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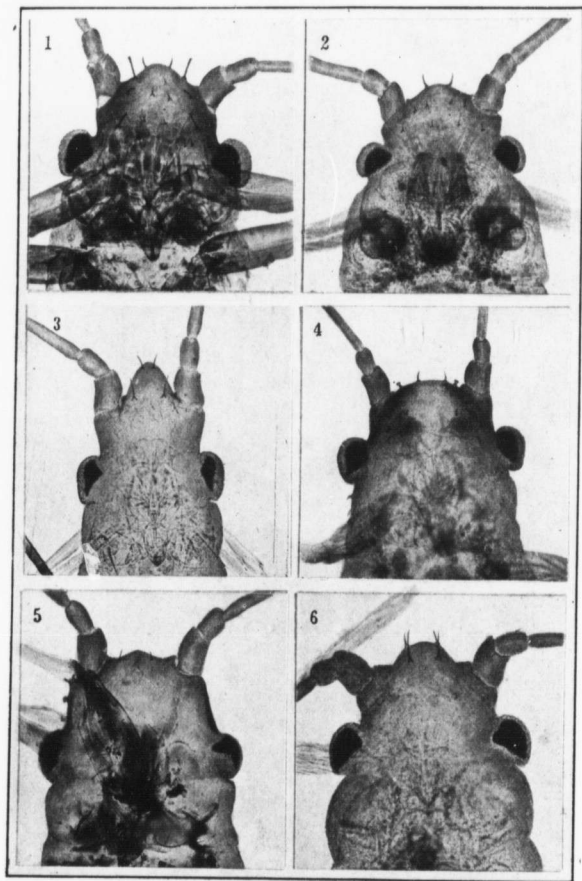
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THE GENUS SALTUSAPHIS.

(See p. 8.)

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No. 1

SYNOPSIS OF THE GENUS *SALTUSAPHIS*. (APHIDIDÆ—HOM.).

BY A. C. BAKER, WASHINGTON, D.C.*

The genus *Saltusaphis* was erected by Theobald for his species *scirpus* from Egypt. A study of a number of American species found on sedges and in marshy localities indicates that there are at least five species of this genus in America. Two of these have been already described in other genera, viz., *Brachycolus ballii* Gill. and *Chaitophorus flabellus* Sanb.

Gillette (Ent. News, vol. XXII, p. 441) has also described another species in the genus *Brachycolus*, but this species, *tritici*, seems to be a typical member of the genus and closely related to the type species, while *ballii* on the other hand is not. *Flabellus*, while described as a *Chaitophorus* by Sanborn, has been re-described by Gillette and placed in the genus *Callipterus*. The erection of Theobald's genus leaves little doubt in regard to the true position of *flabellus*. The genus may be defined as follows:

Genus *Saltusaphis*.

Body somewhat elongate; head large, eyes prominent, without ocular tubercles. Thorax large with well-defined segments. Antennæ of six segments, usually as long as the body; legs with the two anterior pairs of femora somewhat swollen. Cornicles short and cup-shaped; cauda knobbed; anal plate widely bilobed, posterior extremity of dorsum of abdomen sometimes indented, often deeply so. Fore wing with the media twice branched, hind wing with one oblique vein near its extremity. Wing veins usually bordered with dusky brown; sexes apterous, living in marshy regions, usually on sedges.

The species of this genus present a very characteristic appearance on their host plant. They lie closely appressed to the leaf with their antennæ stretched out parallel in front of the head. When disturbed or alarmed they fall suddenly, or spring from the

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plant, aided by the large muscles of their anterior and middle femora. All sections of the leaf are attacked, specimens being found close to the ground or far out at the tips of the leaves. The sexes appear on the leaf very similar to the viviparous forms, with the exception of the smaller size. The genus belongs to the Callipterini, but seems to be quite distinct from the other genera in the tribe.

It would appear that Theobald has been led into the error of describing the cauda as bifid by the very marked division on the last abdominal segment in the type species. In examining *scirpus* this is the most apparent structure on the caudal portion of the abdomen. The cauda, however, is distinctly knobbed, and the anal plate in the apterous forms appears almost as two distinct plates. This is more plainly seen in some of the other species than in *scirpus*.

The species may be separated by the following key:

KEY TO SPECIES.

(Based on Apterous Form.)

1. Antennæ not much longer than half the body length, and about equal in length to the distance between the vertex and the hind coxæ.....*ballii* (Gill.).
- Antennæ much longer than the distance between the vertex and the hind coxæ, usually as long as the body.....2
2. Posterior extremity of the abdomen quite distinctly bilobed.....3
- Posterior extremity of the abdomen not distinctly bilobed.....4
3. Body covered with fan-shaped or sickle-shaped hairs; vertex not strongly conical.....*scirpus* Theo.
- Body without hairs excepting simple ones on the caudal portion; vertex strongly conical.....*elongatus* Baker.
4. Body covered with fan-shaped hairs about 0.016 mm. long.....5
- Body with slightly knobbed hairs about 0.05 mm. long.....*americanus* Baker

5. Segment III of antenna considerably shorter than width of head across the eyes; colour brownish yellow with blackish markings..... *flabellus* (Sanb.)
 Segment III of antennæ considerably longer than width of head across the eyes; colour pale yellowish green with dusky markings..... *virginicus* Baker.

***Saltusaphis americanus*, n. sp.**

Apterous viviparous female.—General colour reddish yellow; vertex dusky brown, which colour extends caudad on each side to form two large dusky lateral areas on top of head; a rather narrow median area yellow. Thorax with a large, irregular, dark brown patch on each side. Abdomen with similar lateral patches which include the cornicles. Cauda dusky. Femora, proximal extremity of the tibiæ and the tarsi dusky brown. Eyes reddish brown. Antennæ brown with base of III yellowish.

Length from vertex to tip of cauda 1.84 mm.; hind tibia 0.64 mm. Dorsum of body covered with hairs which are situated on rather prominent tubercles. These hairs are about 0.05 mm. long and somewhat expanded at their tips. Extremity of the abdomen scarcely at all divided. Cauda and anal plate usual.

The apterous forms of this species are similar in general appearance to those of *flabellus* Sanb., but are easily distinguished from those of that species by the body hairs.

Apterous male.—General colour similar to that of the viviparous form and with similar markings, but these much fainter. Length from vertex to tip of cauda 1.04 mm.; hind tibia 0.608 mm. Body with hairs of about the same length as those of the viviparous form, but with them little, if at all, expanded at tips.

Antennæ with the following measurements: III, 0.48 mm.; IV, 0.32 mm.; V, 0.32 mm.; VI, (0.128+0.256 mm.). Segments very finely and closely imbricated; III, with 20 to 25 very small, circular sensoria in an uneven row along the segment; IV, with 9 or 10; V, with about 9; VI, with sometimes one on the base of segment beside the usual sensoria at the base of the unguis.

Oviparous female.—Colour very similar to that of the viviparous form, with the colours possibly darker. Length from vertex to tip of cauda 1.6 mm.; antennæ as follows: Segment III,

0.576 mm.; IV, 0.32 mm.; V, 0.304 mm.; VI, (0.16 mm. + 0.256 mm.). All segments without sensoria excepting the permanent ones. Body hairs similar to those of the viviparous form. Hind tibiae 0.672 mm.; somewhat swollen and thickly covered on its proximal two-thirds with almost circular or somewhat oval sensoria.

Described from specimens on balsam mounts made by Mr. H. B. Scammell, the specimens taken on bog grass, Whitesbog, N. J., Oct. 21, 1914.

Type in U. S. Nat. Museum Cat. No. 20719.

Saltusaphis ballii, (Gill.).

Brachycolus ballii Gillette, Can. Ent., vol. XL, p. 67; Ent. News, vol. XX, p. 119.

Specimens of this species are in the collection of the U. S. Nat. Museum, taken on *Scirpus sylvaticus* at Richfield Springs, N. Y., by Theo. Pergande, No. 4052, and typical specimens on *Carex nebraskiensis* collected at Ft Collins, Colo., 5-30-10, by Bragg. These later specimens were deposited in the Museum collection as types by Prof. C. P. Gillette. Oviparous females are in the collection taken on 3-square, Whitesbog, N. J., 11-13-15 by H. B. Scammell.

