the second segment slightly longer than the greatest length of the third, and the third twice as long as the fourth; the abdomen inclining to reddish in some individuals, finely, sparsely setaceous; the saw-guides long and slender, straight above and below, long oblique and bluntly rounded at apex. Length, 6 mm. This is the species given by Norton as *Selandia cerasi*, Peck. Habitat: Eastern United States.....*limacina*, Retz.

- Front wings with the radial cross-vein and the free part of R_4 not interstitial, distant.....3.
3. Front with a distinct impressed V-shaped furrow behind the anterior ocellus 4.
- Front uniformly flat around the anterior ocellus, without indication of a V-shaped furrow 9.
4. Middle fovea triangular in outline and flat on the bottom..... 5.
- Middle fovea rounded or angular in outline and angular on the bottom 7.
5. Front wings with the cell R_4 twice as wide at the R_4 end as at the R_5 end; body black, with the legs beyond the apical fourth of the femora, except a more or less distinctly marked fuscous spot on the apical third of the posterior tibiæ, white; the walls of the pentagonal area distinct, the ridges fine, except on their ventral ends, where they become dilated, forming a distinct frontal crest; with a distinct V-shaped mark behind the median ocellus, its walls high and rounded above; the walls of the pentagonal area continued almost to the base of the antennæ, parenthesis-mark-like in shape on top, the enlarged ventral ends of the walls united, broken at middle by a fine shallow notch; the median fovea deep, triangular in outline, with rounded high walls on the dorsal side, united at each ventral angle with the antennal fovea, and bounded on the ventral side at middle by a small, rounded, tubercular hypoclypeal area; antennal furrow represented on each side of the front by a rounded pit, situated just above the dilated ends of the walls of the

pentagonal area ; the postocular area three times as wide as long ; the front between the eyes and the walls of the pentagonal area broadly and rather deeply hollowed out ; the portion of the antennal furrows on the vertex wedge-shaped, extending from the lateral ocelli to the occiput, the end adjacent to the lateral ocelli widest ; the interocular furrow wanting ; the antennæ with the first and second segments together two-thirds the length of the third, the third segment one and one-half times as long as the fourth, the fourth and fifth subequal, the sixth shorter than the fifth and subequal to the seventh, eighth and ninth, the ninth obliquely rounded at apex ; the dorsum of the thorax polished and finely sericeous ; the wings slightly infuscated, the veins and the stigma fuscous ; the front wings with the free part of R_4 twice as long as the free part of R_5 , the free part of R_4 and the radial cross-vein straight ; the greatest length of the cell R_4 only slightly greater than the greatest length of the cell R_5 ; the legs finely sericeous, the posterior metatarsus shorter than all the following segments together, the second segment slightly longer than the third, the third twice as long as the fourth ; the abdomen very sparsely pubescent ; the saw-guides concave above and gradually, convexly rounded below to a bluntly rounded point at apex. Length, 4 mm. Habitat : Florida. Mrs. Annie Trumbull Slosson, collector. . . *liturata*, n. sp.

Front wings with the cell R_4 not twice as wide at the R_4 end as at the R_5 end, usually subequal. 6.

6. Front wings with the free part of R_4 strongly bowed and the radial cross-vein straight ; body black, with the legs below the knees, except the apical half of the posterior tibiæ and more or less of their tarsi, white ; the walls of the pentagonal area fairly distinct, the ridges fine, enlarged at their ventral ends and forming a fairly distinct frontal crest, the ocellar basin about as broad as long, the V-shaped furrow above the median ocellus sharp and deep, a narrow, flattened area along the crest of its walls, the walls of the pentagonal area continued almost to the bases of the antennæ, slightly concave inwardly on top, the enlarged ventral ends of the walls not united at middle, broken at middle by a shallow but rather broad notch ; the median fovea deep, V-shaped, the base of the V against the frontal crest and each arm extending to an antennal fovea, the tubercular

hypoclypeal area situated between the arms of the V; a large puncture on each side of the front representing the antennal furrow, slightly above the enlarged ventral ends of the walls of the pentagonal area; the postocular area twice as wide as long; the front between the eyes and the pentagonal area broadly, deeply hollowed out; the vertical portion of the antennal furrow deep, wedge-shaped, sides parallel; the interocular furrow wanting; the antennæ with the first and second segments together three fifths the length of the third, the third segment slightly more than one and one-half times as long as the fourth, the fourth slightly longer than the fifth, the sixth, seventh and eighth successively shorter than the one before, the ninth as long as the sixth, sides parallel and bluntly rounded at apex; dorsum of the thorax polished, finely, imbricately impressed, its surface setaceous; the wings infuscated, the veins and stigma black; the front wings with the free part of R_4 slightly longer than the free part of R_5 , R_4 strongly bowed outwardly; the radial cross vein straight; the greatest length of the cell R_4 nearly twice the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus subequal in length to all the following segments together; the second and third segments of the tarsi subequal, the fourth segment about one-half the length of the third; the saw-guides strongly convex below, obliquely truncated at apex, and rather sharply rounded to a point above, the ventral margin and the apex with scattered hairs. Length, 4 mm. Habitat: Columbia, Missouri. C. R. Crosby, collector.....*lineata*, n. sp.

Front wings with the free part of R_4 straight, or approximately so, and the radial cross-vein bowed; body black, with the knees, the tibiæ, except a fuscous spot on the outer half of the tibiæ, more pronounced on the posterior, the front and middle tarsi more or less, and the hind metatarsus, white; the walls of the pentagonal area faintly indicated, obsolete on the middle of the front, their ventral ends enlarged, but not prominent, forming a frontal crest hardly raised above the ocellar basin above; the V-shaped furrow deep and rather broad, with perpendicular walls; the ocellar basin distinctly broader than long, much narrowed below, the crest of the walls of the pentagonal area strongly converging below, their walls continued almost to the antennal foveæ; the puncture on each side

of the front about opposite the enlarged ventral ends of the walls of the pentagonal area ; the frontal crest broadly and deeply broken at middle ; the median fovea distinct, V-shaped, the basal angles extended narrowly to the antennal foveæ ; the hypoclypeal area tubercular, broader than long ; the postocular area about a half wider than long ; the vertical portion of the antennal furrows narrow, shallow, linear, converging in front ; the interocular furrow distinct at its outer ends, wanting at middle ; the antennæ with the first and second segments together three-fourths the length of the third, the third segment about twice as long as the fourth, the fourth and fifth subequal, the fifth nearly twice as long as the sixth, the sixth, seventh, eighth and ninth subequal in length, the ninth narrower than the eighth, bluntly pointed at apex ; the dorsum of the thorax polished, sparsely sericeous ; the wings slightly infuscated, the veins and stigma black ; front wings with the free part of R_4 about subequal in length with the free part of R_5 , the free part of R_4 straight and the radial cross-vein bowed, the greatest length of the cell R_4 one and one-third the length of the greatest length of the cell R_5 ; the legs finely sericeous ; the posterior metatarsus shorter than all the following segments together, the third segment one-fifth shorter than the second, and the fourth one-half the length of the third ; the saw-guides straight above, convex below, obliquely truncated at apex, and bluntly rounded to a point above, the ventral margin and the apex fringed with setæ. Length, 4 mm. Habitat : Columbia, Missouri. C. R. Crosby, collector.....*loricata*, n. sp.

