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The Canadian Entomologist.

VOL. IV.

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No. 3

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KY.

Continued from page 29.

It may be necessary to state that the names which I have used for the different nervures of the wings in these papers are those used by Dr. Clemens, and differ somewhat from those in use by European entomologists.

Various means may be used for the purpose of denuding the wings of their scales, so as to render the neuration distinct. The wing may be pressed slightly between two pieces of moistened bibulous paper, and the process repeated until the wing is sufficiently denuded; or, if this does not denude it sufficiently, the few remaining scales may be removed with a camel's or sable hair brush. M. Guenee moistens the paper with gum water. Soft wax may be used instead of the paper. Dr. Clemens' plan was to moisten a slip of glass, and then, placing the wing upon it, remove the scales with a moistened sable hair brush from one side, and then, turning it over, remove them in the same way from the other side.

But, with the greatest care and skill, there is danger of injuring the wings of the small moths, particularly of breaking off their tips, and especially if the wing is dry. And all of these plans require a great deal of time.

I have found the following plan preferable, as requiring less time and skill and being equally effective. Lay the wing upon a glass slip (e. g. a microscopic slide) covering it with a piece of thin covering glass (e. g. a thin glass cover for microscopic objects). Drop on the glass slip, so that it will flow under the slide, one or two drops of solution of potash or soda, and hold it over a lamp-flame until it begins to boil, removing it at the first ebullition. If boiled too long, the more delicate nervules may be obliterated, and if there is too much liquid, the wing may, by the boiling, become folded, so that it will be spoiled. The finer nervules may also be obliterated by allowing the wing to remain too long in the liquid. But if proper care has been taken in these respects, the glass slip may be removed from the lamp to the stage of the microscope, and the neuration

will be found very distinct, and may at once be accurately sketched under the camera. If it is desired to preserve the wing, it should immediately, by the cautious addition of clean water, be floated off the glass slip on to another clean slip, enough water being used to remove the potash, and the wing dried upon the slip.

This plan answers better still for the removal of the scales of the head and its appendages; and the wing or head may be denuded and sketched under the camera within five minutes.

HYPONOMEUTA.

1. *H. multipunctella* Clem. *Proc. Acad. Nat. Sci., Phila., 1860, p. 8.*

Dr. Clemens' description of this species is too brief for a species belonging to a genus the species of which so closely resemble each other as they do in this genus. In a general way, his description characterizes almost any species of the genus.

He says: "Labial palpi, head, antennæ and thorax white. Thorax with a black spot on the front of the tegulæ, and a few spots of the same hue on the disk. Fore-wings white, with the costa at the base blackish, and longitudinal rows of distinct black dots, *two of which*, one along the inner margin, and one along the fold, are very plain. *Hind wings blackish grey.*" (The italics are my own).

What does "two of which" mean? two spots, or two rows of spots? If the latter, then it does not differ greatly from *H. euonymella*. But "hind wings blackish-grey" does not accord with either of the following species:

2. *H. euonymella*. *N. sp.*

Snowy white. Abdomen yellow; posterior wings silvery white, fringed with snow-white. A black spot on the base of the tegulæ, six others on the thorax; extreme costa black at the base; forty to forty-five black spots on each wing, forming three rows, one on the costal margin, and one on each side of the fold, and a few scattered spots upon the disc. The spots in the costal row are smaller and wider apart than those in the two others, and are not so regular, as in some specimens they are a little out of line, and become intermixed with the discal spots; the two other rows pass beyond the fold, and extend as a double row of small close spots around the apex till they meet the costal row. *The spots on each nearly circular.* *Alar ex.* $\frac{3}{4}$ inch. Kentucky. Very common.

The larva feeds upon the leaves of *Euonymus atropurpureus* in May, weaving together the edges of the leaves so as to enclose a space as large as a man's fist, which is filled with its loose web, and in which one, or

rarely two, larvæ may be found, though there are many such nests on the bush. The larvæ seem to take pleasure in letting themselves down by their threads about half way to the ground and swinging in the air. They are a little over one inch long, slender, greenish-white, with a darker green longitudinal line on the back, and about eight small black spots on each segment, except the second (the head being the first), which has only four or five. The spots are arranged in longitudinal lines. The pupa is green. Pupa May 28th. Imago June 6th.

3. *H. longimaculella*. N. sp.

