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DESCRIPTION OF A NEW NORTH AMERICAN CULEX.

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Amongst a number of Culicidæ sent me by Professor Kellogg from California, collected by himself and the students of Leland Stanford Junior University, is a very distinct new *Culex*, which is here described as *Culex Kelloggii*.

The collection contained several interesting species besides this one, including a new Anopheles, called by Professor Kellogg *Anopheles franciscanus*; specimens of the European *Theobaldia annulata*, Meigen, and the marked *Theobaldia incidens*, Thomson, and several others, which he will refer to elsewhere, including another new *Culex*. It may be here pointed out that Coquillett's *Culex Curriei*, now included in my new genus *Grabhamia*, is very closely allied to *Grabhamia dorsalis*, Mg. It is, however, a smaller and thicker-set insect, and has the last hind tarsus white. This collection also included a series of *Curriei*, as well as *Anopheles maculipennis*, Mg., and *A. punctipennis*, Say. The *A. maculipennis* are smaller than they usually occur in Europe.

Culex Kelloggii, nov. sp.—Thorax brown, with rich reddish-brown scales showing linear arrangement, two small pale spots, some rows of gray scales behind and on the scutellum. Proboscis black, with a white band. Abdomen black, with basal white bands and lateral spots. Legs black; femora pale at base, with a white line or row of spots, also the tibiæ, with a line of white spots. Metatarsi and tarsi showing apical and basal white banding; last hind tarsus with a black median band or all white. Wings unspotted.

♀.—Head brown, clothed with narrow-curved gray scales in the middle and behind, white ones forming a border around the eyes, brown ones between; at the sides small flat white scales, in the middle are numerous ochraceous upright forked scales, laterally the upright forked scales are black, two long brown bristles project forward between the eyes. Palpi black-scaled, with some large white scales at the apex, and some forming

a ring near the base; apex, etc., with a few dark bristles; proboscis black, with a prominent white band; antennæ black, basal and second joints dark, testaceous, the basal joint with white scales internally; clypeus brown. Thorax brownish-black, with rich reddish-brown narrow-curved scales, and a few broader gray ones at the sides in front, and some arranged in lines behind the mesonotum, on its surface are two small pale spots, two of the posterior white lines being continued back from them, two short, broader ones are situated in front of the bare space before the scutellum; the reddish-brown scales have a linear arrangement, due to two prominent median bare lines; bristles black; scutellum brown, with narrow-curved pale scales and brown border-bristles; metanotum deep brown; pleura brown, with some gray scales. Abdomen black, with basal white bands and white lateral spots and brown border-bristles; apex bristly; venter yellowish-brown, with scattered gray scales. Legs black, banded, striped and spotted in lines with white; base of femora gray to dull ochraceous, pale ventrally, with a row of white spots above, almost forming a white line; apex with a white spot; tibiæ also with a row of white spots, forming almost a line, apex white; fore and mid metatarsi and tarsi with narrow apical and basal yellowish bands, except the last tarsal segment; in the hind legs the metatarsi and tarsi have broad, almost white bands, the last tarsal in some specimens being almost all white; ungues equal and simple. Wings with the veins very densely scaled with typical brown Culex scales; those at the base of the third long vein thicker, forming a small, rather obscure, dark spot; first submarginal cell longer and considerably narrower than the second posterior cell, its base slightly nearer the base of the wing, its stem about one-third of the length of the cell; stem of the second posterior cell about two-thirds the length of the cell; posterior cross-vein not quite its own length distant from the mid cross-vein; fringe dark brown; halteres testaceous, knob darkened.

Length.—5 to 5.5 mm.

♂.—Palpi brown, the last two joints nearly as long as the ante-penultimate, the penultimate slightly shorter than the apical; the last two joints with long brown hairs on each side, also on one side of the apex of ante-penultimate joint; there is a narrow pale band at the base of the last two joints and also near the base of the long ante-penultimate joint; proboscis black, with a narrow white band on the base of the apical half; antennæ banded black and white, with flaxen plume-hairs. The head with

more gray scales than in the ♀. Thorax and abdomen as in the ♀. Legs as in the ♀; ungues of the fore and mid legs unequal, both uniserrated, of the hind legs equal and simple. Wings narrow; the fork-cells short; the first submarginal longer and narrower than the second posterior, its stem more than half the length of the cell; stem of the second posterior as long as the cell; posterior cross-vein about its own length distant from the mid cross-vein.

Length.—5 to 5.5 mm.

Habitat.—Stanford University, California.

Time of Capture.—September and October.

Observations.—Described from a series of 5 ♀s and 4 ♂s sent me by Professor Kellogg. It is a very marked species, but presents at first sight a resemblance to *Culex tæniorhynchus*, Wiedemann. It differs, however, in (1) having the legs apically and basally pale banded, (2) in their being marked with lines or lines of spots, and (3) in the simple, not uniserrated, ungues in the ♀ (4), in the structure of the ♂ palpi, etc. Moreover, a hasty examination will show that this species is not nearly so compactly built as in *tæniorhynchus*. The specimens show some variation, both in regard to the thoracic adornment and in the leg ornamentation. One ♀ has no signs of the two small pale thoracic spots, and the last hind tarsal in one appears almost white, and in others the median dark band is very broad, making the tarsal segment almost all dark coloured.

PREOCCUPIED NAMES.

In the Trans. Amer. Ent. Soc., Vol. 29, No. 2, 1903, pp. 168–169, Mr. Chas. Robertson creates, among other new genera in the Megachilidæ, *Gnathodon* and *Ceratias*. Both names have been previously used:

Gnathodon, Rang., 1834—*Mollusca*.
Gnathodon, Gray, 1836—*Mollusca*.
Gnathodon, Jard., 1845—*Aves*.
Ceratias, Kröycov, 1845—*Pisces*.

E. S. G. TITUS, Washington, D. C.

CORRIGENDA.—Page 191 (July CAN. ENT.), fourth line from bottom, for *Eyrtominum* read *Cyrtomium*; and second line from bottom, for *trimula* read *tremula*.

A NEW CAPSID.

BY CHARLES STEVENSON, MONTREAL.*

Lygus Chagnoni, n. sp.—This species of the genus *Lygus* is of a form near to *L. pabulinus*, Linn., in appearance.

It is ovate, convex, bright green in living specimens, with irregular purplish-brown markings at the base of the membrane, smooth and without bristles, and a silky pubescence on the sides of the pronotum, which has an orange-yellow border next the head, shading backwards in narrow lines into the green coloration, so as to make the green appear in broad bands.

Head polished and uniformly orange-yellow. Eyes large and prominent, and of so dark a brown colour as to appear black.

Antennæ slender and long, brown, with shades of orange-yellow. Basal joint uniform yellow, second joint slightly thickens and becomes brown towards the tip, the remaining joints dark brown, becoming much darker towards the end of the last one, which is very dark.

Scutellum convex, smooth, and of a deeper green than the wings.

Wings uniformly green on the corium, clavus and cuneus, the membranes paler and somewhat transparent, with irregular purplish-brown markings. At the meeting of the corium, there is a purplish-brown V.

Abdomen pale apple-green, with marked silvery pubescence, in the form of dashes and dots at the joints, the genital pieces green, with slight rusty tinge on the margins.

Legs pale green, the coxa, trochanter, as also the mesoscutum, very pale, without any spots or markings.

Length to the end of abdomen, 4.0 mm.; to the tip of the membrane, 5.0 mm.; width of pronotum, 1.25 mm.