7. Hypoclypeal area flat, convex, somewhat elevated adjacent to the middle fovea ; body black, with the front and middle legs below the knees, the basal half of the posterior tibiæ and metatarsus, white ; the walls of the pentagonal areas distinct, low on the middle of the front, their ventral ends strongly dilated, forming a prominent frontal crest ; the V-shaped furrow deep, with slanting walls and narrowly flattened along the crest of the ridge ; the ocellar basin longer than broad ; the crest of the walls of the pentagonal area parenthesis-like, curving laterally at their ventral ends ; the walls of the pentagonal area continued to the antennal fovea ; the puncture on each side of the front opposite the dorsal end of the middle fovea ; the frontal crest broad, deeply and narrowly broken at middle ; the median fovea distinct, more or less triangular, situated

above the antennal fovea, and its lateral angles not connecting with the antennal fovea, more or less wedge-shaped in outline; the hypoclypeal area convexly flattened, slightly elevated adjacent to the middle fovea; the postocular area about a half wider than long, strongly, convexly, elevated; the vertical portion of the antennal furrows linear, deep, parallel, the posterior orbits much lower than the postocular area; the interocular furrow faintly indicated at sides and wanting at middle; the antennæ with the first and second segments together two-thirds the length of the third, the third over one and one half times as long as the fourth, the fifth slightly shorter than the fourth, the sixth two-thirds the length of the fifth, the sixth, seventh and the eighth subequal, and the ninth shorter than the eighth, broad, bluntly rounded at apex; the thorax polished, finely setaceous and pitted; the front wings rather strongly infuscated out as far as the apex of the stigma, the remainder and the hind wings hyaline, the veins and stigma infuscated, the stigma darker on the outer half; the front wings with the free part of R_4 slightly longer than the free part of R_5 and slightly bowed inwardly; the radial cross-vein slightly bowed outwardly; the greatest length of the cell R_5 slightly more than two-thirds the greatest length of the cell R_4 ; the legs finely sericeous; the posterior metatarsus much shorter than all the following segments together, the second segment slightly longer than the third, the fourth less than one-half as long as the third; the saw-guides convex below and bluntly, obliquely rounded to a blunt point above. Length, 6 mm. Habitat: Mt. Tom, Massachusetts. A. P. Morse, collector. *lorata*, n. sp.

Hypoclypeal area strongly, convexly elevated throughout its entire length 8.

8. Postocular area distinctly broader than long; body black, with the front and middle legs below the knees, the basal half of the hind tibiæ, and their tarsi more or less, white; the walls of the pentagonal area, distinct, their ventral ends strongly dilated, forming a frontal crest, broadly interrupted at middle by a deep, wedge-shaped middle fovea; the V-shaped furrow distinct, narrow, with high and straight walls; the ocellar basin much longer than broad, the crest of the walls bounding it bowed outwardly; the walls of the pentagonal area continued to the antennal fovea; the puncture on each

side of the front opposite the upper end of the middle fovea, puncture longer than broad; the median fovea somewhat rounded in outline, deep, completely shut off from the antennal fovea; the hypoclypeal area strongly, convexly elevated, quadrangular, longer than broad; the postocular area a half broader than long, convex, but not strongly elevated; the vertical portion of the antennal furrow broad, shallow, linear at bottom, the sides of the furrow slightly converging in front; the interocular furrow faintly indicated at sides and wanting at middle; the antennæ with the first and second segments together three-fifths the length of the third, the third segment considerably more than one and one-half times as long as the fourth, the fourth and fifth about subequal, the sixth, seventh and eighth each slightly shorter than the fifth and subequal to each other, the ninth subequal to the eighth, elongate, broadly and bluntly rounded at apex; the thorax polished, sericeous; the wings hyaline, the veins except the costa, and the stigma except its outer margin, infuscated; the front wings with the free part of R_4 about twice the length of the free part of R_5 and slightly bowed inwardly; the radial cross-vein straight; the greatest length of the cell R_4 one-fifth greater than the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus much shorter than all the following segments together, the second and third segments of the tarsus subequal, the fourth half the length of the third; the abdomen dull, inclining to reddish; the saw-guides convex above and below, gradually rounded to a point at apex. Length, 4.5 mm. Habitat: Ithaca, N. Y. *lunata*, n. sp.

Postocular area about as long as broad and strongly convex; body black, with the front and middle legs below the knees, the basal two-thirds of the hind tibiæ, and the basal three-fourths of the hind metatarsus, white or luteous; the walls of the pentagonal area distinct; the V-shaped furrow deep and distinctly impressed, with slanting walls; the middle fovea deep and strongly impressed, the sides parallel, gradually sloping off above; the antennal furrow represented by a pit on each side of the front; the saw-guides straight above, broadly, convexly rounded below to a blunt point at apex above. Length, 4-6 mm. Habitat: Connecticut. The

above description was prepared for use in another place from a specimen named by Norton, this specimen was not available when the present paper was prepared. Ashmead made this species the type of a new genus, *Periolistoptera*, which cannot be differentiated from *Caliroa* *quercusalba*, Nort.

9. Front with the sides of the pentagonal area expanded above the bases of the antennæ into mound-like prominences 10.
 Front with the sides of the pentagonal area somewhat expanded above the bases of the antennæ, but never mound-like 11.
10. Frontal crest broadly interrupted at middle, the head polished; body black, with the front and middle legs below the knees and the basal half of the posterior tibiæ and tarsi, white; the walls of the pentagonal area fairly distinct, expanded below into strongly-dilated mound-like areas, forming a broad frontal crest broadly interrupted at middle; area above the frontal crest broadly flattened, becoming more or less concave between the lateral ocelli, and extending as a blunt, tongue-like, flattened projection between the lateral ocelli; the V-shaped furrow wanting; the median fovea represented by a roughened, more or less irregular area between and below the dilated ends of the frontal crest, the hypoclypeal area elevated at middle into a ridge of the same height and width throughout, the ridge twice as long as wide; a large puncture on each side of the front, situated opposite the enlarged ends of the frontal crest; the postocular area much broader than long; the front between the eyes and the pentagonal area slightly concave; the vertical portion of the antennal furrows fairly deep, line-like, not expanding at the surface; the interocular furrow completely wanting; the antennæ with indistinct segmentation, the first and second segments together five-eighths the length of the third, the third one and one-half times as long as the fourth, the fourth slightly longer than the fifth, the sixth three-fourths the length of the fifth, the seventh, eighth and ninth subequal in length and slightly shorter than the sixth, the ninth segment with straight sides and truncated at apex; the thorax polished and finely sericeous; the wings hyaline; the veins, including the costa and the stigma, brownish; the front wings with the free part of R_4 subequal in length with the free part of R_5 ; the free part of R_4 and the radial cross-vein straight; the greatest length of

the cell R_4 only one-fifth greater than the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus about subequal in length with all the following segments together, the second and third segments subequal, and the fourth segment one-third the length of the third; the abdomen black; the saw-guides retracted, uniformly convex below and appearing quite strongly narrowed to a blunt point at apex. Length, 5.5 mm. Habitat: Oswego, N. Y. C. S. Sheldon, collector.....*lobata*, n. sp.