White; posterior wings yellowish-white, fringed with white. There are two black annulations on the terminal joint of the palpi: one at its base, the other near the apex. Antennæ yellowish, faintly annulate with fuscous. A small black spot on the posterior margin of the vertex and anterior margin of the thorax, and about four distinct black spots on the posterior margin of the thorax, and a black spot on the base of the tegulæ. Extreme costa black at the base, a long black spot parallel with the fold, beginning at the base of the costa, and about sixteen other *oblong* black spots upon the wing, forming three or four irregular lines of spots, which sometimes seem to coalesce. Besides these spots, there are a few black scales scattered over the wing, and about twelve smaller spots extending around the apex at the base of the ciliae. *Alar ex.* $\frac{1}{2}$ inch. Kentucky. Common.

Larva unknown. I took numerous specimens in the forest, June 4th. The spots, besides being oblong, are larger than in *H. cuonymella*, which is the prettier insect of the two, though both are very pretty.

HERIBEA? STEPHENS.

Stephen's generic descriptions are so general and vague, that one who has to rely upon them, without having seen authentic specimens, is driven to the necessity, in a good degree, of *guessing* at the genus to which a new species may belong. Of the two genera, to one of which the insect described below may belong, viz., *Lophonotus* and *Heribea*, it seems to me that the latter is most probably the one in which it should be placed. "Palpi short, slightly elongate," is indefinite enough, and so is "hind wings *somewhat* linear triangular," and "more or less distinct, oblique, silvery-white, streaks or spots at the tip of the fore wings," is not at all applicable to this species. Nevertheless, rather than encumber the science with a new name, which might be worse than useless, I have concluded to place it in *Heribea*, with the following notes of its structural peculiarities:—

Tongue as long as the anterior coxæ. Maxillary palpi short and slender; labial palpi reaching, but not overarching, the vertex, simple, of the same size from base to near the apex, the terminal joint nearly as long as the first and second together; antennæ simple, more than half as long as the wings; scales of the head appressed or smooth. Anterior wings elongate ovate, *subfalcate beneath the tip*; discoidal cell rather wide, closed, the costal vein attains the margin just behind the middle, not far from the first sub-costo-marginal vein. The subcostal is straight from its base to the costa, just above the tip; the first marginal is given off just before the middle, the second not far behind it, and the third from about the end of the cell: *a short vein connects the second at about its middle, with the base of the third, thus forming a narrow elongate triangular cell, with its base resting on the subcostal near the end of the discal cell.* The discal (or transverse) vein gives off three branches to the hind margin, and below them the median is three-branched, the two terminal branches being much curved at base. Submedian distinct. Posterior wings a little wider than the anterior; costa rather straight, but decidedly retuse before the pointed tip; hind (or apical) margin not emarginate beneath the tip, but passing with a sweeping curve, like a cimeter, to the dorsal margin. Costal vein long and straight; subcostal long, straight, simple attaining the apex. Discal cell wide, closed by a transverse vein, which, near its middle, gives off a vein which bifurcates, sending one branch to the apex, and the other to the hinder margin; the median gives off three branches, one before the transverse vein, and the two terminal ones arising from a common stalk behind it. Submedian and internal veins distinct. The neuration of the forewings is thus scarcely different from that of *Hyponomeuta*, though the wing in this species is falcate, and the neuration of the hind wing is different.

H. ? incertella. N. sp.

Palpi bronzy brown, second joint whitish on its inner surface. Head silvery. Antennæ brown. Thorax reddish or golden brown. Anterior wings greyish-brown, with indistinct spots and patches of darker brown, the largest of which is about the middle of the costal margin. A broad white streak about the basal fourth of the dorsal margin. Apical margin densely scaled; two hinder marginal dark brown lines in the ciliæ, one at their base, the other and wider one at their apex. *Alar ex.* nearly $\frac{1}{2}$ inch. Kentucky.

ON THE EMBRYONIC LARVÆ OF BUTTERFLIES.

BY SAMUEL H. SCUDDER, BOSTON.

Reprinted from "The Entomologist's Monthly Magazine," Volume viii.

In their papers on various species of British *Macro-Lepidoptera*, Messrs. Hellins and Buckler furnish us with much better accounts of the external appearance of caterpillars than can be gained from the meagre and superficial descriptions which used to be thought sufficient; and, as they have not confined their descriptions to the full grown animals, but have followed the creatures through all their moults, they have, in several cases, incidentally shown how great a difference there is between the larva just hatched and the full grown caterpillar; especially in the case of some of the *Rhopalocera* thus treated by them. Mr. Riley, of America, has, in one or two instances, recorded similar facts.

