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THE CANADIAN  
ENTOMOLOGIST.

VOLUME XVII.

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# The Canadian Entomologist.

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No. 1

## ENTOMOLOGY FOR BEGINNERS.

### *THE RASPBERRY SAW-FLY.*

*Selandria rubi* Harris.

BY THE EDITOR.

This destructive insect appeared in great force during the past season in many parts of our Province, doing much damage to the foliage of raspberry plants. Although in form and habits the larva of this insect much resembles the currant worm, it is not nearly so well known, nor is it usually so promptly recognized. There are several reasons for this. The raspberry saw-fly does not appear in such flocks as the currant worm, because the eggs are laid singly and not often near together; nor is the larva easily detected owing to the fact that in color it so exactly resembles that of the leaf on which it feeds.

The eggs are oval, yellowish white and semi-transparent, and are buried beneath the skin of the raspberry leaf near the ribs and veins, placed there by means of the saw-like apparatus situated at the extremity of the body of the female, by which slits are cut in the tissues of the leaf. The skin covering the egg is so transparent that the movements of the enclosed larva may be observed several days before it is hatched. It escapes through an irregular hole made on one side of the egg.

The newly-hatched larva is about one-twelfth of an inch long, with a greenish-white head having a black eye-like spot on each side. The body is nearly white, semi-transparent and thickly covered with transverse rows of white spines. As it grows older the color changes to green, and when full grown it measures about three-quarters of an inch in length and appears as shown on the leaf in figure 1. The body then is of a dark green color, and is thickly set with pale green branching spines. In figure 1 some of the segments of the body are represented, magnified, showing the arrangement of the spines on the back and side. The head is small, of a pale yellowish green color, with a dark brown dot on each

side. The eggs are laid near the tips of the growing canes, and the larvæ are usually found feeding on the upper surface of the young leaves.

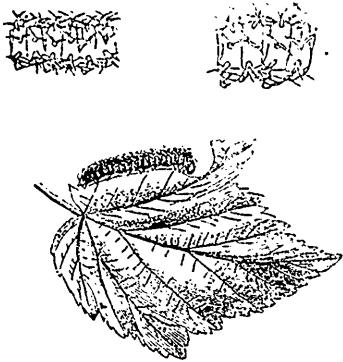


Fig. 1.

When full grown, which is generally from the middle to the end of June, the larva leaves the bush and descends to the ground, where it penetrates beneath the surface and constructs a small oval earthy cocoon mixed with silky and glutinous material. The larva remains unchanged within the cocoon for a considerable period, but finally transforms to a chrysalis from which the perfect insect is produced the following season.

This is a four-winged fly, shown magnified in figure 2, which appears from about the tenth of May to the beginning of June, or soon after the young leaves of the raspberry begin to appear. The wings, which are transparent with a glossy surface and metallic hue, measure when expanded about half an inch across; the veins are black and there is a streak of black along the front margin, extending more than half way towards the tip of the wing. The anterior part of the body is black, the abdomen of a dark reddish hue. Early in the morning when the air is cool these flies, when approached, will fall from the bushes to the ground and remain inactive there long enough to admit of many of them being caught and destroyed, but as the heat of the day increases they become much quicker in their movements, and when disturbed take wing readily.

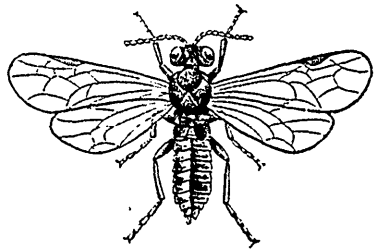


Fig. 2.

The larvæ may be promptly destroyed by syringing the bushes with water in which powdered hellebore has been mixed in the proportion of an ounce of the powder to a pailful of water, or with Paris green and water in the proportion of a teaspoonful of the poison to a pailful of water.

## SPECIES, VARIETIES AND RACES.\*

BY JOHN B. SMITH, BROOKLYN, N. Y.

At the recent meeting of the Entomological Club of the A. A. A. S., Dr. Horn found occasion to say that "nature has no genera, but species only"—genera are mere artificial aids to classification, are seldom sharply defined, and are of very unequal value, according as the student is inclined to value characters; nor are the same characters useful in all the orders, nor indeed in the several families in the same order.

The important part of Dr. Horn's remarks, for the present purpose, is the assertion that "nature has no genera." That Dr. Horn has an experience in American Coleoptera large enough to render such an observation from him of great weight, no one will dispute, and taking the Lepidoptera into consideration I am led by my studies to agree with him thoroughly.

Afterward, at the same meeting, Prof. Fernald, than whom we have no better authority on Micro-lepidoptera, stated that he was greatly interested in Dr. Horn's view of genera, but for his part he would be well content to have a satisfactory limit to species.

What is a species? The question has oft been asked, and never satisfactorily answered. Dr. LeConte long since stated in reply to that question, "Alas! we do not know." Elsewhere he defines it as "an assemblage of individuals which differ from each other by very small or trifling and inconstant characters, of much less value than those in which they differ from other assemblages of individuals; but who determines the value of these characters? The experienced student of that department to which the object belongs; therefore groups of individuals which are recognized as such by those who from natural power and education are best qualified to judge."