Frontal crest very narrowly interrupted at middle, the head finely punctured; the body black, with the front and middle tibiae and the apical segment of their tarsi infuscated; the head uniformly, sparsely, shallowly punctured; the walls of the pentagonal area distinct, expanded below into strongly dilated, mound-like areas, forming a broad frontal crest narrowly and shallowly interrupted at middle; the area above the frontal crest broadly flattened, enclosed by high bounding ridges below the lateral ocelli, and extending broadly behind into the postocular area; the V-shaped area wanting; the median fovea represented by a rounded depression situated between the enlargement of the frontal crest and the elevated part of the hypoclypeal area; the hypoclypeal area broadly convex, somewhat higher adjacent to the middle fovea; the puncture on each side of the front large and situated above the enlarged ends of the frontal crest; the postocular area distinctly broader than long, depressed in front and convexly rounded behind; the front between the eyes and the walls of the pentagonal area strongly concave; the vertical portion of the antennal furrow linear and straight; the interocular furrow completely wanting; the antennae with distinct segmentation, the first and second segments together two-thirds the length of the third, the third segment one and one-half times as long as the fourth, the fourth one and two-fifths times as long as the fifth, the sixth, seventh, eighth and ninth segments subequal, and each about one-half the length of the fifth, the ninth straight on one side and gradually rounded on the other side, and at apex to a blunt point on one side; the thorax polished, sparsely punctured, sericeous; the wings slightly infuscated, the veins, including the costa and the stigma, black; the front wings with the free part of R_4 distinctly longer than the free part of R_5 , the free part of R_4

being slightly bowed inwardly and the radial cross-vein outwardly; the greatest length of the cell R_4 one and two-thirds times the greatest length of the cell R_3 ; the legs densely, finely sericeous; the posterior metatarsus slightly shorter than all the following segments together, the second segment twice as long as the third, and the third twice as long as the fourth; the abdomen polished, sericeous; the saw-guides straight above, uniformly, convexly rounded to a blunt point at apex, the apex and the ventral margin very sparsely setaceous. Length, 6 mm. Habitat: Vancouver, B. C. Received from H. L. Viereck, No. 417.....*laudata*, n. sp.

11. Hypoclypeal area elevated at middle, the elevated portion much longer than broad 12.

Hypoclypeal area elevated at middle, the elevated portion round, mound-like; the body black, with all the legs below the knees beneath more or less whitish; the walls of the pantagonal area fairly distinct, somewhat expanded below but not mound-like, forming a distinct frontal crest, broadly interrupted at middle; area above the frontal crest flattened, decidedly concave in the region of the median ocellus, slightly depressed line-like behind the median ocellus; the V-shaped furrow wanting; the median fovea a flat V-shaped area situated below the frontal crest and connecting with the antennal fovea; the elevated, central portion of the hypoclypeal area round and mound-like; the large puncture on each side of the front situated just above the enlarged ends of the frontal crest; the postocular area uniformly convex and broader than long; the front between the eyes and the pentagonal area concave; the vertical portion of the antennal furrow line-like, deep, wider behind, with sloping sides laterally; the interocular furrow obsolete at middle and slightly marked at sides; the antennæ with distinct segmentation, the first and second segments together three-fifths the length of the third, the third segment twice as long as the fourth, the fourth and fifth subequal, the sixth and seventh subequal and about half as long as the fifth, the eighth and ninth subequal and slightly shorter than the seventh, the ninth straight on each side and obliquely truncate and sharply pointed at apex above; the thorax polished and densely sericeous; the wings hyaline, somewhat infuscated behind the stigma, the veins, including the costa and the stigma,

brownish ; the front wings with the free part of R_4 twice as long as the free part of R_5 ; the free part of R_4 and the radial cross-vein straight ; the greatest length of the cell R_4 one and two-fifths times the greatest length of the cell R_5 ; the legs finely, densely sericeous ; the posterior metatarsus four-sevenths of the length of all the following segments together, the second segment about half as long as the metatarsus, the third segment seven-tenths of the length of the second, and the fourth about half the length of the third ; the saw-guides convex above and below, obliquely, convexly rounded to a point at apex, setæ on apex and ventral margin practically wanting. Length, 6.5 mm. Habitat, Algonquin, Ill. W. A. Nason, collector, Nos. 58c4 and 5811 *lacinata*, n. sp.

12. Frontal crest not elevated above the general level of the basin above it 13.

Frontal crest strongly elevated above the general level of the basin above it ; body black, with the front and middle legs below the knees, and the basal half of the hind tibiæ and the basal two-thirds of their metatarsi, white ; the walls of the pentagonal area distinct, strongly expanded below into a pair of elevated, parenthesis-shaped ridges, forming a frontal crest extending longitudinally to the bases of the antennæ rather than transversely, and rather broadly, deeply broken at middle ; the area above the frontal crest flat, slightly lower at middle, concave around the anterior ocellus, distinctly lower than the upper margin of the frontal crest ; the V-shaped furrow wanting ; the median fovea large, enclosed between the curved lower ends of the frontal crest with furrows extending on each side to the antennal fovea ; the hypoclypeal area elevated at middle into a ridge of uniform width and height, twice as long as wide ; the puncture on each side of the front large, situated near the median dorsal end of the frontal crest, and without any indication of a transverse ridge below it ; the postocular area uniformly convex, about twice as wide as long ; the front between the eyes and the pentagonal area rather strongly concave ; the vertical portion of the antennal furrow line-like, moderately deep, with straight sides ; the interocular furrow completely wanting ; the antennæ with the first and second segments together four-fifths the length of the third, the third segment almost twice as long as the

fourth, the fourth and fifth subequal and twice as long as the sixth, the sixth and seventh subequal, the eighth and ninth subequal and slightly shorter than the seventh, the ninth with slightly tapering sides and broadly rounded at apex; the wings strongly infuscated, hyaline beyond the apex of the stigma, the veins, including the costa and the stigma, black; the front wings with the free part of R_4 one and one-half times as long as the free part of R_5 ; the free part of R_4 slightly bowed inwardly, and the radial cross-vein straight; the greatest length of the cell R_4 one and one-third times the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus subequal in length to all the following segments together, the second segment one-third the length of the metatarsus, the third segment almost as long as the second, the fourth half as long as the third; the saw-guides straight above and on the basal half below, the apical half below convex and strongly, convexly rounded to a blunt point at apex, the apex and the ventral margin with a dense brush of hairs. Length, 6 mm. Habitat, Poquonock, Connecticut. H. L. Viereck, collector. Described by Norton from Massachusetts specimens *obsoleta*, Nort.