Described from three specimens, one caught by Mr. G. Chagnon, in Rouville Co., Que., 11th July, 1902, and two by myself on Montreal Island, 14th July, 1902.

I take pleasure in naming this species after my friend, Mr. G. Chagnon, as a slight token of my appreciation of his companionship in our collecting trips and his great assistance in the identification of species and in my entomological work generally.

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*Read before a meeting of the Montreal Branch, Ent. Soc. of Ont., 9th February, 1903.

NOTES ON FIVE SPECIES OF MEGACHILE.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

I have spent more time than I like to think about identifying bees of the genus *Megachile*, so I have no apology to make for offering some notes which will, I hope, make the process easier for others:

Megachile frugalis, Cresson.—This species was described from the male. I have before me a female collected by Dr. Davidson at Lancaster, California. It practically agrees with the description of *M. zaptlana*, Cresson, ♀, except that it has no lines of white pubescence on the thorax. *M. occidentalis*, Fox, ♀, is very similar, and has the lines of white pubescence, but it has a different clypeal margin, and the very scanty hair on the disc of the clypeus is white. In *M. frugalis*, ♀, the clypeus has long black hair; the ventral scopa is creamy white, black on the last segment. These bees are all of the elongate narrow type. The anterior margin of the clypeus in *frugalis*, ♀, can hardly be called excavated, but presents three gently-rounded prominences, the margin between them being slightly concave.

Megachile montivaga, Cresson.—At flowers of *Tourerea decapetala* (Sims), Raton, N. M., Aug. 27, one ♀ (W. P. Cockerell). Length nearly 14 millim. An Illinois sample is smaller (about 12½ millim.), and has the thorax more densely punctured. The species resembles *M. relativa*, Cr., but is larger and less shining, and the abdominal bands are pure white. A variety of *M. montivaga*, with more conspicuous black hair on the dark parts of the abdomen, was taken by Prof. Townsend at flowers of *Potentilla Thurberi*, on the Rio Ruidoso, N. M., about 6,500 ft., Aug. 1.

Megachile inimica, Cresson.—Las Vegas, N. M., one male at flowers of *Verbena Macdougali*, Aug. 9 (W. Porter). This is *Sayi*, Cresson, said by Robertson to be a synonym of *inimica*. In our specimen the tegulæ are very dark brown. The insect has a long, narrow abdomen, and looks superficially like *M. occidentalis*, Fox. Upon closer study it is seen to be really nearer to *M. pugnata*, Say, from which it is easily distinguished by the hollow process on first tarsal joint being fringed along its whole length with dark fuscous hair; in *pugnata* the basal two-fifths is densely fringed with black hair, and the portion beyond has a short fuscous comb.

Megachile pruina, Smith.—Chaves, N. M., Aug. 6, two males (*Townsend*); Mesilla Park, N. M., one male at flowers of *Isocoma Wrightii*, Sept. 11 (*Porter* and *Cockerell*); near Los Angeles and

Catalina Island, California (*A. Davidson*). This gives the species a very wide range in the south-west, and while it must be confessed that the specimens are not all alike, I am unable to detect anything more than individual variation.

Megachile mendica, Cresson.—♀. Length about 12–13½ millim.; abdomen shovel-shaped; ventral scopa orange, including last segment; white on basal half of second segment.

Gallinas River, at Las Valles, N. M., Aug. 6 (*Porter* and *Cockerell*). Another is from flowers of *Verbascum thapsus*, Rio Ruidoso, White Mts., N. M., 6,900 ft., July 23 (*Townsend*). The scopa of the latter is full of orange pollen.

The New Mexico specimens agree with an Illinois ♀ from Robertson. *M. mendica* looks like a small *M. latimanus*, having the same form and general coloration. In *latimanus* the scutellum is covered with pale ochreous hair, and the mesothorax broadly bordered with the same, so that the black hair is confined to the central part. In *mendica* the light hair of the head and thorax is white, and the scutellum and mesothorax (except the margins of the latter narrowly) are thinly clothed with black hair. In both the thorax, though closely punctured, is shining. In *latimanus* the vertex is mostly, or wholly, clothed with pale hair, in *mendica* it is clothed with black. In both the basal joint of the hind tarsi is broad, and clothed on the inner side with orange hair. The mandibles are similar in both, except that they are less produced in *mendica*. In *mendica* the first recurrent nervure enters the second submarginal cell much further from its base than the second does from its apex; this is not usually the case in *latimanus*.

M. mendica resembles *M. relativa* in the colour and arrangement of the hair on the head and thorax, but *relativa* is a narrower bee, with a conspicuously narrower face. The abdominal bands in *relativa* are yellowish, in *mendica* they are white.

The Mediterranean Flour Moth, *Ephestia kuehniella*, has been sent to me recently from Seattle, Washington, and Honeoye Falls, N. Y. As far as I know, this is the first time the pest has been recorded from the State of Washington. I have specimens of matted flour and larvæ from Arthur, Ont., Canada. In each case reports are made that the insect is doing serious damage to the milling business by matting and clogging up spouts and elevators with flour. The moth seems to be slowly and steadily spreading over the U. S. and Canada.

W. G. JOHNSON, New York.

A NEW OAK-GALL.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. MEX.

Dryophanta rydbergiana, n. sp.—*Gall*: on leaf of *Quercus rydbergiana*, Ckll. (Torreya, Jan., 1903); solitary, 6 mm. diameter, spherical, faintly shiny, light ferruginous, with a microscopically tessellate surface and a scattered stellate pubescence; base concave, point of attachment small; contains a single large cell; the space between the cell and the exterior filled with spongy tissue, which is light green within and ferruginous outwardly.

Fly (cut from gall): ♀.—Body 2½ mm. long, stout, jet black, smooth, neither punctured nor conspicuously hairy; mesothorax and scutellum with a few scattered hairs; front and vertex minutely tessellate; no frontal groove; middle ocellus somewhat depressed; face without carinæ; malar space long, wrinkled; flagellum black, 12-jointed, the last five joints (at least) longitudinally grooved; whole flagellum hairy; first flagellar joint about one-fourth longer than second; basal joints of antennæ dark red; the small first joint punctate; the second much swollen. Parapsidal grooves deep and strong, complete, converging posteriorly; scutellum large and swollen, longitudinally keeled, with a depression on each side anteriorly; anterior margin of scutellum raised into a sharp edge; posterior part coarsely cancellate. Metathoracic ridges very widely divergent caudad. Legs red; tarsi hairy; claws of posterior legs simple; wings hyaline, not spotted, but hairy; veins strongly marked with dark brown; marginal vein not quite attaining costa; areolet present. Ovipositor black, concealed; ventral spine red, covered with long ferruginous hairs.

Hab.—Las Vegas Hot Springs, N. M., about 7,000 feet, March 21, 1903. The gall was on a leaf of last year, the leaves of *Q. rydbergiana* remaining on the bush, though turning brown.

This insect is placed in *Dryophanta*, because it seems on the whole to go there best, but it does not exactly agree with any described American genus. In Mayr's table, given by Cresson, it runs to *Biorhiza*, but it does not belong there. The gall is like that of *Amphibolips*.

CULEX CONSOBRINUS AGAIN.

BY D. W. COQUILLETT, WASHINGTON, D.C.

In the July number of the CANADIAN ENTOMOLOGIST, Prof. J. M. Aldrich attempted to rescue Dr. Williston's *Culex inornatus* from the synonymy by referring the true *Culex consobrinus*, Desvoidy, as a synonym of *Culex pipiens*, Linné, and denying that any of the other species which the writer originally placed in the synonymy of *consobrinus* is identical with *inornatus*.