This, therefore, does not quite answer the question, but leaves an element of opinion in the matter.

Not long since, Mr. W. H. Edwards, in an article on the species of *Papilio*, says: "I hold that every permanent form possessed of marked characters which distinguish it from other forms, and which breeds true to its type, so far as appears or we can know, is to be regarded as a species,

at least till the contrary is proved. And the proof must be actual, not imaginary, facts, not guess work."

Mr. Edwards' definition is very good, but it leaves open the question, What is a "marked character"? That this is a question of opinion will hardly be disputed, and we are thus left as far as ever from a definite reply to our question. I shall not attempt to offer any new definition of a species; but shall in the present essay confine myself to a few instances tending to show that the breeding true to itself is no test of a species, and further that characters to separate species must be sought in other points than color and maculation.

In the Coleoptera no family offers better examples than the Cicindelidæ, and from this family my instances shall be drawn.

The variations of *Cic. 6-guttata* have been recently noted in the CANADIAN ENTOMOLOGIST. My own series of the species consists of 31 specimens, ranging from the immaculate form, blue and green in color, to the *patruale* form with complete median fascia, humeral and sub-humeral spots. The variation in this species is very wide, and is found everywhere, except that the *patruale* form is not found eastward.

A more interesting species is *scutellaris*, of which my series comprises 35 specimens.

In the far west—Kansas, Ind. Terr. and thereabouts—we find the type form of a beautiful metallic red bronze, the scutellar space green, maculation indistinct. It is the only form found in the far west, and is perfectly separable from the following.

In the Eastern States (N. Y., R. I., Md. and Mass., according to my collection) we find a form with similar markings, which are, however, much more distinct, but the ground color is a sordid green. This form is also perfectly distinct from any other, and is recognizable at a glance. With similar markings we find an insect locally in N. J. and Pa., which, however, has the ground color black. It is taken year after year in a small spot near Jersey City, and never shows any approach to the preceding or following. It breeds absolutely true to itself; none of the other forms are taken where it flies. In Northern N. Y., Mass. and Can. we find the same form as to markings, but the ground color brown red with the maculation often connected at margin.

In the Southern States we find the same form green or blue without markings, and in Georgia and perhaps in Va. we find an insect obviously the same, but entirely black. We have therefore a range of color variation

from dead black to bright brown red, to bright green and to metallic bronze red. In maculation from no markings at all to a pale margin to elytra, apical and humeral lunule and marginal spots. The interesting point in these variations is that they are local, that they breed absolutely true to themselves, that they are permanent, possessed of marked characteristics, and are yet merely *races* of one species. Of *Cic. purpurea* I have a series of 46 specimens varying from immaculate bronze red to bright bluish *green*; in maculation from an indistinct median streak to a broad deflexed band, broad apical and humeral lunules, and pale outer margin connecting all markings. The variation is wonderful, and it is not so only in color and maculation, but also in size, and to a less extent in form, *dæcem-notata* being much more slender than the normal form. These, while much less sharply distinct than in the forms of *scutellaris*, are yet largely local, and the local forms in many of the instances breed absolutely true to themselves. The difference between my specimen from Nevada, which is very large and entirely green, and the common Eastern form, is immense, and as great as there is between any two species of the genus.

*C. formosa* is in the West bright metallic red, while in the East it is obscure slate gray, though often with an obvious reddish sheen. These forms breed absolutely true to themselves, and are possessed of marked characters separating them. Yet they are certainly the same. These examples in the Cicindelidæ are not isolated, and indeed it may be said that most of the more widely distributed forms show analogous variations; the variations being important from my point of view by the fact that they are permanent, distinctive, and local.

Thus far as to variations in color. In sculpture there is also a difference, less local, however, the elytra being foveate or not in one and the same form (*abdominalis*), and sometimes almost smooth and distinctly punctured (*Pilatei*).

In sculpture the Carabidæ show more variation, and while my own collection does not show it, Mr. Ulke called my attention to his series, showing an astonishing range of variation in the sculpture of elytra of the same form, and these variations were all more or less local.

Other structural characters vary, and often locally, but need not be especially noted here, the variation in number of the antennal joints in *Prionus* being cited as curious rather than important to our present purpose.



What I have endeavored to show here is a great variability in color and maculation; local constancy of color and maculation, and that the local forms often breed absolutely true to themselves, and come fully within Mr. Edwards' definition of a species.

In the Lepidoptera we find variations equally great. The species of *Satyrus* may serve as an example. Taking the two forms named, *nephele* and *alope* alone, and excluding *pegala*, which really in my opinion belongs with them, we have here two forms, to each of which in most localities Mr. Edwards' definition of a species will perfectly apply.

In my paper on the genus *Satyrus* I have recorded the variations of the species, local and otherwise, and my conclusion on a re-examination of further material is confirmed, showing that in the genus *Satyrus* maculation, so far as any exists, is absolutely valueless for specific separation; and further, though it is possible, of course, to separate the forms, I believe there is no distinct line of demarcation between most of the "species" even recognized in that paper.