It is the purpose of the present communication to point out the probable universality of this law—that caterpillars of butterflies present greater structural differences between the embryonic and adult stages of the same individual, than are to be found in the adult larvæ of allied genera. By the term "embryonic," I designate those caterpillars which have not changed their condition since leaving the egg, a stage in which they generally continue but one or two days. Some of the changes alluded to are more or less gradual in their appearance, but they generally occur at the first moulting of the caterpillar.

All the instances given are drawn from New England butterflies, and the generic terms employed are those used in my list, published in the Proceedings of the Boston Society of Natural History. If any one is sceptical in regard to the facts adduced, I can enter more into detail upon doubtful points. It should also be premised, that in studying caterpillars, the shape and sculpturing of the head, the form of certain segments, and especially the precise number, location and disposition of the spines, thorns, and hair-emitting warts of the body, will be found to furnish abundant means of distinguishing the most closely allied and minutely subdivided genera. But to our examples.

In the genus *Satyrus*, the body of the young larva is furnished with exceedingly long, scarcely tapering, compressed hairs, geniculate a little beyond the base, serrulate above, and generally directed backwards; those, however, which occur on the upper portion of the thoracic segments are directed forward, and thus present a very peculiar contrast. Nothing of

this sort appears on the mature larva, which is represented by Boisduval and Le Conte as quite smooth, but which is probably uniformly clothed with very short hairs.

In the genus *Hipparchia*, the young larva is born with a head of equal height and breadth, furnished with prominent lateral and frontal warts. The body has four pairs of longitudinal rows of tubercles definitely disposed, each tubercle bearing a short, straight, delicately clubbed bristle. The head of the mature larva, on the other hand, bears no lateral or frontal warts, but either half is prolonged upwards into a conical horn as long as the head itself; while the body is furnished only with microscopic hairs, irregularly distributed. In both this and *Satyris* the bifurcation of the last segment of the mature larva, long known as a characteristic of the sub-family of *Satyrinae*, is scarcely perceptible in the embryonic caterpillar, being indicated in *Satyris* only by slight tubercles.

In *Limnitis*, the head of the young larva is smooth and equal, and the body uniform in size throughout, studded with numerous equal, stellate, regularly disposed warts. In the mature larva the head is covered with numerous conical warts, and surmounted by a pair of very large compound spinous tubercles. The body is by no means uniform, the second and third thoracic and eighth abdominal segments being "hunched" and tumid, while the first thoracic segment is much smaller than any of the others; the warts have changed to very variable tubercles—on the second thoracic segment into a long, club-like, spinous appendage—and are mounted on mammulae of different sizes; the whole, aided by the strange coloration of the animal, presenting a most grotesque appearance.

In the young larva of *Grapta*, the head is smooth, and the body furnished with three pairs of rows of minute warts, each emitting a long tapering hair. In the mature larva, the head is crowned by a pair of long, stout, aculiferous spines; and the body bears seven longitudinal rows of mammiform elevations, each surmounted by a compound spine. That these spines are not simply the out-growth of the hairs of the immature caterpillar is evident from the fact that there is a median dorsal row which is entirely wanting at birth, and that the position of the other spines, relatively to the sides of the segments upon which they occur, is quite different from that of the hairs in the young animal.

The same statement, with generic modifications, may be made of *Vanessa* and *Pyrameis*.

In the genus *Argynnis*—or, rather, in that section which has been rightly separated from it under the name of *Brenthis*—the head of the

young larva is much broader than high, and the body profusely furnished with conical warts, arranged, to a certain extent, in clusters, which are in eight longitudinal rows, continuous on the thoracic and abdominal segments, each wart emitting a very long, tapering, spiculiferous hair, expanding into a delicate cup-shaped club at the tip. In the mature larva, the head is equally broad and high, and the body furnished with six longitudinal rows of simple, not clustered, mammulæ, differently disposed on the thoracic and abdominal segments, each mamula bearing a stout, fleshy, conical, bluntly tipped, aculiferous process.

In *Melitæa*, the head of the immature and adult larva scarcely differ. In the younger stages, the body is equal, excepting that the posterior half tapers slightly; in the older period it is also nearly equal, but tapers forward a little on the thoracic segments. Besides this, we find differences similar to, but even greater than, those referred to in *Grapta*. In the embryonic larva, the body is furnished with small warts, giving rise to rather short, tapering hairs, all arranged in five pairs of rows, three of them above, one on a line with, and one below, the spiracles. In the mature form, the hairs have given place to stout tapering spines, each supplied with many aculiferous, conical wartlets, and arranged in a median dorsal series and four pairs of lateral rows, two above and two below the spiracles.