Desvoidy did not give a separate description of his *consobrinus*, but compared it with what he identified as *pipiens*, observing that it differed in having the palpi and tarsi "brunicosis, non flavis." Desvoidy was noted for his erroneous identifications of previously described species, and that he mistook some larger species for the true *pipiens*, seems to admit of no doubt, since the measurement he gives, "long. 3 lineas," is too long for the latter, all the specimens of which in the National Museum fall short of 2.5 lines. His measurements are usually accurate, as may be gleaned from those he gave of such strongly-marked, easily-recognized forms as *Culex mosquito*, *Anopheles maculipennis*, *A. argyritarsis*, *Psorophora ciliata*, etc., all of which are within the range of the specimens of the given species. He gave the same measurement for *consobrinus* as for *pipiens*, and in deciding what species the former refers to it is necessary to find a species which is larger than the true *pipiens*, has the ground colour he gave for *pipiens*, "cinereo-subflavescens. Thorax, dorso-levitor fulvescente," and that inhabits Pennsylvania, the locality given for *consobrinus*. Up to the present time we know of *only one species* that fills all of these requirements, and this is the form which I have identified as *consobrinus*.

Even if I erred in this identification, there are still at least two other names that stand in the way of Dr. Williston's *Culex inornatus*, namely, *C. impatiens*, Walker, the type of which Mr. Theobald states agrees in nearly all respects with what I have identified as *consobrinus*, except in the abdominal banding, and this was not of sufficient importance to cause him to regard it as representing a distinct species; and *C. pinguis*, Walker, which Mr. Theobald admits may be synonymous with *consobrinus*.

As I hope to review this subject more at length in a forthcoming monograph, it need not be enlarged upon here; sufficient facts have been given above to fully disprove Mr. Aldrich's contention in relation to the true *Culex consobrinus* of Desvoidy.

A SUPPOSED MIGRATION OF PIERIDÆ WITNESSED IN VENEZUELA IN THE SUMMER OF 1901.

BY AUSTIN H. CLARK, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

The erratic migrations of certain insects, often in countless swarms, have been noticed and put on record by many observers. In a country where, perhaps, they are scarce, or, it may be, almost wanting ordinarily, they may suddenly put in an appearance in such numbers as to defy all attempts at computation ; or immense swarms of them may sometimes be seen far out at sea, flying steadily in a direction which may take them out so far as to effectually prevent any return.

To show the frequency of this phenomenon, it is only necessary to mention a few cases. The best known, perhaps, or, at any rate, the most familiar, is that of the locust. Large areas of growing crops have been totally ruined and well-to-do people reduced to poverty through the sudden and wholly unexpected appearance of this unwelcome visitor. Many years may pass with no sign of these insects, and then they come, bringing destruction with them. Among the Neuroptera, the dragon-flies, especially the species *Anax bonariensis* of southern South America, seem to be especially subject to these migrations. In these swarms, according to Hudson,* who studied them in the Argentine, all the larger species associate together, and universally fly down the wind, coming commonly from five to fifteen minutes before a burst of the cold, dry south-west "pampero." Weissenborn† describes a great migration of dragon-flies which he witnessed in Germany in the year 1839, and also mentions a similar phenomenon occurring in 1816, which extended over a large portion of Europe. But this habit seems to be of commonest occurrence among the Lepidoptera. Among others, Wallace mentions seeing a vast congregation of Pieridæ in the Indian Ocean, and Maynard a swarm of Danaidæ *(Anosia berenice)* off the coast of Florida. It is now recognized as a more or less regular proceeding on the part of some species or groups, especially among the Pieridæ, to congregate and perform long journeys without any apparent aim.

While approaching the coast of Venezuela in the month of June, 1901, I was struck by the numbers of Pieridæ passed, not in great swarms, but in numerous small loose bunches, which began to appear even before the mountainous coast could be well made out. All these insects were

*The Naturalist on the La Plata, Chapter IX.

†Loudon's Magazine of Natural History, N. S. III.

headed toward the north-east, directly against the trades. Although I was familiar with the fact that commonly the Pieridæ are the first butterflies with which one meets when approaching land, and had tested the truth of it while nearing the coast of Portugal, and also off the Azores, I did not suppose that they regularly occurred in such abundance as I found them here in the Caribbean. In fact, it had been my experience to only meet with a half-dozen or so when approaching land. But here the steamer continually passed by straggling bunches of them, all flying north-east, out to sea. As we neared the shore, they became more common, and when at last I landed and looked up on the mountain-side above La Guaira, there were thousands of them. The whole mountain-side was thickly dotted with specks of yellow and orange, which kept moving steadily on, in an easterly direction, rarely pausing, following, apparently, the line of the coast, and going in the same general direction from which came the trade winds.

On the next day, from the car window of the little train which runs from La Guaira to Caracas, over a roadbed from which are obtained glimpses of great gorges filled with tropical vegetation, as well as of the parched and barren mountain-sides, destitute of life save for a few gaunt post-cacti and scraggy thorn bushes, I saw thousands of butterflies of this group, all moving steadily, like the waters of a great river, toward the east. In many cases I thought I saw the insects flying in another direction. Often I was sure some were flying west, but on taking my bearings I invariably found that my calculations were at fault, and that all the butterflies were moving east. There is, perhaps, no railroad in the world on which a man is so often at a loss to know just where are the cardinal points of the compass. The sun gives no clue during the hotter hours, at the season when I was there, as it is practically in the middle of the sky; and the whole journey is simply a succession of curves, this way and that, so confusing that many times I could not realize the compass had not succeeded in some way in getting out of order and reversing, or at least seriously changing its position with respect to the magnetic pole. Over the mountain-sides and across the valleys Pieridæ could be seen, always near the ground, yet rarely alighting, and invariably travelling eastward.

While at Caracas I made many excursions into the surrounding country for butterflies, and from the hilltops there I could watch the steady migration, although here the numbers were very much less than at La Guaira.

On the way back to La Guaira, as well as while staying there, I made a careful study of the constituents of this vast throng. The most noticeable fact was that practically all were males. In fact, I saw but two or three females, and these were at a little roadside station, half way between the two towns. I am almost certain that these were not members of the general tide, for they were flitting, to all appearance, aimlessly about, and did not evince that peculiar haste to move onward so noticeable in the others.

During my stay at Caracas I collected a number of Pieridæ of several species, and of both sexes, in the meadows near the bank of the river which flows by the city. These seemed not to be affected by the general movement, and acted just as the members of the group ordinarily do.

The most abundant species by far, making up between one-half and three-quarters of the flight, was *Callidryas eubule*. Of the remainder, *Phœbis argante* was the commonest, with a close third in *Aphrissa statira*. Here and there could be seen *Callidryas philea*. Once or twice I thought I could make out *C. cipris*, but could not feel certain of the identification. I make no mention, of course, of others of the group, as *Pontia monuste* and *Gonepteryx clorinde*, which, though common, did not seem to take any part in the migration.

A few days later, while coasting along to the port of Carúpano, I continually saw the butterflies singly and in little bands out over the sea.

From Carúpano I went to the island of Margarita, where I stayed for over three weeks. Here it was a noticeable fact that all the Pieridæ were resident in the little grassy patches, in which they apparently had been bred and stayed all their lives ; and here males and females were observed in normal proportions. Without doubt, the island was receiving its share of wanderers from the mainland, but those there showed no inclination to leave, and were never found outside of the restricted localities where they made their homes.