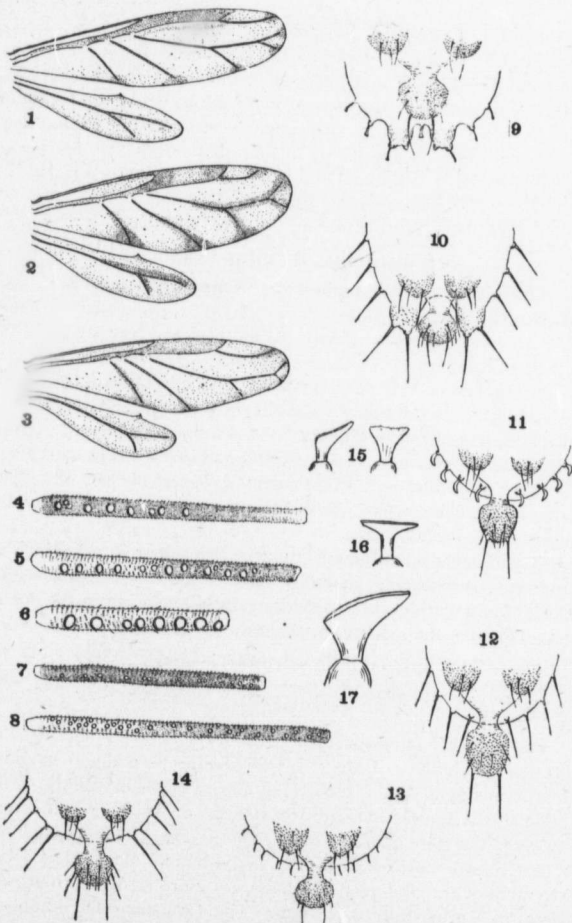
The species has shorter antennae than the other members of the genus, but is very similar in many ways to *americanus* and *flabellus*. The body hairs are short, stout and spine-like.

Saltusaphis elongatus, n. sp.

Only oviparous females of this species have been seen by the writer, but since they are so very different from any of the other species in the genus, no difficulty will be experienced in separating the species at once in this form.

General colour orange yellow, uniform, with the exception of a number of dusky flecks along the margins of the abdomen. Eyes deep wine colour; antennae, from the basal portion of segment III to the tip, dark brown to black.

Length from vertex to tip of cauda 2.34 mm.; hind tibiae 0.64 mm.; scarcely at all swollen, and covered on its proximal portion with a number of sensoria. These are nothing like as abundant as in the species *americanus* and *virginicus*. Antennae as follows:



SALTUSAPHIS—STRUCTURAL DETAILS. (See p. 9)

Segment III, 0.832 mm.; IV, 0.352 mm.; V, 0.4 mm.; VI, (0.176 mm.+0.256 mm.). Vertex much produced, conical, acutely pointed. Cauda and anal plate usual, extremity of the abdomen quite deeply cleft. Body without hairs, excepting at the posterior portion, where it is armed with simple hairs about 0.064 mm. long.

Described from specimens in balsam mounts, the specimens collected by H. B. Scammell and H. K. Plank at Whitesbog, N. J., Oct. 21, 1914. Taken on bog grass.

Type in U. S. Nat. Museum, Cat. No. 20720.

Saltusaphis flabellus (Sanb.)

Chaitophorus flabellus Sanborn—Kans. Univ. Sci. Bul., vol. III, No. 1, p. 37.

Callipterus flabellus (Sanb.) Gillette, Ent. News, vol. XX, p. 120.

Specimens of this species are in the collection of the U. S. Nat. Museum as follows: One specimen taken May 4, 1903, host unknown, at Lawrence, Kansas, by C. E. Sanborn, Type. Specimens collected on *Carex* in May, 1911, and deposited in the collection by Prof. Gillette, and specimens collected by Mr. Bragg on *Carex* at Ft. Collins, Colo., 5-6-12, and deposited in the Museum collection by Prof. Gillette.

There is considerable variation in the colour in the different specimens, some being generally mottled on the dorsum, while others have a distinct, heavy marking down each side on the dorsal area. The fan-shaped spines are, however, the same on all.

Saltusaphis scirpus Theobald.

Saltusaphis scirpus Theobald, Bul. Ent. Research, vol. VI, pt. 2, p. 138.

The writer has never seen alate forms of this species, but through the kindness of Mr. J. J. Davis he has been able to examine an apterous paratype. In the bifid nature of the extremity of the abdomen the species is related to *elongatus*. In other characters, however, it is more closely related to *virginicus*. This resemblance is particularly noticeable in the body hairs. On the posterior extremity of the abdomen the hairs are more elongate than elsewhere, measuring fully 0.048 mm. They are somewhat knobbed, even on the posterior extremity. Only the proximal segments

of the antennæ are present on the specimen. These measure as follows: I, 0.112 mm.; II, 0.064 mm.; III, 0.608 mm.; IV, 0.304 mm. Hind tibia 0.592 mm., hind tarsus 0.144 mm.

***Saltusaphis virginicus*, n. sp.**

Alate viviparous female.—General colour yellowish, marked with dark brown; head with smoky to black background and median yellowish stripe; eyes dark reddish brown. Prothorax similarly marked. Thorax yellow with dark brown lobes; abdomen yellow with lateral row of dark brown or black areas, and with a large, longitudinal, central area of the same colour; antennæ almost uniform dusky. Legs dusky, lighter at the joints, cornicles included on each side within one of the lateral dusky areas. Stigma and wing veins smoky, veins slightly bordered with dusky colour.

Length from vertex to tip of cauda 1.44 mm. Antennæ as follows: III, 0.432 mm.; IV, 0.304 mm.; V, 0.288 mm.; VI, (0.192 mm. + 0.176 mm.). All segments very minutely and closely imbricated. Segment III, with 9 or 10 circular to oval sensoria on the basal two-thirds of the segment in an uneven row. Hind tibiæ 0.688 mm.; hind tarsus 0.112 mm. Fore wing 2.16 mm. long by 0.64 mm. wide. Media distinctly angled. Cornicles very shallow and small. Abdomen densely covered with minute projections.

Apterous viviparous female.—General colour yellowish green. Head unmarked, eyes reddish brown. Body almost uniform yellowish in some specimens, while in others faint, longitudinal, dusky lines are present, extending from the head to tip of abdomen. Antennæ with the basal portion of segment III yellowish, the remainder dusky to black. Legs uniform yellowish or with light dusky areas near the distal extremities of the femora and with the tarsi dusky.

Length from vertex to tip of cauda 2.16 mm.; width across abdomen 0.672 mm., vertex somewhat conical; antennæ as follows: III, 0.464 mm.; IV, 0.336 mm.; V, 0.288 mm.; VI, (0.208 mm. + 0.16 mm.). Hind tibiæ, 0.672 mm.; hind tarsus, 0.128 mm.; entire dorsum covered with small, mushroom or fan-like hairs. Posterior extremity of abdomen scarcely indented.

Apterous male.—General colour similar to that of the apterous viviparous female, but with very little of a yellow tint. Segments

of the body indicated by narrow, smoky, cross stripes. Antennæ black with the exception of the basal two segments and the proximal extremity of segment III. A black rim borders the antennal sockets. Eyes dark brown.

Length from vertex to tip of cauda 1.6 mm. Antennæ as follows: Segment III, 0.4 mm.; IV, 0.256 mm.; V, 0.256 mm.; VI, (0.175 mm.+0.144 mm.). Segment III is armed with a row of about 12 sensoria, which are minute and circular. Segment IV is without sensoria or with 2 or 3 very minute ones. Segment V has a row of about 6, while the base of segment VI has usually the same number. Hind tibia 0.56 mm.; hind tarsus 0.112 mm.

Oviparous female.—Colour very similar indeed to that of the male. The femora, however, have a distinct dusky spot near their distal extremity, and the tibiæ are more dusky than those of the male.

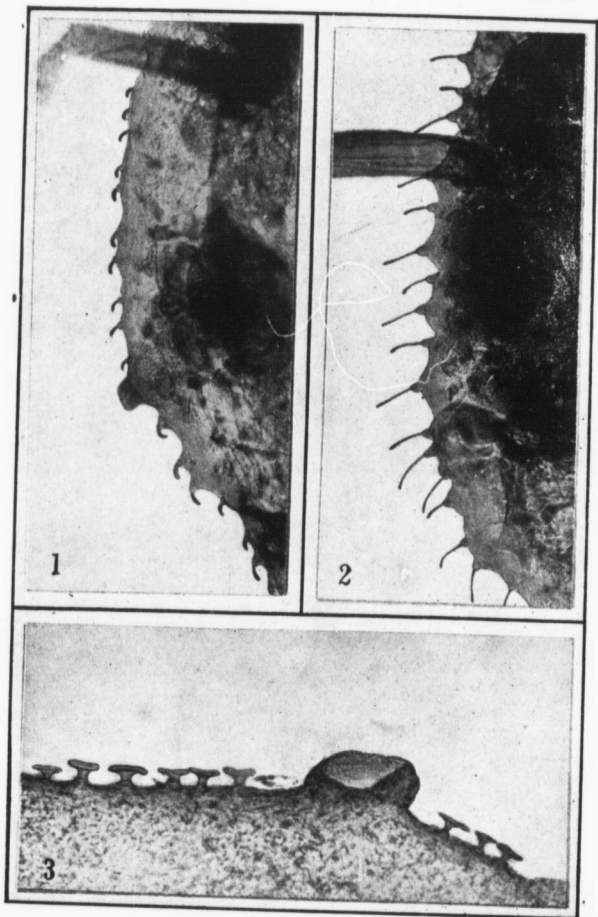
Length from vertex to tip of cauda 1.84 mm. Antennæ as follows: Segment III, 0.416 mm.; IV, 0.304 mm.; V, 0.112 mm.; VI, (0.176 mm.+0.176 mm.). All segments without sensoria, excepting the permanent one. Hind tibia 0.688 mm., somewhat swollen and densely covered with circular, or somewhat elongated sensoria. Body covered with the mushroom-like hairs described in the viviparous forms.