If we next turn our attention to the *Lycænidæ*, we shall find similar differences. While the form of the head and body remain nearly the same from youth to maturity, the contrasts between the dorsal and lateral surfaces of the body are more pronounced in the early stage, both from the greater flattening of the upper field, and from the presence, at the line of demarcation between the two, of a series of warts, emitting hairs, some of which are exceedingly long, and curve backwards; similar hair-bearing warts are present along the fold dividing the lateral and the ventral regions, while there are one or more longitudinal rows of simple warts along the sides. The different groups, the *Theclæ*, *Lycæna*, and *Chrysephani*, can be distinguished by the number of warts to a segment in each of the first-mentioned rows, and by the character of the hairs borne by them. In the full-grown larva, the linear series of warts are wanting, but the whole body is covered with microscopic hairs, seated, in *Lycæna*, on stellate dots, and which are only slightly, if at all, longer upon the angles of the body.

In the *Papilionidæ*, again, we find no differences of importance in the shape of the head, but some peculiar features in the armature and form of

the body. In *Colias*, the embryonic animal is furnished with four rows of peculiar appendages on either side of the body, three rows above the spiracles, each bearing one appendage to a segment, and one beneath them bearing two appendages to a segment; these appendages are short, fleshy papillæ, expanding from a slender base to a club-shaped apex, as broad at its tip as the entire length. In the mature larva, all this is wanting, but the body is profusely clothed with minute short hairs, seated on regularly-disposed delicate warts.

Pieris is similar; the young larva is furnished with long, hair-like appendages, tapering slightly, but at the tip expanding into a delicate club, and disposed much as in *Colias*. In the mature larva, the body is furnished with two sets of minute warts, one arranged in regular transverse series and hairless, the other irregularly distributed and emitting each a short delicate hair.

In *Papilio*, the body of the infantine caterpillar is invariably more or less angulated, like that of the young Lycænid; while, at maturity, it is always quite regularly rounded above the spiracles. It is furnished, when young, with several longitudinal rows of bristle-bearing tubercles, one tubercle to a segment in each row, one row in the middle of the side more conspicuous than the others. When full grown, the body is almost entirely naked in the species I have examined, being supplied only with smooth hairless, scarcely elevated, lenticular warts, or with irregularly distributed very minute wartlets, bearing inconspicuous hairs. In other species there are long, fleshy filaments upon the sides of the mature caterpillar, but I have not seen the embryonic stage. In addition, the first segment is supplied with an osmaterium, which is wanting in early life.

The *Hesperidæ* strongly remind us of the genus *Colias*; for we find the body of the embryonic larva supplied with rather short fungiform or infundibuliform appendages, disposed in rows upon the sides of the body, and arranged as in the *Pierinæ*; while in the full grown caterpillar, the body is furnished only with short downy hairs, irregularly and profusely scattered. This furnishes an additional proof, of which many others are not wanting, of the close affinity of the *Papilionidæ* and *Hesperidæ*.

We have thus passed in review most of the great groups of *Rhopalocera*,* and have substantiated, in a general way, the assertion made at the outset:—that there are greater structural differences between the embryonic and adult stages of the same individual than can be found in the

*Mr. Riley finds similar changes in *Danaë*.—S. H. S.

adult larvæ of allied genera. Indeed, this statement is perhaps too feebly formulated, so important are many of the distinctions which have been traced. These differences, it should be noted, are not always in the same direction ; for we have seen that caterpillars which in infancy are clothed with appendages of a unique and conspicuous character, definitely disposed, display, in mature life, irregularly distributed, scarcely perceptible warts, emitting simple and nearly microscopic hairs ; while others, which in their earliest stage bore regular series of simple hairs, seated on little warts, become possessed, at maturity, of compound spines, surmounting mammulæ, also definitely arranged, but occupying a very different position to the hairs of early life. So, too, we find some caterpillars which bear a tuberculated, irregular head in infancy, and a smooth and equal one at maturity ; or the reverse, where the head is simple at birth, and heavily spined or cornute when full grown ; others, again, remain almost unchanged through life. This latter condition of uniformity never applies to the appendages of the body, whether we consider their character alone or their disposition. Nor—the only other possible condition—do we ever find larvæ bearing only irregularly distributed, simple, minute hairs in infancy, and regularly arranged special appendages at maturity. Indeed, it is doubtful whether such a phenomenon exists in Nature ; since in the numerous and varied groups that have been examined, special dermal appendages have been found to be an invariable characteristic of embryonic larvæ.