When I left the island I coasted along the shore as far as Trinidad (B. W. I.), but did not observe anything of the swarms I had seen near La Guaira ; and it may be mentioned here that neither about Carúpano nor at any part of the coast were the insects found so abundantly as at and near La Guaira.

There are two possible explanations of the facts just stated : Either that this is the regular habit of these butterflies, to keep constantly moving eastward during the imago state, or that it was an unusual migration.

Further observation will prove which view is correct. But I have seen nothing to show that this is the ordinary mode of procedure for Pieridæ in this region; and from the immense numbers observed, it seems to me that it was one of those peculiar migrations to which this group seems to be particularly subject, started, perhaps, by some chance few down toward Puerto Cabello, or, it may be, as far as Coro, which picked up more and more as they went on, until when they arrived in the vicinity of La Guaira their numbers were beyond calculation, all the later additions to the multitude taking the same direction of flight as that adopted by the originators of the movement.

Perhaps the course taken was at first an expression of positive anemotaxis—a flight against the prevailing wind. But later the sense of direction seems to have become so firmly fixed that they moved east even when in the sheltered valleys or in gorges where the direction of the wind was changed.

This is, in brief, what it was my lot to witness while in Northern Venezuela; and it is much to be hoped that others who chance to be in that locality at some future date will make notes of their experiences with the butterflies mentioned, and prove conclusively whether this was a normal condition of affairs or an extraordinary chapter in the history of insect life in this region.

NEW APOIDEA FROM MONTANA.

BY AUSTIN W. MORRILL, PH. D., MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.

Bombus Cooleyi, n. sp.—♀. Length, 16–17 mm. Integument black; clothing black, yellowish white, pale ochreous yellow and rusty yellow. Head, seen from in front, about as wide as long. Malar space about one-sixth the length of eye. Third segment of antenna one-half longer than fourth, and scarcely longer than fifth. Face thickly clothed with pale yellowish-white hair, on the sides mixed with black. Vertex clothed with yellowish-white hair, which is fringed in front with black. Cheeks clothed with brownish-black, sometimes slightly mixed with whitish, hair. Clypeus shining, sparsely punctured, labrum fringed on free edge with rusty yellow hair. Clothing of thorax above and on sides yellowish white, mixed with black in front of insertion of wings. A broad patch of black between the wings surrounds the smooth, polished mesothoracic disc and extends back in a point over the middle of metathorax. On each side of metathorax is a tuft of yellowish white hair.

On sides of propodæum the yellowish-white hair is more or less mixed with black. Coxæ, trochanters and bases of femora on inner side with whitish hair. Clothing of femora elsewhere brownish black. Corbiculæ rusty yellow. Integument of posterior tibiæ dark brown; of tarsi light yellowish-brown. Tarsi clothed with fine, bright yellowish-brown pubescence. Wings slightly stained with brown, nervures brown.

Dorsal surface of abdomen: First segment clothed on each side with a tuft of ochreous-yellow pubescence, the space between being bare, or nearly so; second segment clothed with black, slightly mixed with yellowish, except apical sides, where pubescence is pale ochreous-yellow; third segment clothed similarly to second segment, except on extreme sides, where the pubescence is also pale ochreous-yellow; fourth segment entirely clothed with pale ochreous-yellow pubescence; fifth segment clothed with black, more or less mixed with yellowish pubescence and with a yellowish fringe on apical margin; sixth segment scantily clothed with short black and brownish hair, at apex, brownish, velvety. Ventral surface: Segments two, three, four and five are fringed apically with yellowish-white hair. Specimens from Prof. R. A. Cooley, taken at Middle Cr. Canon, Bridgen Canon and Bozeman (elev. 4,800 ft.), Montana, in June and July, 1899, and July, 1901, respectively.

Colour variety A. Differs from type only in following details of colour: clothing of second and third abdominal segments above, entirely black, except for a few yellow hairs on apical sides of third segment.

From Prof. R. A. Cooley, taken at Bridger Mt., Montana, elev. 6,000 ft., June, 1899.

Colour variety B. Differs from type only in colour of clothing of third abdominal segment above, which is entirely ochreous-yellow, except for a narrow band of black extending along the middle of the dorsum, from the anterior to posterior margin of the segment, and a few black hairs on the sides.

From Prof. R. A. Cooley, taken at Bozeman, Montana, elev. 4,800 ft., June, 1901.

Described from three ♀ specimens; one, the type deposited in the collection of the Mass. Agric. College; co-types deposited, one at the U. S. Nat. Museum and one in the collection of the Montana Agricultural College. Varieties A and B were described from one ♀ specimen of each, both in the collection of the Mass. Agric. College.

I take pleasure in naming this species after my friend, Prof. R. A. Cooley, of the Montana Agric. College.

Bombus atrifasciatus, n. sp.—♀. Length, 17½ mm. Black, clothed with unusually fine and long, black and pale yellowish-white hair. Head, seen from in front, considerably longer than broad.* Eyes comparatively small. Malar space about one-half the length of eye. Face broad. Third segment of antenna slightly longer than fifth; fifth a little longer than fourth. Clypeus strongly arched, shining, sparsely and rather coarsely punctured on sides. Labrum deeply cleft, sparsely clothed with brownish pubescence. Head clothed with brownish-black pubescence, mixed with whitish between bases of antennæ. Thorax clothed with pale yellowish-white pubescence, except a broad oval band of black between the wings. Coxæ, trochanters and bases of femora of first and second pairs of legs clothed with whitish pubescence; femora elsewhere than at base, tibiæ and tarsi clothed with reddish-brown pubescence. Coxæ, trochanters and femora of third pair of legs clothed with long yellowish-white hair; corbiculæ rusty yellow, inner side of first tarsal segment light brown, hind tarsi elsewhere clothed with very fine yellowish pubescence. Integument of legs brownish black. Wings stained with brown, nervures dark brown. Abdomen rather robust. Dorsal surface: segments one, two, four and five clothed with pale yellowish-white pubescence; extreme sides and lateral portions of the posterior margin of segment three clothed with pale yellowish white, remainder of three clothed with brownish-black pubescence; segment six sparsely clothed with short brownish yellow pubescence, velvety at apex. Ventral surface: segments two, three, four and five are fringed apically with pale yellowish-white hairs, much longer on sides than in the middle; segment six clothed at apex with brownish-yellow, velvety pubescence.

Described from one ♀ specimen from Prof. R. A. Cooley, taken at Gallatin Co., Montana, elev. 9,400 ft., collected in July, 1900. Deposited in collection of Mass. Agric. College.

Psithyrus latitarsus, n. sp.—♀. Length 19–20 mm. Integument black, clothing black and yellow. Head seen from in front, a little longer than broad. Malar space about one-fourth the length of eye. Clypeus punctate. Third and fifth segments of antenna subequal, fourth segment about two-thirds as long as third. Clothing of head black, slightly mixed with yellow on vertex. Clothing of thorax brownish-yellow, except a narrow band of black between the wings and a little black on sides of

*In the type, the length of the head, measured from vertex to base of the labrum, is 6 mm.; breadth 5 mm.

propodæum. Wings subhyaline, smoky brown, nervures brown. Legs, except tarsi, clothed with black and brownish-black pubescence. First tarsal segments clothed with brownish-black, except inner sides and tips, which with the four following tarsal segments are clothed with brownish-yellow pubescence, darkest on inner side of first tarsal segments. Length of metatarsus about two and one-half times its greatest width, posterior edge strongly arcuated.

