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COLLECTING TERRESTRIAL ARTHROPODS IN BARBADOS AND ANTIGUA, BRITISH WEST INDIES.

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I. Barbados.

The data upon which the following notes are based were secured by the writer and Mrs. Stoner during the time spent on the islands of Barbados and Antigua as members of the Barbados-Antigua Expedition sent out by the University of Iowa in the spring of 1918. The time between May 9 and June 17 was spent at Barbados. Collecting at Antigua was done between June 19 and July 19.

The island of Barbados is situated in $13^{\circ} 4'$ North latitude and $59^{\circ} 37'$ West longitude, and is the most easterly of the Antillean chain. It is about twenty-one miles long by fourteen broad, with an area of 166 square miles and a population of about 200,000, nine-tenths of which is black. The strata forming the basement series of Barbados consist of siliceous and calcareous sandstones and clays. About six-sevenths of the total area of the island is covered by a cap of corai rock which is more or less flat, and rises in a series of terraces to Mt. Hillaby in the "Scotland district," which is 1,104 feet in height. An area of approximately 6,000 acres at the northern and eastern side of the island has received that name on account of its peaked and hilly character. The remainder of the island is low and flat or at most slightly rolling, with few swamps and marshes and but two or three fresh water streams of any importance. Practically all the tillable land is under sugar cane, and but few remnants of the forests which once covered the island now remain. The annual rainfall is about sixty inches, and usually comes in the form of showers during the summer months. The dry season occurs in the winter and early spring months.

On account of the slight physiographic differentiation, the almost uniform state of cultivation and the density of the population, Barbados is not a particularly favorable place for collecting insects. In addition, practically all the grass land is closely grazed by goats and cattle, so that dense growths of vegetation are much restricted. In general the affinities of the insect fauna are with that of South America, but a number of North American and closely allied forms are to be found. A few indigenous forms also occur.

Whenever the entomologists started out on a collecting trip, the fact was quickly noised abroad that strange people were collecting butterflies. How the news spread so quickly was somewhat of a mystery in view of the fact that telephone service is seldom available to the blacks. But in a short while groups of children and older persons as well would put in their appearance and express a desire first to know what we were going to do with the insects, and suggesting as a probable answer that perhaps they were to be made into medicine. Having been more or less satisfactorily appeased by our answers, the second thought was to be of assistance—for a consideration. After a few usually vain attempts

to secure the particular insects desired the youngsters desisted in their efforts to capture specimens, but often continued to follow at a safe distance to view the strangers. Not always were the followers peaceable, for on one occasion the entomologist was followed for a considerable distance over the hills of the Scotland district by an ever-increasing mob of black children, who drew others from far and near by their shouts of "A German spy." On another occasion the writer was taken for an escaped lunatic, and three big black fellows armed with a rope were making ready to capture the luckless "bug man" and escort him within the four walls of the nearby lazaretto. However, the persuasive powers of the intended victim were sufficient to permit him to continue unmolested.

Among the men in "Little England" who take a special interest in entomology and who did much to aid us were Mr. Wm. Nowell, Mycologist in the Imperial Department of Agriculture; Dr. J. C. Hutson, the then Acting Entomologist in that Department, and who was taking the place of the regular Entomologist; Mr. H. A. Ballou, then absent in Africa on special economic investigations, and Mr. J. R. Bovel, Entomologist in the Colonial Department of Agriculture. Rev. N. B. Watson, of St. Lucy's Parish, one of the delightful old-time naturalists, has a fine collection of native insects, and Sir Gilbert Carter, a former Governor of Barbados, has in his beautiful home an excellent collection of native Lepidoptera.

A few of the principal collecting places may be briefly referred to here. One of the chief places frequented by insects of various kinds is the more or less protected series of terraces referred to above. Here on the side next the sea the vegetation is somewhat sheltered from the direct rays of the sun, and the more delicate shrubs, small trees, weeds and Solanaceae in particular offer a plentiful supply of food for plant-feeding insects, many kinds of which were taken in the sweep net.

The high, dry flats between these terraces are often thickly overgrown with the long, dense, sour grass which, however, is harsh and supports few insects other than grasshoppers.

It was indeed a pleasure to meet with one of our old friends, *Megilla maculata* along with many other less well-known forms of Coleoptera, as well as an abundance of Hemiptera in the small ditches scattered over the island. These are usually grown over with grass and weeds, and in them, during heavy rains, the water flows in torrents; shortly thereafter they again become dry, but the stimulus given the vegetation by the more than usual amount of water keeps it continually green and fresh. The surrounding country often becomes exceedingly dry, and many species of insects congregate in these well-watered places on account of the abundant food supply.

The semiaquatic vegetation bordering small pools and streams also often furnishes good collecting places, as indeed do the waters and bottoms of the pools and streams themselves.

Often along the uncultivated borders of cane fields various kinds of weeds and grasses grow, particularly if in low or somewhat moist and shaded situations. Even the cane fields themselves offer somewhat limited opportunity for collecting.

Nor should the Scotland district with its dense tropical vegetation and

its rock ledges and bluffs be omitted; nor Calais and other sandy beaches; nor the cliffs and upland flats near Speightstown—each somewhat different in its aspect from the other, and lending some variety to the scenery as well as to the day's catch.

The Arachnids are extremely well represented on Barbados, and vary in size from spiders with an extent of from four to five inches to the minute *Tetranychus*. The Barbados tarantula, a tailless whip scorpion, is among the most interesting of the group, and is commonly found under the moist bark of decaying trees.

Myriapods are very common. A black Julid with transverse markings of green and averaging from four to four and one-half centimeters in length is most abundant. On one occasion a sort of migratory movement of these Arthropods was observed. Hundreds of them were crossing the dazzling white coral road in moving from one cane field to another, and all seemed to be going in the same direction. A small Polydesmid is very common under rocks along the bases of the terraces.

Scolopendrids are abundant under sticks and stones in damp places and under the dried leaves of sugar cane, with which some of the fields are covered. These Centipedes are known locally as "forty-legs," and the natives have a great fear of them. The popular belief is that a bite from one of them will cause a "fever" in the victim. The specimens are commonly from three to six inches in length, very active and difficult to handle, and it requires considerable dexterity to transfer one safely to the killing bottle without being bitten.

Many years ago the Mongoose (*Herpestes*) was imported into Barbados for the purpose of destroying the rats. It is now fairly common all over the island. While it, no doubt, has been responsible for some diminution in the number of rats the experiment has not been a success, for in addition to its destruction of birds of various kinds, particularly the Ground doves (*Columbigallina*), the blood-thirsty animal has killed off a great many lizards and centipedes, which are enemies of insects. As a result destructive insects have become more abundant on the island since the introduction of this animal, which is now much despised by the natives.

Of the Hexapoda only the more conspicuous will be mentioned here. On account of the scarcity of suitable breeding places the order Odonata is not well represented. The vicinity of Indian and Bird Rivers and the large swamp in the suburbs of Bridgetown offer limited opportunity for larval development. The common pond fly (*Erythrodiplax umbrata*) and the red pond fly (*Tramea abdominalis*) are probably the most abundant. Four or five other representatives of the order occur here also.

The order Orthoptera is represented by a goodly number of species. Earwigs (*Forficula*) are common in rocky places in the vicinity of cane fields, and in leaf sheaths and stems of old canes. Cockroaches are abundant in cane fields and houses; a half dozen species are found on the island. One of the most common, and at the same time conspicuous representatives of the group is the large, yellowish, short-horned grasshopper (*Schistocerca pallens*), which is found commonly on the flats grown up in sour grass. The insect is very difficult to capture on account of its rapid flight and its habit, when closely pursued, of crawling some distance in the short grass before again taking flight, and then

of springing up suddenly in an unexpected quarter and flying off again. Many miles were traversed in pursuit of these elusive insects. Another common Acridiid is *Orphulella balloui*, which also frequents grass lands. Conocephalids and Gryllids are not abundant.

The Hemiptera is the best represented of any of the orders, both in actual abundance and in number of species. Of the aquatic forms the water strider *Gerris marginata* is by far the most abundant, and is found in all the permanent fresh-water streams and ponds of any size. Of the other Heteroptera the family Pentatomidæ is well represented, about twelve species having been collected. The two most common species are the green bug (*Nezara viridula*) and the brown bug, known locally as the "pea chink" (*Edessa meditabunda*). This latter form is one of the most abundant plant feeding Heteroptera on the island. Two other Pentatomids, *Piezodorus guildinii* and *Arvelius albopunctatus* are also worthy of mention, the former being much the commoner of the two. The cotton stainers (*Dysdercus* spp.) have not yet made their appearance on Barbados although they are present in all the other islands of the West Indian group. Of the Homoptera there are several kinds of scale insects; Cicadellids and Membracids are common on vegetation in moist or partly-shaded places; a few Fulgorids are found in the wooded Scotland district.

Beetles are well represented on Barbados, and a number of them are of considerable economic importance. Perhaps the most conspicuous species in this connection is the Scarabæid beetle, locally called the "brown hardback" (*Phytalus smithi*), the larvæ of which injure the roots of sugar cane, citrus trees, palms and bananas. Effort is being made by the Colonial Department of Agriculture to control the pest by offering prizes to schools and schoolmasters for the greatest number of the insects brought in to the entomologist's office. In addition, a "bounty" of 2d. per four hundred is paid. The writer saw in a glass laboratory jar in Mr. Bovell's office 27,200 live specimens of this beetle which had been collected for the bounty offered. In 1916 the collection of adults on one estate amounted to 589,680. A small Hymenopteron, *Tiphia parallela*, is parasitic on the beetle, but the parasite is not sufficiently abundant to hold the pest in check.

A single tiger-beetle (*Cicindela suturalis* var. *hebræa*) is found upon the island, and at only one place, Calais beach, southeast of Bridgetown. A long stretch of sand affords a typical habitat for this beautiful white form.

Of the aquatic beetles the Dytiscidæ are most abundant, though in the larger pools and streams the large black Hydrophilid, *H. ater*, is not uncommon. Among the Coccinellids, in addition to the common spotted ladybird (*M. maculata*) the red ladybird (*Coccinella sanguinea*) is also found, and is even more common than the former. Strangely enough carrion beetles are not found upon Barbados, and but one species of short-winged scavenger beetle was collected. Once, upon coming across the decaying remains of a mongoose the carcass was examined carefully for insects, but the net result was a single fly puparium. Two other beetles should receive special mention on account of their abundance. The fine black Tenebrionid *Hopatrinus gemellatus* is found everywhere under small stones along the bases of the terraces, and the Chrysomelid *Homophwa aequinoctialis* is abundant on the common weeds and grasses.

Of the weevils the beautiful gray and black striped Curculionid *Diaprepes*

abbreviatus is one of the most common and, at the same time, destructive. The larvæ are very injurious to sugar cane, boring into the cane bases and sometimes completely severing them. This insect is found throughout the West Indies.

Of the Rhopalocera there are not many examples on the island, but among them are two of our well-known forms, the monarch butterfly (*Anosia plexippus*) and the painted lady (*Vanessa cardui*) both of which are fairly common. The three other common species are *Catopsilia eubule*, *Dione vanillæ* and *Junonia geneveva*.

Moths are moderately common, the Sphingids and Noctuids being best represented. Some of these are present in sufficient numbers to cause considerable damage in the larval state. Among these are the tobacco worm (*Protoparce sexta* and *P. cingulata*), while the familiar cotton worm (*Alabama argillacea*), corn ear worm (*Laphygma frugiperda*) and the boll worm (*Heliothis obsoleta*), as well as various species of "cutworms" (*Prodenia* spp., etc.), come in for their share of attention from the plantation owners. Perhaps the most common moth on the island is the pretty Arctiid *Utetheisa ornatrix*, which is particularly abundant on the high grassy flats and in open places in palm groves.

The order Diptera is well represented, and some of its more notorious members are fairly common. Both the filaria mosquito (*Culex fatigans*) and the yellow fever mosquito (*Stegomyia fasciata*) are present, the former being the more abundant. Practically all the houses of the white people and the better class of negroes are furnished with mosquito nets over the beds, although neither the doors nor the windows are screened against these or other insects. Numerous cases of the deformity known as elephantiasis or Barbados leg are to be seen among the natives, who sometimes adopt curious methods in an attempt to hide their affliction from the public.

Since there is a goodly number of brightly coloured flowering trees and plants on Barbados one naturally expects to find a large and varied hymenopterous fauna. However, he is somewhat disappointed, for the paucity of flower-visiting forms is very striking. One of the most conspicuous bees is the large bluish-black carpenter bee (*Xylocopa aeneipennis*), which builds its nest in old posts and decayed branches of trees. A still larger and reddish-brown form (*Xylocopa fimbriata*) is also quite common. Both are excellent flyers for such heavy bodied insects. Of course, the honey bee (*Apis mellifera*) is also found in some numbers, although it is not so common as with us. Of the wasps (Vespidæ) the "Jack spaniard" (*Polistes annularis*) is very common and builds its paper nests on the sides of the rocky terraces. The cow bee (*Polistes bellicosus*), is found less commonly but in similar situations. The family Formicidæ is represented by considerably the largest number of species.

Aside from the strictly entomological aspect and from the facts already mentioned, two or three items of particular interest stand out in the writer's mind as worthy of special note. Seldom is it that a tropical country is entirely free from snakes but, so far as is known, none now occur on the island of Barbados and but one small worm-like form (*Typhlops* sp.) has been able to survive the mongoose and other enemies on Antigua. Lizards are, however, extremely abundant on the trees and among the rocks and, of course, form an important natural check to the increase of noxious insects.

As the collector proceeds along his hot and dusty way he suddenly comes upon one of the dazzling white coral roads. Following this for a short distance a large iron hydrant comes into view, and soon refreshing water is to be had. These hydrants, similar in size and shape to the fire hydrants in our cities, are found along the main highways at intervals of from a mile to two miles, and are practically the only means the natives have of obtaining water which is stored in reservoirs far inland and piped to all portions of the island, except the rough Scotland district. Quite a different situation prevails in Antigua, where practically all the drinking water is collected in great catch basins and the natives in the rural districts must carry it to their homes, sometimes a considerable distance away.

(To be continued.)

THE IMMATURE STAGES OF THE GOLDENROD LEAF-BUG,
STRONGYLOCORIS STYGICA SAY (MIRIDÆ, HETEROP).

BY MORTIMER D. LEONARD, ITHACA, N.Y.