13. Lateral ridges of the pentagonal area not elevated at all on the front below the lateral ocelli; body black, with the legs below the knees white, the apices of the posterior tibiae and tarsi more or less infuscated; the walls of the pentagonal area distinct, but broadly rounded, broadly expanded at their ventral ends, parenthesis-shaped, the curve being turned outward, forming a frontal crest not strongly raised above the surfaces adjacent to it, deeply broken at middle; the area above the frontal crest flattened, concave, extending behind the median ocellus, between and somewhat behind the lateral ocelli; the V-shaped furrow wanting; the median fovea limited to three diverging lines, one extending between the break in the frontal crest and the others to the antennal fovea; the hypoclypeal area elevated at middle into a ridge uniformly wide and high, about a half longer than wide; the puncture on each side of the front large and situated above the dilated ends of the walls of the pentagonal area; the postocular area strongly convex, broader than long; the front between the eyes and the pentagonal area deeply concave; the vertical portion of the antennal furrow fairly

deep, linear, extending straight to the lateral ocelli, then bending abruptly outward around the ocelli and extending for a short distance beyond them; the interocular furrow completely wanting; the antennæ indistinctly segmented, the first and second segments together three-fifths the length of the third, the third segment one and one-half times as long as the fourth, the fourth one and two-fifths the length of the fifth, the sixth seven-ninths of the fifth, the sixth and seventh subequal, the eighth slightly shorter than the seventh, the ninth slightly shorter than the eighth, strongly oblique on the sides to a bluntly-rounded point at middle of apex; the thorax polished; the wings infuscated, hyaline beyond the apex of the stigma, the veins black, the costa and stigma infuscated luteous; the front wings with the free part of R_4 one and two-sevenths longer than the free part of R_5 ; the free part of R_4 bowed inwardly and the radial cross-vein straight; the greatest length of the cell R_4 one and one-fourth times the greatest length of the cell R_5 ; the legs sericeous; the posterior metatarsus subequal in length to all the following segments together, the second segment two-fifths the length of the metatarsus, the third segment five-eighths the length of the second, and the fourth one-half the length of the third; the abdomen polished black; the saw-guides retracted and impossible of description. Length, 4 mm. Habitat, Wood's Hole, Massachusetts. Described from two specimens received from Dr. Harrison G. Dyar. Bred from larvæ on *Quercus coccinea* *quercuscoccinea*, Dyar.

Lateral ridges of the pentagonal area strongly and distinctly elevated on the front below the lateral ocelli; the body black, including the coxæ, trochanters, and femora except the knees, the knees and the basal third of the tibiæ white, the remainder of the tibiæ and tarsi infuscated; the walls of the pentagonal area distinct, strongly elevated below the lateral ocelli, becoming almost obsolete near the middle of the front, the ventral ends dilated, the two portions standing oblique to each other with their inner and outer margins straight, forming an inverted V-shaped frontal crest strongly broken at middle, and not elevated above the area immediately above it; the area above the frontal crest perfectly flat immediately above the crest, becoming strongly concave in the region of the median

ocellus, extending behind the ocellus, and with a longitudinal furrow extending from the median ocellus for a short distance onto the postocular area; the V-shaped furrow wanting; the median fovea a dumb-bell-shaped area below the frontal crest; the hypoclypeal area elevated at middle into a ridge, uniform in width and height, twice as long as wide; the puncture on each side of the front low down, opposite the enlarged ends of the walls of the pentagonal area; the postocular area strongly convex, much broader than long; the front between the eyes and the walls of the pentagonal area hardly concave; the vertical portion of the antennal furrows shallow, linear, extending below the lateral ocelli to the ventral ends of the ridge below the same; the interocular furrow marked at sides, obsolete at middle; the antennæ with distinct segmentation, the first and second segments together three-fourths the length of the third, the third segment one and four-fifths times as long as the fourth, the fourth and fifth subequal, the sixth, seventh, eighth and ninth subequal and three-fifths the length of the fifth, the ninth straight on one side, slightly tapering on the other, bluntly rounded at apex, all the segments densely covered with moderately long hairs; the thorax polished and sericeous; the wings slightly infuscated, the veins, including the costa and the stigma, brownish; the front wings with the free part of R_4 one and fourth-sevenths times the length of the free part of R_5 ; the free part of R_4 bowed inwardly and the radial cross-vein bowed outwardly; the greatest length of the cell R_4 one and two-fifths times the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus five-sixths the length of all the following segments together, the second segment two-fifths the length of the metatarsus, the third segment slightly shorter than the second, the fourth one-half the length of the third. Length 4.5 mm. Habitat: Mts. near Claremont, California. Described from a male received from Mr. C. F. Baker.....*labrata*, n. sp.

14. Hypoclypeal area elevated at middle into a prominent carina; body black, with the front and middle legs below the knees and the base of the hind tibiæ white, the remainder of the hind legs infuscated; the walls of the pentagonal area prominent, high just below the

lateral ocelli and broadly expanded at their lower ends into a V-shaped frontal crest, broadly and squarely broken at middle; the area above the frontal crest slightly concave below, deep around the median ocellus, the walls bounding it here slanting, rather abrupt and high; the V-shaped furrow wanting; the median fovea a five-sided area, narrower above, enclosed by the frontal crest and the elevated upper end of the hypoclypeal area, with a narrow furrow extending to the antennal fovea; the hypoclypeal area strongly elevated at its upper end, with a ridge at middle, uniform in width and height, and longer than wide; the puncture on each side of the front, near the middle of the front, broad and somewhat shallow; the area between the eyes and the pentagonal area almost flat; the vertical portion of the antennal furrow linear, extending to the lateral ocelli; the interocular furrow completely wanting; the antennæ with distinct segmentation, the first and second segments together two-thirds the length of the third, the third segment one and one-fifth times as long as the fourth, the fifth almost as long as the fourth, the sixth five-sixths of the fifth, the seventh, eighth and ninth subequal, slightly shorter than the sixth, the ninth much narrower than the eighth; with straight sides and bluntly rounded at apex; the thorax polished; the wings hyaline, the veins and the inner margin of the stigma brownish, the costa and the outer margin of the stigma darker; the front wings with the free part of R_4 twice as long as the free part of R_5 ; the free part of R_4 and the radial cross-vein straight; the greatest length of the cell R_4 one and four-fifth times the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus slightly longer than all the following segments together, the second segment two-fifths the length of the metatarsus, the third segment subequal to the second, and the fourth one-half the length of the third; the saw-guides straight above, slightly convex below and broadly convexly rounded, somewhat truncated at apex above. Length, 4.5 mm. Habitat: Ithaca, N. Y. *lata*, n. sp.

Hypoclypeal area broadly convex, not with an elevated ridge at middle; body black, with the legs below the knees paler, strongly infuscated; the walls of the pentagonal area low and rounded, somewhat elevated in the region of the lateral ocelli, but flat on top,

their lower ends dilated, diverging like an inverted V, with straight sides, broadly rounded; the frontal crest hardly broken at middle, and somewhat elevated above the flattened area above it; the area above the frontal crest flat on its lower half, strongly concave around the median ocellus and ending in a well-marked V-shaped furrow; the median fovea a triangular depressed area, with arms extending to the antennal fovea and another through the slight break in the frontal crest; the hypclypeal area broad, uniformly convex, its upper end strongly elevated; the puncture on each side of the front small, with straight sides, well-like, located at the median end of the ridge of each side forming the frontal crest; the postocular area uniformly convex, much broader than long; the front between the eyes and the pentagonal area concave; the vertical portion of the antennal furrows deep, linear, extending to the lateral ocelli; the interocular furrow obsolete at middle, faintly indicated at sides; the antennæ with distinct segmentation, the first and second segments together two-thirds the length of the third, the third segment one and one-third times the length of the fourth, the fifth and sixth subequal, slightly shorter than the fourth, the seventh, eighth and ninth subequal and slightly shorter than the sixth, the fourth to sixth segments broadest, gradually narrowing to the apex, the ninth segment with straight sides and truncate at apex; the thorax polished and finely sericeous; the wings hyaline, slightly infuscated below the stigma, the veins, including the cost and the stigma, brownish; the front wings with the free part of R_4 nearly twice as long as the free part of R_5 ; the free part of R_4 bowed inwardly, and the radial cross-vein straight; the greatest length of the cell R_3 slightly more than twice the greatest length of the cell R_5 ; the legs finely sericeous; the posterior metatarsus four-fifths the length of all the following segments together, the second segment one-third the length of the metatarsus, the third and fourth segments together subequal to the second; the saw-guides straight on their upper and lower margins, obliquely truncated and with a blunt point at apex above. Length, 5.5 mm. Habitat: Oswego, N. Y. C. S. Sheldon, collector. Recorded by Norton from Massachusetts and Illinois..... *fasciata*, Nort.