Dorsal surface of abdomen: Clothing sparse and short; black and pale lemon-yellow, the hair of the former colour usually tipped with brownish or yellowish, more noticeable on posterior margins of the segments. Pubescence on first segment black, sometimes mixed with yellow on the sides; on second segment black; on third segment black, with more or less yellow on sides posteriorly; on fourth segment entirely yellow, except for a patch of black on middle of basal half, which may or may not extend in a point to apex of segment; on fifth segment black except extreme sides, which are yellow; terminal segment naked except for a very fine brownish velvet-like pubescence below and on sides above ventral surface of abdomen; segments one to five have an apical fringe of black hairs. From each side of apical segment below arises an angular, keel-like process, which is directed outwards and downwards, the two converging posteriorly, becoming less pronounced, and disappear near the tip of the segment. From above these keel-like processes can be plainly seen extending outwardly from the sides of the apical segment.

Described from nine ♀ specimens from Prof. R. A. Cooley, taken at Gallatin Co., and Bozeman, Montana. Type deposited in collection of Mass. Agric. College. Co-types at Mass. Agric. College, U. S. Nat. Museum, and at Montana Agric. College.

This species in colour, general form and size resembles *P. insularis*, Smith; but the two cannot be even closely related, as will be seen from the following partial description of the latter species:

Malar space about one-third length of eye. A tuft of yellow on head just above insertion of antennæ, another on vertex, and sometimes a very small one between insertion of antennæ—all fringed with black. Metatarsus about three times as long as its greatest breadth, posterior margin nearly straight. Apical segment of abdomen below with a simple rounded swelling on each side, not projecting enough to be noticed from above.

I have examined thirteen ♀ specimens of *P. insularis* from Montana and one from New Hampshire (Durham), all of which agree with Smith's

description of the species. One of these specimens was sent to Washington, D. C., where it was compared by Mr. Ashmead with a specimen of *P. insularis*, determined by Cresson, and was found to agree.

P. latitarsus, n. sp., also resembles *P. campestris* of Europe in colour, but can be readily separated from it by the broader metatarsus and the structure of the ventral side of the terminal abdominal segment.

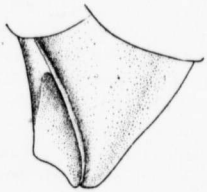

FIG. 9.

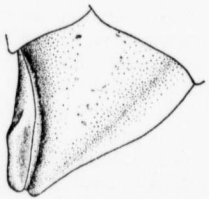

FIG. 10.

FIG. 11.

FIG. 12.

Fig. 9.—*Psithyrus latitarsus*, n. sp.; side view of terminal segment of abdomen.

Fig. 10.—*Psithyrus insularis*, Smith; side view of terminal segment of abdomen.

Fig. 11.—*Psithyrus latitarsus*, n. sp.; tarsal segments of left hind leg.

Fig. 12.—*Psithyrus insularis*, Smith; tarsal segments of left hind leg.

SOME NEW NORTH AMERICAN HOMOPTERA.

BY E. B. BALL, AG. COLLEGE, LOGAN, UTAH.

Phlepsius collitus, n. sp.—Resembling *fulvidorsum*, but smaller and paler. Colour fulvous, elytra brown, with two imperfect light bands. Length, ♀, 6 mm.; width 2 mm. Vertex short, obtusely rounded, but little longer on middle than against eye, three times wider than long; disc convex; the anterior margin distinct, but not sharply angled; elytra rather long and narrow; venation distinct, claval veins separate, parallel. Colour: vertex fulvous, sometimes with faint brownish mottling; face uniform dull brown; pronotum fulvous, usually mottled with brown on the disc; scutellum fulvous. Elytra pale, heavily inscribed with brown, omitting three spots on the sutural margin, an oblong area just inside the costa on the apical half, and a pair of oblique bands starting from the first and last sutural spots, which are milky white. In the lightest specimens the brown tends to run together into dark blotches on the costa and between the white spots on the suture. Genitalia, female segment twice the length of the penultimate, the lateral angles obtuse, the posterior margin roundingly produced on the median third, and strongly notched in the middle. Disc of the segment fulvous, the posterior margin on each side of the slit black, the lateral angles light.

Described from three females from Ames, Iowa. This species has long been confused with *fulvidorsum*, but is readily distinguished by the shorter head and distinct genitalia.

Phlepsius lippulus, n. sp.—Form of *fulvidorsum* nearly, but slightly smaller, and with a shorter vertex. Colour milky white, with three brown bands. Length 5.5 mm.; width 1.75 mm. Vertex nearly right-angled, one-third longer on middle than against the eye, twice wider than long, acutely angled with front, the margin distinct, except near the eyes. Front rather narrow; margins straight. Pronotum long, strongly angled in front, disc convex in both diameters. Elytra rather narrow, the venation obscure. Colour: vertex pale orange, an ivory white median line on tip, with a pair of oval brownish spots adjoining it, and a pair of black dots on the margin, nearly half way to the eyes. Face pale, slightly and evenly irrorate with fulvous brown. Pronotum fulvous brown; the anterior submargin white. Scutellum fulvous brown; the oblique margins light, interrupted with a pair of black spots. Elytra milky white, a transverse fulvous brown band across the middle of clavus, another just back of clavus and a narrow apical margin of brown. The second band

forks on the middle of corium, and begins and ends in dark spots on the margin. A round black dot in the middle of the anterior milky band against the claval suture. Genitalia: female segment moderately long, half longer than the penultimate; posterior margin nearly straight, slightly roundingly produced on the median half.

Described from two female specimens from Biscayne Bay, Fla., collected by Mrs. Annie T. Slosson. This is a beautiful and strikingly distinct species. The milky-white elytra with the distinct brown bands will readily separate it from any other broad-headed species.

Phlepsius pauperculus, n. sp.—Resembling *albidus*, but smaller and with a sharper vertex. Colour pale greenish-white; elytra faintly fuscous marked. Length 3 mm.; width less than 1 mm. Vertex nearly as long as pronotum, half wider than long, nearly right-angled before; disc flat; anterior margin thick, slightly acutely angled with face. Face strongly convex in profile; pronotum short, wrinkled, depressed just back of the anterior margin. Elytra short, broad; venation indistinct. Colour: pale greenish-white. Vertex sometimes pale yellowish-white. Elytra pruinose, white or greenish-white, with a very few fuscous dots. Face and beneath pale greenish-white. Genitalia: female segment rather long, over twice the width of the penultimate; posterior margin nearly straight, the lateral angles rounding; median fourth slightly produced and faintly notched.

Described from three specimens taken at Grand Junction, Colo., by E. P. Van Duzee and the author.

Phlepsius Franconiana, n. sp.—Resembling *Uhleri*, but larger, with a more acutely angled vertex and a narrower head. Length, ♂, 5 mm.; width 1.4 mm. Vertex sloping in same plane as pronotum, slightly transversely depressed, subangulate, with the margins distinct; margins subparallel. Face as in *E. strobi*, the front slightly more flaring above and with the base angled instead of rounding. Pronotum truncate, or very slightly emarginate, its anterior margin strongly curved. Colour: vertex and pronotum fawn colour, with light mottling. Scutellum testaceous, with four white points in a triangle at apex. Elytra brown, with brownish fuscous irrorations and reticulations, a broad, light band just back of scutellum, a narrow line just before the apex of clavus, and an irregular one just before the apex. The bands are strictly transverse, and the middle one is slightly narrower than the brown one in front of it. The reticulations are continued across the light areas. Face fawn colour, with

fuscous irrorations and a white mark just under the apex of vertex. Eyes red. Genitalia: male valve triangular, two-thirds the length of the ultimate segment; plates long, triangular, their margins straight; apices acute, two and one-half times the length of the valve, slightly exceeded by the pygofers. The margins clothed with fine silky hairs, submargins with coarse bristles arising from black spots.