Described from specimens reared by the writer at East Falls Church, Va., during Oct., 1916, on *Carex* sp.

Type in U. S. Nat. Museum Cat. No. 20721.

EXPLANATION OF PLATES I, II AND III.

- Plate 1, Fig. 1. Head of apterous viviparous form of *S. americanus*.
 " " 2. Head of apterous viviparous form of *S. ballii*.
 " " 3. Head of oviparous form of *S. elongatus*.
 " " 4. Head of apterous viviparous form of *S. flabellus*.
 " " 5. Head of apterous viviparous form of *S. scirpus*.
 " " 6. Head of apterous viviparous form of *S. virginicus*.
- Plate 2, Fig. 1. View of portion of abdomen of *S. flabellus* showing hairs.
 " " 2. View of portion of abdomen of *S. americanus* showing hairs.
 " " 3. View of portion of abdomen of *S. virginicus* showing hairs.



SALTUSAPHIS—STRUCTURAL DETAILS.
(See p. 8.)

- Plate 3, Fig. 1. Wings of *S. ballii*.
 " " 2. Wings of *S. flabellus*.
 " " 3. Wings of *S. virginicus*.
 " " 4. Segment III of antenna of alate viviparous form of *S. virginicus*.
 " " 5. Segment III of antenna of alate viviparous form of *S. flabellus*.
 " " 6. Segment III of antenna of alate viviparous form of *S. ballii*.
 " " 7. Segment III of antenna of male of *S. virginicus*.
 " " 8. Segment III of antenna of male *S. americanus*.
 " " 9. Caudal extremity of apterous viviparous form of *S. scirpus*.
 " " 10. Caudal extremity of oviparous form of *S. elongatus*.
 " " 11. Caudal extremity of apterous viviparous form of *S. flabellus*.
 " " 12. Caudal extremity of apterous viviparous form of *S. americanus*.
 " " 13. Caudal extremity of apterous viviparous form of *S. ballii*.
 " " 14. Caudal extremity of apterous viviparous form of *S. virginicus*.
 " " 15. Hairs of *S. scirpus*.
 " " 16. Hair of *S. virginicus*.
 " " 17. Hair of *S. flabellus*.

NEW SPECIES OF COLEOPTERA OF THE GENUS
 MORDELLISTENA.

BY EMIL LILJEBLAD, CHICAGO, ILL.

Material in the family Mordellidæ, one of the most neglected of the families of the Coleoptera, neglected alike both by the collector and the systematist, has long been sought by the writer. Having accumulated a large number of specimens, and the opportunity having been presented to make a thorough study of the forms at hand, not alone in my cabinet but in that of Mr. A. B. Wolcott, a

few strikingly distinct species have been recognized as yet undescribed. These it is deemed expedient to make known now.

Quite a few other supposedly new species remain, but the author considers it the part of wisdom to await the acquisition of more extensive series before settling upon the validity of these forms.

Unless otherwise indicated, the types of the species herewith described were collected by the writer and are to be found in his collection.

***Mordellistena rutifa*, sp. nov.**

Hind tibia with two converging oblique ridges; first joint of hind tarsus with three, and the second with one oblique ridge.

Ferruginous; nearly linear; head black, with front slightly ferruginous; thorax and elytra ferruginous, the latter slightly darker towards apex; under surface ferruginous; anal style very short. Length 4 mm.

One specimen from Eggers, Illinois, July 7. Collected by A. B. Wolcott, in whose collection the type is placed.

This species is most nearly allied to *Mordellistena tosta*, but differs in having the tibial ridges converging, no trace of a third ridge, and the second joint of hind tarsus with only one ridge. It is longer, nearly parallel, and with the head black.

This should be placed in collections after *M. atriceps*.

***Mordellistena exilis*, sp. nov.**

Hind tibia with two equal parallel ridges; first joint of hind tarsus with four, second with two ridges.

Black; nearly linear; head, mouth-parts and thorax ferruginous, the last with a black median line reaching to middle; antennae a little darker at apex; front legs and middle femora ferruginous, the middle tibia and tarsi darker; hind femora and apex of tibia and tarsal joints black. Elytra black, with testaceous pubescence. Beneath black, with coarser testaceous pubescence; anal style long and slender. Length 4 mm.

One specimen from Ft. Sheridan, Illinois, August 7.

This species has the form and size of *Mordellistena marginalis*, but is at once distinguished by the tibial ridges.

This is to follow *M. tosta* in a systematic arrangement.

Mordellistena rufa, sp. nov.

Hind tibia with two ridges, the anterior extending across the outer face of the tibia; first joint of hind tarsus with four and the second with two ridges.

Ferruginous; elytra with the lateral margins from base to the middle and the suture black. Mesosternum black; hind coxal plate and abdomen clouded with black; anal style long and slender. Length 4 mm.

One specimen from Palos Park, Illinois, May 28.

This species resembles *M. ustulata*, differing only in the ridges. It should follow *M. splendens*.

Mordellistena insolita, sp. nov.

Hind tibia with three oblique ridges, the upper one less developed; the first and second joints of hind tarsus with three and the third with two small ridges.

Subcuneate; head, thorax, anterior and middle femora ferruginous, tibia and tarsi darker; hind legs and under surface black, with cinereous pubescence. Elytra black, with silky, iridescent pubescence; anal style black, long and slender. Length 5 mm.

Two specimens from Lee County, Texas, April 1. Collected by Rev. G. Birkmann. Paratype in collection of A. B. Wolcott.

This species somewhat resembles *M. texana*, but differs in the tibial and tarsal ridges, *texana* having four ridges on the tibia, and not any ridge on the third joint of the hind tarsus. It should follow *M. singularis*.

Mordellistena vera, sp. nov.

Hind tibia with three oblique ridges and a rudiment of a fourth; first joint of hind tarsus with four, second with two, and third with two ridges.

Black; head and thorax sparsely covered with testaceous pubescence; base of antennæ, mouth-parts and legs reddish brown. Elytra covered with silky, reddish-brown pubescence, more densely on the suture, and forming a narrow, sutural line. Beneath black, with testaceous pubescence; abdominal segments reddish at apex; anal style long and slender. Length 5-5.5 mm.

Three specimens. Type from St. Louis, Missouri, July 7.

Paratypes from Paw Paw Lake, Michigan, August 18, and Evans-ton, Illinois, July 2; the latter in collection of A. B. Wolcott.

Nearest allied to *M. unicolor*, but differs in size, being much longer, more robust and having two ridges on the third joint of hind tarsus. It should follow *M. schauppii*.

• ***Mordellistena pulchra*, sp. nov.**

Hind tibia with three oblique ridges, the upper more oblique; first joint of hind tarsus with four, second with three oblique ridges.

Black; head ferruginous, with a dark cloud on vertex; mouth-parts dark; thorax rufous, with a narrow margin, the base, apical angles and a median line black; antennæ dark brown; first and middle legs with femora black, the tibia and tarsi ferruginous; hind legs ferruginous, the tarsal joints black at apex. Elytra black, with fine cinereous pubescence; a wide rufous vitta from base nearly to apex. Beneath black, with sides of hind coxal plates and basal joints of abdomen ferruginous; anal style short and slender, apical two-thirds black. Length 4 mm.

One specimen from Bowmanville, Illinois, August 18.

Judging from the original descriptions, this species has the colour and size of *M. attenuata* Say or *vittigera* Lec., but the tibial and tarsal ridges are entirely different. It should follow *M. aequalis*.

***Mordellistena wolcottii*, sp. nov.**

Hind tibia with three rather short, oblique ridges, which extend only one-third across the outer face of the tibia, and two small rudimentary ridges; first joint of hind tarsus with six ridges, three small or rudimentary; second joint with two ridges.

Form robust; head and thorax black, coarsely covered with silky, yellowish pubescence; base of antennæ and mouth-parts ferruginous; legs fuscous. Elytra rufous, slightly darker towards apex, with the base, suture, an oblique vitta from humerus to the middle, and a slightly oblique band behind the middle and apex, with silky, golden-yellow pubescence; beneath black, with yellowish pubescence; anal style long and slender, fuscous. Length 4.5 mm.

One specimen from McGregor, Iowa, July 16. Collected by A. B. Wolcott, in whose collection the type is placed.

This species is very unique, and I do not know of any described species that it at all resembles. It should follow *M. pulchra*.

***Mordellistena gigas*, sp. nov.**

Hind tibia with four very oblique ridges; first joint of hind tarsus with five, second with two, and third with one oblique ridge.