In *Chionobas* and *Canonympha* we have analogous variation, also largely local; but the material in these genera is not yet sufficiently large to allow a final conclusion. In the Noctuidæ very similar variations occur. In the East, *Agrotis lubricans* is one of our most constant forms and has a handsome reddish suffusion over the primaries. In Kans. and N. M. is found a form apparently bearing no relation to it; but yet when closely examined proving identical with our Eastern forms, except that the red shade is replaced by blackish. This Western form Mr. Grote named *beata*. In Texas the examples taken are intermediate between the extremes of Eastern and Western types, and as properly referred to one as the other.

The variations of *Agrotis declarata* Wlk. (*campestris* Grt., *decolor* Morr., and *verticalis* Gu.) further illustrate the same local tendencies. This, in the East, is dark in ground color; westerly the thorax and basal space become rust red, and in some localities the only form found has a lilac gray ground color. Now it is scarcely conceivable that with the same amount of material to work with, any one could come to a different conclusion, yet at least two of the forms are good species under Mr. Edwards' definition. Other species show equally striking variations, and yet are undoubtedly alike.

I have cited but a few instances of variation, where the variations are

to an extent constant and local; many more could be cited, but these are sufficient to show—

First, that ground color cannot be exclusively relied upon as specific distinction, either in Coleoptera or Lepidoptera.

Second, that maculation, except where it completely changes a pattern, is not in itself a specific character.

Third, that species which are widely distributed vary, and the variations are often local, and constant.

In reference to this last proposition, it is a recognized fact that in Coleoptera the most common and widely distributed species show the greatest variations. *Pterostichus lucublandus* may be cited as an instance. That the Atlantic coast fauna is very widely distributed, many species ranging from Maine to Texas, and westward beyond the Mississippi. That further west the faunal character changes. The Heteromorous type becomes most prominent; often apterous and usually slow in motion, and living in crevices, the species do not travel much, and well marked forms are often locally common, but not elsewhere found. In the great canons and valleys of the Rocky Mts. and the Sierras, nearly each has its own peculiar fauna, poor in species, but rich in examples, and owing to the natural barriers to the habits of the predominant types, species become fixed, local, and very constant, showing little or no variation.

To the Lepidoptera these natural obstacles do not form as complete a barrier, because of their powers of flight; still we find a tendency to local variation. The *Agrotis* afford good examples of that.

Now in an admitted case like the variation of *Cic. scutellaris* and *Satyrus nephele*, by what term shall we designate these forms? Not as species, for they differ only in characters which are inconstant, yet the characters are locally permanent. Sub-species conveys an indefinite and inaccurate idea; variety is applied also to forms which occur mingled with the type form, and not exclusively applicable to such local forms as I have cited.

An analogous case exists with the highest of beings—man. The best authorities agree in saying that notwithstanding the immense structural differences between them, there is yet but one species of *Homo*. The various forms are termed *racas*. Why not apply the same terms to such forms as *nephele* and *alope*? They are admittedly one species, and yet locally breed perfectly true to themselves, and except in localities where they intergrade, they are easily distinguished. *Pegale* occupies a similar

position, and so do some of the western forms. All these, as is also the case in the Cicindelidæ cited, are offshoots from the same stock which have varied gradually as they spread over a larger territory, and became gradually local and fixed, but yet show their relationship by their identity of structure.

*Satyrus* shows no structural differences except a slight one in wing form, separating what I term group *alope* and group *silvestris*. All the species of each group show their intimate relationship.

To Coleopterists I need hardly speak. Dr. Horn takes every opportunity of saying that color and maculation do not alone suffice for specific separation; only structural characters should be recognized.

Lepidopterists have not yet come to that conclusion. Not only is structure not regarded in the question of a new species, but characters are used—color differences—which are known to vary in allied species. Take the species of *Argynnis*, for instance: What are they based upon? Slight variations in maculation, which an examination of a large series of *cybele*, *aphrodite* or *atlantis*, show to be inconstant.

Yet structural characters are by no means wanting in the Lepidoptera. Of over 200 species of *Agrotis* examined by me, two-thirds show obvious differences in structure, and the others differ in other obvious characters exclusive of color.

Of the species of *Mamestra* thus far examined by me, no two agree entirely in structure; and indeed throughout the Noctuidæ good species are very generally separated by distinctive structural peculiarities. That the Diurnals and Bombycidæ show similar variations is almost certain, and as soon as students in these groups will cease to rely upon minute differences in color and maculation, but will accept the facts that western species vary quite as much and perhaps more than eastern species, then will it be possible so to describe a species that it can be recognized.

The tendency of all species is to vary in color and maculation, and the variations also tend to become locally permanent; still these local forms cannot yet be regarded as anything but races—certainly not species, and it is not only confusing, but discouraging, to see a series of *Colias*, *Argynnis* or *Satyrus* all named as species, differing by such trivial characters that one dares not remove a label or change the position of an insect for fear that the species could not be again recognized.