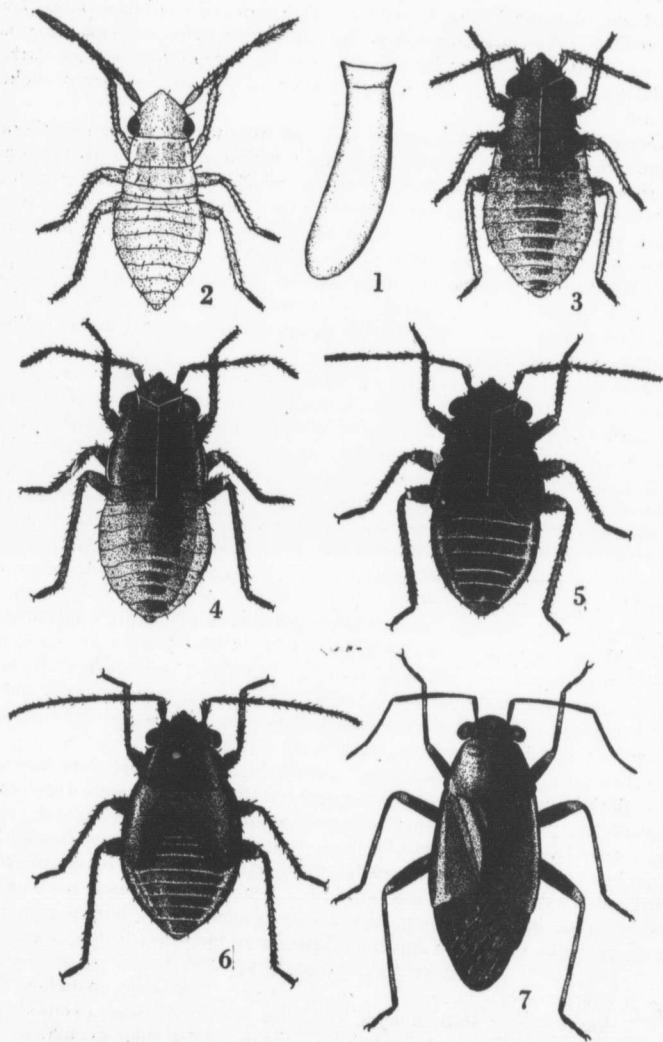
During the latter part of May and the first of June, in the vicinity of Honeoye Falls, N.Y., the nymphs of a black leaf-bug are found in great abundance in patches of goldenrod, where they subsist on the leaves of this plant. Little is known concerning the life-history or the seasonal history of this insect. In 1916 on June 5, nymphs of all stages were found in a large patch of goldenrod. Those of the second stage, however, predominated, and only a few individuals in the fourth and fifth stages were present. Second and third stage nymphs were noticed as early as June 1, feeding on the tender leaves of the terminal shoots. By July 5, fifth stage nymphs predominated.

Following is a description of the several stages which the insect passes through in the course of its development. To Mr. H. H. Knight I am indebted for the determination of the species. The drawings were made from living material by the writer.

Egg (Fig. 1). The eggs of this species have not been found, but they are undoubtedly inserted into the more succulent portions of the goldenrod stems during late June and July, where they remain over winter and hatch the following May. On June 25, 1915, females, apparently swollen with eggs, were common. On opening the abdomen of some of these eggs, which were undoubtedly mature, were found. The description of such an egg is as follows: length 1 mm.; greatest width .27 mm.; pale yellowish or translucent, shining, cylindrical and slightly curved; somewhat compressed, and with a prominent cap which is narrowly elliptical when viewed from the top.

Stage I (Fig. 2). Length .93-.97 mm.; width of head including eyes .33 mm. General colour yellowish; head and thorax slightly tinged with orange or pale brownish; each of the thoracic segments with a pair of darker spots. These spots are usually faint, but vary somewhat in intensity with the individual and as to whether it is newly hatched or nearly ready to molt. Eyes reddish. Antennæ tinged with dusky; tip of first three segments often somewhat paler. Tarsi tinged with dusky. Caudal border of meso- and metathorax slightly curved backward.

Stage II (Fig. 3). Length 1.3 mm., greatest width (across abdomen) .6 mm. Head and prothorax blackish; the hind angles of the mesothorax and



STRONGYLOCORIS STYGICA SAY (MIRIDÆ, HETEROP).

the lateral border of the metathorax yellowish brown; a brownish yellow median line on the thorax meets a V-shaped line of the same colour on the head between the eyes. Abdomen yellowish brown with a series of darker median transverse spots in the centre of each segment, becoming successively smaller toward the caudal end; abdominal spiracles indicated by a series of small dark dots. Eyes dark reddish. Antennæ brownish yellow, tip of first three segments somewhat lighter. Legs concolorous with antennæ; femora, except tip, and tarsi darker. Caudal margin of meso- and metathorax either straight or curved slightly forward.

Stage III (Fig. 4). Length 1.6 mm., greatest width (across mesothorax) .7 mm. Head and thorax shining black; inner margin of eyes narrowly yellowish; a narrow, yellowish median line on thorax, which, as in the preceding stage meets a V-shaped line of the same colour on the head between the eyes. In the darker specimens this is sometimes but faintly indicated on the thorax. Abdomen dark reddish, marked as in preceding stage, except that in the darker specimens the median spots entirely overlie the ground colour. Eyes dark reddish. Antennæ pale brownish; tip of first three segments lighter. Legs dark brownish or dusky; tip of femora lighter; tarsi somewhat darker. Wing-pads becoming apparent.

Stage IV (Fig. 5). Length 1.8 mm., greatest width (across wing-pads) about 1 mm. Head and thorax black, somewhat shining and finely punctate. The narrow median line on thorax and V-shaped line on head in this stage are reddish. Inner border of eyes narrowly reddish. Abdomen very dark reddish brown; posterior border of segments narrowly reddish. Eyes blackish. Antennæ grayish brown; extreme tip of first two segments lighter. Legs concolorous with antennæ; extreme tip of tibiae lighter; tarsi darker; coxæ and trochanters pale translucent yellowish. Wing-pads reach nearly to fourth abdominal segment. Venter reddish brown. Beak brownish yellow; tip and base blackish.

Stage V (Fig. 6). Length 3.1 mm., greatest width (across wing-pads) 1.8 mm. Much the same as the preceding stage. There is, however, no median line on the thorax or V-shaped line on the head, and the antennæ are somewhat darker than in the preceding stage. The femora, except the tip, and the basal half and tip of the tibiae are dark brownish. The wing-pads now reach nearly to the fifth abdominal segment.

Adult (Fig. 7). Length 5 mm. Shining black; membrane dark brownish. Eyes dark brown. Leg markings somewhat variable but in general femora are blackish, tip brownish yellow; base and usually tip of tibiae blackish; sometimes only base of front tibiae black, and more or less all of middle and hind tibiae black. Tarsi often entirely blackish, or with two basal segments somewhat paler. Beak more or less brownish. Venter shining black, nonpunctate, and in certain lights finely clothed with short golden hairs. With the exception of the genitalia there is no apparent difference in the sexes.

EXPLANATION OF PLATE XIV.

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|-----------------------------|-----------------------------|
| Fig. 1. Egg. | Fig. 4. Third stage nymph. |
| Fig. 2. First stage nymph. | Fig. 5. Fourth stage nymph. |
| Fig. 3. Second stage nymph. | Fig. 6. Fifth stage nymph. |
| | Fig. 7. Adult. |

NOTES ON THYSANOPTERA FROM BRITISH COLUMBIA.

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The following notes are submitted herewith to augment our knowledge of Western Thysanoptera, a group which appears to have been sadly neglected by Canadian entomologists.

Orothrips kelloggii yosemitii Moulton. (Plate XV, Figs. 1-3.)

A single female of this variety was taken on Mt. McLean at Lillooet, B.C., at an altitude of about 6,000 feet, off *Amelanchier*, on July 25, 1917. I have been unable to compare this single female with specimens of *kelloggii* or of its variety *yosemitii*. From the description, however, given by Moulton (1), the shape of the sense areas on antennal segments 3 and 4, together with the relative lengths and colours of the antennal joints, clearly place the specimen from Lillooet as belonging to the variety *yosemitii*. There are, however, certain structural features in the specimen before me which differ from the short description given by Moulton.

Antenna.—The measurements of the antennal segments compare with the description with the exception of segment 4, which compares with segment 3 in length as 74 to 99 μ , instead of as 96 to 99 μ . The constriction in segment 3 is not very apparent, and the base of segment 3 is white or at least lighter in colour than the apical portion of segment 2, which is yellow. Sense areas are present on the apical portions of segments 3, 4, 5 and 6; those on segments 3 and 4 ovoid; those on segments 5 and 6 circular, with a simple transparent sense-cone protruding from each. There also appear to be two ovoid sense areas, beside each other, on segment 3, and the same on segment 4.

Mouth Cone.—Maxillary palpi 7-segmented, the basal joint large and as long as the remaining six segments; labial palpi 4-segmented. (2)*

Colour.—The colour is brown; head and prothorax darker than the remainder of the body, which is shaded with orange.

It may be seen, therefore, that despite the small variations noted, the species from Lillooet belongs to the variety *yosemitii*. Being so, it is interesting, as this record greatly extends the distribution of this insect, which so far has only been recorded from the Yosemite Valley, California.

Æolothrips fasciatus Linn. (Plate XV, fig. 4.)

I find in my collection two male specimens of this species; one taken off *Lithospermum pilosum* from Kelowna, B.C., on May 16, 1917; and the other off the bloom of the cultivated dahlia from Agassiz, B.C., on July 14, 1914. The latter specimen was taken in association with females of the same species and with many adults of *Frankliniella tritici*. In the literature at my disposal I have been unable to find any reference to males of *Æ. fasciatus*. For that reason I submit herewith the following description with the respective measurements of the two specimens before me.

Æ. fasciatus, 2 males (A and B).

Head, length .14 mm. and .14 mm., width .17 mm. and .18 mm.; prothorax, length .15 mm. and .15 mm., width across centre .18 mm. and .20 mm.; meso-

*Moulton (2) gives labial palpi 4-segmented in the key, but on pp. 45-46 gives 5-segmented in the description of the genus and species.

and metathorax length over dorsal plates .26 mm. and .22 mm., width across metathorax .28 mm. and .26 mm.; abdomen, length .84 mm. and .82 mm., width across male appendage on 9th segment .21 mm. and .21 mm.; total length of body 1.39 mm. and 1.33 mm.; antennal length .46 mm. and .37 mm.; length of segments:

	1	2	3	4	5	6-9
A.....	35	52	113	105	87	70
B.....	32	43	78	87	70	61

Colour, uniformly light brown, first few abdominal segments slightly lighter in colour, though blending with remainder of body; male appendage of same colour as the head, intersegmental and body pigment carmine. Antennal joint 1, concolorous with head; 2 brown shading to light brown at tip; 3 light brown at base, brown in upper half with a circle of darker brown at tip; remaining segments 4-9 brown. Legs brown concolorous with head with the exception of upper half of fore-tibiae and fore-tarsi, which are light brown. Fore-wings banded with two brown between three white areas.

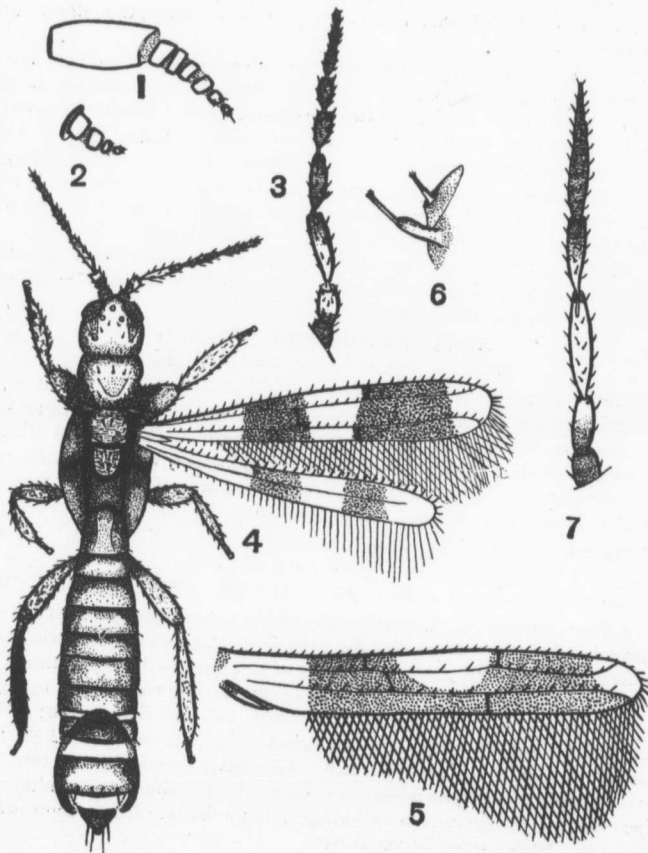
Females have been taken on a variety of plants of which may be mentioned *Elymus condensatus*, clover, *cratægus*, cherry, *Prunus demissa* and *Amelanchier* at various times during May, June and July 1914-1918 at Victoria, Lillooet, Agassiz, Vernon and Kelowna. The distribution of this species in the Province of British Columbia must, therefore, be widespread, inasmuch as it has been taken in localities varying from the humid to the arid. During the summer of 1918 females of this species were observed to be in association with the Onion Thrips (*T. tabaci*, upon which it is doubtless predacious, on onion foliage at Kelowna, B.C. Williams (3) records this species as predacious on the pea thrips (*Kakothrips pisivora* West) in Europe, but also notes that it feeds on pollen and plant juices (4).

Æolothrips annectans Hood (5).

(Plates XV, fig. 5, and Plate XVI, fig. 1.)

This species apparently occurs commonly in British Columbia. It has been taken on several occasions during May, June and July in the past three years at points in the Okanagan Valley, and in the vicinity of Victoria on Vancouver Island. It has been taken also on a variety of plants, among which may be mentioned, *Acer glabrum*, *Ribes viscosissimum*, *Sambucus racemosa*, *Ilex europæus*, apple, alder, *Lithospermum pilosum*, *Amelanchier florida*, and in sweeping through general vegetation. Possibly the most notable record of its presence in numbers was observed in Kelowna, B.C., during early July (1918) in commercial onion plantations, where many specimens were seen associated with and doubtless predacious upon the onion thrips (*T. tabaci*). Mr. J. D. Hood, to whom some British Columbia specimens were submitted, agreed that my "determination was correct, though a remarkable addition to its known distribution," (April, 1918). According to my information this species thus far has only been recorded from Maryland, Virginia and New York State, U. S. A. (6).

Eleven specimens before me clearly agree with the account given by Hood (5). The presence of slight transverse striations across the occiput constitutes



del. 70

the only main difference from the published description. The fore-wings are shaded as described, but in addition have their extreme basal portions, (scale and fore-wing), shaded brown-gray. The measurements of the British Columbia specimens may be briefly given as follows:

Head, length .15 mm., width across occiput .19 mm.; prothorax, length .15 mm., width at centre .22 mm.; total length of body, 1.7 mm.-1.8 mm.; fore-wing, length .94 mm.-1.01 mm.; antennæ, length .40 mm.-.42 mm.; antennal segments, length:

Segment.....	1	2	3	4	5	6-9
Length.....	30	52	105-122	87-96	70	52

In addition, the following notes are added to the description already given by Hood:

Fore-wings.—Cross-veins present; two cross-veins connecting anterior ring vein to first longitudinal vein, one connecting the two longitudinal veins, one and (apparently) sometimes two connecting second longitudinal vein to posterior margin of wing; spines on anterior margin of ring vein 37-41, on first or anterior longitudinal vein 13-16 (arranged 6-8 brown, 2-3 white, 4-6 brown), on second or posterior longitudinal vein 19-21 (arranged 1 white, 18-20 brown); on scale 5-6 on anterior margin and one central. The two wings of the same specimen often vary in the matter of alar spines.

Maxillary palpi.—3-segmented, geniculate, basal joint twice as broad and nearly twice as long as the middle joint, apical small; labial palpi 4-segmented, basal joint as long as the remainder.

***Æolothrips auricestus*, new species.**

(Plate XV, figs. 6, 7, and plate XVI, fig. 2.)