Subcuneate; head, thorax, mouth-parts, base of antennæ, and legs rufous. Elytra black, finely punctured, with reddish brown iridescent pubescence; basal margin, a short oblique humeral vitta, narrow lateral margin and entire suture with golden yellow pubescence. Beneath testaceous; mesosternum, hind coxal plates, and the basal margins of first and second segments of abdomen fuscous; anal style fuscous at apex. Length 6 mm.

One specimen from Edgebrook, Illinois, July 10.

This is one of the largest species of *Mordellistena* I have seen. It is likewise a very handsome species, and may readily be recognized by its distinct colour and number of ridges. It should follow *M. fusco-atra*.

RECENT STUDIES OF CANADIAN SPIDERS.

BY J. H. EMERTON, BOSTON, MASS.

For many years past I have worked on the spiders of New England, and as these have become better known and the collections more complete, have from time to time wandered over into adjoining territory. In the summer of 1916 I made a visit to the neighbouring part of Canada, with the object of seeing where and how far the familiar species extended in that direction. All authorities agreed that it was best to start early, so the cold and rainy weather of the middle of June found me at Ottawa, in company with Mr. W. T. M. Forbes, the lepidopterist, consulting with the resident entomologists where it was best to go and how to get there. The Ottawa Field Club had an outing the next day, and in that helpful company I began operations at the Experimental Farm, the umbrella, which had become a constant companion, serving to catch the spiders shaken from hedges and the specimen trees of the Arboretum. As the weather improved, Mr. Gibson took us to the old lumber camp in Chelsea and up King's Mountain, and later I

went north to the end of the railroad at Maniwaki. At Montreal, after a day in the cleared-up shrubbery of Mt. Royal and a fruitless visit to St. Hilaire, we, at last, with the help of Mr. Winn and Mr. Corcoran, found the way to some still unspoiled country on the farther side of Westmount, where, in a boggy wood, we found the same forest spiders as in the uncultivated spots at Ottawa and Hull. Consulting with the Montreal entomologists about the hilly country to the north we were recommended to Montfort, which proved to be an excellent collecting ground, with ponds and bogs 1,500 feet or more above the sea and a fauna of a more northern character than Montreal. Next we went to Sherbrooke and Megantic, but met wet weather again and only got a few samples of the local spiders. At Quebec, however, there was a week of fine weather, and following the directions of Mr. Boulton I explored the Gomin bog, and went for a couple of days to Beaurpré and up Cap Tourmente. My time was now getting short, but I took the steamboat up the Saguenay and spent a day at Chicoutimi and in a flying visit to Lake St. John. About a hundred species of spiders were taken during this trip, and nearly all of these were species well known in Maine and New Hampshire, and most of them all over New England and New York. A little north of the St. Lawrence River and up out of the valley were a few species which occur only in Northern Maine and the upper forests of the White Mountains. Probably nearly all the species known in New England extend much farther north and west, and fifty of them are already known to extend across Canada to the Rocky Mountains, most of them following the southern border of the spruce forest belt. The best examples of these are two species which live in cobwebs between the branches of small spruce and balsam trees and are comparatively easy to find. Their distribution, as far as known, is shown on the maps. One, *Theridion zelotypum*, extends over the whole of Maine except the southwest corner. It crosses New Hampshire at Lake Umbagog and Dixville Notch and extends north of the Canadian boundary as far as Ottawa. It does not occur in the White Mountains, the Adirondacks, Northern Vermont nor around Toronto. Farther west it begins again at Nipigon, on Lake Superior, and continues westward in spruce bogs to Prince Albert, Athabaska Landing, and Jasper Park in the Rocky Mountains.

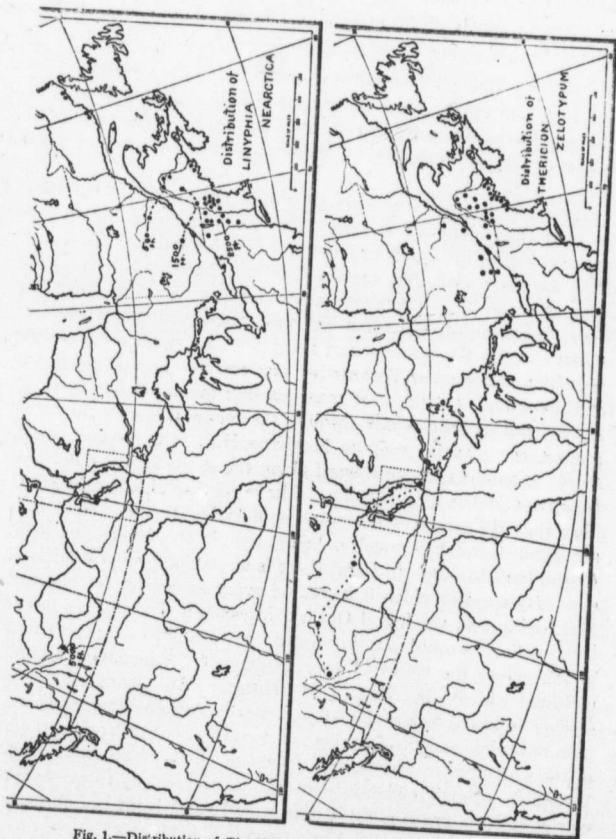


Fig. 1.—Distribution of *Theridion zelotypum* and *Linyphia nearctica*

Its northern limits are unknown. The other species, *Linyphia nearctica*, lives in the forests of the New England mountains from 2,500 feet up to 4,500 feet, or as far as trees grow. At Montfort, in the hills north of Montreal, at Dixville Notch and on Mt. Kinca, Me., it comes down to 1,500 feet. At Lake St. John and in Northern Maine it lives at the general level of the country, below 500 feet, and on the coast of Labrador and at Eastport, Me., at the sea level. Its range westward has not been traced, but it occurs at Laggan in the Rocky Mountains at an elevation of 5,000 feet.

As the maps show, there are gaps to be filled in the distribution of even these common species. The *Theridion* probably follows westward along the Ottawa River and Lake Huron to Lake Superior. The *Linyphia* probably crosses Ontario farther north, perhaps along Hudson Bay. These two species outline, as well as anything does, the so-called Canadian life zone. South of it another set of spiders occupy the country, and some of the species common in the meadows of Boston or Toronto are also common around the ponds of Edmonton. On the west coast another fauna extends north to Alaska and its species mix through the mountains with the other groups, some as far east as Medicine Hat. On the east coast, arctic species extend southward along the shores of Labrador and Newfoundland as far as Maine. I have tried to give here the outlines that the study of Canadian spiders has to fill in, and it is gratifying to see how much is being done in this interesting field. At the Park Museum in Banff there is already a local collection of over fifty species, which is increased every season by the curator, Mr. Sanson. At the Royal Ontario Museum in Toronto is a larger local collection and an interesting set of spiders from various points across the country from Nipigon to Vancouver Island, collected chiefly by Mr. T. B. Kurata. At Ottawa are the spiders collected before 1890 by J. B. Tyrell and other early explorers of the Geological Survey, and more recent collections made in the way of their other work by entomologists in all parts of the Dominion. Small collections of Canadian spiders from several correspondents are coming in this winter, and I am beginning to think about another summer excursion in Canada.

POPULAR AND PRACTICAL ENTOMOLOGY.

THE PLUM CURCULIO IN ONTARIO, NATURE AND EXTENT OF THE INJURIES, CONDITIONS FAVOURING THE INSECT, AND MEANS OF CONTROL.

PART II—CONDITIONS FAVOURING THE INSECT, AMOUNT OF DAMAGE DONE, AND MEANS OF CONTROL.

BY L. CAESAR, GUELPH, ONT.

(Continued from vol. XLVIII, page 400.)

As the Curculio winters, in the adult stage, under rubbish or in any good hiding place, and as the better the opportunities for good winter quarters the larger number of beetles that will come safely through the winter, we should naturally expect that orchards or parts of orchards bordering on thick woods, or waste places where long grass, weeds, brush or other rubbish abounds, or orchards that are badly neglected and have an abundance of weeds and rubbish within their own borders, would be worst infested. Such is the case, for, as a rule, in Ontario it is only orchards of this type that do suffer much from the Plum Curculio.

AMOUNT OF THE INJURY.

No accurate estimate of the amount of injury has been made for the Province as a whole, but I believe I am right in saying that the fruit in well-cultivated and well-sprayed orchards with clean surroundings suffers only to a very small extent, probably not more on an average than 1% to at most 5%. On the other hand the loss in neglected orchards or in the parts of well-cared-for orchards immediately adjoining ideal winter quarters for the beetle is sometimes very great. Under such circumstances apricots, plums and sweet cherries sometimes have almost every fruit stung and destroyed, and nearly half of the apples, even on trees that are heavily laden, may be attacked and drop, or if the crop is a light one nearly all may be destroyed.