It is thoroughly illogical at all events for a student to accept the theory of evolution, which necessarily precludes the idea of fixedness in species,

and then to make the slightest and most trivial character serve as a basis for a new species, even when it is known that the character is elsewhere in the genus a known variable one.

In my *Satyrus* paper I termed "forms" what I here term "races." The latter is more expressive and more in accordance with the nomenclature in other departments of zoology.

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## CONTRIBUTIONS TO THE NORTH TRANS-CONTINENTAL SURVEY.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

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### ORTHOPTERA.

Herewith is presented for publication a partial list of the Orthoptera collected by Dr. H. A. Hagen and Samuel Henshaw during the summer of 1882, along the line of the Northern Pacific Railway. The collection, although not an extensive one, contains some new forms, as well as several interesting varieties of well known species. The collection is also of much interest in extending the range of quite a number of species heretofore recorded as occurring only on the eastern slope of the continental divide, or at the extreme eastern edge of the great interior basin, to the western slope.

Taken as a whole, this collection of Orthoptera is very complete for the regions in which it was made, and shows careful work both in its formation and preservation. It is to be regretted, however, that so few specimens of some of the more interesting forms were taken, a feature which, no doubt, might have been remedied to some extent had their value been known at the proper time.

There still remain a few species which are to be more carefully studied and compared before they can be properly placed. These, when I have the time to do so, will be worked up, and, in connection with the doubtful ones here enumerated, will form the subject for a future paper, when, it is hoped, I will be able to add such points as have been carelessly overlooked here.

## ACRIDIDÆ.

*Stenobothrus æqualis* Scudd. Quite a large series of what appears to be this insect were taken July 16, at Yakima River. The specimens differ from eastern ones in several respects, but not enough to warrant describing them as new. The occiput is a trifle longer than usual, and the middle row of spots on the tegmina extends almost to the tip. There are males and females of both greenish and brownish-gray colors.

*Stenobothrus coloradus* Thos. A few examples of the ordinary form on Yakima River, July 16.

*Stenobothrus curtippennis* Scudd. This trim little species is represented by quite a large number of specimens, among which at least three well marked varieties occur. They were taken at various points along the Yakima River in July.

*Stenobothrus* sp. ? A single specimen of a species resembling *S. brunneus*. and perhaps that species, but so badly damaged that it is difficult to place it with a certainty. Same locality as the preceding.

*Chlocaltis abdominalis* ? Thos. The collection contains a single male which is doubtfully referred to this species. Locality not noted.

*Aulocara elliottii* Thos. This species was numerous at Yakima and Ellensburg, as well as at many other points in eastern W. T. Among the specimens examined I find two well marked varieties which agree with Mr. Scudder's description of *A. cœruleipes* sufficiently close to be referred to that species, which is a synonym of *Stauronotus elliottii* Thos.

*Dissostcira carolina* Linn. Three specimens of this wide-spread species were taken at Portland, Oregon.

*Circotettix undulatus* Thos. A few at Yakima, July 16.

*Circotettix carlingianus* Thos. Same locality as the preceding.

*Trimerotropis suffusa* Scudd. A few specimens from some point in Washington Ter. which I neglected to note when they were examined.

*Trimerotropis vinculata* Scudd. W. T.

*Trimerotropis pseudofasciata* Scudd. A single male from some point in eastern W. T. This species was found by me on Birch Cr. in central Idaho, where it was quite common during July and August, 1883.

*Trimerotropis cœruleipennis*, n. sp.

Distinct from all other North American species with which I am acquainted in the coloring of the wings.

Wings without the median dusky band, faint cœrulean blue at the

base. Tegmina with the dusky markings not forming definite bands as a rule.

Vertex between the eyes rather broad, bounded by a sharp wall, with a well defined carina running longitudinally through the middle; frontal costa moderately prominent, contracted a little at its upper end and at the ocellus, widening below; sulcate throughout, deepest at the ocellus, the bounding walls or carinae sharp, reaching the clypeus. Antennae normal. Pronotum with the anterior lobes a trifle more contracted above than usual, the median carina distinct throughout, considerably elevated on the anterior lobes where the disk is much swelled and tuberculate. Tegmina rather narrow, extending beyond the abdomen one third their length. Posterior femora reaching the tip of the abdomen.

The general color is a dirty grayish yellow or yellowish brown, profusely flecked with irregular brownish dots. Face and sides of pronotum, with the anterior and middle legs, dirty whitish gray, densely flecked with various shades of brown; there are a few black dots and dashes along the carinae of the face, pronotum and posterior femora. Antennae annulated with alternate rings of testaceous and obscure brown. Tegmina cinereous brown on the basal two-thirds, transparent on the apical third, flecked with numerous small, quadrate, obscure brown spots, which, in some specimens, are pretty evenly distributed over the wing, while in others they are gathered into three irregular bands, the basal one occupying the basal third, the middle one the centre, and the other the apical third of the wing; beyond this the principal veins are brown, while there are also a few of the quadrate spots scattered at random. Wings beautiful sky-blue at base, gradually fading toward the middle, where the colored portion terminates. At this point and where the fuliginous band usually occurs, the nerves and nervures are dark, but otherwise there is no indication of a dusky band. Beyond this the wings are perfectly transparent, with nerves and nervures near the apex dusky. The upper portion of the thoracic and basal abdominal segments is tinged with a faint bluish color. Posterior femora with two dusky spots on the upper edge which are continued as black bands on the inner face, where the apex is also black; posterior tibiae glaucous, with the inner base black, followed below by a rather wide yellowish white annulus, spines black-tipped; tarsi bright yellowish white. Lower surface dirty whitish.