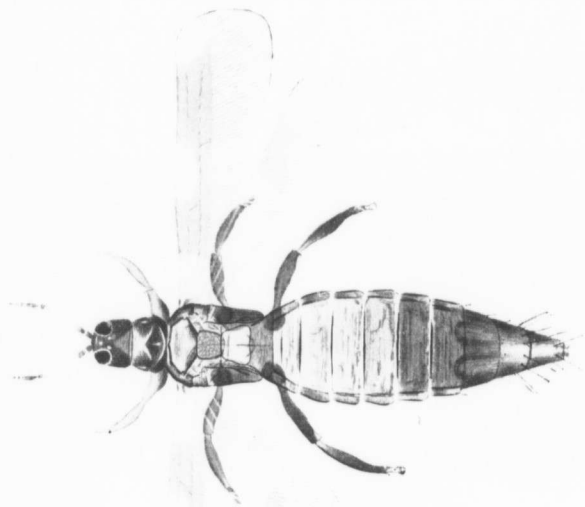
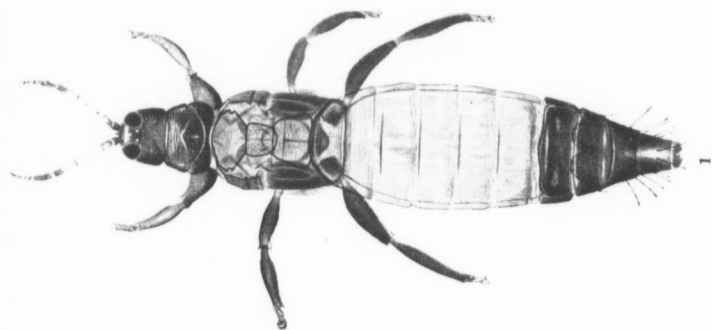
I am indebted to Mr. J. D. Hood, of the United States Biological Survey, for confirming my belief, that this species has not been previously described.

Measurements.—Head, length .18 mm., width across occiput .21 mm.; prothorax, length .18 mm., width .22 mm.; mesothorax, length .24 mm., width .35 mm.; abdomen, length 1.48 mm. Total length of body about 2.08 mm.; antennæ, total length .44 mm.; antennal lengths:

Segment.....	1	2	3	4	5	6-9
Length.....	35	61	113-122	87-91	70	70

Colour.—Brown; head slightly darker brown than other parts of the body; antennal segment 1, brown; 2, brown at base (at times light brown at base) shading to white at tip; 3, creamy-white with a circle of brown at tip; 4, pale-brown at base shading to brown at tip; remaining segments similar to segment 1. Legs brown, fore-legs lighter; fore-tibiæ and tarsi light-brown; abdomen segments 2-6 golden-yellow, last four segments brown, segment 1 light brown shading to yellow on posterior half. Fore-wings banded, with two brown areas between three clear white ones, each area of about equal width. Hind wings banded, similar to the fore-wings, but the bands of brown are pale and indistinct. Scale shaded brown at base.

Head.—Slightly wider than long, about equal in length to the prothorax, slight transverse striations across occiput, covered with numerous small spines;



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1

eyes large, on ventral surface extending rather more than half way the length of the head, coarsely faceted and sparsely pilose; ocelli three, conspicuous, the posterior pair contiguous with the inner margins of the eyes; mouth-cone reaching into the posterior third of the prothorax; maxillary palpi 3-segmented, geniculate, basal joint twice as broad and nearly equal in length to the middle joint, apical small; labial palpi 4-segmented, three apical joints slightly longer than basal joint; antennæ 9-segmented, about two and one-half times as long as the head, all segments clothed with numerous short spines, those on segments 1 and 2 fewer and stouter, spines on all segments about equal in colour to the segments upon which they are placed; sense areas on apical portions of segments 3, 4 and 5, being respectively elongated and inconspicuous, elongated and conspicuous, oval and conspicuous.

Prothorax.—Slightly wider than long, about equal in width and length to the head, emarginate midway on each lateral margin, the dorsal surface clothed with numerous stout spines. *Mesothorax* wider than prothorax, mesoscutum striate-reticulate, with eight prominent spines. *Metathorax* narrower than mesothorax, metascutum reticulate, with four spines on dorsal surface. *Legs*, front femora thickened, slightly lighter in colour to femora of middle and hind legs, all tibiæ armed at apex, those spines on hind tibiæ much the strongest, hind tibiæ with 8-10 stout spines on inner margin, each fore-tarsus armed with a stout hook, which is yellow, and a tooth, which is shaded brown. *Fore-wings* reaching to about the eighth abdominal segment, rounded at tip, cross-veins present, no cross-vein apparent connecting the second longitudinal vein with the posterior ring vein, five to eight minute spines on each brown area on the anterior longitudinal vein, and six to eight on each brown area on the posterior longitudinal vein, right wing often varying from the left wing in the matter of alar spines, all spines equal in colour to the portion of wing upon which they are placed; scale with one central spine and six to eight inconspicuous spines on anterior margin. *Hind wings* with a short spine-like fringe on anterior margin reaching from basal fourth to tip, simple fringe along the posterior margin. *Abdomen* elongate-ovate, conspicuous spines only on the ultimate and penultimate segments.

Described from 9 macropterous females, taken by the author from the Western Wild Rye grass, *Elymus condensatus*, at Vernon and Kelowna, British Columbia, in July, 1917. Brachypterous forms also occur in association with the macropterous forms. Their body characters agree with the above account.

The type and cotype have been placed in the collection of the National Collection of Insects, Department of Agriculture, Ottawa, Canada. Paratypes are also retained in the collection of the author.

Taeniothrips inconsequens Uzel. (The Pear Thrips.) Plate XVII.

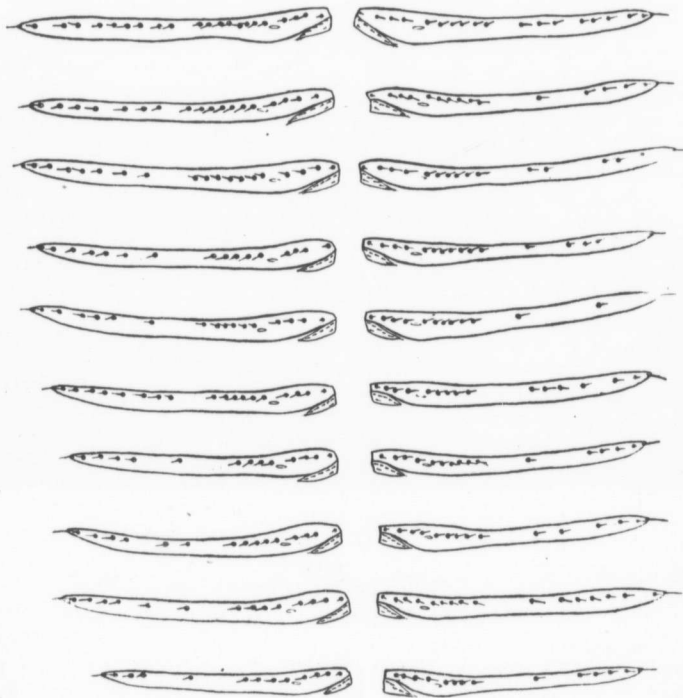
During the course of a two-year's study (1916, 1917) of the pear thrips, *Taeniothrips (pyri) Dan* *inconsequens* Uzel, on the Pacific coast of British Columbia, a number of variable points in the external anatomy became apparent following the close examination of a large number of specimens. Early in the study it was apparent that the spines upon the wing, both as regards numbers and position, represented too variable a character alone to certify its specific identity. This observation led to a close examination of the essential specific

characters of the species, and the results of this study are recorded herewith, supplementing the description already given by Moulton (2).

Head.—Width across the occiput .15 mm., across the eyes .13 mm.; length 3. mm.; slightly wider than long; cheeks arched; occiput transversely striate, bearing eight minute spines immediately posterior to the compound eyes; a pair of very prominent spines between the posterior ocelli, situated within the margins of the pigmented ocellar crescents; a single minute spine, on each side, near the margin of the compound eyes, in a lateral direction from the anterior ocellus; vertex smooth; compound eyes, prominent, oval in outline black with light borders, coarsely faceted and slightly pilose; ocelli approximate yellow, margined inwardly with orange-brown crescents, posterior ones approximate to but not contiguous with the light inner borders of the eyes. Mouth-cone pointed, tipped with black, maxillary palpi three-segmented, each segment about equal in length, the second shortest and the third longest; labial palpi two-segmented, basal segment very short. Antennæ eight-segmented, about two and one-half times the length of head (.32 mm.); spines on all segments pale; a forked sense area on dorsal surface of segment 3, with a similar area on ventral surface of segment 4, with a pair of moderately stout spines immediately beneath each area; whorls of minute inconspicuous hairs on posterior portions of segments 3 to 6. Antennal lengths, segment 1, 33μ to 36μ ; 2, 42μ to 47μ ; 3, 63μ to 64μ ; 4, 54μ to 64μ ; 5, 33μ to 42μ ; 6, 57μ to 66μ ; 7, 9μ to 10μ ; 8, 12μ to 13μ . Total length .30 mm. to .34 mm.

The head characters, thus given, are apparently stable, and represent the typical formation. Three prominent spines of equal and normal length may, however, at times, be found between the posterior ocelli. Variations in the antennæ are frequently met with, but these may be classed as distinct deformities. They often take the form of a reduction in the number of segments from eight to seven or six, either by the fusion of two segments or by the complete elimination of certain segments.

Prothorax, length .13 mm.; breadth .2 to .25 mm.; as long as head, but wider; dorsal surface smooth; sides slightly arched; a weak spine anteriorly-directed on the anterior angles; a pair of large, strong spines on the posterior angles; from twenty-eight to thirty-six spines scattered over the dorsal surface, all small and inconspicuous, except a central moderately stout pair on the posterior margin and a single one, of equal strength, on each side, situated immediately cephalad of the stout pair in the posterior angles. *Mesothorax*, sides evenly convex, angles rounded; scutum (mesonotal plate) striate. *Metathorax*, scutum and scutellum (metanotal plates) faintly striate; four spines along anterior margin of scutum, the inner two the largest. *Legs* moderately long; spines on tip of fore and middle tibiæ weak; hind tibiæ furnished with a row of seven to nine strong, light-brown spines and a pair of stout spines borne at the tip of each tibia; tarsus furnished with one comparatively stout light-brown spine near the base, and a few pale ones. *Wings* present, extending slightly beyond the tip of abdomen, about twelve times as long (1 mm.) as wide; pointed at tips; colour very slightly tinted light-brown; costal vein thickly set with from twenty-three to thirty-three long spines; costal fringe twice as long as costal spines; fore-vein with twelve to twenty-two spines arranged in groups. On the basal half of wing, on the fore-vein, a single small spine, followed by a



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group of three spines, followed by a variable group of not less than four and as many as eight spines; on the distal half of wing the spines of the fore-vein are exceedingly variable, both as regards numbers and disposition; hind-vein with twelve to eighteen regularly placed spines; scale five spines; interior of scale one spine.

It may be shown, also, that it is the exception, not the rule, to find the two wings of the same specimen equal as regards length of wing, or number and disposition of alar spines. Almost invariably the two wings are dissimilar in some respect. Plate XVII represents outline camera lucida sketches of the right and left wings of ten typical specimens. Rather more than half of the wings examined (59 per cent.) showed the basal portion of the fore-vein with spines "arranged in two groups of 3 to 6, respectively," whilst 28 per cent. were arranged in two groups of 3 and 5, 7 per cent. in 3 and 7, 5 per cent. in 3 and 4, and 1 per cent. in 3 and 8. These figures, indicating the differences that are liable to occur plainly, show that the wing characters are of minor value in the quick and ready examination for the determination of the species.

Abdomen sub-ovate; 10-segmented, tapering abruptly toward the tip from the eighth segment. Dorsal surface of segment 2 to 8 with from eight to ten spines on each segment, the most prominent being on the lateral margins; posterior margin of segment 8 with a fine comb-like structure consisting of from thirty-eight to forty-four teeth; segments 9 and 10 with about ten of the longest and most prominent spines of the body. *Total length* from tip of vertex to tip of abdomen about 1.26 mm. *Colour*, head, thorax and abdomen uniformly dark-brown with connective tissue between segments of the abdomen, the tarsi and tibiae shading from light-brown to yellow. Segment 3 of the antennae light brown.

The wings though slightly tinted with light-brown, when resting over the back, appear, to the naked eye, to be grey in comparison to the dark-brown of the abdomen. Many light coloured specimens, especially those forms which have recently emerged from the soil in the spring, may be frequently observed; this colour difference, however, may be preserved throughout the life of the adult.

***Thrips physapus* Linn.**

This species is common in British Columbia, under arid and humid conditions, and may be found throughout the entire season. It has been taken commonly off dandelion at Vernon and near Victoria during early April and May, as well as off *Rubus parviflorus* flowers during June in Vancouver, and recently it has been found in the blooms of partly frozen garden flowers, during December. Carpenter (7) before the Royal Dublin Society in 1900 and again in 1901, draws attention to this species as being destructive to the blossoms of the pear near Dublin, Ireland, causing a failure in the fruit crop. In British Columbia, in localities frequented by *Taeniothrips inconsequens*, *Thrips physapus* also is found to occur, often in similar positions on like plants, frequently associated in the same blossom.

***Thrips tabaci* Lind.**

The adults of this species are known as the "Onion thrips" in British Columbia. The species undoubtedly occurs on a wide range of plants, and is

known to cause considerable commercial loss in onion plantations in the "dry belt" of the Province. First generation larvæ developing from eggs laid by overwintering specimens become first apparent in early June in the Okanagan Valley. This species also occurs on Vancouver Island.

Haplothrips statices Hal.

This species has been beaten from the branches and foliage of cultivated apple and plum trees, *Spiræa discolor*, and other native shrubs at Victoria on Vancouver Island and at Vernon, B.C. It appears to be the commonest species infesting the flower heads of clover, having been observed in great numbers in such plants, both at Vernon and Penticton, B.C. This insect has been recorded from many widely separated points, including, on the west, Oregon and California (8). From Montana (9) we receive information that this species has been proven destruction to the set of red-clover seed. Judging from the numbers that this species occurs in the clover heads, particularly in the "dry belts" of the Province of British Columbia, it is possible that some injury, not as yet proven, may be caused.

Leptothrips mali Fitch.

I am indebted to Mr. J. D. Hood for establishing the correct identity of both a nymph and an adult of this species. With this assistance I am able to offer the following few additional notes on the habits of the species:

A colony of twelve adults was taken clustering in the empty burrow of some solitary burrowing hymenopteran in a dead twig of an Olivet cherry tree at Okanagan Falls, B.C., on April 10, 1918. It was evident that these insects, which were a few inches from the entrance of the burrow, had hibernated in this position. They were observed first on splitting the twig lengthwise.

On August 27, 1917, a group of 5 nymphs and 2 females of this species were taken off the gummy exudation caused by the larva of *Anarsia lineatella* on a peach tree at Penticton, B.C. They were apparently feeding on the exudate. Specimens of individual adults have been taken at various times during May, July and July off the foliage and branches of *Acer glabrum*, alder, amelanchier, apple, peach and crataegus, at points in the Okanagan Valley between Vernon and Vaseaux Lake, Lilloet, and near Victoria on Vancouver Island.

As recorded by Hood (8) this species is widespread in its distribution and common "from early spring to late fall." He states that for the most part this species lives "singly on the leaves of various trees." This agrees entirely with the majority of the records noted above. It is only necessary to add that, apparently, adults cluster for hibernation purposes, and that nymphs may, at times, be found closely assembled at one place.

Chirothrips manicatus Hal.

Males and females of this species occur commonly at the Coast, and in the Interior of British Columbia on many roadside grasses.

I wish in conclusion to thank Mr. J. D. Hood, of the United States Biological Survey, for the assistance he has given me in this group of insects. Furthermore, my thanks are due to Mr. Warburton Young, of the Health of Animals Branch, Dominion Experimental Farm, Agassiz, B.C., for his drawings of *Æ. auricestus* and *Æ. annectans*.

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EXPLANATION OF PLATES.

PLATE XV.

- Fig. 1. *Orothrips kelloggii yosemitii*, maxillary palpi.
- Fig. 2. *Orothrips kelloggii yosemitii*, labial palpi.
- Fig. 3. *Orothrips kelloggii yosemitii*, right antenna.
- Fig. 4. *Ælothrips fasciatus*, male.
- Fig. 5. *Ælothrips annectans*, right wing.
- Fig. 6. *Ælothrips auricestus*, n. sp., maxillary and labial palpi.
- Fig. 7. *Ælothrips auricestus*, n. sp., left antenna.