NOTES ON THE PREPARATORY STAGES OF PHILOMETRA
METONALIS, WALK.

BY HENRY H. LYMAN, MONTREAL.

In 1907 I spent a week, from Aug. 3rd to 10th, at Prout's Neck, Me., and found the "Common Green-head of the Seashore" (*Tabanus nigrovittatus*) very abundant and was several times bitten by the females, the males, as in all of the blood-sucking flies, including the mosquitoes, being harmless. When being driven to the railway station on the 10th in a carriage with a top, they kept swarming around and sometimes alighting on the cover, and having a number of glass-bottomed pill boxes in my pocket three specimens were secured. Later, when about to put the flies into a cyanide bottle, I noticed that in one case the glass bottom was pitted over with eggs of a honey-yellow colour, and as these had not been previously noticed I supposed that they had been laid by the fly. Not being especially interested in the Diptera and not expecting to be able to rear the larvæ I neglected to make any microscopical examination and description of the eggs.

When the eggs hatched, instead of being Dipterous maggots, they appeared to be little caterpillars, and a suspicion arose as to whether the eggs might have been laid by some moth that had been boxed and not been noticed till after the fly had been captured. Not having the least idea what the larva fed on, they were put in a tin-topped jelly jar with an assortment of "generally favourite food-plants" such as dandelion, plantain, wild cherry, etc., but as the chance of succeeding with them seemed extremely slender little attention was paid to them, and when the contents of the jar were turned out to see if the larvæ were still alive, it was found that they had eaten sparingly of the dandelion leaves and were resting upon them, although they had turned brown, wet and rotten.

Feeling compunction for neglect and fearing that they would suffer from so miserable a diet the jar was cleansed and a supply of fresh green leaves was put in and the larvæ carefully transferred to them by a camel's-hair pencil. Strange though it seemed, they did not appear to relish fresh leaves, but when they became moist and rotten the larvæ were nearly always found upon them. The amount eaten was small and growth was slow, but they were plump and about the same colour as the rotten dandelion leaves. There were not many to begin with and one by one they died off, till by hibernating time only two remained. Despairing of carrying them safely through the winter they were sent to the late Dr.

Fletcher, who was much interested in the matter, and sent the fly to Prof. Hine, who determined it as belonging to the species named above, but could give no information as to its early stages.

On 17th June, 1908, Dr. Fletcher wrote me as follows:

“ ‘Lyman’s mystery,’ your supposed larva of the fly from Scarboro’, Maine, has been one of the funniest things to rear that I have ever tried. One of the two specimens you sent to me last autumn was almost dead when received and did not recover. The other I got through the winter and this spring it revived about the beginning of May and ate very sparingly through May and June, I suppose not as much as one good big leaf the whole time. Its chief food was dead birch leaves after they had become damp in the tin. It also ate one good meal from dandelion and a small one from some leaves of *Aster cordifolius*, and the first day I brought it up it nibbled a little from the edge of a violet leaf, but I came to the conclusion that, like *Epizeuxis* and some other moths, its natural food-plant was dead leaves. This larva pupated on 15th, and I am most anxiously awaiting to see what will emerge.” The pupa disclosed the imago about 27th June, 1908, and it proved to be a small Deltoid moth, which was found, on my visit to Washington last spring, to be *Philometra metonalis*, Walk.

On 13th June, 1908, Dr. Fletcher made a description of the larva, with brief notes on its habits, and a few days later additional notes on the cocoon, for a copy of which to incorporate in this paper I am indebted to Mr. Arthur Gibson, his Chief Assistant:

“Length, 15 mm; width, 2.5 mm. at widest part. Head, 1.25 mm. wide, rounded, drab, mottled with purple; bilobed at apex; mouth-parts darkened. Body cylindrical, tapering a little to each end. General markings: a conspicuous dorsal stripe from segments 2 to 13, a narrow subdorsal line on a pale subdorsal field; a wide suprastigmatal band bearing in its centre the third series of tubercles, in front of each of which is a dark blotch; substigmatal fold pale, mottled with purple. Thoracic shield drab, with pale stripe in the middle lined on each side with black; 5 small bristles on each side, two in front, three behind, sloping forward over the head, shield bearing the end of the suprastigmatal band as a dark blotch at lower end. Dorsal stripe dark olive-black, conspicuous. Suprastigmatal band wide and purplish-brown, mottled. The two subdorsal series of tubercles almost in a line. Sublateral series in a straight line above and slightly anterior to spiracles, conspicuous by white shield at

base. The bristles on segments 2, 3 and 4 slope forward, on the rest of the body backward. All bristles much depressed, almost horizontal to the body. Substigmatal fold pale. Ventral surface mottled with purple. Spiracles on first three segments large and black, very conspicuous, all legs concolorous with body.

"The larva was very sluggish and fed but little on dead birch leaves and fresh dandelion leaves. The cocoon was very slight, a few strands of coarse silk fastening a leaf rolled round the larva. Change to pupa on June 16."

I have hunted up all the references accessible to me in regard to this species, but have failed to find anything recorded in reference to its preparatory stages.

Of the allied species *Philometra serraticornis*, Grote, referred by Dr. J. B. Smith as a synonym of *P. eumelusalis*, Walk., Henry Edwards records in his work on the "Described Transformations of North American Lepidoptera," apparently on the authority of French, that the larva feeds on the roots of grasses; and of *Epizeuxis æmula*, Hubn., he gives Phlox as the food-plant.

I have been unable to find in Dr. J. B. Smith's "Revision of the Deltoid Moths" any reference to the food of any of the genera being rotten or decaying vegetation, but Mr. A. F. Winn has directed my attention to a paper by the late Dr. C. V. Riley in *Insect Life*, IV, 108, on "A New Herbarium Pest," in which a new species and genus are described, *Carphoxera ptelearia*, Riley (referred in Dyar's Catalogue to the genus *Eois*, Hubner), a small geometer which preys upon dried plants. In this paper the author says that a number of genera of Deltoids are known to feed on dead leaves, mentioning *Epizeuxis æmula* as feeding on the dead leaves of hickory, *Palthis asopialis*, Guen., and *Zanclognatha minimalis*, Grote, on dead leaves of oak. I shall be thankful for any further information in regard to this matter, and especially for references to any published records of similar observations.

PACHYBRACHYS PROXIMUS.—A CORRECTION.

By some strange inadvertence I have described two species of *Pachybrachys* under the same name of *proximus* in the last number of the CANADIAN ENTOMOLOGIST, pages 313 and 320. The name *proximus* should be retained for the species described on page 313, and *confusus* applied to that on page 320.—FRED. C. BOWDITCH.