Length of body, ♂ 20 m.m., ♀ 28 m.m.; of antennae, ♂ 7.5 m.m.;

♀ 9.5 m.m.; of tegmina, ♂ 22 m.m., ♀ 31 m.m.; of hind femora, ♂ 10 m.m.; ♀ 15 m.m.

Specimens from Umatilla and Yakima, June 26-July 10. There are also specimens of this insect in the U. S. National Museum at Washington, from Montana, Idaho and Wyoming, and I have seen others that were taken in Utah.

*Psinidia sulcifrons* Scudd. A pair of what I take to be this species from a point in eastern W. T.

*Psinidia wallula* Scudd. Specimens taken July 18, at Lone Tree, Yakima River, and others at various localities in eastern Washington Terr.

*Cammula pellucida* Scudd. The collection contains quite a large series of this destructive locust, obtained at various points in Washington Territory during the month of July. Most of the specimens examined are of a rather darker color than usual in Pacific Coast representatives of this species.

*Arphia tenebrosa* Scudd. Quite a large series of specimens from La Chapples, on the Yakima River. These are of the variety described by Stal as *A. sanguinaria* in his Orthoptera Recentia.

*Hippiscus montanus* Thos. A few specimens taken at Camp Umatilla, W. T., June 27.

*Hippiscus lineatus* Scudd. Colville, W. T., July 24.

*Hippiscus lineatus* (?) Scudd. Var. The collection contains a few specimens of an insect agreeing with this species in all other respects, save the humeral vitta of the tegmina, which are wanting in these. The tegmina are also more equally flecked with small dusky spots than in typical specimens. Taken July 4-16 at various points along the Yakima River.

*Hippiscus Haldemanni* Scudd.? Several specimens doubtfully referred here, but do not know just where taken.

*Hippiscus corallipes* Hald. Several specimens which appear to belong here.

*Pezotettix borckii* Stal. The collection contains a single female which I refer to this species, from a point in eastern W. T.

*Pezotettix hispidus*, n. sp.

Without tegmina or wings. Body robust, glabrous, striped with yellow and piceous; posterior femora reaching beyond the extremity of the abdomen in both sexes. Hispid throughout.

Vertex between the eyes moderately broad, depressed, broadly and quite deeply sulcate, the sulcus broadening gently anteriorly where it is open, with a faint longitudinal carina through the centre; the lateral walls prominent, rather broadly and roundly angled, highest just above the upper canthus of the eyes; fastigium coarsely punctate. Frontal costa prominent, nearly equal, as broad as the front edge of the fastigial sulcus; deeply sulcate throughout. Lateral carinae diverging, reaching the lower corners of the face. Lateral ocelli very prominent, larger than the ocellus of the frontal costa, of a bright amber color. Antennae as long as the head and thorax combined, the basal joint large, as wide as long, second joint pyriform. Eyes of moderate size, rather prominent, nearly globular (male), or with the front edge almost straight (female). Pronotum equal in the male, expanding posteriorly in the female; median carina slight but visible throughout, most prominent in the female, lateral carinae obsolete; front margin straight, posterior margin slightly truncate, posterior lower angle nearly a right angle. Meso- and metanotum not differing on the dorsum from the basal abdominal segments. Abdomen tapering evenly and gradually posteriorly, sharply carinated; last segment in the female greatly contracted, valves of the ovipositor exerted, reminding one of the structure of these parts in *Tettigidea*; male abdomen with the last ventral segment pointed, the apex squarely docked and slightly but roundly notched. Supra-anal plate a little longer than broad, somewhat triangular, the posterior margin gently rounded, the apex slightly produced. Anal cerci cylindro-conical, directed upward and a very little backward, the extreme tip slightly contracted to a rather sharp point. Female cerci cuneiform, directed backward. Posterior femora moderately robust, but not greatly thickened at the base, with all the carinae prominent and sharp, extending beyond the abdomen in both sexes. Posterior tibiae normal; tarsi with the first and third joints equal.

General color brownish picaceous above, yellowish beneath. Face, lower half of the deflected lobes of the pronotum, and under surface of the body, with the anterior and middle legs ochraceous (female) or citrinous (male). Antennae fuscous. A bright yellow line commencing on the lateral margins of the fastigial sulcus and extending backward on each side of the occiput across the pronotum at the outer edges of its disk to the tip of the abdomen, enclosing along the middle a line of the brownish picaceous. Below these, on the sides, a broad stripe of the upper surface color, extending from the hind margin of the eyes to the tip of the abdo-



men, separating the dorsal yellow stripes from the yellowish under surface, enclosing on the meso- and metapleura a bright yellow patch and oblique line. Posterior femora with the disk and upper edge brownish yellow or yellowish fuscous, inner side with lower sulcus bright red; upper surface with very faint indications of the usual dark bands. Posterior tibiae yellowish brown, becoming paler apically, a broad yellowish annulation near the base, spines black tipped.