The injury in the fall and late summer to peaches and apples seems to vary with the season. This year in the Niagara District in orchards where there is no doubt at all that there were thousands of new beetles in August and September, very little injury was done, only an occasional apple here and there, even in the dirtiest of sur-

roundings, being attacked, though in rearing cages the beetles fed freely upon the fruit. Some years, however, the beetles do a great deal of damage in late summer and autumn. For instance, in Prince Edward County one fruit-grower to whom I showed the sort of injury done by the beetles at that time of the year, stated that he had that year 15 tons of apples rendered culls by such injuries. Next year, after he had carried out the suggestions given below for control, he reported very little loss.

MEANS OF CONTROL.

1. *Natural enemies.*—There is no doubt that climatic conditions, as they vary from year to year, play a very important part in determining the relative abundance or fewness of these insects. They are also held in control to some extent by various predaceous and parasitic insects and by other animals, but not to such a degree as to allow us to rely on them alone.
2. *Clean surroundings.*—The first step in the control of the *Curculio* should be a general cleaning up of the orchard itself and of its surroundings so far as this is practicable. Get rid of all rubbish, cut down thickets, remove stone piles, burn off old grass and all brush. In this way the favourable conditions for hibernation are removed.
3. *Cultivation.*—It is seldom that one sees a well-cultivated orchard badly infested. Cultivation, especially if it can be continued into the month of July without danger of winter injury to the trees, will kill the pupæ in their easily broken earthen cases in the soil. It also seems to help in other ways, and by letting the sunlight beat upon the fallen, infested apples and killing the larvæ within by the excessive heat. Good pruning would also help in this way.
4. *Spraying with arsenicals.*—The best spray to use is arsenate of lead at the strength of from 2 to 3 lbs. to 40 gallons of dilute lime-sulphur (strength 1.008 sp. gr.) or Bordeaux mixture. The lime-sulphur or Bordeaux is added to control diseases. Fortunately the proper time to spray apples for this pest is just after the blossoms have fallen, which is, of course, the right time for the Codling Moth, and also one of the most important times for the scab fungus. The spraying, to get best results on all three things, should be very heavy.

and thorough. If this work is well done, only in very badly infested orchards will it have to be repeated. In the latter case the best time to give the extra application will be in about 12 or 14 days after the one just mentioned. Plums and cherries should be sprayed with the same mixture, first, as soon as the fruit has set and the calyces have fallen, and then again in about two weeks' time. Occasionally a third application two weeks later may be desirable. Peaches should be sprayed soon after the fruit is well set and all the enveloping parts of the flower have dropped, so that the poison can cover the whole fruit. No lime-sulphur should be used, but only water or water with 1 or 2 lbs. of freshly slaked lime to every 40 gallons. One spraying is sufficient for Ontario conditions if well given. Many peach orchards do not require any spraying for this pest.

It is well to remember that all the above methods should be combined in the control of the Plum Curculio, for spraying alone though it will reduce the number of the insects will not thoroughly control them, and experience has shown that cultivation and clean conditions in and around the orchard are of very great value. Jarring used to be recommended, but in the writer's opinion is impracticable under modern conditions of fruit-growing.

THE SHELL-BARK HICKORY MEALY-BUG.

BY A. H. HOLLINGER, UNIVERSITY OF MISSOURI, COLUMBIA, MO.

(Continued from vol. XLVIII, page 413.)

DESCRIPTION OF ADULT FEMALE.

Adult female when mounted: varying from 2.6 mm. x 2.2 mm. (at the beginning of oviposition) to 5.7 mm. x 2.4 mm. (at the height of oviposition). Beak well developed and two-segmented, about 175 x 235 microns, the distal segment being about as long as the beak is wide; numerous setæ are borne on the beak; innumerable body setæ, averaging about 50 microns long, occur on both surfaces of the derm; in addition, innumerable, small (2 to 3 microns), obscurely triangular gland-pores occur all over the derm; also some slightly larger, circular gland-pores are in the cephalic region, and also along each abdominal segment and scattered

through the thoracic region; antennæ of two formulæ; 82137546 and 8(21)37564, (see figure 2, h); the graphic representation of

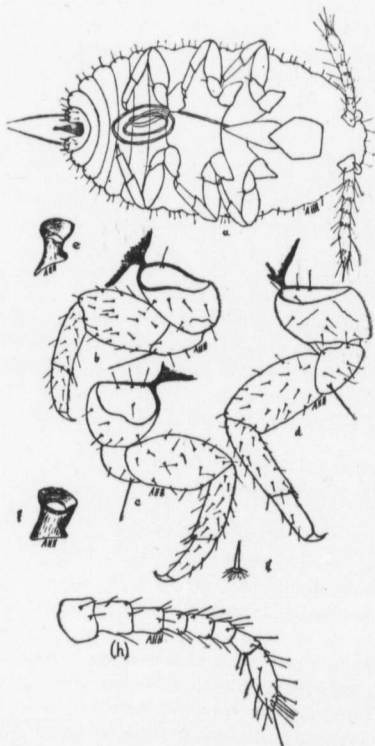


Fig. 2.—*Pseudococcus jessica*, n.sp.; adult female.

the antennal segments as per diagram, (see figure 3); each segment bears several setæ and is relatively stout, the width of the

antennae averaging about 45 microns; the legs are relatively short and thick set, the extreme measurements being as follows:

	Coxa.	Tro.	Femur.	Tibia.	Tarsus.
Prothoracic leg (see figure 2, b).....	88 x 126 103 x 126	103 x 50 115 x 50	188 x 100 206 x 100	147 x 50 144 x 44	94 x 35 100 x 41
Mesothoracic leg (see figure 2, c).....	94 x 141 118 x 150	109 x 59 118 x 74	206 x 106 221 x 109	141 x 53 173 x 50	83 x 44 106 x 38
Metathoracic leg (see figure 2, d).....	112 x 147 123 x 141	112 x 65 129 x 77	206 x 103 235 x 109	159 x 50 188 x 56	103 x 38 118 x 47

Tarsal claws vary from 32 to 40 microns; legs bearing numerous setae; the anal lobes are undeveloped, but each bearing its usual long seta, 132 microns long; setae of the genital opening are about 100 microns long; spiracles stout with undeveloped, cup-shaped disc,

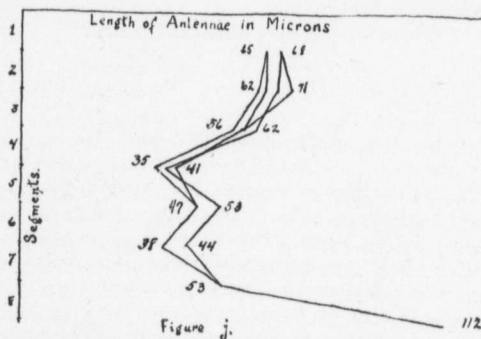


Fig. 3.—*Pseudococcus jessica*, n.sp.; measurements of antennal segments.

see figures (e) and (f); body setae, in caudal region especially, numerous and well developed; "circumgenital" type of gland-pores are located in the region of the genital opening but are not numerous, being scattered; cerari developed only in the caudal region, (see figure 2, g, which represents a conical seta of the anal cerari.)

NEW NEARCTIC CRANE-FLIES (TIPULIDÆ, DIPTERA).
PART II.*

BY CHARLES P. ALEXANDER, ITHACA, N. Y.

This paper is a continuation of the first part under this title (Can. Ent., vol. XLVIII, pp. 42-53, February, 1916). Unless stated otherwise the types of the new species are in the collection of the author.

Family *Tipulidæ*.

Subfamily *Limnobiinæ*.

Tribe *Limnobiini*.

Genus *Dicranomyia* Stephens.

***Dicranomyia mel'eicauda*, sp. n.**

Antennæ black throughout; thorax dark brown, the mesonotal stripes very dark brown, wings with the stigma short, oval, very dark brown; abdomen dark brown with the ventral lobes of the male hypopygium light yellow.

Male.—Length 5.8-6.7 mm.; wing 6.5-7.6 mm.

Rostrum and palpi black. Antennæ black throughout; segments of the flagellum uniformly oval. Head black with a very sparse, grayish bloom.

Mesonotum dark brown with a golden yellow bloom, most apparent on the lateral margins of the præscutum and the median area of the scutum, præscutal stripes shiny, dark brown, particularly without pollen; scutellum dark brown, postnotum with a dense, yellowish gray bloom. Pleura dark brownish black with a grayish bloom on the posterior sclerites, more golden yellow on the anterior sclerites. Halteres dark brown, the base of the stem more yellowish. Legs with the coxæ brown, sparsely gray pruinose; trochanters and femora dull yellow, the latter soon passing into dark brown; tibiæ and tarsi dark brown. Wings with a slight dusky or grayish tinge; stigma very prominent, oval, dark brown; veins dark brown. Venation: *Sc* short, ending about opposite the origin of the sector; *Sc*₂ rather distant from the tip of *Sc*₁, this distance about equal to the short, oval stigma; *Rs* elongate, arcuated at origin, more than twice the length of the basal deflec-

* Contribution from the Entomological Laboratory of Cornell University.
January, 1917

tion of R_{4+5} ; basal deflection of Cu_1 at the fork of M ; cell $1st M_2$ closed.