PLATE XVI.

1. Brachypterous female of *Ælothrips auricestus*, n. sp. (drawn and painted under author's instruction, by Mr. C. W. Young, Agassiz, B.C.).
2. Macropterous female of *Ælothrips annectans* Hood, (drawn and painted under author's instruction, by Mr. C. W. Young, Agassiz, B.C.).

PLATE XVII.

Variations in alar armature of fore-wing of *Tæniothrips inconsequens* (diagrammatic, author's illustration).

APPOINTMENTS—CANADIAN ENTOMOLOGICAL BRANCH.

Mr. Leonard S. McLaine, M.Sc., of the Canadian Entomological Branch, has been transferred from the Dominion Entomological Laboratory, Fredericton, N.B., to Ottawa, and has been appointed Chief of the Division of Plant Inspection and Executive Assistant to the Dominion Entomologist. As Chief of the Division of Plant Inspection, Mr. McLaine will have immediate charge of the work of inspection and fumigating imported nursery stock, and of the field work against the Brown-tail Moth in Eastern Canada, and such other duties as the enforcement of the insects and pests regulations under the Destructive Insect and Pest Act may involve.

Mr. M. B. Dunn, Temporary Assistant at the Dominion Entomological Laboratory at Fredericton, N.B., has been appointed an Entomological Assistant in the Division of Forest Insects of the Entomological Branch, Ottawa, and under the direction of Dr. J. M. Swaine he will be assigned to sample plot investigations in the forests of Quebec and Ontario.

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

BY CHARLES P. ALEXANDER, URBANA, ILL.

As in the other papers of this series, the types of the new species are deposited in the collection of the writer, unless stated otherwise.

GENUS *Dicranoptycha* OSTEN SACKEN.

Dicranoptycha sobrina quadrivittata, new subspecies.

Female.—Length 10 mm.; wing 10.5 mm.

This variety is similar to typical *sobrina*, differing as follows:

Mesonotal præscutum gray, more yellowish on the disk, clearer gray along the margin; four distinct dark brown stripes, the median pair longest, indistinct in front, clearer behind, lying parallel and separated from one another only by a capillary gray line. Tuberculate pits distinct, close together, lying just before the level of the pseudosutural foveæ, separated from one another by a distance a little less than the diameter of one. Pseudosutural foveæ very pale, elongate, linear. Lateral stripes short. Scutal lobes dark brown. Pleura grayish above, paler ventrally. Coxæ whitish. Wings gray; veins dark brown; wings very long and narrow; *Rs* shorter than cell *1st M₂*, almost square at its origin and running close to *Ri*; *Sc* ends just before the fork of the sector. Abdominal tergites uniformly dark brown.

Habitat.—Colorado.

Holotype.—♀, Peaceful Valley, Colorado, August 25, 1917, (T. D. A. Cockerell).

This species was included in some interesting crane-fly material kindly sent me for study by Prof. Cockerell. It is very different in the details given above from the extensive series of typical *sobrina* in my collection. More material will be needed to determine the true status of the fly.

GENUS *Molophilus* CURTIS.

Molophilus squamosus, new species.

Antennæ of the male short; general coloration dark gray; male hypopygium with the dorsal pleural appendage flattened, very broad, the dorsal face roughened; ventral pleural appendage a powerful black arm that is acute at the tip, which is bent ventrad.

Male.—Length 3.2–3.4 mm.; wing 4.7–5 mm.

Rostrum and palpi dark brown. Antennæ of the male short, dark brown throughout. Head gray.

Pronotum dark brown medially, yellowish laterally. Mesonotum gray, the humeral angles paler; scutelum yellowish; postnotum brownish gray. Pleura grayish. Halteres yellow, the knobs a little darker. Legs with the coxæ, trochanters and base of the femora yellowish; remainder of the legs brown. Wings whitish subhyaline; veins dark brown; a very indistinct darker clouding along the cord at *r*, *r-m* and the basal deflection of *Cu*. Venation: deflection of *R₃₊₄* short, subperpendicular, shorter than the basal deflection of *Cu*; fusion of *Cu*₁ and *M*₃ very long, much longer than *Cu*₁ beyond the fork.

Abdomen dark brown, the posterior margins of the tergites yellowish, broader on the terminal segments; hypopygium grayish brown. Male hypopygium with each half of the tergite contiguous or overlapping at the tips. Dorsal pleural appendage lying transversely, the tip directed proximad and dorsad,

very broad and flattened with the dorsal surface minutely roughened into tiny spines or raised scales that are more prominent, subserrate, along the outer margin. Ventral pleural appendage powerful, acute, shiny black, straight basally, suddenly narrowed to the acute tips which are directed ventrad, the concave face weakly toothed.

Habitat.—California.

Holotype.—♂, Alpine, San Diego County, California, April 9, 1915, (M. C. Van Duzee).

Paratopotype.—Sex uncertain.

The type is in the collection of Mr. Van Duzee.

Additional specimens of a closely related form from the Muir woods, Marin County, California (May 19, 1915, M. C. Van Duzee) agree closely with this species in general characters, but are much more reddish in their general colour, the dorsal pleural appendage not so broad, and the ventral pleural appendage with about three or four large spinules before the tip. *Molophilus squamosus* is a small, delicate species, allied to *M. paulus* Bergroth, but readily distinguished by the very broad, dorsal pleural appendages and the differently constructed ventral appendage. From *M. spiculatus* Alex., *M. comatus* (Doane) and other allied forms it is told by its much smaller size and slightly different structure of the male hypopygium.

Molophilus bispinosus, new species.

Antennæ of the male short; general coloration light brown; male hypopygium with the lobes of the ninth tergite produced apically into straight, slender arms; dorsal pleural appendage elongate, very straight and slender, acute at the tip; ventral pleural appendage powerful, sickle-shaped, the concave face with strong spinules.

Male.—Length about 4 mm.; wing 5.5 mm.

Rostrum and palpi brown. Antennæ of the male short, the scape brownish yellow, the flagellar segments dark brown, clothed with a long pale pubescence. Head with the front yellow, vertex and occiput gray.

Pronotum pale. Mesonotum light brown, the tuberculate pits black, widely separated. Pleura grayish brown. Halteres pale. Legs brownish yellow, the tips of the tarsi darkened. Wings subhyaline; a faint blotch of dark hairs on the radial cross-vein and another on the radial-median vein; a faint cloud at the basal deflection of *Cu*₁; veins dark brown, subcosta yellow. Venation: basal deflection of *R*₄₊₅ and *r-m* in alignment; fusion of *Cu*₁ and *Me* a little shorter than *Cu*₁ beyond the fork.

Abdomen dark brown, the hypopygium reddish yellow. Male hypopygium with the tergite profoundly split medially as in the genus, the halves thus formed with the tips rather narrow, directed proximad so as to be almost contiguous on the median line; each lobe on the sides at the apex produced caudad into a slender, flattened, straight, fleshy lobe whose inner margin is fimbriate. Dorsal pleural appendage slender, elongate, almost straight beyond the enlarged base, the tips acute. Ventral pleural appendage powerful, strongly curved, the subacute apex directed ventrad, the ventral or concave face with several equidistant large and acute spinules.

Habitat.—California.

Holotype.—♂, Berkeley, California, May 25, 1915, (M. C. Van Duzee).

GENUS *Gnophomyia* OSTEN SACKEN.***Gnophomyia tristissima cockerelli***, new subspecies.

Female.—Length about 8.5 mm.; wing 7.2 mm.

Similar to typical *tristissima*, differing as follows: Antennæ a little longer. Legs somewhat stouter. Wings hyaline, with a few dark seams along the veins, these seams on *Rs*, *R₄₊₅*, *M*, *Cu*, *M₃* and *second A*; cell *Sc* dark. Venation: *Sc* ending beyond the fork of *Rs*; *Sc₁* long, about equal to *R₂₊₃*.

Habitat.—Colorado.

Holotype.—♀, Campus of the University of Colorado, Boulder, Colorado, September 20, 1917, (Felicita Claer).

The distinctly bicolorous, longitudinally streaked, wings is the most conspicuous character to separate this fly from typical *tristissima* O. S. of the eastern United States, in which the wings are uniformly darkened. The type was kindly sent me by Prof. Cockerell, to whom the form is respectfully dedicated. In the collection of the United States National Museum there are a few specimens of this variety, likewise from Colorado (from the collection of C. V. Riley, taken by Morrison).

GENUS *Gonomyia* MEIGEN.***Gonomyia (Gonomyia) aciculifera***, new species.

Belongs to the *noveboracensis* group; similar to *noveboracensis* Alex. but larger; wings with *Sc* shorter and with *Sc₂* at the tip of *Sc₁*; *R₂* not so close to *R₁* at the wing margin; male hypopygium with the ventral pleural appendage expanded at the apex into a paddle-like blade whose lower margin is minutely toothed.

Male.—Length 5 mm.; wing 5.4 mm.

Described from an alcoholic specimen.

Rostrum and palpi entirely dark brown. Antennæ dark brown throughout, the basal segments enlarged. Head dark.

Mesonotum dark, the humeral angles a little brighter. Pleura brownish, brighter posteriorly. Halteres elongated, pale, the knobs dark. Legs with the coxæ dark, the trochanters a little paler; remainder of the legs broken. Wings pale grayish yellow; stigma indistinct; veins light brown. Venation: *Sc* rather short, ending far before the origin of the sector, the distance between the two only a little less than the length of the basal deflection of *Cu₁*; *Sc₂* very close to the tip of *Sc₁* and about subequal to it; *Rs* strongly arcuated; *R₂₊₃* very long as in this group of species, almost straight beyond the origin; *R₂* semiperpendicular, short, the distance on the wing margin between the tips of veins *R₁* and *R₂* is a little greater than *R₂* alone; cell *R₂* a little larger than in *noveboracensis*; *R₄₊₅* straight, not approaching *M₁₊₂* at the wing margin; basal deflection of *Cu₁* at the fork of *M*.

Abdomen dark, the posterior margins of the tergites paler. The colours produced by pruinosity in dried specimens are undoubtedly somewhat different from those of the alcoholic type just described. Male hypopygium similar to that of *noveboracensis* (as figured in the Proceedings of The Academy of Natural Sciences of Philadelphia for 1916, Pl. 30, Figs. 79 and 80), but differing in many important respects; the flattened dorsal pleural appendages have but few setæ along the truncated or concave apex; the long, slender, ventral arm is expanded into a paddle at the tip, this with the lower margin minutely

denticulate, the teeth coarser proximally but very minute and delicate on the distal two-thirds of the blade. The tubercle at the dorsal inner edge of the pleurite bears three very long bristles that are but little shorter than the dorsal pleural appendage. The gonapophyses and penis-guard are fused into a sub-cylindrical tube that is armed caudally with several needle-like points. The arrangement of these chitinized horns is about as in *noveboracensis*, but their shape and structure is very different; appendage *b* is almost straight and has the two arms of the bifid tip very unequal, the shorter one appearing as a small spine at about mid-length of the appendage; appendage *c* appears forked at its very base, the one arm very stout basally, near the apex narrowed and strongly curved; the other fork is shorter, gradually pointed and flattened to the tip, the margin with a thin line of hairs. Below (ventrad of) the tube on either side is a very large, flattened, nearly hyaline plate that is almost invisible in balsam.

Habitat.—California.

Holotype.—♂, Wildcat Cañon, San Pablo, California, September 16, 1906, (J. Chester Bradley).

The type is in the collection of Cornell University.

The only described Nearctic species that is close to *G. aciculifera* is *G. noveboracensis* Alex. (Can. Ent., Vol. 48, pp. 319, 320; 1916) of the northeastern United States. The wing venation and the structure of the male hypopygium will easily separate the two forms. In this group of species, the male hypopygium is very complicated in structure, and I am unable to correlate the remarkable structures that surround the penis-guard, with the gonapophyses found in other groups of the genus. Very few specimens of these two species have yet been discovered, and more material is needed to finally decide these homologies.

GENUS *Tricyphona* ZETTERSTEDT.

Tricyphona petiolata, new species.

Size very small; antennae dark brown, with fifteen evident segments, those toward the tip small and nearly globular; general coloration light buff, the mesonotum with a single conspicuous median dark brown stripe; wings nearly hyaline; cell R_3 petiolate; R_2 perpendicular, at the very tip of R_1 ; cell M_1 lacking; cell $1st\ M_2$ open by the atrophy of m ; abdomen brown, the hypopygium conspicuously light yellow.

Male.—Length about 5.5 mm.; wing 6 mm.

Rostrum and palpi dark brownish black, the former very short. Antennae dark brownish black, with fifteen evident segments, short, the first segment elongate, the second enlarged, globular, the first flagellar segment elongate oval; those toward the end of the organ smaller and subglobular; the last segment is elongated and constricted medially as though formed by the close approximation of two small segments. Head brownish gray.

Pronotum buffy, broadly dark brown medially. Mesonotum light buffy yellow, the præscutum with a single broad, dark brown median stripe that is narrowed at the tip and becomes obliterated before the suture; lateral præscutal stripes lacking. Pleura buffy yellow. Halteres pale basally, the knobs dark-brown. Legs with the coxæ buff; trochanters light yellow; femora brown, paler basally; tibiae and tarsi dark brown. Wings nearly hyaline, narrow; stigma lacking; veins yellowish brown. Venation: *Sc* long, ending slightly

beyond the fork of R_{2+3+4} ; R_5 short, oblique, almost straight; R_{2+3+4} variable in length, in one wing shorter than the basal deflection of Cu_1 , in the other a little longer; R_2 (the apparent r cross-vein; see Alexander; *A New Interpretation of the Wing-venation of the Pediciine Crane-flies*, Ent. News, Vol. 29, pp. 201-205, pl. 12; 1918) inserted at the extreme tip of R_1 , perpendicular; cell M_1 lacking; cell 1st M_2 open by the atrophy of m ; petiole of cell M_3 nearly equal to the basal deflection of Cu_1 .

Abdomen dark grayish brown, the subterminal segments a little darker; hypopygium conspicuously light yellow.

Habitat.—Colorado.

Holotype.—♂, Peaceful Valley, Colorado, August 25, 1918, (T. D. A. Cockerell).

This interesting little fly is to all appearances a *Rhaphidolabis* of the subgenus *Plectromyia*, but the number of antennal segments precludes it from that group, and until more material is available I prefer to consider it a *Tricyphona* to where it will run by the keys. There are only fifteen distinct antennal segments, but the terminal one is evidently formed by the close approximation of two very small segments. The fly somewhat resembles a very small specimen of *Rhaphidolabis major* Alex., but the size and venation, especially the position of R_2 and the lack of cell M_1 , easily separate the two.

GENUS *Liogma* OSTEN SACKEN.

Liogma nodicornis flaveola, new subspecies.

Male.—Length 12 mm.; wing 8.3 mm.

Female.—Length 11 mm.; wing 9 mm.

This variety is similar to typical *nodicornis*, but is much more yellowish throughout. Compared with specimens of typical *nodicornis*, the following differences are apparent:

Antennæ light brown. Mesonotal præscutum with the ground colour yellowish brown with the three brown stripes rather narrow and scarcely confluent; scutal lobes only indistinctly darker; mesonotal postnotum yellowish with only the terminal third blackish. Pleura mostly yellow, a small, circular, dull black area on the mesepisternum behind the fore coxa. The extensive shiny black areas on the mesosternum before the middle coxa are not continuous across the midventral line. Abdomen pale brown.

Habitat.—Virginia.

Holotype.—♂, Great Falls, Virginia, May 19, 1915.

Allotopotype.—♀, June 7, 1915.