Length of body, ♂ 18.5 m.m., ♀ 21 m.m.; of antennæ, ♂ 9.25 m.m., ♀ 10 m.m.; of pronotum, ♂ 3.35 m.m., ♀ 4 m.m.; of hind femora, ♂ 11 m.m., ♀ 11.5 m.m.

Colville, W. T., July 24.

This insect has been placed here provisionally, but will have to be removed to its proper place when the section of the family to which it belongs has been properly worked up in this country.

*Pezotettix washingtonius*, n. sp.

Yellowish white beneath, ferruginous above. Tegmina pointed, nearly two-fifths as long as the abdomen.

Head rather small, short; seen from the front somewhat quadrate. Vertex between the eyes a little wider (male), or once again as wide (female) as the first antennal joint, much depressed; deeply sulcate in the male, scarcely so in the female; sides nearly parallel, broadening slightly anteriorly; front margin not closed. Frontal costa rather prominent, nearly equal, contracted a trifle at the fastigium, edges rounded, not sulcate, rather coarsely punctured above the ocellus. Eyes large, rather prominent, rounded posteriorly, straight in front; equaling in length the portion of the cheeks below them. Face slightly arcuate, somewhat oblique. Pronotum with the sides nearly equal (male), or broadening slightly posteriorly (female); median carina distinct on the posterior lobe and the front margin of the anterior lobe in the male, and on the posterior lobe only in the female; lateral carinae, or rather the lateral angles, middling sharp, nearly equal throughout, cut by the middle and last transverse incisions; disk punctulate; the three transverse sulci or incisions deep, the middle and last passing the lateral angles to the sides, posterior one about the middle. Sides of the pronotum somewhat gibbous, appearing as if composed of three well-defined lobes or segments when observed from above, most apparent in the male. Front margin nearly straight, very slightly truncate; posterior margin obtusely rounded. Meso- and meta-

thorax rather longer than usual, thereby throwing the base of the posterior femora about (female) or back of the middle of the body (male), and giving it a rather "long-waisted" appearance. Tegmina extending upon the second abdominal segment, ovate-lanceolate, meeting upon the dorsum. Abdomen carinated, rather slender; the last ventral segment of the male upturned, prow-shaped, with the point produced into a blunt projection; cerci rather long, the width about one third the length, directed a little backward and inward with the apex rounded and curving slightly forward; supra-anal plate triangular, the apex rounded and minutely notched, with a long, deep central foveola; marginal apophyses of the preceding segment small, wart-like projections. Posterior femora inflated at the base, rather smooth, extending beyond the apex of the abdomen. Prosternal spine large, conical, transverse, rather long, and directed backward. Antennæ normal, a trifle longer than the head and pronotum combined.

The general color is testaceo-ferruginous above, yellowish beneath. Face, occiput and disk of the pronotum flecked with numerous minute fuscous dots, which run together in some specimens and form rather large irregular blotches; a broad piceous band extending from the posterior edge of the eye along the upper margins of the lateral lobes of the pronotum to the last transverse incision. Meso- and meta-pleura dark brown or black with a stripe of the light color extending from the base of the tegmina to the insertion of the posterior femora. Tegmina dark brown with a few irregular, fuliginous dots along the middle area; nerves a little lighter. Posterior femora testaceous, with the base and two rather dim bands fuscous, these bands being plainest on the upper edge. There are also a few black dots along the lower edge of the disk and about the apex. Posterior tibiæ bright red, with the knee and spines black. Antennæ testaceous, becoming slightly infuscated apically.

Length of body, male 18.5 m.m., female 22 m.m.; of antennæ, male and female 8 m.m.; of tegmina, male 5.5 m.m., female 6 m.m.; of hind femora, male 10.5 m.m., female 12 m.m.

A large series at Loon Lake, Colville Valley, Washington Terr., July 25th.

*Pezotettix enigma* Scudd. Yakima River, July 16, and other localities in W. T.

*Bradynotes opimus* Scudd. Ten specimens of this clumsy, wingless locust were taken on Yakima River opposite Ellensburg, July 8, 9.

*Bradynotes montanus*, n. sp.

Small, comparatively slender, dark reddish brown, with livid yellow and white markings; tegmina sometimes obsolete, when present as in *Pezotettix gracilis*.