August, 1871.

NOTES ON THE LARVA OF
ACRONYCTA OCCIDENTALIS, *Grote*.

BY W. SAUNDERS, LONDON, ONT.

THIS insect in the imago state closely resembles *A psi*, of Europe, and has been, and we believe still is, doubtfully regarded as identical by several eminent European entomologists. We think, however, that a comparison of the larval forms of the two insects will help to dispel any doubts which may be entertained regarding the dissimilarity of the species. The following description of the larva of *occidentalis* has already appeared in part, in the Annual Report of the Entomological Society of Ontario to the Commissioner of Agriculture for 1870, where it is given,

and, as we supposed at the time, correctly so, under the name of *psi*; but since probably but few of our readers will have seen that Report, and as the edition is sometime since exhausted, we shall reproduce the description here in a fuller form:—

Larva sparingly hairy, found feeding on plum, cherry and apple.

Head rather long, bilobed, somewhat flat in front; black, with yellowish dots at the sides, and with a few scattered whitish hairs.

Body above bluish-gray, with a wide slate-coloured dorsal band, having a central pale orange line from second to fifth segments. From fifth to eleventh inclusive, each segment is ornamented with a beautiful group of spots, placed in the dorsal band, two of them bright orange—one in front and one behind—and one on each side of a greenish metallic hue; each group being set in a nearly circular patch of velvety black. There are two lateral cream-coloured stripes, the upper one adjoining the dorsal band, these stripes growing indistinct towards the anterior and posterior segments, and down which extends, from each of the black dorsal patches, a short black curved line, having immediately behind its junction with the dorsal band a yellowish dot. The sides are marked more or less with dull ochrey spots, some of which form a broken band, close to the under surface. On the dorsal portion of twelfth segment is a dull black spot, considerably raised, forming a small hump; terminal segment flattened and blackish. Body sparingly covered with whitish hairs, which are distributed chiefly along the sides, close to the under surface.

Under surface dull greenish, feet black.

Described from several specimens; found in the early part of September, entered the chrysalis state from the 15th to 20th September, and produced the imago from the 6th to the 8th of June following.

Mr. E. Newman, in his valuable work called "British Moths," gives a very full description of the larva of *psi* as follows:—"The head of the caterpillar is rather wider than the second segment; the body is hairy with parallel sides, but humped on the back; the first hump is slender, long, erect, horn-like, and seated on the fifth segment; the second hump is shorter, broader, and on the twelfth segment. The head is black, hairy, and shining; its divisions very convex; the second segment is black, with a very narrow median yellow line; the third, fourth, sixth, seventh, eighth, ninth, tenth and eleventh segments have a broad median yellow stripe, and there is a median square spot of the same colour on the hinder part of the twelfth segment; the horn-like hump on the fifth segment is

intensely black, and clothed with crowded short black hairs, intermixed with scattered long ones ; on each side of the median stripe is an equally broad jet black stripe, and in this on every segment, from the fifth to the twelfth both inclusive, are two transverse bright red spots, with two minute whitish warts between each pair, the warts emitting black bristles ; below the black stripe on each side is a broad gray stripe, emitting gray hairs, and including the black spiracles ; this gray stripe is reddish on the anterior segments, the intensity of the red increasing towards the head. The belly, legs, and claspers are dingy flesh coloured. It feeds on white thorn, pear, and a variety of other trees."

The long, intensely black hump on the fifth segment, which is a very striking characteristic in *psi*, is entirely wanting in *occidentalis*, the coloration also is very different, the broad median yellow stripe, in the former from sixth to twelfth segments is also wanting in the latter. The circular black patches in the American species is represented in the European insect by a broad black stripe bordering the equally broad yellow one, the grouping and color of the clusters of small dorsal spots on each of these segments is also very different. In *psi* the black is bordered with a broad gray stripe becoming reddish on anterior segments, while in *occidentalis* the same portion is covered with two narrower cream colored stripes, becoming less distinct on the anterior segments. Many other minor points of difference might be deduced, but these, we think, are sufficient to show that in the larval state these species are widely diverse.