The northern *L. nodicornis nodicornis* (O. S.) is easily told from the pale yellowish southern race above diagnosed by its much more extensive black thoracic pattern. In the type-material of typical *nodicornis*, both varieties are represented. As typical of *nodicornis* in the strict sense the writer selects the lectotype from the material taken in the White Mts., New Hampshire.

GENUS *Tipula* LINNÆUS.

Tipula doaneiana, new name.

Tipula californica Doane (1912), non *Tipula californica* (Doane) (1908).

In 1908, Doane described under the name *Pachyrhina californica*, a species of crane-fly that both Dr. Dietz and the writer now refer to the pachyrhinoid series of the genus *Tipula*. Dietz (1918), under the misconception that it was

the 1908 name that was preoccupied, renamed this species *Tipula xanthomela*. The 1912 species is here renamed as above in honour of Prof. R. W. Doane.

Tipula ludoviciana, new species.

Belongs to the *tricolor* group; closely related to *T. sayi* Alex. (*costalis* Say); male antennæ very long, bicolorous; wings with a dark costal margin, beneath which is a vitreous streak; a narrow, brown seam along vein *Cu*.

Male.—Length about 13.5–14 mm.; wing 11.5–11.8 mm.; antennæ about 13–13.5 mm. Hing leg, femur 9.3 mm.; tibia, 11 mm.

Female.—Length about 12 mm.; wing 11.4 mm.

Male.—Frontal prolongation of the head moderately elongated, light brown, the nasus slender. Mouth-parts and palpi dark brown. Antennæ exceedingly elongate, approximately as long as the entire body, the scape light brown, the flagellar segments with the basal swelling dark brown, the pedicel light yellow, on the terminal segments more infuscated; the pedicel of the intermediate flagellar segments is six times as long as the basal enlargements; in addition to the usual black verticils, the segments are provided with a delicate pale pubescence that is easily removed. Vertical tubercle prominent, entire. Head dark with an indistinct darker median line.

Mesonotum brown, probably more or less gray pruinose in dry material, the prescutum with three very broad, dark brown stripes; postnotum pale, margined with brown. Pleura pale, probably more or less pruinose in life, with indistinct dark markings on the mesopleura, and dark brownish black on the mesosternum between the middle and hind coxæ. Halteres slender, brown. Legs with the coxæ largely pale; trochanters yellowish, dark brown apically; femora and tibiae brown, darkest apically; tarsus brown. Wings gray, the costal region dark brown, this including cells *C*, *Sc*, *1st R*₁, *2nd R*₁, the anterior portion of *R*, and the outer end of *R*₂; a broad brown seam along vein *Cu* occupying the space between that vein and the weak degenerate anal vein immediately behind it; a vitreous longitudinal stripe behind the brown costal margin, this including the posterior portion of cell *R*, the anterior portion of *M*, and the base of cells *R*₃ and *R*₅; veins dark brown. Venation: *m-cu* short but distinct; petiole of cell *M*₁ about as long as cell *1st M*₂.

Abdominal tergites light brown, the transverse impressed areas on either side near the base of the segments very distinct, black; sternites paler. Male hypopygium small, compressed, as in the *tricolor* group, with the sclerites fused into a continuous ring. Ninth tergite with the median lobe very depressed, broad, the posterior margin with a very flattened, V-shaped notch which is black and roughened; no pencil of hairs on the sides of the median lobe. Outer pleural appendage oval, flattened, pale, with sparse black hairs; inner pleural appendage simple in structure. Ninth sternite carinate. Eighth sternite unarmed.

Female.—Similar to the male; antennæ short, much darker coloured than in the male; ovipositor with the tergal valves long, slender, straight; sternal valves short, very compressed, the tips subacute.

Habitat.—Louisiana.

Holotype.—♂, Morgan City, Louisiana, June 18, 1917, (Cornell University Expedition, Lot 542, sub. 16).

Allotopotype.—♀.

Paratopotypes.—2 ♂'s.

The type is in the collection of Cornell University.

Tipula ludoviciana is allied to, and superficially resembles, *T. sayi* Alex. (*costalis* Say) which has the antennæ of the male short, about reaching the base of the abdomen; no dark seam along the vein *Cu*; the petiole of cell *M*₁ much shorter, and the colorational and hypopygial details different.

This new species of *Tipula* has the male antennæ of a length that is quite unique among the known nearctic species of the genus, but which is equalled or exceeded in certain exotic forms.

***Tipula plutonis*, new species.**

Similar to *T. coracina* Alex. of northern Alaska; general coloration gray, the præscutal stripes darker; wings almost clear; abdomen dark gray with the lateral margins of the tergites broadly yellowish; male hypopygium very simple in structure, the ninth tergite broadly transverse, the posterior margin almost straight across with a tiny V-shaped median notch; outer pleural appendage very large and tumid, working transversely across the genital chamber; ninth sternite with a deep, V-shaped notch.

Male.—Length 10.5 mm.; wing 11.5 mm.

Frontal prolongation of the head dark brown, the nasus distinct; mouthparts dark brown. Antennæ short, the basal segments paler brown, the flagellum dark brown throughout; segments of the flagellum short-cylindrical with the terminal swelling about equal to the basal enlargement, the segments but feebly constricted at midlength. Head light gray, more obscure posteriorly.

Mesonotal præscutum dark gray with four indistinct dark brown stripes, the median pair very indistinctly divided by a capillary line. Remainder of the mesonotum dark gray, the scutal lobes indistinctly marked with brownish. Pleura gray, the dorso-pleurai membranes more yellowish. Halteres yellowish brown, the knobs dark brown. Legs with the coxæ dark gray, tipped with paler; trochanters yellowish, tipped with blackish; remainder of the legs broken. Wings subhyaline or very pale grayish; stigma distinct, brown; a distinct obliterative streak extending from before the stigma through cell 1st *M*₂; veins dark brown. Venation: *Rs* almost straight; cell *M*₁ very deep, the petiole short, about equal to a or a little less than *r-m*; cell 1st *M*₂ pentagonal; *m-cu* obliterated by the punctiform contact of *Cu* on *M*₃₊₄.

Abdomen dark gray, the lateral margins of the tergites broadly yellowish, the posterior margins of the tergites and sternites very narrowly and indistinctly ringed with silvery. Male hypopygium of very simple structure. Ninth tergite flattened, broadly transverse, almost rectangular, the posterior margin almost straight across and with a minute median V-shaped notch. Ninth pleurite very extensive, the suture indicated by a distinct curved line beneath, the proximal ventral angle narrowed and tufted with a few long, silky hairs. Outer pleural appendage very large and tumid, the ventral face blackened, the surface of the appendage covered with a few short appressed hairs; inner pleural appendage represented by a small flattened, subcircular lobe. The pleural appendages work across the genital chamber after the fashion of the *Limnobiini*, not against the ninth tergite as in most species of the genus. Ninth sternite profoundly notched by a narrow, V-shaped incision. Eighth sternite

unarmed. Eighth tergite, except at the ends, concealed beneath the seventh tergite.

Habitat.—California.

Holotype.—♂, Alta Meadow, Sequoia National Park, California, altitude 9,000 feet, July 19, 1907, (J. Chester Bradley).

The type is in the collection of Cornell University.

This primitive little *Tipula* bears a certain resemblance to *T. coracina* Alex. of Alaska, and the two probably belong to the same group of the genus. The type of *T. plutonis* was sent to Prof. Doane for comparison with his types; he notes the general resemblance of the species to *T. spernax* O. S., to which, however, the species is at most distantly related. The fused hypopygium of *T. spernax* with a broad, median tergal lobe will easily separate the species from any other similar member of the genus.

Tipula shasta, new species.

Belongs to the *angustipennis* group, close to *T. angustipennis* Lw., but with the thorax darker coloured, the wings of a very decided reddish yellow tinge, the abdomen without a black dorso-median stripe, and the details of the male hypopygium different.

Male.—Length 20–21 mm.; wing 17–18 mm.

Frontal prolongation of the head black, moderately elongated, the nasus distinct; mouth-parts black. Antennæ with the first segment black; the second segment and basal two-thirds of the first flagellar segment pale brown to almost black; remainder of the antennæ black; flagellar segments with the basal swelling moderate in size. Head broad, genæ swollen, eyes small. Head dark brown with a very narrow, pale, whitish yellow line surrounding the eyes.

Mesonotal præscutum buffy, more dusky anteriorly, clearer near the suture; præscutum with four very distinct, dark brown stripes, the median pair long, slightly narrowed behind, separated from one another by a more or less distinct capillary line; the lateral stripes, and, less distinctly, the median stripes, are surrounded by a narrow, intensely black border; scutum buffy, the lobes dark brown, surrounded by narrow, black margins; scutellum with three blackish lines; postnotum dark. Pleura dark brown, indistinctly blotched with still darker markings. Halteres orange, the knobs and terminal portions of the stem dark brown. Legs with the coxæ grayish brown; trochanters brown, femora reddish with the tips narrowly dark brown; tibiae pale reddish, the tips narrowly and indistinctly darkened; tarsi with the basal segments dull reddish, gradually passing into a dark brown. Wings with a strong, saturated, reddish yellow tinge, clearer, more yellow, on the costal region, especially cell *Sc*, more brownish on the posterior portion and the wing-apex in cells *R*₂ and *R*₃; stigma large, dark brown; a small hyaline obliterative area before and beyond the stigma; an indistinct hyaline line across the base of cell *1st M*₂; a large pale blotch toward the end of cell *M*, as usual in this group of species; the only nearctic species of *Tipula* known to the writer with wings of this colour is *T. ultima* Alex. (*flavicans* Fabr.) of the eastern United States. Venation: cell *M*₁ short-petiolate, the petiole a little longer than *r-m*; *m-cu* distinct or punctiform.

Abdomen with the first segment blackish; remainder of the abdomen bright reddish, the lateral margins of the tergites more obscure; third abdominal tergite usually a little darker in colour than the other segments. Male hypopy-

gium very similar to that of *T. angustipennis*, but more enlarged and compressed. Ninth tergite large, gradually narrowed posteriorly, the caudal margin with a very broad and deep V-shaped notch, the apices of the adjacent lobes bluntly rounded, and each tipped with a small, chitinized tubercle. Ninth pleurite complete, large, the posterior angle produced caudad into a broad, flattened, obtuse chitinized lobe; proximal ventral angles of the pleurite each with a very prominent yellowish fleshy lobe that juts caudad, the apex bifid by a broad notch; outer pleural appendage small, cylindrical to subclavate, with numerous long, pale hairs; inner pleural appendage a large, compressed blade whose apex juts into the notch of the tergite. Ninth sternite with the adjacent margins contiguous, from the opening a long, slender, chitinized rod and a few long, coarse, yellow hairs protrude. Eighth sternite unarmed, somewhat projecting behind. Eighth tergite entirely concealed beneath the seventh tergite.

Habitat.—California.

Holotype.—♂, Foothills of Mount Shasta, California, May 17, 1914.

Paratopotypes.—Males with the type, May 16, 17; *paratypes* two ♂'s, Yosemite Valley, California, May 22, 1908, (E. T. Cresson, Jr.).

The type is in the collection of Dr. Dietz; paratypes in the collection of the writer and the American Entomological Society.

This beautiful, yellow-winged *Tipula* is related to *T. angustipennis* Lw. of northern North America, but is abundantly distinct. The type material was very kindly sent me by Dr. Dietz with the indication that it probably represented a new species. The writer could not reconcile the fly with any of the descriptions, and sent the material to Prof. Doane for his opinion and comparison with his extensive series of Western *Tipulas*. He also believes the species to be close to *T. angustipennis*, which is certainly the case, but the two species show numerous constant differences. Prof. Doane writes that he has a female of this species from the Yosemite Valley.

NOTES ON PELENOMUS SULCICOLLIS FÄHRIS. (CURCULIONIDÆ).

BY ROBERT MATHESON, ITHACA, N.Y.

During the past three seasons a small patch of some five or six square yards of fringed loosestrife (*Steironema ciliatum* (L.) Raf.) growing on the bank of a small stream which passes near my house has been badly destroyed by some foliage feeding insect. My attention was attracted to it this season as nearly every plant, and it was almost a pure stand of this species, was practically destroyed, the leaves having been completely riddled, and many of the stalks badly eaten. Previous examinations had shown that a small coleopterous larva was doing the work, but I had not noted them in any considerable numbers. Late in July (1918) I found numerous small silken cocoons scattered over the under side of the leaves of the loosestrife, and on later examination I found many small snout beetles feeding on the plants.

As the beetle seemed to be a species about which very little was known, I reared a few of the larvæ and made a close examination for the place of egg deposition. My efforts were rewarded and, though rather late in the season, I found all stages of the beetle. The beetle was kindly identified by Mr. C. W.

Leng as *Pelenomus sulcicollis* Fährs. (Curculionidæ), and as nothing has ever been published on the biology of this genus I think these few notes may be of interest.

The beetles were very abundant during August and early September, oftentimes five or six beetles being present on a single leaf. They feed largely on the leaf tissue, skeletonizing it; though this year, on account of the almost complete destruction of the leaves by the larvæ, the beetles were forced to feed on the stems and mid-ribs of the leaves. These they cut into with their mandibles, and then eat the softer parts within. During the latter part of September the beetles became fewer and fewer in numbers, and there is no doubt that they hibernate somewhere amongst the fallen leaves and rubbish.

After some search I found where the eggs are laid. Just beneath the lower epidermis of the leaves near the veins I found a few empty egg-shells. (Plate XVIII, Fig. 3). The eggs are laid singly and, as a result of the oviposition, the area in which the egg is laid dies and becomes brown. This dead area shows only on the lower surface, evidently the parenchyma not being sufficiently damaged.

The larvæ feed on the lower surface of the leaves almost entirely. They destroy the lower epidermis and parenchyma, leaving the upper epidermis intact. This soon dies, and large open spaces are left, giving the appearance shown in Plate XVIII, Figs. 1 and 2. As the larvæ do not possess legs they evidently move by the action of the large flat surfaces on the ventral side of each segment. These can evidently be moved slightly by muscular action, though I have never seen the larvæ actually crawl.

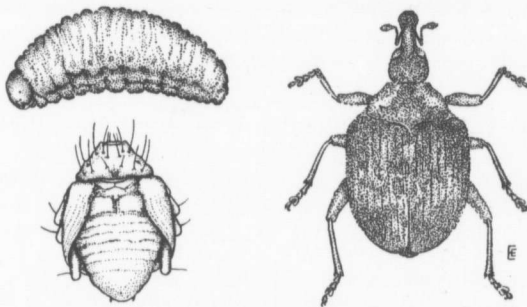
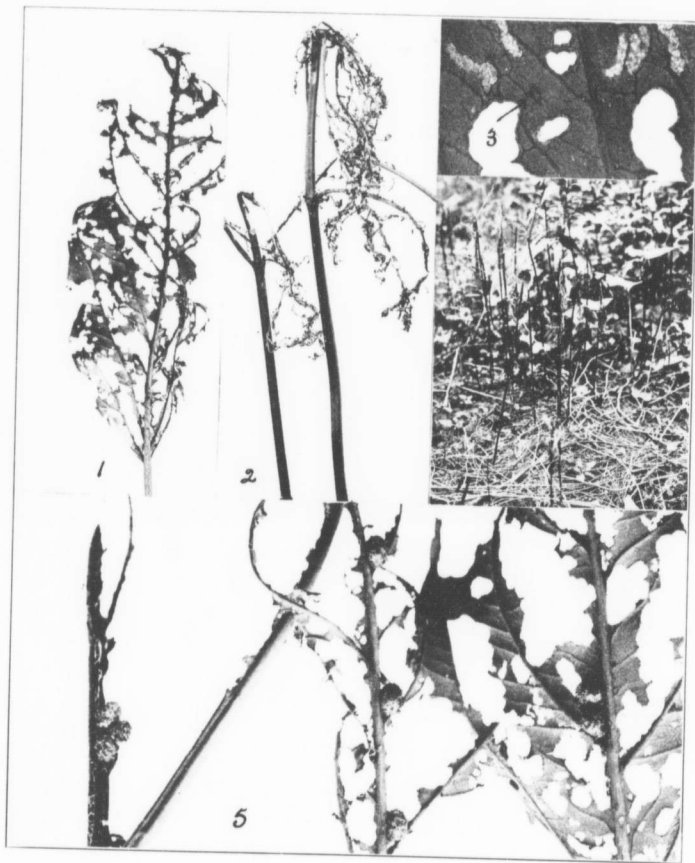


Fig 23.—*Pelenomus sulcicollis* Fährs.; mature larva, pupa and adult.