THE GEOMETRID GENUS STAMNODES, GUENÉE.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

This genus has not been heretofore accorded a place in our lists, but must now be included to cover a well-defined group of species, ranged at present under the genus *Coenocalpe*, Hubn. Long ago I became convinced of the need for their separation, and obtained, through Mr. L. B. Prout, the European type of the genus. I found it did not fit a single species, with the exception, perhaps, of *polygrammata*, Hulst. If this prove to be so, for I am not certain of it as a fact, then with it would go, I presume, the recently described species, *Coenocalpe elegans*, Gross., which he says is nearly related. I have not yet seen his type specimen. Meanwhile, a conviction, after reading his description of the genus *Stamnodes*, Guenée, and of its type *pauperaria*, Evers., forced itself upon me, that Guenée's genus must also cover certain of our species, and again I sought the kind offices of Mr. Prout for the procurement of a type specimen. It was no easy task to secure one, but it has just come to hand, a fine male from Central Asia. Its venation, style of markings, of colouring, of scaly covering, all coincide with American forms, of which the nearest would be *Seifertii*, Neum., reduced one-half. The species which easily separate under it are :

Seifertii, Neu.
topazata, Str.
fervifactoria, Grote.
splendorata, n. sp.
formosata, Str.
Franckata, Pears (MSS.).
gibbicostata, Walk.
annellata, Hulst.
coenonymphata, Hulst.
Alaskæ, Hulst.
delicata, Gross.

Of the remaining species, *aurata*, Grote; *magnoliata*, Guen.; *oxygramma*, Hulst, form a small composite group, which may include *parinotata*, Zeller, and possibly *Hydriomena basaliata*, Walk.

Phlebeculata, Guen., if I interpret his description correctly, does not belong here, but may be found to displace some of our *Hydriomenid* names.

Carnata, Pack., was originally described from California, and is, I believe, a good species rarely taken. I have one specimen in fair condition, which I take to be Packard's species. Forms of *polygrammata*, Hulst, frequently bear this name in collections. If I can separate it correctly, then it does not belong here, but is a near relative of some of our smaller Hydriomenidæ.

Tessellata, Pack., does not belong in *Coenocalpe*, because it is a true *Marmopteryx*, having the fore tibiæ strongly spinose at apex. When Dr. Hulst so classed this species he must have had before him a specimen similar to one I placed under that name in an article on Arizona material in Bulletin No. 1, Brooklyn Institute Museum. They are both brilliant species, and have a superficial resemblance, but ought not to be confused in future. Recently I have received from Provo, Utah, two specimens of the real *tessellata*, taken in June of this year by Mr. Tom Spalding. A description follows of the Arizona species, under the name of

Stamnodes splendorata, n. sp.—Expanse, 30 mm. Palpi short, stout, creamy-brown, beneath white, tinged with deep rose-pink. Front cream-brown, a line of pure white above clypeus. Collar and vertex whitish, tinged strongly with rose-pink. Antennæ, thorax, body above, and along costa of primaries, creamy-brown or *café-au-lait* colour, the latter indistinctly checkered with dull white. Ground colour of all wings a brilliant golden-orange, intensified apically and toward outer margins. On primaries one-third in from apex a series of jet black, short strigæ, form a band, which, broad at costa, and reaching diagonally toward margin, makes a point and ceases at vein 4, where it is joined by another line of similar strigations from the extreme apex, enclosing costally an irregular rounded orange spot. A single line of like strigæ, between the veins, extends from apex to vein 4, just within margin. No marginal lines. Fringes long, pink, cut at veins with creamy-brown, rather broadly opposite veins 1 to 4, and between all veins, tipped with a patch of pure white. Secondaries without markings of any kind, except some shadowy strigations of cream-brown near apices, and with fringes paler than on primaries. Beneath, the primaries along costa and at apices are a rich creamy-brown, the former cut with four blocks of pure white. The black strigæ reproduced as above, but the enclosed rounded spot is a deep rosy pink cut with white strigæ. Extending in an outward curve from costa, one-third

in from apex, to anal angle, these markings are enclosed with a deep rosy pink, cut with short white strigæ. From base below costa to this curved line, golden-orange as above, without other markings. Secondaries deep rose-pink. Some irregular costal blotches, and the veins, are a rich creamy-brown, the whole surface irregularly strigate with black and white, the latter forming a patch at costa near apex, and a large irregular discal dot. Fringes as above, but less pink, and more heavily cut with brown and white. Body and abdomen beneath whitish, flecked with creamy-brown and deep rose-pink. Legs whitish, barred terminally with creamy-brown, and washed basally with rose-pink.

Types: Two males taken at Palmerlee, Cochise Co., Arizona, in July, by Messrs. Doll and Schæffer. One of these is in the Brooklyn Inst. Museum, the other was kindly donated to the author, and is in his collection.

Morrisata, Hulst, is a *Petrophora*, and a synonym of *volucer*, Hulst (vide Grossbeck, Trans. Am. Ent. Soc.). My paper does not definitely dispose of *all* the species listed as *Coenocalpe*, and in that respect is unsatisfactory to me, but it has required two years of effort to advance thus far, and I feel that some portion of them would better occupy a fixed position, leaving the future to determine for the rest.

THE AMERICAN DRAPETISCA.—*Drapetisca* was erected for the species *socialis*, Sund., which has remained its sole known representative. A form found in the United States has always been regarded heretofore as belonging to this European species; but a careful comparison with specimens from Europe shows it to be different. It may be designated as *Drapetisca alteranda*.

The two species may be separated clearly through structural differences, both in the epigyna of the females and in the palpi of the males. Among these differences may be mentioned that the distal portion of the epigynal plate in *alteranda* is subcordiform, whereas in *socialis* it is quadrangular, with the angles not much rounded; and that in the palpus of the first form the apophysis of the bulb is larger and decidedly more acute apically than in the European species.

R. V. CHAMBERLIN, Provo, Utah.

SYNONYMICAL AND DESCRIPTIVE NOTES ON NORTH AMERICAN HETEROPTERA.

BY EDWARD P. VAN DUZEE, BUFFALO, N. Y.

Thyreocoris pulicarius, Germar.

Dr. Distant has very kindly compared for me specimens of our northern and southern forms of this insect with the type of *Corimelena marginella*, Dallas, and assures me that that species is identical with our smaller southern form, and he agrees with me in placing this under the name *pulicarius*, Germar. Whether our larger northern form is a distinct species or merely a variation of *pulicarius* is a question on which I am still in doubt.

Brochymena Harrisii, Uhler.

An examination of Uhler's type in the Harris collection shows this to be a synonym of *annulata*, Fabr. Dr. Uhler's identification of *annulata*, published in connection with his description of *Harrisii*, really refers to *f-pustulata*, Fabr., as pointed out by me in my Annotated Catalogue of our North American Pentatomidæ. This leaves without a name the species cited by me as *Harrisii* in the paper above mentioned, which I now describe as

Brochymena punctata, n. sp.

Brochymena Harrisii, Van D., Trans. Am. Ent. Soc., XXX, p. 31, 1904.

Smaller than *annulata*, with the head more truncated at apex; pronotum, scutellum and elytra distinctly dotted with smooth white points. Length, 14-15 mm.