Abdomen black, the basal segments indistinctly reddish medially, the caudal margins pale; basal sternites yellowish, the apical segments dark brown. Male hypopygium with the fleshy ventral lobes bright honey-yellow, the remainder of the hypopygium black, in great contrast with these lobes.

Habitat.—Colorado.

Holotype, ♂, Bear Creek, Morrison Co., Colorado; October 20, 1915 (Oslar).

Allotype, ♀, with the type.

Paratopotypes, 20 ♂ ♀.

Tribe *Antochini*.

Genus *Antocha* Osten Sacken.

***Antocha monticola*, sp. n.**

Antennæ brown; head grayish yellow; thoracic dorsum without stripes.

Male.—Length 5.5 mm.; wing 7.1 mm.

Female.—Length 5–6.4 mm.; wing 7–8 mm.

Rostrum and palpi dark brown. Antennæ dark brown with a coarse, white pubescence; flagellar segments rather small, the two or three apical segments longer than those segments immediately before them. Head grayish yellow, with an indistinct, narrow, dark brown median line.

Pronotum dark brown. Mesonotum light brownish yellow without distinct stripes; median area of the præscutum behind more grayish pruinose; scutum light yellow, the median area grayish pruinose; scutellum yellowish white; postnotum brown. Pleura pale grayish yellow. Halteres short, pale yellow, the knobs brown. Legs with the coxæ pale yellow; femora yellow, a little darkened apically; tibiæ brownish yellow, slightly darker at the extreme tips; tarsi dark brown. Wings whitish opalescent; stigma elongate, indistinct, yellowish; veins pale brown. Venation: cross-vein r present; cell $1st M_2$ small; basal deflection of Cu_1 before the fork of M .

Abdomen brownish yellow above, the apical segments darker; hypopygium orange.

Habitat.—Colorado.

Holotype, ♂, Platte Canyon, Colorado; July 17, 1915 (Oslar).

Allotype, ♀, with the type.

Paratopotype, ♀.

Differs from *A. saxicola* O. S. of Eastern North America in the antennal flagellar segments less elongated and paler coloured; head more yellowish, the thorax without stripes, etc.

Tribe *Eriopterini*.

Genus *Ormosia* Rondani.

***Ormosia nimbipennis*, sp. n.**

Coloration reddish brown; wings dusky gray; cell *1st M*₂ of the wings open, the outer deflection of *M*₃ lacking; anal veins convergent.

Male.—Length 4 mm.; wing 5.8–6 mm.

Female.—Length 5.4 mm.; wing 6.3 mm.

Rostrum dull yellow; palpi brown. Antennæ moderately elongate, uniform dark brown throughout. Head brownish gray.

Mesonotum reddish brown without distinct stripes; interspaces with a dense, yellow pilosity; tuberculate pits remote from the anterior margin of præscutum and closely approximated, separated from one another by a distance about equal to one-half the diameter of one; postnotum with a slight grayish pruinosity. Pleura pale brown with a sparse, gray pruinosity; sternum dull yellow. Halteres pale yellow. Legs with the coxæ and trochanters dull yellow; femora dull yellow, only a little darkened apically; tibiæ and tarsi dark brown. Wings dusky gray; costal region and the stigma brownish; veins dark brown; wing membrane with abundant, short, appressed, black hairs. Venation: cell *1st M*₂ open, the outer deflection of *M*₃ being absent; cross-vein *r* usually a little shorter than the portion of *R*₂ before it; *R*₂₊₃ about equal to the deflection of *R*₄₊₅; petiole of *M*₂ short, less than the basal deflection of *Cu*₁; anal veins convergent.

Abdomen dark brown, the hypopygium a little lighter; hypopygium with the pleural appendages acicular at their apices, black; a prominent median appendage, rectangular, the base and head slightly expanded, the latter squarely truncated or slightly concave across the tip.

Habitat.—Northeastern United States.

Holotype, ♂, Woodworth's Lake, Fulton Co., New York; altitude 1,600 feet; August 13, 1916 (Alexander).

Allotype, ♀, with the type.

Paratopotypes, 10 ♂ ♀.

***Ormosia mesocera*, sp. n.**

Related to *O. monticola* O. S.; antennæ shorter and the flagellar segments not so greatly attenuated; wings more nearly hyaline.

Male.—Length 3.7–3.8 mm.; wing 4.4–4.8 mm.

Restrum and palpi dark brown. Antennæ dark brown; segments only moderately elongated, not greatly attenuated as in *monticola*; each flagellar segment with a slight, apical, narrowed stem that is equal to about one-half the basal swelling; each segment with abundant rather short hairs and verticils. Head dark brown.

Pronotal scutellum dull, light yellow. Mesonotum reddish with a sparse, gray bloom; thoracic stripes indistinct. Pleura pale brown, very sparsely gray pruinose. Halteres short, the knobs large, pale brown. Legs with the coxæ and trochanters pale yellowish brown; femora dark brown, paler basally; tibiæ and tarsi brown. Wings pale grayish subhyaline, the costal region and stigma more brownish; veins dark brown. Venation: cell 1st M_2 open; anal veins slightly convergent.

Abdomen dark brown, the hypopygium a little more reddish. Hypopygium with the pleural appendages short, blunt, slightly curved.

Habitat.—Northeastern United States.

Holotype, ♂, Simmon's Woods, Gloversville, Fulton Co., New York; altitude 900 feet; June 22, 1916 (Alexander).

Paratopotype, ♂.

Related to *O. monticola* O. S. (Mon. Dipt. N. Am., pt. 4, pp. 145, 146; 1869), but the antennal segments much shorter, the individual segments of the flagellum not greatly attenuated and with the hairs and verticils shorter; no indication of the paler apices to the flagellar segments, and the hypopygial details different.

O. monticola is a late summer species, most abundant in August; *O. mesocera* appears to be more vernal in its appearance on the wing.

Ormosia megacera, sp. n.

Related to *O. divergens* Dietz; antennæ of the male elongated, nodulose; anal veins strongly divergent; body coloration dark brown; appendages of the male hypopygium strongly curved.

Male.—Length 3.3–3.7 mm.; wing 4.8–6 mm.

Rostrum and palpi short, dark brown. Antennæ dark brown; flagellar segments greatly elongated, tapering at both ends, especially apically; hairs and verticils on the segments as long as the segments themselves; whole antennæ nearly as long as the body. Head dark brown.

Pronotum pale whitish. Mesonotal præscutum dark brown with three still darker brown stripes, the median one very broad; scutum brown, the lobes with darker centres; scutellum and postnotum dark brown, sparsely gray pruinose. Pleura and sternum dark brown, rather heavily gray pruinose; dorso-pleural membranes dirty yellow. Halteres dark brown, the extreme base yellowish. Legs with the coxæ pale gray; trochanters and femora pale, the latter darker apically, tibiæ and tarsi dark brown. Wings almost hyaline, but with a faint, gray tinge; costal area a little more suffused; stigma ill-defined; veins dark brown. Venation: cell 1st M_2 open, the outer deflection of M_3 lacking; anal veins strongly divergent; 2nd A short and straight.

Abdomen dark brown, including the hypopygium; hypopygium with the pleural appendages black, in the form of chitinized hooks that are strongly curved.

Habitat.—Northeastern United States.

Holotype, ♂, Simmon's Woods, Gloversville, Fulton Co., New York; altitude 900 feet; June 22, 1916 (Alexander).

Paratopotypes, 2 ♂'s.

Related to *O. divergens* Dietz (Trans. Am. Ent. Soc., vol. 42, p. 144; 1916) which is reddish brown in colour, and the hypopygium of the male very differently constructed.

Genus *Trimicra* Osten Sacken.

Trimicra angularis, sp. n.

Antennæ black; head yellow with a black median line; præscutum yellow with three dark brown stripes; pleura yellow with two stripes; abdomen yellow with the segments marked with brown; wings gray with sparse brown markings.

Male.—Length 5 mm.; wing 5.2 mm.

Rostrum and palpi brown. Antennæ with the first segment yellowish; remainder of the antennæ dark brownish black, the flagellar segments short-cylindrical. Head broad, light yellow, palest on the front, richer on the vertex and occiput; a dark brown linear mark on the head.