When mature the larvæ spin small silken cocoons on the under surface or axil of the leaf, and in the destroyed ends of the stem. These pupal cases are rather beautiful, especially when a number of them are formed close together. (Plate XVIII, Fig. 5.) In these silken cells the larvæ transform to pupæ within a few days, and the adults emerge in about two weeks. After emergence the beetles feed quite extensively before going into hibernation. So far as my observations go there is undoubtedly only a single generation a season.



Pelenomus sulcicollis Fährs.—1. Destruction of foliage. 2. Destruction of plant.
 3. Eggs in leaf tissue. 4. View of destroyed plants.
 5. Pupal cases on stem and leaves.

DESCRIPTION OF STAGES.

The egg.—The egg was not observed though egg-shells were found in the place of oviposition.

The larva.—The mature larva is dirty white to almost pure white in colour. The head is rather strongly chitinized, and the prothorax possesses a narrow, chitinized area on the dorsal surface. The rest of the larva is soft and possesses no defensive structures, even setæ of all kinds being absent. The head is small, rounded, almost spherical in shape, and about one-half as wide as the thorax. Two black ocelli are present on each side of the head just above the mandibles. The body of the mature larva is strongly curved dorsally, much wrinkled by transverse depressions, and tapers slightly in both directions. The ventral surface is flattened. Legs are absent. The larva measures 4 mm. in length.

The pupa.—The pupa is broad, short and somewhat flattened. It is at first pure white, later darkening, and before transforming assumes the dark colours of the beetles. The wing-pads lie curved under the body, passing between the second and third pair of legs. The prothorax is strongly tuberculate, and from the tubercles arise long, chitinized setæ, about 14 in all. Similar setæ arise from the distal lateral ends of the femora, the head and beak. These long setæ prevent the soft body of the pupa from coming in contact with the pupal cell. The pupa measures 2.5 mm. in length by 2 mm. in extreme breadth.

The beetle.—The beetle is a rather pretty snout beetle, and is described by Blatchley and Leng in their "Rhyncophora of North-eastern America" as follows:—"Broadly oval. Dark piceous, clothed with brown scales having a brassy tinge and variegated with pale ones, the latter condensed on the sides and on basal half of dorsal channel of thorax, and forming on the elytra a small post-scutellar and numerous smaller subquadrate spots; antennæ and legs reddish-brown. Beak scarcely longer than head, widened toward apex, densely and finely punctate. Thorax nearly twice as wide at base as long, dorsal channel entire, widening into a fovea in front; lateral tubercles acute, disc finely and closely punctured. Elytra one-fourth wider at base than thorax, sides broadly rounded, striæ punctured; intervals feebly convex, the alternate ones slightly more so. Length 2.3-2.5 mm."

THE SYNONYMY OF *HELICE* CHAMBERS AND
THEISOA CHAMBERS. (MICROLEPIDOPTERA).

BY ANNETTE F. BRAUN, CINCINNATI, O.

The description of the venation of *Theisoa* by Chambers in his characterization of that genus, and his figure in the Journal of the Cincinnati Society of Natural History were both made from male specimens, as an examination of material of both sexes shows. Singularly enough, subsequent studies on this genus have also been confined to males, as must be concluded from the published notes by Mr. Busck (cf. Proc. Ent. Soc. Wash., XI, 94, 1909), where, in establishing the synonymy of *Cacelice* and *Theisoa*, he refers to the figure of the "characteristic venation" of this genus, as shown in *Cacelice permolestella* Busck. Observations made by the writer on *Theisoa constrictella*, *T. permolestella* and *Helice pallidochrella*, and presented below reopen the interesting question of

the relationship of *Theisoa* and *Helice*. For earlier references to these genera see Dyar's List, Nos. 5592, 6130, 6182.

In *Theisoa constrictella*, males (Fig. 24-a) in the fore wing, veins 7 and 9 are out of 6, with 8 absent; here the transverse vein is much nearer to 10 than to 9. In the female (Fig. 24-b) 8 is present, and 9 separates from the stalk of 6, 7, 8 and 9 sooner than in the male, thus showing a less specialized condition. In the hind wing of the male (Fig. 24-c) the vein apparently forming the upper margin of the cell reaches the margin of the wing just below the apex; if followed toward base, it is seen to curve downward, being more or less distinctly connected with lower margin of cell near the middle of the wing by a very short discal vein, from thence to base it is obsolescent. In one specimen, the hind wing on one side (Fig. 24-d) shows an additional vein lying costalward of this; it is indistinct from base to middle, where it makes a scarcely noticeable bend toward the discal vein, and reaches the costa at about two-thirds the wing length. I consider this vein 7 and its presence in this instance an atavistic character. In the hind wing of the female (Fig. 24-e) the upper margin of the cell extends almost straight from base, reaching the *costa* almost at apex; it is rather indistinct in its basal half. Its course in the basal half is exactly that of the "additional vein" in one male wing, above mentioned; in its apical half its course is such as to lead to the inference that it is formed by the coalescence of the vein, which normally in the male forms the upper margin of the cell with the "additional vein." There is no indication of a discal vein in the female. From these observations I conclude that the venation of the hind wing in this species was derived from a type in which both veins, 6 and 7, were present and separate; in the process of evolution, the male and female show a divergence, in direction of development to the extent that in the male vein 7 has disappeared completely by obsolescence leaving vein 6 to form the upper margin of the cell, while in the female, 6 has coalesced completely with 7, the only evidence of the process remaining being the costal ending of the apical vein as contrasted with its terminal ending in the male.

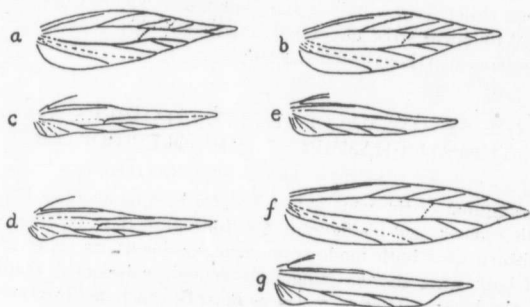


Fig. 24.

In order to determine whether the same difference in venation exists between the sexes of *Theisoa permolestella*, an examination of a series of specimens was made; this examination revealed that all the specimens of *T. permolestella*

are males. The venation agrees with the usual venation of the male *T. constrictella*. No indication of vein 7 was found in the hind wing; vein 6 reaches the margin considerably below the apex.

Helice pallidochrella is found to be represented by females only. The venation agrees with that of the female *Theisoa constrictella*; with slight differences indicating a more generalized condition, viz., in the forewing (Fig. 24-f) 9 is separate from the stalk of 6, 7 and 8; in the hind wing (Fig. 24-g) 6+7 is distinct to the base, but its course is exactly that of this vein in *T. constrictella* female.

My conclusion is that *Theisoa permolestella* is the male of *Helice pallidochrella*. In the genus *Helice* we have an extremely specialized Gelechiid genus, of which the female of one species, in venation the least specialized, has alone retained the characteristic Gelechiid shape of the hind wing. Another factor which argues against the retention of the genus *Theisoa* as a Cosmopterygid genus, is that the costa of the hind wing does not show a degree of modification in outline corresponding to the specialization in venation.

The supposed specific differences separating *Theisoa permolestella* from *Helice pallidochrella*, are not confined to either, but are shown in individuals of both. Late summer specimens of males (supposed *T. permolestella*) and females (*H. pallidochrella*) show a dark ternal spot opposite the costal spot at the apical third, which is more or less distinct, sometimes as large as the costal spot.

The synonymy of the genera and species under discussion will, therefore, stand as follows:

Helice Chambers, Can. Ent., V, 187, 1873 (Type *H. pallidochrella* Chambers).

syn. *Theisoa* Chambers; *Cacelice* Busck.

1. *pallidochrella* Chambers.
syn. *gleditschiælla* Chambers; *permolestella* (Busck).
2. *constrictella* (Zeller).
syn. *bifasciella* (Chambers).
3. *multifasciella* (Chambers).

NOTES ON SULCACIS LENGI DURY* AND ORCHESIA CASTANEA MELS.,* BREEDING IN FUNGI.

BY HARRY B. WEISS, NEW BRUNSWICK, N.J.

Sulcaxis lengi Dury.

This species, which was described by Dury in 1917 (Syn. of Col., Fam. Cistidæ (Cioidæ) of Amer. N. of Mex.-Jour. Cin. Soc. Nat. His., Vol. XXII, No. 2, p. 20) from Vermont and Cincinnati specimens, has recently been found in New Jersey breeding in the following fungi,**—*Lenzites betulina* L., *Polyporus versicolor* L., *Polyporus gilvus* Sch., and *Polyporus hirsutus* Wul., all of which occur on dead wood of deciduous trees. It was most abundant in *Polyporus versicolor* at Monmouth Junction, N.J., and occurred only sparingly in *Polyporus hirsutus*.

Hibernation appears to take place in both larval and adult stages, as both of these forms were found on March 1, but no pupæ. By keeping the infested

*Kindly identified by C. W. Leng.

**Identified by Erdman West.

fungi in a warm room for several weeks, pupæ were finally secured. Most of the larval feeding was done in the context, and it was here also that pupation took place.

Full-grown Larva.—Length 1.7 mm.; width 0.42 mm. Grub-like; slightly curved when viewed laterally; subcylindrical, tapering slightly anteriorly; skin somewhat wrinkled, creamy white except for mandibles and adjacent mouth-parts which are dark; ocelli lateral, one pair and a single one above; body segmentation distinct; body bearing a few scattered hairs; first thoracic segment twice as long as second; remaining thoracic and abdominal segments subequal in length; ninth and last abdominal segment bears a dorsal pair of dark, strongly chitinized, comparatively large hooks curved anteriorly; each leg terminated by a fine curved hook.

Pupa.—Length 1.22 mm.; width 0.48 mm. Creamy white, sparsely hairy, posterior end terminated by two parallel spines.

***Orchesia castanea* Mels.**

This species was described by Melsheimer in 1846 (Proc. Phil. Acad. Nat. Sci., III, 57). Blatchley (Coleoptera of Indiana) records it from Indiana in woody fungi and Smith (N. J. State Mus. Rept. 1909) lists it from several points in New Jersey from "hard fungi" on trees.

During the first week of March, larvæ of this species were plentiful in *Trametes suaveolens* L., on willow at Kingston, N.J., and to a slight extent in *Lenzites betulina* at New Brunswick, N.J. In view of this it appears that overwintering takes place in the larval stage. It undoubtedly breeds in other species of fungi as *Trametes suaveolens* and *Lenzites betulina* are not what one would call hard fungi, and as Schwarz (Psyche I, 1876, pp. 145-148) mentions it as inhabiting a fungus growing on a dead beech. The larva feeds in the context and tubes, and pupation, which requires about eight days in April, occurs in the context.

Full-grown Larva.—Length 7 mm.; width 1.6 mm.; subcylindrical, slightly curved when viewed laterally; sparsely hairy; segmentation distinct; creamy white except for head and mouth-parts, which are brownish; antenna conical, light, three-jointed, distal segment bearing two hairs on tip; ocelli lateral, five in number, three in a row and two single ones posterior to them; first thoracic segment one and one-half times length of third; second thoracic segment somewhat constricted medially; nine abdominal segments; ventral abdominal surface wrinkled; legs three-jointed, each terminated by a dark, chitinized hook; each leg bears a few spine-like hairs and a group of short spines on anterior basal portion; spiracles on first prothoracic and abdominal segments one to eight.

Pupa.—Length 5-6.5 mm.; width 1.8-2.3 mm.; elongate, rounded anteriorly and pointed posteriorly; creamy white; head and prothorax bearing numerous large and small acuminate spines each with a tuberculate base, each spine bearing a long hair which arises just below the tip, the largest spines occurring near lateral and anterior margins of prothorax; a pair of similar spines occur on dorsal surface of second and third thoracic segments; each abdominal segment bears a transverse row of dorsal spines, the largest ones being median and lateral; abdominal spines slant posteriorly; last abdominal segment bears a pair of small hooks curved upward and anteriorly.

THE PANURGINE BEES OF NORTH DAKOTA AND A NEW EPEOLUS. (HYM.)

BY O. A. STEVENS, AGRICULTURAL COLLEGE, N. DAK.

Since 1910 the writer has spent as much time as other duties would permit collecting and studying the flower-visiting insects, chiefly bees, of this state. A list of the wasps had been published (*Ent. News*, Vol. 28, pp. 419-423, 1917) Records of some of the bees have been published as follows:

Cockerell—*Can. Ent.* Vol. 43, p. 390, 1911.—*Neopasites* (*Holcopasites*) *robertsoni* Cwfd. and *Andrena hirticincta* Prov.

Crawford—*Can. Ent.*, Vol. 45, pp. 155-156, 1913.—*Prosopis stevensi*, n. sp.—*Proc. U. S. Mus.*, Vol. 48, p. 579, 1915.—species of *Panurginus*.—*Insec. Ins. Menst.*, Vol. 3, pp. 125-126, 1915.—*Holcopasites stevensi*, n. sp.

Franklin—*Ent. News*, Vol. 26, pp. 413-415, 1915.—species of *Bombidæ*.

Swenk—*Univ. Nebr. Studies*, Vol. 12, No. 1, 1912.—species of *Nomada* (3 new).

—*Ibid.*, Vol. 15, No. 2, 1915.—species of *Nomadidæ* (8 new) and *Stelididæ*.

The present paper presents records of the *Panurgidæ* of Ashmead, and also a new *Epeolus*. Prof. Cockerell has kindly suggested that these described species were new and has looked over the descriptions. The types will be placed in the U. S. National Museum.

FAMILY MACROPIDÆ.

Macropis morsei Robertson. (det. Crawford).

Fargo, Kensal, New Rockford, Deering, Kenmare, Pleasant Lake and Granville. Mostly at flowers of *Steironema*; at one time many of both sexes were found sucking nectar at *Lactuca pulchella* (which was growing near a quantity of *Steironema*). Occasional specimens at *Apocynum androsæmifolium* and *A. hypericifolium* (males), *Petalostemon oligophyllum*, *Onagra strigosa*, *Solidago canadensis*, *Symphoricarpos occidentalis* and *Taraxacum taraxacum*; June 26 to Aug. 11.

FAMILY DUFOUREIDÆ.

Halictoides marginatus (Cresson). (det. Crawford).

Fargo, Valley City, Lakota, Rugby, Monango (J. F. Brenckle). Mott (J. R. Campbell), Dickinson (C. H. Waldron). A rather common bee, mostly at sunflowers (*Helianthus petiolaris*, *H. scaberrimus* and *H. tuberosus*), also at *Grindelia squarrosa*; Aug. 9 to Sept. 18.

Halictoides maurus (Cresson). (det. Crawford).

Cavalier, Valley City, Mandan, Glen Ullin, Leeds, Minot, Marmarth. A fairly common bee at flowers of *Campanula rotundifolia*; June 30 to Aug. 5.

FAMILY PANURGIDÆ.

Perdita canadensis Crawford (det. Crawford).