Apex of the head very obtusely angled, almost truncated, the inner angle of the cheeks scarcely meeting over the apex of the tylus. First antennal joint almost attaining the tip of the head, second and third respectively longer, the fourth equal to the third. Pronotum hardly as wide as in *annulata*; the humeri less produced, and the anterior lobe with coarser and more irregular denticulations; the posterior lobe quite distinctly denticulate on the latero-anterior margin; the surface closely and quite regularly punctured with fuscous on a whitish ground; anteriorly with the dark punctures segregated along the submargins and in two oval patches at the inner angles of the callosities; the median line carinate and smooth anteriorly. Scutellum shorter and more rounded at apex than in *annulata*, punctured with blackish on a pale ground, and marked with

a few scattering larger black pits, and a cluster of the same at each basal angle, intercepted by an oblique pale callous. Elytra pale, with distinct dusky punctures, which become finer and confluent in areas posteriorly on the disk; the surface sprinkled with conspicuous white calloused points, which are found more indefinitely on the scutellum and pronotum. Membrane more irregularly and obscurely veined than in the allied species. Connexivum conspicuously alternated. Legs, base of the antennæ and the rostrum ferruginous or obscure brown; the black apex of the latter attaining the base of the third ventral segment. Genital segment of the male short, of almost equal length across its whole width, the broad apical sinus subangular.

Described from one male and two female specimens received from the Georgia State collection. These were captured in Georgia, but I have seen others from Virginia. The short, square head, white points on the elytra, and imperfect white points and black pits on the pronotum and scutellum will distinguish this species.

Genus PERILLUS, Stal.

In the Genera Insectorum, Asopinæ, Schouteden has divided this genus into two, restricting the name *Perillus* to one species (*confluens*), as represented in our fauna, and establishing a new genus, *Perilloides*, for our other species—*bioculatus*, *circumcinctus*, *splendidus* and *exaptus*.

Genus PODISUS, H. S.

In the Genera Insectorum, Asopinæ, p. 68, M. Schouteden has reviewed genus *Podisus* as recognized in the Enumeratio, placing the name *Podisus* as a synonym of *Apateticus*, Dallas, and renaming the larger group of species ordinarily called *Podisus* as *Eupodisus*. Evidently he has done this on the "first species" rule, a risky rule to follow in any case, and in this instance particularly unfortunate. Stal has worked out the relations of the various species in this genus with great care, and I can see no reason why we should not follow him. Herrich-Schæffer's first species under his new genus *Podisus*, *punctipennis*, is a straight synonym of *Apateticus halys*, Dallas; his second species, *strigipes*, is an aberrant form, for which Stal has founded the genus *Mineus*, while his fifth species, *albiceps*, is a synonym of *Tynacantha marginata*, Dallas, and must be rejected. This leaves his third and fourth species, *vittipennis* and *pallipes*, which Stal considered as typical of the genus, as he had a perfect right to

do, and consequently adopted the name *Podisus* for this, the largest section of the group, sinking his own genus *Telepta* as a synonym.

I would correct Schouteden so far as to divide this group into two distinct genera: *Apateticus*, Dallas, with *Apœcilus*, Stal, as a subgenus, and *Podisus*, H. S., with subgenus *Tylospilus*, Stal. This would leave *Telepta*, Stal, and *Eupodisus*, Schoutd., as straight synonyms of *Podisus*. I would suggest the following as the most logical arrangement of our North American species of this group:

Genus *Apateticus*, Dallas.

Subgenus *Apateticus*, Dallas.

1. *lineolatus*, H. S.
halys, Dallas.
punctipennis, H. S.

2. *marginiventris*, Stal.
Gillettei, Uhler.

Subgenus *Apœcilus*, Stal.

3. *cynicus*, Say.
grandis, Dallas.
4. *bracteatus*, Fitch.
5. *crocatu*, Uhler.

Genus *Podisus*, H. S. (Stal).

Subgenus *Podisus*, H. S. (Stal).

Telepta, Stal.

Eupodisus, Schoutd.

1. *maculiventris*, Say.
spinosus, Dallas.

2. *serieventris*, Uhler.

3. *modestus*, Dallas.

4. *placidus*, Uhler.

5. *pallens*, Stal.

6. *sagitta*, Fabr.

didymus, P. B.

monospilus, Walker.

7. *fuscescens*, Dallas.

8. *mucronatus*, Uhler.

Subgenus *Tylospilus*, Stal.

9. *acutissimus*, Stal.

Genus SCOLOPOCERUS, Uhler.

Hitherto this genus has been placed in the *Coreinae*, near *Dasycoris*. It properly belongs to the *Centrosclinae*, near the genera *Althos* and *Catorhintha*, between which it should be located in our lists.

Subgenus XEROCORIS, Van Duzee.

This subgenus of *Narnia* was established by me in 1906 for *Narnia Snowi* and *Wilsoni*. (Ent. News, XVI, p. 385.) *Narnia Snowi* is the type of this subgenus.

FAMILY BERYTIDÆ.

I can see no valid reason why this group should be assigned family rank. I would place it in the *Lygæidæ* as a subfamily, immediately following the subfamily *Cymina*, as has been done by Stal in the Enumeratio.

Neides muticus, Say.

This species has the coriaceous punctured elytra of *Neides*, and certainly belongs there, and not in *Jalysus*, where it is located in the Lethierry and Severin Catalogue.

Cymodema exiguum, Horvath.

I can discover no character by which to distinguish this species from *Cymus breviceps*, Stal. The two descriptions seem to refer to one and the same insect, which inhabits the Atlantic region from New Jersey to Southern Florida. I would place it in *Cymus*, although the second antennal joint is scarcely, if at all, longer than the basal. The sternal sulcation is scarcely indicated.

Belonochilus Koreshanus, Van Duzee.

Dr. Distant has compared examples of this species with the types of his *B. Mexicanus*, and pronounces them sufficiently distinct.

Perigenes fallax, Heidemann.

In the Harris collection is an example of this species under the name *Pamera constricta*, Say. This specimen, which, I understand, was determined by Say himself, wants the head, but I felt no doubt of the identification. Later I sent specimens of *fallax* to Mr. C. W. Johnson for his independent judgment, and he agrees with me in the determination. This is the species formerly determined by me as *constrictus*, Say, and it is so listed in my catalogue of the Hemiptera of Buffalo, but since the publication of Mr. Heidemann's paper I have used Say's name for an allied species, which I now describe as :

Perigenes costalis, n. sp.

Longer and narrower than *constrictus*, with the pale costal margin uninterrupted, the surface nearly smooth, not pilose as in fresh examples of that species. Length, 6-8 mm.

Head closely golden-pubescent, frequently eroded. Cheeks more prominent than in *constrictus*. Pronotum proportionately longer, the constriction nearer the posterior margin, anterior lobe less narrowed anteriorly, the posterior more coarsely punctured. Anterior femora incrassated, armed with three stout spines and a few minute teeth. Genital segment of the male oval, convex at base, beyond which is a broad lunate apical compression. Colour black; antennæ, legs, five longitudinal vittæ on the posterior lobe of the pronotum, the median a slender carina, fulvotestaceous; apical one-half of the second antennal joint, and sometimes the third joint, a broad annulus on the anterior and posterior femora, and a narrow one on the intermediate, black; apical joint of the antennæ, tips of the tibiæ and tarsi and the rostrum piceous or almost black. Coxæ and hind edge of the pro- and metapleura more or less ochraceous. Elytra mostly blackish, with the edges, the nervures and the costa, sometimes broadly, whitish. There is usually a pale spot on the inner angle of the corium, and in pale examples the whitish areas are more or less punctured with black. Membrane fuliginous with pale nervures. Slender edges of the scutellum ferruginous.