Vertex between the eyes very broad, slightly deflected, scarcely sulcate, with a very faint though perceptible transverse depressed line joining the upper extremities of the eyes, this line bending forward so as to form a gentle arc with the convexity to the front. Frontal costa moderate, nearly equal throughout, expanding a little at the ocellus, where it is very shallowly sulcate. Pronotum simple, expanding equally and rapidly posteriorly in the female, nearly equal in the male; front margin straight, posterior margin slightly but broadly truncate; median carina of the pronotum slight, visible throughout, on the anterior lobe as a mere smooth line not elevated in the least, in some specimens represented by a very faint depressed hair line, on the posterior lobe slightly elevated, the sides gently tapering; lateral carinae obsolete, except in some specimens where they are visible on the extreme front edge of the anterior lobe as blunt shoulders. Anterior lobe coarsely and somewhat distantly, and the posterior minutely and thickly punctate, rugulose. Abdomen carinate, tapering gently and evenly backward. Tegmina situated low on the sides, small, straight, narrow, three times as long as broad, the apex rounded. Posterior femora short, somewhat tumid, nearly (female), or just reaching the tip of the abdomen (male). Last ventral segment of the male abdomen upturned, prow-shaped, entire; cerci elongate conical, with the tips directed backward and gently downward, reaching a trifle beyond the tip of the supra-anal plate. This latter very similar to that of *B. obesus*, but proportionally broader apically. Female cerci mere rudiments, while in *B. obesus* and *B. opimus* they nearly equal those of the male.

The general color is dark reddish brown with livid yellow and white markings above, flavous beneath. Face griseous yellow, becoming darker above, the vertex and occiput brownish fuscous; a very narrow but sharply defined yellow line commencing near the upper posterior angle of the eye, separating the occiput from the genæ and extending backward on to the pronotum, where the lateral carinae would be if present; in some specimens a third line of a similar nature is present, beginning at the vertex and extending backward along the middle of the occiput. Sides of pronotum yellowish white, with a broad brownish piceous band extending from near the middle of the anterior lobe obliquely upward to the posterior

transverse incision; posterior lobe with the dorsal surface much lighter colored than the anterior lobe. Abdomen with a bright yellowish white line following the dorsal carina its entire length, this line bordered below by a black line followed by a medium broad band of the general color above; below this last band the sides of the abdomen are dull blackish or fuliginous. All these lateral lines and stripes fade away apically. Posterior femora brownish testaceous above, with the upper carinæ and inner and outer upper half of the apex black; there are very faint traces of the usual dusky bands present on the upper surface. Tibiæ yellow, spines black-tipped, tarsi yellowish with a lurid tinge.

In the living insect the colors are much brighter and contrast very strongly. The yellowish hair lines and dorsal line of the abdomen are glossy white, while the front and lower surface are of a bright lemon yellow. The brown is a bright hazel.

Length of body, male 17 m.m., female 22 m.m.; of pronotum, male 3.85 m.m., female 4 m.m.; of antennæ, male 6 m.m., female 6.75 m.m.; of tegmina (when present), male 2.25 m.m., female 2 m.m.; of hind femora, male 8.5 m.m., female 10 m.m.

*Habitat*.—Colville, Loon Lake, Washington Terr., July 23-25 (Dr. H. A. Hagen); also near Helena, Montana, among the trailing junipers on north mountain slopes at moderate elevations (L. Bruner). There were a few pairs in the present collection taken as cited above.

*Melanoplus atlantis* Riley. The collection contains quite a number of specimens that must be referred to this wide-spread and everywhere abundant species, although they vary considerably from typical specimens taken at the east. At various points in Washington Territory.

*Melanoplus cinereus* Scudd. Lone Tree, Yakima River, July 18.

*Melanoplus infantilis* Scudd. The collection contains a single female of this small species, which was taken at some point in eastern W. T.

*Melanoplus curtis* Scudd. A pair of short-winged *Melanopli* which are referred to this species without hesitation. This species is very closely related to *M. rectus*, an insect found in the mountains of New England.

*Melanoplus femus-rubrum* DeGeer. The collection contains but a single male specimen of this species, which comes near *M. interior* Scudd.

*Melanoplus minor* Scudd. There are two males of this well-marked species, which has, at various times, been referred to *Caloptenus occidentalis* Thomas, but which is quite distinct from that species. They were taken in eastern W. T.

*Melanoplus Packardii* Scudd. There are quite a number of this species in the collection, taken at Umatilla, Oreg., and also near Ellensburg. These specimens are interesting since they all have the hind tibiæ red instead of bluish, as in the typical specimens from Nebraska and neighboring States.

*Melanoplus extremus* Walker (?). The collection also contains a few specimens of a *Melanoplus* which is referred with some doubt to this species of Walker's. The insect in question is somewhat closely related to *M. atlantis* Riley, but differs from this species in its larger size, more robust form, comparatively shorter tegmina and wings, the much longer and more upturned last ventral segment of the male abdomen, and in the longer and broader cerci of the male. The general color is a dirty yellowish with markings of dull brown and black, arranged much as in *M. atlantis*. The female can be distinguished from that of *atlantis* in its more robust form and the much heavier and more rounded prosternal spine. Hind tibiæ dull yellow, with a very faint brownish tinge in some specimens.

There are also specimens of this insect in the collection of the U. S. National Museum from Ft. McLeod, British America, and Helena, Ft. Ellis and the Madison Valley, Montana, and also Salmon City, Idaho.

*Melanoplus femoratus* Burm. A few specimens from W. T.

*Melanoplus* ——— sp. The collection also contains a few specimens of what appears to be still another species somewhat closely related to *M. atlantis* and *M. scriptus* Walk, but which were not critically examined when the specimens were before me. These were also taken in W. T.