Sheldon, Pleasant Lake, Williston and Dickinson (C. H. Waldron). At flowers of *Helianthus petiolaris* and *H. scaberrimus*; July 25 to Aug. 21. Some twenty of each sex and several pairs taken in copula. The male has not been described. The more strongly marked ones agree quite closely with the description of that sex of *P. lacteipennis* Swenk and Cockerell. In others the yellow markings are almost entirely absent. The mandibles are usually yellowish-

red medially, darker red apically and greenish black basally. The females agree well with the original description. The spots on the first abdominal segment are often absent, and the bands on the others are sometimes all interrupted medially. Mr. Crawford writes that he is uncertain of the validity of the species.

***Perdita bruneri* Cockerell.**

Fargo, Enderlin, Sheldon, Valley City, Jamestown, Bismarck, Pleasant Lake, Rugby, Minot, Schafer, Williston and Dickinson (C. H. Waldron); Aug. 6 to Sept. 15. A common bee and much the most common of the genus in the State. Only four females were taken at Fargo previous to 1917, when it was found in considerable numbers. Mostly at flowers of *Grindelia squarrosa*; also at *Chrysopsis villosa*, *Aster multiflorus* and *Helianthus petiolaris*.

***Perdita swenki* Crawford.**

Valley City and Pleasant Lake at *Grindelia squarrosa*, *Chrysopsis villosa*, *Helianthus maximiliani* and *Solidago canadensis*; Aug. 11 and 13. Taken only the two times, although in considerable numbers at Valley City. These two species determined by Prof. Cockerell some time ago as *P. cockerelli* Cwfd. and *P. bruneri* Ckll.

***Perdita tridentata*, new species.** (Fig. 25, 1).

Male.—Length 4 to 5.5 mm. Head and thorax greenish-blue. Yellow markings as follows: base of clypeus with a broad median and narrow marginal extensions, supra-clypeal spot about half as high as wide, lateral face marks gradually or irregularly narrowed to a point at about the upper level of antennal sockets (see Fig. 1), mandibles except tips, scape and under side of flagellum (less so on first three joints); tegulae, wingbases and small spots on pronotum; front half of anterior legs for their entire length, a narrower stripe on intermediate ones, knees of posterior legs and often a very narrow stripe on their tibiae; bands on first, fourth and fifth segments interrupted medially, those on second and third slightly notched.

Apex of clypeus, labrum, upper side of flagellum and a small spot on apex of scape, light brown; legs and abdomen dark brown; wings clear but nervures dark, apex of abdomen triangular but obtusely rounded.

Type No. 6372. The type is from a series of 13 specimens taken on *Helianthus petiolaris* at Pleasant Lake, North Dakota, Aug. 11, 1913. Two were taken on *H. scaberrimus* near Sheldon, Aug. 14, 1916, and one on *H. petiolaris* at the same place Aug. 21, 1918.

"A species of the *affinis* group," writes Prof. Cockerell. The abdomen is very much like that of *P. swenki* Cwfd. The clypeal marking is somewhat variable, the central extension sometimes quadrate and covering a large part of the clypeus, but more commonly rounded and shorter, the lateral extension sometimes nearly absent. In one specimen the clypeus is nearly all dark and the abdominal bands are considerably reduced. Supra-clypeal mark often notched above, sometimes almost divided.

***Perdita laticincta* Swenk and Cockerell.**

Sheldon, Pleasant Lake and Dickinson (C. H. Waldron). All at *Helianthus petiolaris*; July 28 to Aug. 21. Prof. Cockerell has confirmed the identification of this and the next two species.

Perdita citrinella Graenicher.

Minot and Granville. At *Petalostemon oligophyllum*; July 8 and Aug. 22, five females, eleven males.

Female.—Dark sutures of head and thorax quite prominent; two specimens have tibiae dark except knees, middle tarsi dark, ventral surface of abdomen dark medially, and scape and upper side of flagellum dark.

Male.—Closely resembles the female. Hind tibiae usually dark behind; abdomen usually with dark triangular patches at sides of segments 2 to 5.

The males does not seem to have been previously described, although Crawford recorded* a specimen from Medicine Hat, Alberta, Canada. The markings of both sexes vary quite a little, but there is no suggestion of intergrading with the following species. In a series of eight males taken at the same time, considerable variation is known. The dark lines next the eyes are shorter than in the female, but the spots between these and the antennae are prominent, sometimes each occupying one-fourth the width of the front; well developed spots are sometimes present at sides of lateral ocelli and small ones behind apex of eyes. Two have lateral brown lines on the mesoscutum, while one has suffused brown lines both medially and laterally, and nearly complete bands on abdomen. One has hind tarsi yellow.

Perdita perpallida Cockerell.

Sand hills near Sheldon, Aug. 12, 1916, and Aug. 21, 1918, at *Petalostemon villosus*; ten females, seven males. This species would seem to have been expected where the preceding was taken, and vice versa. This plant occurs only in this part of the State and near Pleasant Lake and Towner (not far from where *Perdita citrinella* was taken); *P. oligophyllum* and *purpureum* are common plants throughout the State.

Perdita martini Cockerell.

1895.—*Perdita martini* Cockerell, Proc. Acad. Nat. Sci. Phila., 1895, p. 14, male.

Male.—Agrees closely with the original description. The yellow on the face extends about to the middle of the anterior ocellus, its upper line irregular, being depressed under the lateral ocelli and slightly produced next the eye, a narrow line following the direction of its upper border reaching the lateral ocellus. Brown of the antennae above mostly limited to the junctions of the first four or five joints of the flagellum; yellow on cheeks extending fully two-thirds the length of the eyes.

Meso-pleuræ with a broad yellow mark extending from front coxæ to midway between middle coxæ and tubercles; middle tibiae with a dark spot above, posterior tibiae dark, and femora on apical half both above and below; posterior tarsi brownish; stigma yellow, nervures brownish.

Female.—Length 5 mm. Yellow on clypeus, labrum, a low supra-clypeal spot, spot behind base of mandibles, lateral face marks extending from middle of clypeus to slightly above base of antennae with an irregular margin, scape of antennae and lower side of flagellum, tegulae, tubercles and a line on prothorax connecting them. Legs with coxæ dark, trochanters yellow; anterior yellow except a spot in inner side of femora; middle with a larger spot on femora, and a small one on outer side of tibiae; posterior dark except knees. Dark bands of

*Can. Ent. vol. 44, p. 359, 1912.

abdomen rather more pronounced than in male, the first three slightly produced backward at the sides.

Minot, North Dakota, Aug. 22, 1915. One of each sex on *Grindelia squarrosa*. Allotype No. 9293; male No. 9294. The female runs in Cockerell's table (1896) to *zonalis* Cress. or *rectangulata* Ckll. It resembles the latter in face markings. Mr. E. T. Cresson, Jr., has kindly compared these with the type of *P. martini* and considers them identical. He notes: "yellow of cheeks to 1/2 eye and black of occiput extends nearly to lower orbit level; mid-tibiae not darkened, post-tibiae darkened above, all femora immaculate; nervures pale and all pale parts more whitish than yellow." He also sends a sketch of the pleural markings, which shows a rather greater and more irregular extension of yellow on the fore part of the mesopleurae.

Greeyleyella beardsleyi Cockerell. (det. Crawford).

1907.—*Panurginus malvastri* Swenk and Cockerell, Ent. News, Vol. 16, p. 179.

Dickinson, two females July 4, 1912 (C. H. Waldron), two females and a male July 4, 1914; Gascoyne, June 19, 1918, one pair in copula, five males and three females; Mott, July 7, one male. All at flowers of *Malvastrum coccineum*.

To the list of species *Panurginus* which Crawford has published*, a number of new localities may be added and the complete list is given, herewith. *P. innuptus*, *nebrascensis* and *renimaculatus* are quite common bees, the others less so.

Panurginus innuptus Cockerell.

Fargo, Nicholson, Valley City, Bismarck, Dickinson (C. H. Waldron), Marmarth, Lakota, Stanley and Minot. At flowers of *Helianthus annuus* (cult.), *H. maximiliani*, *H. tuberosus* and *H. strumosus*; *Brauneria pallida*, *Ratibida columnaris*, *Solidago canadensis*, *Grindelia squarrosa*, and *Centaurea jacea* (cult.); July 4 to Sept. 11.

Panurginus renimaculatus Cockerell.

Fargo, Jamestown, McKenzie, Bismarck, Dickinson (C. H. Waldron), Sentinel Butte, Grand Forks, Lakota, Crary, Perth, Devils Lake, Minot and Williston. Mostly at flowers of *Grindelia squarrosa*, occasionally at *Aster multiflorus*, *A. paniculatus*, *A. chinensis* (cult.), *Boltonia asteroides*, *Helianthus maximiliani* and *H. petiolaris*; Aug. 5 to Sept. 22.

In addition to the characters given by Crawford for the male, the wings are clear, and the dorsal surface of the first abdominal segment closely punctured up to the depressed apex (*nebrascensis* has smoky wings and first segment with more or less of a smooth shining space before the depressed apex, and a smooth, slightly raised median line.)

Panurginus nebrascensis Crawford.

Fargo, Valley City, Jamestown, McKenzie, Bismarck, Lakota, Crary, Devil's Lake, Granville, Minot, Tolley, Williston. Mostly at flowers of *Grindelia squarrosa*, also at *Chrysopsis villosa*, *Cuscuta gronovii* (1 male), *Petalostemon oligophyllum*, *Solidago canadensis* and *Taraxacum taraxacum*; Aug. 5 to Sept. 28.

Panurginus simulans Swenk and Cockerell.

Fargo, Williston and Dickinson (C. H. Waldron). At flowers of *Helianthus annuus* (cult.), *H. maximiliani*, *H. petiolaris* and *Taraxacum taraxacum*; July 28

*Proc. U. S. Mus., vol. 48, p. 579, 1915.

to Sept. 8. I have never been quite satisfied with the disposition of this species, but Mr. Crawford writes that he has twice compared it with the types.

Panurginus piercei Crawford.

Fargo, Valley City, Dickinson (C. H. Waldron), Monango (J. F. Brenckle). Mott (J. R. Campbell), Wales, Lakota, Crary and Perth. At flowers of *Grindelia squarrosa*, *Helianthus annuus* (cult.), *H. maximiliani*, *H. scaberrimus*, *H. tuberosus* and *Solidago rigida*; Aug. 8 to Sept. 16.

Two other species of *Panurginus* have been collected but not yet determined. One is a species related to *P. parvus* Rob. flying in July; the other is autumnal and probably related to some of the eastern forms.



Fig. 25.—1. *Perdita tridentata*—face markings of type.
2 and 3. *Hesperapis carinata*—dorsal (fig. 2) and lateral (fig. 3) view of seventh and eighth abdominal segment.

Hesperapis carinata, new species.

Male.—Length 10–11 mm. Black with dense ochraceous pubescence, which is paler on the face and pleuræ, also on the thorax above in some specimens; face narrowed below, about as long as the median width; vertex smooth and shining, produced but very little beyond the eyes; antennæ not elongate, black; the flagellum reddish beneath, its joints scarcely longer than wide except the first and last which are slightly so, the second half as long; maxillary palpi about 750 microns, the six joints subequal; joints of the labial palpi about 425, 425, 275 and 275 microns; mandibles toothed.

Mesoscutum rather dull, the punctures of moderate size and separated by slightly more than a puncture width; propodeum rounded, the central area very smooth and shining, the sides dull and hairy; tegulæ reddish yellow; wings hyaline, nervures and stigma honey colour, the subcosta darker; first submarginal one-half longer than second, the second narrowed a little more than half; cubital nervure very straight throughout, also the second transverse-cubital, and the basal nearly so; the basal received a little anterior of the transverse medial; legs not thickened, dark, tarsi reddish yellow, the claws deeply cleft.

Abdomen dull, first segment more shining and with a thin ochraceous pubescence; the others with short black hairs and a few scattered ochraceous ones especially on the second and third; all with prominent apical ochraceous bands; seventh dorsal segment punctured at the base and with ochraceous pubescence at base and on the sides, testaceous, smooth and shining with a high, Y-shaped carina; eighth ventral somewhat narrowed and rounded at apex. (Fig. 25—2, 3).

Ten males, at flowers of *Helianthus scaberrimus* in the sand hills near Sheldon, North Dakota; August 12, 1916. Type No. 9681. Also six males at *H. petiolaris*, same place August 21, 1918. This runs in Cockerell's table (Psyche, 1916, p. 176) to *larrea*, but Prof. Cockerell writes that the superficial resemblance is

rather to *rhodocera*—"has quite the appearance of some *Hesperapis*, but is a peculiar and isolated species." The finding of a species of this genus previously known only from the southwestern United States, presents another interesting question in the status of this group. The first lot were taken early in the forenoon on a misty day and were inactive. The second trip proved too much the same to shed any further light on their habits.

Calliopsis coloradensis (Cresson).

Fargo, Valley City, Jamestown, Bismarck, Sentinel Butte, Lakota, Crary, Devils Lake, Perth, Granville, Minot and Williston. A common bee, usually at flowers of *Grindelia squarrosa*, also at *Chrysopsis villosa*; Aug. 4 to Sept. 10. Specimens of this species have been examined by both Cockerell and Crawford.

Calliopsis nebrascensis Crawford. (det. Crawford).

Valley City, July 26, 1913. A number at flowers of *Verbena hastata*.

Calliopsis andreniformis Smith. (det. Cockerell).

Fargo, Aug. 24 and 26, 1912. One female and two males at flowers of *Melilotus alba*. Another female on *Solidago canadensis*, Fargo, Sept. 11, 1917, is referred by Cockerell to var. *rhodophilus* Ckll.

Protandrena asclepiadis Cockerell. (det. Crawford).

Minot, Aug. 22, 1915, 2 females; Marmarth, July 4, 1918, eight females, ten males. At flowers of *Lactuca pulchella*, *Petalostemon oligophyllum*, *Symphoricarpos occidentalis* and *Astragalus gracilis* (males, about sunset).

Epeolus dacotensis, new species.

Female.—Length 12–14 mm., stout, black with four white abdominal bands which are broad, entire and nearly straight; sparse white appressed pubescence on margins of mesoscutum especially anteriorly, on collar, metanotum, tubercles and a small patch behind them, a few on base of abdomen and sides of fifth segment; otherwise entirely black; a few erect, black hairs on upper part of face, vertex, cheeks, pleuræ and mesoscutum.

Clypeus with close, shallow punctures and scattered larger ones; face slightly narrowed below; maxillary palpi with only one evident free joint which is about .3 mm. long; central lobes of mesoscutum large, low and rounded, the lateral ones small, indistinctly pointed; mesonotum coarsely and somewhat confluent punctured; wings dark, the second submarginal narrowed nearly to a point, third not narrowed; abdomen broad, band on first segment broader than the rest, concave medially (from the base of the abdomen); last two bands slightly curved at the sides; fifth segment with a large differentiated area which is scarcely at all flattened.

Male.—Entirely similar, length 12–13 mm.; apex of abdomen truncate.

Williston, North Dakota; one female (type No. 8969) Aug. 8, four males Aug. 14, 1915; one of the males on flowers of *Helianthus petiolaris*, the other, at a clay bank; Marmarth, North Dakota, July 4, 1918, two females on *Lactuca pulchella* and one on *Helianthus petiolaris*. A very distinct and striking species probably parasitic on *Anthophora occidentalis* and *A. neomexicana*, colonies of the former nesting at Williston, the latter at Marmarth. One of the Marmarth females has the pale pubescence more abundant on the mesonotum, and extending considerably on the mesopleuræ and a little on the outer sides of the legs, especially the tibiæ.

ON THE USE OF THE NAMES LACHNUS AND LACHNIELLA. (HOM.)

BY A. C. BAKER, BUREAU OF ENTOMOLOGY, WASHINGTON, D.C.