Described from a good series representing both sexes, taken at Hamburg, N. Y., and Columbus, Ohio. On account of its more elongated form and style of marking this insect has a slight resemblance to a stout *Paromius longulus*. Some specimens are almost black, with the slender costa pale. In perfect examples the head and pronotum have a few scattering black hairs.

Genus PYGÆUS, Uhler.

Stal, in 1874, established genus *Salacia*, indicating two sections: "A" with the base of the pronotum and apex of the corium sinuated, and "B" with these margins straight or feebly arcuated. Section "A" was described as a distinct genus by Distant in 1893, and as this was the first and supposedly typical section of Stal's genus his name, *Cligenes*, must replace *Salacia*, which was preoccupied. Section "B" was described the next year by Dr. Uhler as genus *Pygæus*, with one species, *pallidus*, ranging from Canada to the West Indies. Dr. Uhler's species is evidently identical with that described one year later by Dr. Bergroth as *Cligenes*

minutus, and both may be identical with Stal's *Salacia pilosula*, although that author describes the third and fourth joints of the antennæ as of equal length. *Cligenes* has not yet been reported from north of Mexico. *Pygeus* I would retain as a distinct genus with *pilosulus* and *pallidus* as North American species.

Genus ISCHNODEMUS, Fieber.

Heretofore but little has been published on our North American species of this genus, and until very recently but one species, *falicus*, had been recorded from our territory. Descriptions of four new species from Florida and one from the Western States have been published by me during the present year, together with a doubtful recognition of one of the *Biologia* species, making a total of seven species now known from the United States. The following key may assist in placing these species :

- Rostrum not or scarcely passing the base of the prosternum 1.
 Rostrum reaching to or behind the middle of the mesosternum 3.
 1. Antennæ ferruginous or pale at base 3. *præcultus*, Dist.
 Antennæ black or somewhat piceous in immature examples 2.
 2. Third antennal joint scarcely shorter than the second and fourth ; discal areole of the corium with fuscous veins 1. *falicus*, Say.
 Third antennal joint distinctly shorter than the second and fourth ; discal areole of the corium immaculate 2. *rufipes*, Van D.
 3. Osteolar orifice concolorous, blackish or very obscurely pale 4.
 Osteolar orifice large and conspicuously pale or rufo-testaceous 5.
 4. Antennæ stout, basal joint a little longer than thick ; colour black, legs and base of the antennæ dark rufo castaneous ; hind margin of the pronotum narrowly testaceous 4. *lobatus*, Van D.
 Antennæ slender, basal joint much longer than thick ; legs and base of the antennæ pale rufo-testaceous ; hind margin of the pronotum broadly rufo-testaceous 5. *Slossoni*, Van D.
 5. Black ; pronotum narrowed from its base ; size large. 6. *conicus*, Van D.
 Castaneous ; pronotum posteriorly oblong, abruptly narrowed anteriorly ; size medium, form slender 7. *badius*, Van D.

1. *Ischnodemus falicus*, Say.

Say, Complete Writings, I, p. 331.

This species is widely distributed in the United States, from New York southward, but I did not take it in Florida, which is probably beyond its southern range. Its best differential characters are given in the above key, and more fully in my description of *rufipes*.

2. *Ischnodemus rufipes*, Van Duzee.

Bulletin Buffalo Society of Natural Sciences, IX, p. 167, 1909.
So far as I know this species has been taken only in Florida.

3. *Ischnodemus præcultus*, Distant ?

Biologia Centrali Americana, Heteroptera, I, p. 196, 1882.

Last year I received from the late Prof. F. H. Snow two examples of a slender species which agree reasonably well with Distant's short description. These are both brachypterous, and proportionately more slender than is indicated in his figure, and the rostrum is shorter than described by him, scarcely attaining the anterior coxæ; the vertex also is black and pubescent and the size is larger. If not identical, these forms are so close I do not care to describe the present specimens as a distinct species without more material. They were taken by Prof. Snow in the Santa Rita Mts., Arizona, at an altitude of 8,000 feet.

4. *Ischnodemus lobatus*, Van Duzee.

Bulletin Buffalo Society of Natural Sciences, IX, p. 169, 1909.

This is another Florida species which I have not seen from elsewhere. It may be distinguished from the preceding by the longer rostrum and from *badius* by its black colour and the concolorous orifices.

5. *Ischnodemus Slossoni*, Van Duzee.

Entomological News, XX, p. 233, 1909.

Most nearly related to *falicus*, but with more slender antennæ, the base of which are rufo-testaceous, and the rostrum is longer. The types were taken by Mrs. Slosson at Jacksonville, Florida, and I captured one example at Raleigh, N. C.

6. *Ischnodemus conicus*, Van Duzee.

Entomological News, XX, p. 234, 1909.

This is a large species allied to *Sallei*, Sign. It was taken at Galveston, Texas, by the late Prof. Snow.

7. *Ischnodemus badius*, Van Duzee.

Bulletin Buffalo Society of Natural Sciences, IX, p. 168, 1909.

Of this rather large castaneous species I took numbers on the shore grass along Tampa Bay at St. Petersburg, Florida. I do not know of its having been taken elsewhere, but it is not unlikely that it will be found at other places along the Gulf Coast.

SOME SYNONYMS IN NORTH AMERICAN LYCOSIDÆ.

BY RALPH V. CHAMBERLIN, PROVO, UTAH.

Pardosa diffusa, Emerton (Trans. Conn. Acad., 1909, p. 208), = *Pardosa moesta*, Banks (Proc. Acad. Sci., Phil., 1892, p. 70).

Pardosa tristis, Keyserling (Verh. d. z. b. Ges. Wien, 1887, p. 485), = *Pardosa xerampelina*, Keyserling (Verh. d. z. b. Ges. Wien, 1876, p. 622).

Pardosa atromedia, Banks (Proc. Cal. Acad. Sci., 1904, p. 355), = *Pardosa lapidicina*, Emerton (Trans. Conn. Acad. Sci., 1885, p. 355). This is a common species in Southern California, where the habitat is closely similar to that of the species in the north-east. The agreement of eastern and western specimens in structure and habit is complete.

Lycosa crassipalpis, Emerton (Trans. Conn. Acad. Sci., 1909, p. 206), is clearly a *Schizocosa*. It is very close to *saltatrix*, Hentz, from which its differences are likely to prove less than specific, variation in *saltatrix* being large.

Lycosa contestata, Montgomery (Proc. Acad. Sci., Phil., 1903), = *Lycosa pratensis*, Emerton (Trans. Conn. Acad. Sci., 1885, p. 483).

Lycosa arenicola, Scudder (Psyche, 1877), is preoccupied, and hence must give way to *Lycosa Pikei*, Marx.

Lycosa pacifica, Banks (Proc. Cal. Acad. Sci., 1904, p. 354), = *Lycosa erratica*, Hentz. Examination of extensive material from Utah to California, in comparison with material from the middle west and the east, shows no good basis for the specific or varietal separation of the western specimens. Variations in some points of the characteristic colour pattern are interesting, but wholly in line with the tendencies shown in various other groups in the same regions.

Allocosa degesta, Chamberlin (CAN. ENT., 1904, p. 287), is doubtless the same as *Trochosa noctuabunda*, Montgomery (Proc. Acad. Sci., Phil., 1904). It is a typical *Allocosa*.

Lycosa exalbida, Becker, doubtfully listed in my Revision under *Allocosa*, was included in the N. A. spider fauna through an error, and should be stricken from our list. It is a South American species.