Described from one male from Franconia, New Hampshire, taken by Mrs. Annie T. Slosson, and kindly sent me by Mr. Van Duzee.

Thamnotettix waldana, n. sp.—Form and general appearance of *montana* nearly, slightly larger and lacking the white markings of that species. Testaceous brown; the vertex and margins of elytra pale. Length, ♀, 5.5 mm.; ♂, 5 mm. Vertex transversely depressed, one-fourth longer on middle than against the eye, over twice wider than long, broadly and evenly rounding to the front. Pronotum twice longer than the vertex, rugose on the anterior submargin. Elytra rather long, narrow and closely folded behind; venation distinct, similar to that of *belli*.

Colour rusty brown; the vertex pale yellow, with a trace of rusty brown near base, sometimes forming a tranverse band in the male; the tips of the claval nervures and the costal margin of the elytra, from before the middle to just before the tip, white. Face and below varying from pale to nearly all fuscous. Genitalia: female segment rather long, truncate, with a broad triangular notch containing a strap-shaped tooth as long as the segment. Male valve short, obtusely rounding; plates three times as long as valve, rather long, spoon-shaped, the margins clothed with long hairs.

Described from sixteen specimens taken in North Park and Rico, Colo., by the author.

Thamnotettix orbonata, n. sp.—Resembling *atridorsum* and *infuscata* in general form, but paler. Pale, smoky greenish, with a broad rounding vertex. Length 5.25 mm. Vertex rounding to front, half as long as its basal width, a little more than half the length of the pronotum, one-third longer on middle than against the eye. Head slightly wider than the pronotum; front parallel margined, narrowing to the clypeus; clypeus narrow, constricted above the middle. Elytra much longer than the abdomen, broad and flaring slightly behind. Venation as in *atridorsum*. Colour pale green, slightly tinged with smoky brown. Elytra subhyaline, slightly iridescent; eyes dark; ocelli deep green. Genitalia: female segment short, over twice wider than long; posterior

margin very slightly sinuate; ovipositor long, slightly exceeding the rather slender pygofers.

Described from two females from Biscayne Bay, Fla., collected by Mrs. Slosson.

Thamnotettix Shermani, n. sp.—Resembling *cyperacea* in general appearance. Slightly stouter, paler, with a double-lined vertex margin and a deltocephaloid venation. Length 5.25 mm.; width 1.5 mm. Vertex flat; anterior margin obtusely angular, definitely and slightly acutely angled with the front, a third longer on middle than against eye, half wider than long. Elytra rather long, but with the apex broader than in *cyperacea*. Venation distinct, strong; two cross nervures between the sectors; the central anteapical cell long, constricted and divided beyond the middle. Colour: pale tawny, iridescent over a subolivaceous ground. Vertex pale tawny-yellow; anterior margin white, narrowly margined above and below with black, the black line above almost constricted into six dots. Elytra subhyaline with a slight tawny iridescence. Face pale tawny, below pale straw. Genitalia: female segment rather long; posterior margin nearly straight; the lateral angles prominent.

Described from one female taken at Raleigh, N. C., by Prof. Franklin Sherman, who sent a number of fine Jassidæ for determination.

Chlorotettix rugicollis, n. sp.—Resembling *spatulatus*, but with a broader vertex. Green, with a red band on the margin of vertex. Length 7 mm. Vertex broad, obtusely rounding, but little longer on middle than against eye, two and one-half times longer than wide, evenly rounding to front. Elytra rather long, the veins large and distinct. Colour: pale green, a transverse red band on margin of vertex and front, sometimes extending over the eyes. The male has the elytra clouded with tawny brown. Genitalia: female segment deeply triangularly excavated, with a strap-shaped tooth, similar to that in *spatulatus*. Male valve nearly as wide as the ultimate segment, and about half as long; plates nearly flat, long, triangular; the margins sparsely haired.

Described from four specimens: One female from Jacksonville, Fla., from Otto Heidemann; a pair from Woodbine, N. J., taken Aug. 2nd, 1902, by E. P. Van Duzee; and one female from Victoria, Tex., received from U. S. Nat. Museum. The remarkably broad vertex with the red margin will at once separate this from the other spatulate forms in this group.

Driotura gammeroidea, var. *fulva*, n. var.—Size and form of the species larger than var. *flava*. Entirely brownish fulvous, except the eyes, which are darker.

Described from eight specimens from Denver, Colo., collected by the author.

Driotura robusta, var. *vittata*, n. var.—Size and form of the species, black and white, variable. Vertex with a transverse light line on anterior margin, expanded into two spots at apex; four oblique black stripes on elytra, alternating with four light ones. A transverse light band on abdomen, and a broader one on face.

Described from six examples from Southern Colorado.

Acinopterus acuminatus, var. *variegatus*, n. var.—Form and structure of the species, but much lighter coloured. Vertex, pronotum and scutellum inclined to be reddish, especially in the male. Elytra whitish pruinose, nervures greenish, not margined, except towards apex and along the sutural margin, three fuscous points along the suture, and sometimes one on the disc of each elytron.

Described from twenty-four specimens from Colorado and Arizona.

A. acuminatus, var. *viridis*, n. var.—Form and structure of the preceding nearly; slightly smaller. Bright grass-green both above and below. Eyes and extreme tip of elytra fuscous.

Described from a number of specimens from Southern Colorado and Arizona. This is the common form in Southern Colorado, where it was collected by E. P. Van Duzee and the author.

A. acuminatus, var. *brunneus*, n. var.—Slightly larger than the preceding variety. Vertex, pronotum and scutellum pale green, washed with cinnamon-brown. Elytra pale cinnamon-brown, slightly fuscous at tip. Whole insect with a slight tawny iridescence, below pale green.

Described from three specimens from Rifle, Colo.; taken by the author.

Liburnia Slossoni, n. sp.—Resembling *Stenocranus lautus* in size and general appearance. Somewhat resembling *D. maidis*. Length, macropterous ♀, 5 mm. Face broad, strongly carinate, slightly narrowing above. Elytra very long and narrow, resembling a *Stenocranus*, the outer branch of the first and the inner branch of the third sector uniting with the cross nervure alongside the second sector. Colour: Face black, the carinæ light, basal compartment of vertex, pronotum and

scutellum pale creamy. A pair of parallel black stripes extending the entire length, interrupted on the sutures; a pair of black spots outside these on the posterior part of the scutellum, and a pair of black spots behind the eyes. Elytra pale creamy, subhyaline, a brownish stripe covers the outer part of the base of clavus and inner half of corium back to middle, beyond this the nervures are deep smoky-brown, except the outer fork of the outer sector, its cross vein and the outer apical nervure. Legs striped with fuscous and pale.

Described from three females collected at Biscayne Bay by Mrs. Annie T. Slosson. This very large and distinct form in this group is only one of the many fine Homoptera that have come to hand from Mrs. Slosson's collecting, and I take pleasure in naming it after her.