In aphid literature much confusion has existed in the use of the two names mentioned in the title of this note, and it seems worth while to give the history of the names at the present time in order that entomologists may have the facts before them.

The genus *Lachnus* was erected in 1835 by eurmeister, and five rather diverse species were included in the genus, but no type was set. Of these species *fagi* L. and *quercus* L. were removed as the types of other and more recent genera. Various species were from time to time set as the type of *Lachnus*. These are as follows:

- 1840. *Aphis roboris* Lin. by Westwood.
- 1863. *Lachnus pinicola* Kalt by Passerini.
- 1908. *Aphis nudus* De Geer by Mordwilko.
- 1910. *Lachnus punctatus* Burm. by Wilson.
- 1911. *Lachnus fasciatus* Burm. by Wilson.

Now the first three fixations are invalid, since the species were not included in the original genus. The first valid fixation, therefore, is that of Wilson 1910, when he set *punctatus* as type. According to the rules of nomenclature, this species must remain the type of the genus *Lachnus*.

Unfortunately there is no uniformity of opinion as to what *punctatus* really is. In other words, the genus *Lachnus* must remain unknown until *punctatus* is definitely determined. In 1911 Wilson wrote as follows: "A careful study of *Lachnus viminalis* Boyer, Boyer's description of that species and Burmeister's description may (?) show that *L. viminalis* Boyer is identical with *L. punctatus* Burm. In that case *Lachnus* will be definitely established with *L. fasciatus* as type." According to the present writer's reasoning it would be definitely established with *L. punctatus* (= *viminalis*) as type, the species set by Wilson in 1910. Later in his 1911 paper Wilson assumed that the two species *punctatus* and *viminalis* were the same and, following his argument as just quoted, he made *L. fasciatus* the type of *Lachnus*, disregarding his earlier fixation. This was evidently done because *L. viminalis* had been fixed as the type of *Tuberolachnus* by Mordwilko in 1908. In a recent paper (1919) Wilson makes the simple statement that *fasciatus* is the type of *Lachnus*.

The writer contends that if the identity of *punctatus* and *viminalis* is conceded to be established, then according to our rules *Tuberolachnus* will become a synonym of *Lachnus* having the same species *punctatus* (= *viminalis*) as type. And this is a species very different from *fasciatus*.

The writer holds no brief for either species, but contends that without special action suspending the rules in this case it is impossible to consider *fasciatus* the type of *Lachnus*. He is as anxious as any other worker to have the genus *Lachnus* definitely established, but he feels that if a change of type for the genus is desirable, considering all the facts, it can be had only through action by the authorities properly qualified to suspend the rules.

The genus *Lachniella* was erected by Del Guercio in 1909, but no type was set for the genus. In 1911 Wilson stated this fact, and then placed the genus as a synonym of *Lachnus* in the following way:

7. *Lachnus* Burmeister.Syn. *Lachniella* Del Guercio.Type *L. fasciatus* Burm.

Since no type had previously been established for *Lachniella*, and since the genus contained a number of diverse species the placing of it thus, according to the writer's reasoning, indicates *fasciatus*, one of the included species of *Lachniella* as its type. Otherwise there would be no reason for so placing the genus. In his most recent paper (1919) Wilson has used *Lachniella* in quite a different sense, and would exclude *fasciatus* from the genus. This species, the present writer contends, is the only one that has in any way been suggested as type of *Lachniella*, and he believes that it is the type of the genus. Otherwise the genus is without a type.

This leaves the genus *Lachniella* of Wilson without a name, and to this genus we give the name *Wilsonia* and fix *Lachniella gracilis* Wilson as its type. The different genera with designated types will thus stand as follows, at least until some definite ruling has been made changing the present legitimate type of *Lachnus*.

Genus *Lachnus* Burm.—Type *Lachnus punctatus* Burm.Genus *Lachniella* Del Guercio—Type *Lachnus fasciatus* Burm.Genus *Wilsonia* Baker—Type *Lachniella gracilis* Wilson.

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NEW COLEOPTERA. VIII.

BY H. C. FALL, TYNGSBORO, MASS.

The receipt of a very distinct new species of *Ochthebius* from California which it is desirable to make known, affords the opportunity for recording one or two errors in the literature of this genus. Descriptions of a few other new species are added. All types are in the author's collection.

Ochthebius martini, sp. nov.

Form very broad, aeneo-piceous, side margins of elytra explanate throughout and paler in colour. Labrum deeply triangularly emarginate. Prothorax one-third wider than long, widest at anterior third, sides arcuate in basal half, then suddenly deeply sinuate, nearly as in *rectus* (See Horn's figure), transparent border extending from apex to base, becoming very narrow in front of the middle, the sides strongly obliquely convergent from the point of maximum width, feebly arcuate to nearly straight basally; median line deep and entire; discal foveæ rather small and not very conspicuous, well separated, the posterior narrow and about twice the length of the anterior; lateral impressions deep and subparallel sided; surface rather densely, coarsely, evenly punctate, distinctly alutaceous throughout between the punctures. Elytra not more than one-

eighth longer than wide, stria punctures moderately coarse, intervals feebly convex, wider than the striae on the disk, scarcely so at sides, finely transversely wrinkled. Legs pale, femora more distinctly punctate than usual. Length 2 mm.; width 1.2 mm.

A good series of this very fine species was taken at Redwood Park, California, by my friend Mr. J. O. Martin, to whom it is a pleasure to dedicate the species.

Of our previously described species, *puncticollis* alone possesses an equally broad form, but in it the thorax is much less conspicuously narrowed behind than in *martini*, and the surface is not alutaceous. The terminal joint of the maxillary palpus in the present species is unusually short, not, or only just perceptibly longer than wide, not narrowed apically, the tip broadly arcuato-truncate. In this respect it differs from every other species with which I have compared it, though most nearly approached by *puncticollis*. In this connection it may be remarked that the very unique marine *Ochthebius lapidicolus*, recently described by Van Dyke, has also aberrant maxillary palpi, the terminal joint very small, short and pointed.

O. fossatus Lec. An examination of the type of this species described in 1855 from Ft. Yuma, Cal., shows that it is not the same as *nitidus*, with which it was united by LeConte, but is really identical with the closely allied *tuberculatus* and *foveicollis*, described in 1878, the former from New Mexico, the latter from Florida. Horn correctly united *tuberculatus* and *foveicollis* in his revision of the genus in 1890, choosing to retain the latter name, although *tuberculatus* takes page precedence. Both these names, therefore, fall into synonymy, and *fossatus* must be restored to the List.

O. nitidus Lec. This seems the proper place to say that the drawing of the thorax of this species, Fig. 7, in the plate accompanying Horn's paper shows that the author must have had something entirely different in hand. The thorax in *nitidus* is closely similar to that shown of *foveicollis*, Fig. 2, differing only in the discal foveae being smaller and more widely separated. The textual description of the thorax harmonizes completely with the plate; in the description of the elytra, however, special mention is made of the unusually smooth apex, which is the most characteristic feature of the true *nitidus*. Whether this latter character was taken from the specimen in hand or was merely transcribed from LeConte is now a question.

***Saprinus rugosifrons*, sp. nov.** (Horn's Group IV).

Rather broadly oval, convex, polished black, the legs dark rufous. Head rather densely subtrigose, marginal stria feebly traceable at sides of the front. Prothorax distinctly less than twice as wide as long, punctures rather closely placed throughout, rather abruptly longitudinally strigose in about the lateral fifth, much finer toward the middle, with coarser punctures along the base, and a few in a vague longitudinal median impression, which is most evident basally. Elytra about one-third wider than long, sides broadly arcuate, more strongly so about the humeri, finely punctate basally, becoming gradually more densely and coarsely so at apex, where the interstitial surface is finely alutaceous. First dorsal stria attaining the apical fourth; second, third and fourth striae progressively slightly shorter, the fourth arcuately joining the sutural which is slightly abbreviated at apex; oblique humeral well impressed

and almost attaining the internal subhumeral which parallels the posterior half of the first dorsal; external subhumeral entirely distinct from the marginal. Pygidia alutaceous, closely punctate, with a slight tendency toward substrigosity, especially at apex. Prosternum moderately convex at summit, striae long, parallel, abbreviated in front. First ventral plate concave at middle and with a small tubercle near its posterior margin; last ventral with a transverse flattened tumidity which is obtusely prominent at its lateral limits.

Length (to elytral apex) 3.15 mm. Width 2.6 mm.

Aweme, Manitoba. A single example sent by Mr. Norman Criddle. This species is to be placed near *obscurus* of Horn's Group IV. It is at once separable from any described species of the group by its rugose front and strigose sides of the pronotum. The remarkable ventral modifications are without doubt sexual in nature.

Saprinus castanipennis, sp. nov. (Horn's Group IV).

Broadly oblong-oval, black, elytra castaneous, legs rufous, surface polished throughout. Head finely, rather closely, punctate. Prothorax and elytra punctate over the entire surface, sparsely finely so medially, the punctures becoming much coarser and closer at the sides of the thorax where they are separated by less than their own diameters, also toward the elytral apex where they are of the same size as at the sides of the thorax, but separated on the average by their own diameters. Prothorax a little less than twice as wide as long, sides rather strongly convergent and straight in basal two-thirds. Elytral striae strong, rather feebly punctate, first attaining the apical fourth, second and third nearly as long, fourth nearly reaching the apical third, strongly arched at base and joining the entire sutural. Pygidia rather densely punctate. Prosternum moderately convex, the striae parallel and terminating about one-fourth from the apex. Anterior tibiae multispinulose.

Length 2.3 mm. to the elytral apex, 2.5 mm. over all; width 1.85 mm.

Aweme, Manitoba, 21-VI-1918, (Criddle).

Judging from the description this species is nearest Casey's *laramiensis*, which is, however, a much larger insect (3.-3.4 mm.) with darker legs and with the thoracic punctuation "only slightly closer laterally."

Saprinus iris, sp. nov. (Horn's Group VIII).

Not very broadly oval, polished areas with viridi-aeneo-cupreous lustre, the dull punctured areas bluish, legs dark rufo-piceous. Head smooth, a feeble transverse impressed line above the frontal margin. Prothorax nearly twice as wide as long, sides moderately converging and feebly arcuate, surface not densely strigoso-punctate at sides and in front, leaving a triangular discal polished impunctate area; side margins very narrowly smooth, base with the usual coarse marginal punctures. Elytra rather more than one-fourth wider than long; striae finely punctate, the first nearly as long as the elytra and curved at its extremity, second three-fourths as long as the elytra, the third and fourth slightly passing the middle; fourth hooked at base, sutural interrupted widely at base in the type, feebly joining the fourth stria in a second specimen; oblique humeral fine and nearly parallel with the first stria; internal subhumeral occupying the middle third of the elytra, with basal appendix nearly joining it to the oblique humeral; external subhumeral not distinct from the marginal; disk rather finely, not densely punctate in somewhat less than apical half, the punc-

tured area finely alutaceous and dull, the impunctate area between the first and fourth striae also slightly dull owing to an extremely fine, scarcely visible ground sculpture; area between the fourth striae highly polished. Propygidium and pygidium evenly rather closely punctate, the punctures becoming gradually a little smaller toward the pygidial apex. Prosternal lines approximate, gradually convergent anteriorly, becoming subconfluent and evanescent at about the anterior fourth.

Length (to elytral apex) 2.1 mm.; width 1.75 mm.

Described from two examples submitted by Mr. Norman Criddle, who took them at Aweme, Manitoba, V-31-1909 (type) and VII-1-1915. I thought on first sight that these might be small specimens of the rare *seminitens* of LeConte, to which they are certainly allied. On comparing them, however, with the unique type of the latter I find it to be not only much larger, but also a much more coarsely and densely sculptured species with brown bronze surface lustre (not at all bluish) external subhumeral stria distinct from the marginal, the fourth stria joining the sutural and strongly impressed all the way around. None of the more recently described species of Blatchley, Wolcott and Casey agree very closely with the present one.

***Telephorus neglectus*, sp. nov.**

Very similar to *carolinus* with which it is likely to be found mixed in most collections. It may easily be recognized by the following comparative characters.

Neglectus.

Size smaller, averaging 8-9 mm.
Antennae a little shorter,
joints 4-10 each, about three
times as long as wide.
Front, before the antennae,
broadly infusate.
Prothorax more strongly
transverse.
Claws with a rather strong
but acute basal tooth.

Carolinus.

Size larger, averaging 9-10 mm.
Antennae a little longer,
joints 4-10, about four
times as long as wide.
Front, before the antennae
more narrowly infusate at middle
Prothorax less strongly
transverse.
Claws "cleft"; the basal
tooth long and narrow.

The types (σ , φ), mounted on one pin, bear labels "Framingham, Mass., V-23-10, C. A. Frost and "Beating oak." Other specimens before me are from Sherborn, Hopkinton and Tyngsboro, Mass., and Berkely, R.I. I am indebted to Mr. Frost for calling my attention to the difference in the claws, which led him to separate his *carolinus* material into two species. The two species are about equally common in Eastern Massachusetts, and it would be interesting to know how widely *neglectus* is dispersed beyond the type region. The form with cleft claws, which is doubtless the true *carolinus*, is quite widely diffused, the material in my own cabinet ranging from New England to Nebraska and North Carolina.

***Pedilus parvicollis*, sp. nov.**

Very elongate; black; prothorax, labrum and front coxæ rufotestaceous; palpi dusky testaceous; legs varying from brown to piceous, the tarsi paler. Head rather small, tempora wanting, eyes large, separated by a distance equal to their own width as viewed from the front; front closely punctate, vertex and occiput sparsely so. Antennæ (♂) strongly flabellate; joint 1 of the usual form, 2 very short, transverse, 3 equal to 1 and 2 united and with a branch slightly shorter than its own length, 4-10 shorter, the outer ones with branches about four times their own length, 11 about as long as the branch of the preceding joint. Prothorax of same width as the head, sides strongly rounded before the middle, oblique and nearly straight posteriorly, surface polished and rather finely sparsely punctate. Elytra nearly parallel, nearly twice as wide and six times as long as the prothorax, less finely and more closely punctate than the latter. Pubescence fine and sparse. Body beneath shining, finely punctate, last ventral segment very broadly obtusely rounded posteriorly. Claws with a small obtuse basal angulation.

Length 6 to 7 mm.

Habitat.—California Sierras.

Described from four males, two of which, including the type, were taken by Mr. G. R. Rilate at Monache Meadows, Tulare Co., 8,000 to 8,300 feet.; the other two by Mr. Hopping at Round Meadow in the Giant Forest region. This species can only be compared with *P. flabellata*, with which alone it agrees in the flabellate male antennæ and in the form of the thorax. In *flabellata*, however, the antennal rami begin on the fourth joint, the third being small and similar to the second, and the prothorax is relatively larger with the sides less strongly rounded than in the present species. The absence of tempora, and the head and thorax of equal width distinguishes *parvicollis* from every other species of our fauna.

GIFT TO THE LIBRARY.

The Rev. Dr. Fyles, of Ottawa, a Life-member and former President of the Entomological Society of Ontario, has most generously presented to the Library a remarkable original work, "as a token of his appreciation of the great pleasure and profit his connection with the Society has afforded him." It is a large folio volume, handsomely bound in leather and entitled, "Illustrations in Natural History." It contains 107 water-colour drawings, chiefly of insects but including a few depicting flowers, birds, reptiles and other animals. The pictures were originally prepared to illustrate popular lectures, and are accordingly of large size and strikingly coloured in order to be visible to the whole of a numerous audience. Many of them were exhibited for this purpose at the annual meetings of the Entomological Society. The volume is a highly-prized addition to our Library, and will serve as a lasting record of the author's artistic skill and devotion to nature in all its aspects. To many also it will bring back memories of delightful addresses by the now venerable author. — C. J. S. BETHUNE, Librarian.