There are also quite a large number of specimens of the genus *Tettix* which I have not tried to determine, of which there are at least two species. I expect, however, to work up this section of the Acrididæ after I have more material at my command than at present.

#### GRYLLIDÆ.

*Gryllus luctuosus* Serv. ? The specimens in the collection which are referred to this species with some hesitation, are all females, and have the ovipositor very long, 16 m.m. Taken at Spokane, W. T., and Umatilla, Oreg.

*Gryllus neglectus* Scudd. There are five females of another species which are referred here. They have the ovipositor 10 m.m. in length. Portland, Oreg.

*Gryllus* —— sp. Still another species of *Gryllus* is represented in the collection by two females and one male. These are somewhat larger than the preceding species and have the ovipositor 12.5 m.m. in length. One female taken at Portland, Oregon, June 19, a second at Camp Umatilla, June 27, and the third, a male, at Yakima River, July 18.

*Gryllus* —— sp. The collection contains a single specimen of a fourth species, a female also. It has the posterior femora quite long and robust, reddish brown, and ovipositor of the same color, length of latter 13.75 m.m. Camp Umatilla, June 27.

*Æcanthus* —— sp. I find in this collection some pupæ of an *Æcanthus*, probably *Æ. niveus*. Locality not noted.

There are also specimens of the following genera of Locustidæ that have not been carefully compared: *Udeopsilla*, 2 sp.; *Dectes*, 2 sp.; *Anabrus*, 1 sp.; *Stenopelmatus*, 1 sp.; *Orchelimum*, 1 sp.; *Xiphidium*, 1 sp.; *Ceuthophilus*, 1 sp.; and a single larva of a Mantid.

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### LARVA OF CHRYSOMELA CLIVICOLLIS, KIRBY.

BY G. H. FRENCH, CARBONDALE, ILL.

Length .30 of an inch; abdomen nearly globular, flattened beneath; head and thorax narrow. Head pale grayish yellow; thorax and abdomen pale gray, a dorsal blackish line on the abdomen and a transverse stripe of the same on the thorax. Stigmata black, legs pale, the articulations dark; two black spots on each side of the head. Body smooth, shining, a few hairs on the anterior part.

Chrysalis.—Length .40 of an inch; thorax, wing and leg cases rose pink, as also the under side of abdomen; upper side of abdomen pinkish gray with a dorsal pink line. Stigmata black. Each joint of abdomen has a transverse row of black points on its posterior edge.

This larva was found feeding on the leaves of *Enslenia albida*, a vine of the milk-weed family, August 21, 1884. Several times the beetles have been found on a prickly ash bush that grows not far from where this vine has grown in my yard for a number of years, but I could not see that they had eaten the leaves of the bush; but last summer both the larvæ and beetles were found on this vine eating the leaves, establishing the fact of food plant. The larva pupated September 2nd, and the imago appeared September 8th, giving six days as a pupal period.

## CORRESPONDENCE.

*Dear Sir*: In my collecting notes for 1883 I find the following items:

"June 24. Took upon the ground under a white-wood tree, a male *Callosamia promethca*, with peculiar marks upon front wings."

"June 27. Two specimens of *promethca*, male and female, both showing the peculiarity of markings noticed in the one captured on 24th inst."

These were fresh specimens, evidently just hatched, and were found under the same white-wood tree. Examining the bushes and under-brush, I found an empty cocoon, apparently that of *promethca*, hanging to a beech shrub. Never having seen *angulifera*, and knowing there was no name in the Canadian list except *promethca* for such an insect to come under, I placed it in my collection as a variety of that species. Mr. Moffat pronounced it *angulifera* the moment he saw the specimens, and took home with him a male, sending me a male from Mr. James Angus in return. The latter specimen measures 4 inches, while the male of my own capture expands only  $3\frac{3}{4}$ , and the female a little over  $4\frac{1}{2}$  inches. As Mr. Moffat announced in the June number, these moths were taken near this village. A friend of mine, Mr. Avery, got one in the same woods this summer.

A. H. KILMAN, Ridgeway, Ont.

*Dear Sir*: In some collecting done the past season near McLean P. O., in the Northwest Territory, I found *Vanessa cardui* common, and during latter half of June saw a good many individuals of *Euptoicta claudia* Cramer. Neither of these butterflies appear in the lists of Capt. Geddes in CAN. ENT., Dec., 1883, and March, 1884. This occurrence of *claudia* is interesting, and to me rather a surprise. The locality mentioned is on the Can. Pac. Ry., 332 miles west of Winnipeg, and about 25 miles south-west of Fort Qu'Appelle.

THOS. E. BEAN.

*Dear Sir*: Dr. J. G. Morris writes me that he will have later, a letter from the son of the Rev. J. F. Melsheimer, the oldest son of F. V. Melsheimer. Rev. J. F. Melsheimer was a minister in Hanover from 1814 to 1826. He died in 1829, in Adams Co., Pa., and left three children, all of whom are living.

H. A. HAGEN, Cambridge, Mass.