Phyllodinus flabellatus, n. sp.—Larger and lighter coloured than *nervatus*, and with a longer vertex. Testaceous brown, with the posterior half of the vertex, the scutellum and the tips of the short wing pads milky white. Length, brachypterous ♀, 3 mm., width 2 mm. Head slightly narrower than pronotum, vertex nearly quadrate, rounding in front. Front parallel margined, much longer than wide. Elytra about as long as head and pronotum, truncate behind, venation simple, indistinct. Colour: vertex and face dark brown, with about seven narrow interrupted transverse white bands. A light stripe across the apex of front, extending on across the genæ to join the stripe on the reflexed portion of pronotum. Clypeus piceus, pronotum with the anterior half piceous brown, posterior half and scutellum milky white. Elytra brown, the posterior margin milky white, broadest towards the costal margin. Abdomen above brown, a median and three lateral rows of white dashes, the anterior ones reduced to dots. Below dark brown or pitchy. Two anterior pairs of femora dirty straw, their foliaceous tibiæ fuscous, the tarsi white, tipped with black.

Described from two females, one from Washington, D. C., from the collection of Otto Heidemann, and the other from Riverton, N. J., collected by C. W. Johnson, and sent by E. P. Van Duzee. Another female from the District of Columbia apparently belongs here, but is immature and not fully coloured. This is a pretty species, and might be mistaken for a *Pissonotus* but for the foliaceous tibiæ.

TWO NEW PHYTOPHAGOUS HYMENOPTERA.

BY WILLIAM H. ASHMEAD, A. M., D. SC.

Xiphydria erythrogaster, sp. nov.—♂. Length, 9.8 mm. Head and thorax black, marked with yellow as follows: The black of the head is confined to the occiput, a large spot on the crown is dilated on each side, but does not quite reach the eye, while the yellow is confined to the cheeks, the face to above the insertion of the antennæ, the front orbits and a V-shaped mark above the eyes. Mandibles yellow, with black teeth; prothorax yellow, with a black line on collar above and a black mark in the lateral depressions: mesonotum black, with two yellow spots on the disc; scutellum with the axillæ yellow; meso- and meta-sternum yellow, with black marks. The abdomen is pale ferruginous, except the first segment above, which is black; the dorsal segments 1 to 4 have a yellow spot on each lateral margin, while the ventral segments 4 to 6 have tufts of black hairs. The antennæ are 16-jointed, the first four joints pale ferruginous, the others black or blackish, joints 4 to 6 being tipped with yellow, the scape the longest joint, the third joint longer than the fourth, the following gradually shortening. Wings hyaline, faintly tinged, the veins brown. Legs pale ferruginous, the coxæ and trochanters more or less yellowish, or yellow in front.

Type.—Cat. No. 6844, U. S. N. M. (Ashmead collection).

Hab.—Avalon, N. J. (Charles W. Johnson).

Calameuta Johnsonii, sp. nov.—♀. Length, 9 mm. Black and shining; the mandibles, except at apex, the apex of the third palpal joint, the front legs anteriorly from the middle of the femora to the fourth joint of the tarsi, a band on each side of abdomen, a spot at the apical angle of the 5th and 6th ventral segments, and the margins of the hypopygium, lemon-yellow; wings slightly smoky, the veins blackish, the stigma brown; antennæ thickened towards apex, 21-jointed, the third joint shorter than the fourth.

Type.—Cat. No. 6843, U. S. N. M. (Ashmead collection).

Hab.—Riverton, N. J. (Charles W. Johnson).

QUEBEC DIPTERA.

BY THOMAS W. FYLES, 54 WOLFE ST., LEVIS, QUEBEC.

I have taken, in the Province of Quebec, the undermentioned species of two-winged flies, the names of which do not appear in the Toronto Check List :

Culex consobrinus, *Desvoidy*.
Chironomus tæniapennis, *Coq.*
Tanypus hirtipennis, *Loew.*
Diplosis grassator, *Fyles.*
Bibio pallipes, *Say.*
Plecia heteroptera, *Say.*
Tipula cincta, *Loew.*
Pachyrrhina lugens, *Loew.*
Stratiomyia obesa, *Loew.*
Chrysopila quadrata, *Say.*
Leptis vertebrata, *Say.*
Leptis Boscii, *Macquart.*
Dasyllis flavicollis, *Say.*
Lampria bicolor, *Wiedemann.*
Leptogaster histrio, *Wiedemann.*
Argyramœba sinuosa, *Wied.*
Thereva senex, *Walker.*
Pterodontia flavipes, *Gray.*
Rhamphomyia umbrosa, *Loew.*
Dolichopus plumipes, *Scopoli.*
Syrphus xanthostomus, *Wied.*
Syrphus arcuatus, *Fallen.*
Sphegina rufiventris, *Loew.*
Rhingia nasica, *Say.*
Xylota curvipes, *Loew.*
Cistogaster immaculata, *Macq.*
Ocyptera Carolinæ, *Desv.*
Echinomyia florum, *Walker.*
Gonia capitata, *De Geer.*
Exorista vulgaris, *Fallen.*
Sarcophaga sarraceniæ, *Riley.*
Pollenia rudis, *Fabricius.*
Ophyra leucostoma, *Wiedemann.*
Anthomyia radicum, *Linneus.*
Blepharoptera lutea, *Loew.*
Tetanocera plebeja, *Loew.*
Pyrgota undata, *Wiedemann.*
Stictocephala cribellum, *Loew.*
Scioptera vibrans, *Linneus.*
Chætopsis ænea, *Wiedemann.*
Eutreta sparsa, *Loew.*
Eurosta solidaginis, *Fitch.*
Tephritis albiceps, *Loew.*
Palloptera superba, *Loew.*
Heteroneura spectabilis, *Loew.*

ENTOMOLOGICAL RECORD.—In the last two Annual Reports of the Entomological Society of Ontario, Dr. James Fletcher has given a very valuable and highly-interesting record of the important events in the world of Canadian Entomology noted during each year. As the preparation of this record involves a large amount of labour on his part and its completeness and consequent value depends upon individual workers throughout the Dominion, it is earnestly hoped that each one will send in, without delay, notes of any remarkable captures or interesting observations that he has made, and not put off doing so to the end of the season. If received week by week, the trouble of classifying the notes and the necessary correspondence is not very great, but if allowed to accumulate it becomes most burdensome. Address (postage free), Dr. James Fletcher, Central Experimental Farm, Ottawa.

NOTES ON THE STRIDULATION AND HABITS OF RANATRA FUSCA, PAL. B.

BY J. R. DE LA TORRE BUENO, NEW YORK.

Little is known regarding the sounds produced by the Rhynchota, and that little refers almost exclusively to the Cryptocerata, of which Corixa has had the most attention; and some few observations have been made on Nepa, Sigara and Notonecta. It seems to me, therefore, that it would be well to put on record the observations and notes made by me on the stridulation of *Ranatra*, together with a few other remarks on this insect.

Ranatra fusca, Pal. B., supposed to be the common form in the north-eastern portion of America, on being removed from its natural element, gives forth a peculiar note. Recently I have had the opportunity to study this at close range, in a specimen at present living in my aquarium. On taking the Hemipteron out of the water, the stridulation can be plainly felt by the fingers, even though, as is at times the case, no sound is audible. The vibrations, when heard, produce a rasping, creaky chirp. Careful examination shows that the sound-producing apparatus of *Ranatra* departs somewhat from the more commonly met devices, while being similar to that in other insects in regard to the general method of producing tonal vibrations by the friction of suitably roughened surfaces in contact. The stridulatory areas in this insect are situated in the deep and elongated coxal cavities of the first pair of legs. This, as far as I have been able to learn, is an unusual position, which is not mentioned by Packard in his "Text-book of Entomology"; nor have I been able to find any reference to the production of sounds by *Ranatra* in the literature on the subject that I have been able to consult.