Mesonotal præscutum light yellow, with three very broad, dark brown stripes that are confluent behind, the middle stripe ending before the transverse suture; tuberculate pits at nearly mid-length of the sclerite, rather linear, separated by a distance equal to nearly twice the short diameter of one; scutum light yellow, the lobes largely dark brown, this consisting of two confluent blotches; scutellum light yellow, broadly dark brown medially, broadest anteriorly; postnotum yellowish basally, brown caudally. Pleura yellow with two indistinct and somewhat interrupted lateral stripes, the dorsal one passing above the root of the halteres, the ventral one including the sides of the sternum; sternum yellow, except the sides and a narrow, dark brown, median line on the mesosternum; dorso-pleural membranes dusky. Halteres yellow. Legs with the coxæ and trochanters light yellow; remainder of the legs broken. Wings broad, the anal angle prominent; membrane light gray with small, grayish brown spots as follows: At the origin of R_s , at r , tip of R_1 , fork of R_s , along the cord and outer end of cell $1st M_2$; veins dark brown. Venation: Sc_2 far removed from the tip of Sc_1 , lying just distad of the origin of R_s ; r lying far from the tip of K_1 , this distance equal to about one-half of R_s ; cell $1st M_2$ closed, narrowed at its inner end; basal deflection of Cu_1 far before the fork of M ; second anal slightly bisinuate.

Abdominal tergites dull yellow, more brownish basally, a dark brown median blotch on each segment; sternites dull yellow, dark brown medially, the apical segments clearer yellow. Hypopygium with two broad, flattened lobes under the 9th tergite, these heavily chitinized on their dorsal edges; pleurites long, slender, somewhat digitiform; appendages black.

Habitat.—Utah.

Holotype, ♂, mouth of Bear River, Utah; Sept. 16, 1914 (A. Wetmore).

Type in the collection of the United States Biological Survey.

The reference to *Trimicra* is somewhat provisional, although probably correct.

Genus *Rhodomastix* Skuse.

Subgenus *Sacandaga* Alexander.

***Rhodomastix flava colradensis*, subsp. n.**

Allied to *R. flava flava*; antennal flagellum black; pleurae white-pruinose; femora and tibiae tipped with brownish; wings with R_2 almost perpendicular to R_{2+3} ; R_3 almost straight; m very long.

Male.—Length 5.5 mm.; wing 6.9 mm.

Rostrum and palpi brown. Antennae with the first scapal segment yellowish, the remainder of the organ black. Head pinkish gray with a very narrow and indistinct median line of darker.

Pronotum yellowish, a little browner medially, the sides of the scutellum whitish. Mesonotal praescutum dull whitish yellow, dusted sparsely with a grayish pollen, and with three broad, reddish-brown stripes; the broad, middle stripe ends far before the transverse suture and is slightly bifid caudally; scutum with the median area whitish, the outer lateral portions of the lobes dark brown; scutellum bright yellow; postnotum reddish brown, sparsely pruinose. Pleura yellow, more bluish white pruinose on the mesopleurites. Halteres light yellow. Legs with the coxae brownish; trochanters dull yellow; femora light brown, broadly tipped with dark brown; tibiae brown, very narrowly tipped with darker; tarsi brown. Wings opalescent, subhyaline; costal region a little more yellowish; stigma ill-defined, yellowish brown, veins dark brown. Venation: R_2 short, almost perpendicular to R_{2+3} at the fork; cross-vein m very long so that the outer deflection of M_3 is greatly reduced, almost punctiform.

Abdominal tergites brownish yellow; sternites a little brighter.

Habitat.—Colorado.

Holotype, ♂, Platte Canyon, Colorado, July 17, 1915 (Oslar).

Close to typical *flava* Alexander of Northeastern America, but sufficiently distinguished by the black antennal flagellum, the mesopleura more whitish pruinose, the femora and tibiae tipped with brown and in the slightly different venational details.

Genus *Crypteria* Bergroth.***Crypteria americana***, sp. n.

Body coloration reddish, wings subhyaline, the radial cross-vein present.

Female.—Length 5 mm.; wing 6.4 mm.

Rostrum brownish yellow; palpi brown. Antennæ dark brown throughout; fusion segment composed of the first five flagellar segments; remaining nine flagellar segments elongate-oval. Head clear, light gray.

Thoracic dorsum reddish with a very sparse whitish bloom; stripes indistinct; a small group of long, black bristles on each side of the pronotal scutum, mesonotal præscutum with a row of similar bristles on each side of the broad median area; scutellum more yellowish. Pleura yellow, with a sparse, bluish bloom on the mesopleurites. Halteres pale, the knobs a little darker. Legs with the coxæ and trochanters light yellow; femora light brown, a little brighter basally, tibiae and metatarsi light brown; remainder of tarsi dark brownish black. Wings grayish subhyaline; veins dark brown. Venation: Sc_1 elongate, ending just beyond the radial cross-vein; Sc_2 removed from the tip of Sc_1 to a distance about equal to the basal deflection of Cu_1 ; Rs elongate, arcuated; R_{2+3} moderate, a little longer than cell *1st M₂*; cross-vein *r* present; basal deflection of R_{4+5} short; cross-vein *r-m* long, arcuated, cell *1st M₂* elongate, pentagonal; cell *M* very deep, a little longer than its petiole; basal deflection of Cu_1 just before the middle of cell *1st M₂*; second anal vein very elongate, subsinuate, ending about opposite the middle of the long sector.

Abdominal tergites brown; sternites light yellow; valves of the ovipositor elongate, strongly upcurved.

Habitat.—Oregon.

Holotype, ♀, Mt. Angel, Oregon (F. Epper).

Type in the collection of the United States National Museum.

This interesting crane-fly is the first described, New World representative of the genus. It agrees closely with the genotype, *C. limnophiloides* Bergroth of northern Europe, differing in the more reddish body coloration and in certain venational features, especially in the retention of the radial cross-vein.

Tribe *Pedicini*.Genus *Tricyphona* Zetterstedt.***Tricyphona autumnalis*, sp. n.**

Allied to *T. calcar* O. S.; female with the wings semi-atrophied and the valves of the ovipositor straight; male with the hypopygium provided with conspicuous long hairs.

Male.—Length 13.5–15 mm.; wing 13.5–14 mm.

Female.—Length 20 mm.; wing 9.6 mm.

Male.—Rostrum dull yellow, the palpi dark brown. Antennæ with the scapal segments dull, brownish yellow, the five or six basal segments of the flagellum yellowish, thence passing into dark brown at the tip of the organ. Head light gray, indistinctly darker medially, the frontal tubercle blackish; vertex with long yellowish hairs inserted in black punctures.

Mesonotal præscutum yellowish with three indistinct, reddish yellow stripes; scutellum and postnotum whitish yellow. Pleura whitish yellow. Halteres yellow, the knobs brown. Legs with the coxæ and trochanters light yellow; femora yellow, passing into brownish at the tips; tibiæ yellow, narrowly dark brown at the tips; tarsi dark brown. Wings yellowish subhyaline, the costal region more saturate yellow; stigma brown; veins brown. Venation: vein *R* ⁴⁺⁵ forked, the petiole very short, subequal to the *r-m* cross-vein.

Abdominal tergites dark brown, a little paler caudally; basal sternites yellowish, terminal sternites brown, the segments narrowly ringed with paler on the caudal margins. Hypopygium with the pleurites and appendages dark brown, densely long-hairy.

Female.—Similar to the ♂ but the antennæ shorter; wings relatively very small, semi-atrophied; femora and tibiæ with the dark apices less distinct; valves of the ovipositor powerful, almost straight.

Habitat.—Northeastern United States and Eastern Canada.

Holotype, ♂, Woodworth's Lake, Fulton Co., New York; altitude 1,600 feet; September 2, 1916 (Alexander).

Allotype, ♀, with the type.

Paratopotypes, 25 ♂ ♀; *paratypes*, ♂, Meach Lake, Quebec, Sept. 2, 1903 (Jas. Fletcher); ♂, Rostrevor, Quebec, Sept. 2, 1907 (A. Gibson); ♂ ♀, Katahdin, Piscataquis Co., Maine, Aug. 22,

1913 (Alexander); ♂, Orono, Penobscot Co., Maine, Aug. 14, 1913 (Alexander); ♀, Roque Bluff, Washington Co., Maine, Aug. 13, 1913 (Morse); ♂ ♀, Ellsworth, Hancock Co., Maine, Aug. 3 to 21, 1913 (Stanwood); ♂ ♀, South Portland, Maine, Sept. 4, 1913 (Alexander); Dug Mt., Hamilton Co., N. Y., Aug. 8, 1912 (Young); Mt. Pinnacle, Fulton Co., N. Y., Aug. 5, 1913 (Alexander); ♂, North Fairhaven, Cayuga Co., N. Y., Sept. 12, 1914 (Alexander); ♂, Grand Island, Erie Co., N. Y., Sept. 6, 1909 (M. C. Van Duzee).

(To be continued.)

BOOK REVIEWS.

BIOLOGIA CENTRALI-AMERICANA. Insecta, Lepidoptera—Heterocera, Vol. IV, Tineina, Pterophorina, Orneodina and Pyralidina and Hepialina (part). By the Right Hon. Lord Walsingham, 1909-1915, London.