For the proper comprehension of the *modus operandi*, a brief and necessarily superficial description of that portion of the thorax in which the coxæ are set is not out of place. The narrow, elongated prothorax of *Ranatra* is not of sufficient width to receive both coxæ with any space between them. In order, therefore, to provide for this, the segment in question expands cephalad, and is provided with two deep slits extending to the anterior margin, one on each side, for the reception of the coxæ. Due to the extreme shortness and transverseness of the head, the lateral processes of the cavities have the appearance of cheeks, and resemble somewhat the cheek-pieces of a Greek helmet. The coxæ rub against the inner surface of the exterior walls of the cavities. Doubtless this surface

is roughened in some manner, as well as the portion of joint mentioned, on the areas of friction. This mechanism cannot be properly explained without a dissection, hence the insufficiency of the preceding.

To stridulate, *Ranatra* holds the first pair of legs in the same plane as the body, perfectly straight, and somewhat separated at the extremities, in such a manner as to press the coxæ against the inner surface of the outer wall of the coxal cavity. The insect jerks its legs while in this position back and forth, and thus causes the vibration. Both legs may be in motion at once, independently of each other; or one only may be waved about. Each leg, therefore, stridulates without reference to the other, as *Ranatra* jerkily moves it about in anger or excitement.

In the literature and references that I have been able to look up, no mention is made of this peculiarity of *Ranatra*, although it cannot have passed unnoticed by students of these hemipterous groups. In his "*Catalogus synonimicus et topographicus Rhynchotorum aquatilium hucusque in Italia repertorum*," Dr. A. Griffini gives a very full bibliography of the aquatic Rhynchota, and he records only one essay on the subject in question, "On Stridulation in the Hemiptera Heteroptera," by O. H. Swinton, which mentions *Nepa*, but makes no reference to *Ranatra*. Mr. G. W. Kirkaldy, F.E.S., also has had a paper on "The Stridulating Organs of Water Bugs (Rhynchota), especially of Corixidæ," treating principally of the last named. At some future date I shall endeavour to give a fuller account of the organs in *Ranatra*, together with a bibliography. Meantime, a few random notes on habits may not be without interest.

The way in which *Ranatra* seizes its prey is very characteristic. I feed mine on living flies, which are presented with a forceps under water. When the fly attracts its attention, *Ranatra* very slowly, almost imperceptibly, moves its fore-legs, with the knife-like tarsus away from the tibia, toward its prey. When the tibiæ are almost, or quite, touching the victim, the movement is so sudden and quick that one is aware of it only by seeing the prey seized. Sometimes its hold is not satisfactory, and then it will let go, first with one tarsus, get a firmer grip with that, and then do the same with the other. Once it has the fly securely held, *Ranatra* slowly approaches it to its extended beak, with which it seems to touch and feel it until it finds a suitable spot, and proceeds to a leisurely meal. From this it might seem that *Ranatra* depends for its food not on such inhabitants of the water as swim by, but on the unwary ones that come to

rest anywhere within reach of its rapacious claws, and then only for some time. This is somewhat borne out by the fact that there are two or three smaller insects in the aquarium with my specimen, which have thus far entirely eluded *Ranatra's* appetite.

A noticeable characteristic is the exceeding slowness of this insect's motions. They are practically imperceptible, and only the change of relative position of limbs or body makes one aware that it has moved. On occasion, *Ranatra* swims, not very fast nor very gracefully, but sufficiently well to afford it more rapid transportation when it chooses to resort to this method of locomotion. The fringing hairs of its long legs are of great help in this. The second and third pairs are the ones used in swimming and walking, or otherwise moving about, by this insect, the first pair being used almost exclusively for prehension.

SOME CORRECTIONS TO DR. DYAR'S LIST OF NOCTUIDS.

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I.

In Dr. Dyar's recent very full and careful List of North American Noctuids, Wash. Cat., pp. 98–247, are a few errors which I would briefly point out in this journal. They have mostly arisen from a neglect of a couple of papers in CAN. ENT., and one in Proc. Am. Phil. Soc., 1895, as well as from a two literal following of Prof. Smith's Washington list. With regard to the general sequence of the order adopted, I have given that preferred by myself in these pages, and can only repeat here that the Noctuid series *(Lithosia—Noctua)* affords a parallel to that of the blues and skippers in the butterflies, and that I should place them below the series *Bombyx, Lachneis—Geometra*, disturbing as little as possible the older classifications.

For sequence and nomenclature see my paper, CAN. ENT., XXXIII., 116. The papers in CAN. ENT. apparently neglected by Dr. Dyar are: Vol. XXV., 217, and 153. The types of the forms therein described are, I believe, in the National Museum, Washington. They were sent at the time to Prof. Riley.

I shall not especially and in detail again refer to the names of Mr. Walker which incorrectly replace for the moment certain of these given by me. They have been already discussed in these pages; all the facts with regard to the use of *Hormisa* are given by me in the paper in the Am. Phil. Proceedings, above alluded to, p. 429, 1895. For *Hormisa*, which is a synomyn of *Epizeuxis*, the term *Litognatha* should be substituted.

A small box was mailed to me at Bremen by the late Mr. Hill, from Albany. As I remember, it contained, among the few specimens, the types of *Hepialus auratus* (*Sthenopis*, Cat. p. 580) and *Rheumaptera immediata* (3404 Cat., marked with a star and type stated to be "lost").

The contents of the box were deposited in the Bremen Museum for preservation.

In Dr. Dyar's list of Noctuids, I notice the following double names: The specimens identified as 2249 *sericea*, are probably 2253 *venustula*. What *sericea* is, is not known; the erroneous determination came from Albany. No. 2134 and No. 2143 I considered identical. No. 2201 should be referred as synonymous with No. 2223. The original name was changed by the authors.

2473. *Formosa* is type of *Chrysanympha*, Grote, Proc. Am. Phil. Soc., 417, 1895. I cannot regard this as congeric with *moneta*, which is type of *Polychrysia*, Hubn. (Grote, id.). But I may be wrong.

2475. *Æreoides*, not "*æroides*"; this mistake is copied from Smith, Wash. Cat. 247.

2479. *Festucæ* is type of *Chrysaspidia*, Hubn. Verz. (Grote, id.), and *illustris* is type of *Euchalcia*, which latter term is therefore here wrongly employed, and should be dropped. Speyer, Staudinger and myself agree that *Putnami* is not a race of *festucæ*, but a distinct species, and it appears to be also Asiatic in its range (Staud. and Rebel Cat. 2547, p. 237).

2489. *Egena*: the identification of this species from Florida, given in Smith's List, p. 251, CAN. ENT., XV., 26, should have been cited.

2493. The identification of *fratella* with *ou* is incorrect, as stated by Smith, Wash. List, p. 252. The two are distinct species, in my opinion. Any confusion between them seems to arise from a wrong identification of Guenée's species.

On page 206 of Dr. Dyar's List, the genera, *Oxycilla tripla* and *Zelicodes linearis*, Proc. Am. Phil. Soc., l.c., 1895, are omitted. *Linearis* is wrongly cited under "*Hormisa*," No. 3033. Of this species Prof. Smith has written that it does not belong to *Litognatha*, and is not a Deltoid at all. Types of these two species are in coll. Neumogen, where Dr. Dyar examined them for me, l.c., p. 418.

Mailed August 1st, 1903.