Volume IV of the *Biologia Centrali-Americana*, by Lord Walsingham, a most important contribution to our knowledge of the Micro-lepidoptera, has, up to the present time, not been reviewed by any of the entomological journals of the United States or of Canada. This is probably due, not to a failure to appreciate it at its true value, but to the fact that Mr. August Busck, the one best fitted to make the review, of American micro-lepidopterists, assisted in the work of its preparation. The present writer does not intend this to be taken in the sense of a review, but rather as a note of congratulation which may call more general attention to the successful completion of this great work, in which the micro-lepidopterist is more especially interested.

The volume comprises an exhaustive study of the *Tineina*, *Pterophorina* and *Orneodina* of Central America, and includes also a few species of *Pyralidina* and *Hepialina*, as additions to the list given by Mr. H. Druce, in vols. I and II of the *Biologia Centrali-Americana*.

There are listed 1,025 species, 225 genera and 27 families, of which 586 species, 54 genera and 2 families are described as new.

In the majority of instances descriptions of new genera are accompanied by cuts, from drawings made by Mr. J. H. Durrant,

showing the head in profile, and the neuriation of both wings. Ten excellent plates in colour are given portraying 350 species.

The collaboration of three specialists of such recognized standing as Lord Walsingham, Mr. J. H. Durrant, his assistant, and of Mr. August Busck, has resulted in a valuable production which commands careful and respectful consideration.

The conclusion that secondary sexual characters should be discarded, as a means for delimiting genera, while not a new one, as stated by the author, has not won the universal approval that should be accorded it. Lord Walsingham is, therefore, to be congratulated on having been the first to apply this principle in such a comprehensive manner. A list of genera in which these characters are eliminated as a means of generic classification has, of course, led to the sinking of a number of old and well established names as synonyms. Under *Eucosma* Hb., for example, are placed such familiar names as *Epiblema* Hb., *Epinotia* Hb., and *Thiodia* Hb.

The bibliographical work has been done most thoroughly and will make this work indispensable to all who specialize within the groups treated.

Attention is called, by the author, to the necessity for more careful work in the description of neuriation, and to the fact that it is necessary, in most cases, to denude the wing and study it under the microscope. This is undoubtedly true and too much reliance should not be placed upon descriptions based upon older and more inadequate methods. The writer wishes to call particular attention to the helpfulness of the many drawings illustrating the text, and regrets that it was not possible to carry out this plan of illustration for every genus described as new. An adequate verbal description of the neuriation of a new genus, for example, is doubtless possible, but doubtless also it is seldom, if ever, given.

The writer is informed that, by an unusually thoughtful arrangement, drawings of unique types were placed, where specimens of the insects were lacking, with either the British or the United States Museum. This feature has added greatly to the usefulness of the book itself and of the collections of the two museums mentioned.

Lord Walsingham has surely won the thanks of all students of micro-lepidoptera, and especially of those on this side of the Atlantic, for his great and helpful contribution.

CHAS. R. ELY.

CHECK LIST OF THE HEMIPTERA (EXCEPTING THE APHIDIDÆ, ALEURODIDÆ AND COCCIDÆ) OF AMERICA, NORTH OF MEXICO.
By Edward P. Van Duzee. N. Y., New York Entomological Society, 1916.

All Hemipterists will welcome the appearance of Dr. Van Duzee's Check List of North American Hemiptera, as it gives them, at last, a complete list of the species of this order (with the exception of the three families mentioned) found within the territory indicated in the title, and includes their systematic arrangement, full synonymy, the date of each name and roughly the distribution of each species.

Dr. Van Duzee has followed the lines of the Oshanin Katalog of Palearctic Hemiptera, and has included the results of the latest and best systematic studies dealing with this order. The list begins with the family Scutelleridæ and follows, in reverse order, the system published by Reuter.

The rule of priority has been followed throughout the work, and the synonymy includes that of all the higher group names as well as that of the genera and species. Different types are used for the various grades of group names, the generic and specific appearing in bold-faced type, and the synonyms in italics.

The list gives the names of 698 genera and 2,945 species, and concludes with an index to the generic and higher group names, a feature which greatly facilitates its use.

Dr. Van Duzee is to be highly congratulated on the completion of his invaluable work, and students of Hemiptera and of general and applied entomology will all feel deeply indebted to him and will await with great interest the appearance of the fuller and more complete bibliographical and synonymical catalogue of the Hemiptera, which will be published in the near future.

G. A. M.

THE SARCOPHAGIDÆ OF NORTH AMERICA. *Sarcophaga and Allies in North America*. By J. M. Aldrich. Memoir of the Thomas Say Foundation of the Entomological Society of America. Lafayette, Ind., 302 pp., 16 pls. (Published November 30, 1916.)

This attractive volume constitutes the first Memoir of the Thomas Say Foundation of the Entomological Society of America, and it is peculiarly appropriate that it should be the work of the Editor of the Foundation. At the Columbus meeting of the Entomological Society of America in December, 1915, a standing committee was established under the name of "The Thomas Say Foundation," the purpose of which is "for the publication of works of a monographic or bibliographic character on the insects of North America." The establishment of this Foundation is the outcome of a proposal made to the Society in 1913 by Mr. Nathan Banks. As its success must depend on the financial assistance it receives from those interested in its publications, it is to be hoped that generous support will be forthcoming from all who desire to assist in the production of a series of monographs on American entomology somewhat similar to the well-known monographs of the Ray Society.

Dr. Aldrich could not have selected a more desirable group for monographic treatment than the Sarcophagidæ. Entomologists have been confronted for some time with the almost hopeless task of identifying the species of this group of flies, the discovery of whose diverse habits has demonstrated how important they are from biological and economic standpoints. The flies are larviparous and the habitats of the larvæ range from decomposing animal substances and excrement, to the bodies of warm-blooded vertebrates. They appear to show an interesting transition from the habit of devouring dead insects to parasitism upon living ones.

Only those who have endeavored to identify the species of *Sarcophaga* will appreciate the difficulty of using the old descriptions, and Dr. Aldrich (and with his work we would couple the excellent work of Dr. R. R. Parker in the same group) has endeavored

to raise what he rightly calls the "virtual blockade" in this group. The chief object of the author has been to make the species recognizable and their determination as easy as possible. To this end he has subordinated the desire so frequently prevalent among certain systematists to create a large number of genera. Had he not been conservative in this respect there is little doubt that no one but the author would have been able to recognize the genera. The author's remarks on this aspect of the subject will find much sympathy among working entomologists. He says: "A survey of the present status of the Muscoid Diptera indicates unmistakably that our great need is not more genera, but a more complete knowledge of species. The tendency of extreme generic specialization is to erect about itself impenetrable barriers of names, as is well illustrated by Desvoidy and Bauer. Genera conceived in this mental atmosphere are likely to be almost wholly subjective creations, which make no impression on the minds of others. The argument that the classification must express the relations has its dangers, partly from the subjective elements involved, and partly from the fact that the classification has also another important function—to provide us with names for our species, which should be as stable as possible if they are to have any usefulness. Furthermore, to separate a species from the genus in which it has been located expresses one relation, that of difference; but it obscures another, that of resemblance, which may be more important. One of the main objects of the present work is to make the identification of species as simple and certain as possible, and thus to attract biological and economic workers to the group. This object would inevitably be defeated by the erection of a considerable number of separated genera. These are the governing considerations which have prompted the preservation as nearly as practicable of the old genus *Sarcophaga*."

The species are separated on the characters of the genitalia which method of separation in this group was first employed by Parker in his study of the Sarcophagidæ of New England. The taxonomic value of the genitalia in different groups of insects, such as Diptera, Coleoptera, Lepidoptera and Mallophaga, is now being clearly demonstrated by different workers, and a valuable and

comparatively simple means of identification is thus being put into the hands of working entomologists.

In this monograph one hundred and forty-five species and varieties belonging to sixteen genera are described. Excellent figures are given of the genitalia in one hundred and thirty-eight cases. The species can be readily divided into eight groups by not restricting the separation to generic characters but by using the most salient and easily recognizable characters that can be found. In a large number of cases the female has not been described, and the author rightly admits the possibility of errors occurring through the identification of females with the wrong males, as few pairs collected *in copula* exist in the collections he has examined, which collections, by the way, include the chief collections of Sarcophagidæ on this continent.

Ninety-five new species are described and several new varieties. Five of these new species and one new variety occur in Canada.

When we remember that in the author's Catalogue of North American Diptera, one hundred and six nominal species of Sarcophaga were listed and that hardly more than half a dozen of these had been described in a manner that would permit recognition, the extent of our indebtedness to him for this contribution will be readily appreciated. He has placed both systematists and economic workers under a debt of gratitude for his painstaking work which will undoubtedly stimulate others to study this group of flies, the investigation of whose habits is rapidly disclosing the economic importance of the group.

We cannot conclude this review without remarking on the excellent manner in which the monograph is printed and bound, and we hope that this standard will be maintained in future volumes of this series. It is unfortunate that in the author's desire to make the work immediately available, a number of typographical errors have been overlooked, and we think that the inclusion of an outline sketch of *Sarcophaga* would have added to the value of the introductory description.

C. GORDON HEWITT.

Mailed January 24th, 1917.