The imago of *occidentalis* is said by Mr. Grote (see Proc. Ent. Soc. Phila., vol. 6, p. 16,) to differ from *psi*, "by the paler color of primaries, which are more sparsely covered with scales, and their somewhat squarer shape. The reniform spot on the disk shows a bright testaceous tinge, and the ordinary spots are less approximate than in *psi*. The secondaries are dark grey, nearly unicolorous, a little paler in the male, and darker in either sex than its European analogue."

After a careful comparison of a number of bred specimens with the European insect we fail to see the validity of most of the distinctive points urged by Mr. Grote. We have found the color of primaries to vary much, in some examples they have been darker, but in the majority they have been fully as light as those of *psi* ; nor can we see any difference in uninjured specimens with regard to the density of the scale covering. In some the wings are somewhat squarer, but it is a difference scarcely perceptible, and in other examples we have failed to detect it. The testa-

ceous tinge in the reniform spot is perceptible in all the specimens we have seen, in some quite bright, but in others exceedingly faint. The relative approximation of the ordinary spots varies so much in different individuals as to be of little distinctive value. The darker color of secondaries is, we believe, more uniform, and is quite characteristic in most instances, but in several male specimens we have been unable to trace any difference in this respect. There are two other small points of distinction, not mentioned by Mr. Grote, which we have thus far found invariable: in *psi*, the orbicular spot has a black border on the outer side; in *occidentalis*, this is wanting, or scarcely perceptible, or otherwise replaced by a faint entire testaceous bordering. In *psi*, the inner black bordering of the reniform spot is double at its lower extremity, while in *occidentalis* we have never found it otherwise than single, and this much less distinct in most specimens. All these points of difference in the imago state, it must be admitted, are very slight and vague as compared with the striking dissimilarity of the insects in their respective larval forms.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY THE EDITOR.

From Kirby's Fauna Boreali-Americana: Insecta.

(Continued from page 36.)

217. *TRACHYS ACUDUCTA* Kirby.—Length of body 4 lines. Taken by Capt. Hall in Nova Scotia.

[163.] Body oblong, punctured, hairy with scattered minute decumbent bristles resembling little scales, of a bronzed and glossy copper colour. Front with a slight sinus: prothorax transverse, trilobed at the base; disk longitudinally convex and naked; sides hairy; surface in the disk covered with minute transverse undulated lines curving upwards, and sides reticulated with them: scutellum transverse acuminate: elytra uneven, constricted before the middle, clouded and obsoletely banded towards the apex with minute whitish bristles; tips rounded, serrulate: prosternum broad, a little constricted in the middle, rounded at the apex.

[164.] FAMILY PYTHIDÆ.

218. *PYTHO NIGER* Kirby.—Plate vii., fig. 2.—Length of body $5\frac{1}{4}$ — $5\frac{1}{2}$ lines. Several taken in Lat. 54° , and in the journey from New York to Cumberland-house.

[165.] Body linear, depressed, black, shining, punctured. Head with a longitudinal impression on each side between the eyes; nose smooth, flat, with the intermediate space less punctured; antennae and palpi dusky-rufous: prothorax conspicuously channelled, with the usual deep longitudinal impression on each side, lateral contour very convex, constricted posteriorly: elytra furrowed with elevated smooth interstices; furrows punctured and abbreviated at each end; base of the elytra, where the furrows cease, punctured: body underneath minutely punctured; abdomen piceous; tarsi rufous.

VARIETY B. Tibiæ also rufous: thighs piceous.

C. Body entirely ferruginous. It agrees with A in sculpture and every other respect except colour.

Many individuals of the present species were taken in the Expedition, all of them agreeing in having no tint of blue in the elytra; in having the levigated part of the base punctured, and the sides of the prothorax more prominent, than in *P. depressus*, from which it seems clearly distinct. [Included in the List of Canadian Coleoptera. Taken on the North Shore of Lake Superior by Agassiz's Expedition.]

219. *PYTHO AMERICANUS Kirby*.—Length of body 5—7 lines. Several taken in Lat. 54°, and in the journey from New York to Cumberland-house.

This species differs from the preceding chiefly in having the abdomen, medipectus, postpectus, legs and mouth rufous; in a slight punctured elevation on each side of the nose; the space between the eyes also is more distinctly punctured, and there are two deep impressions under the head between the eyes; the prothorax is widest anteriorly, and not constricted behind; and the elytra are deep blue, and scarcely punctured at the base.

It differs from *P. depressus*, in being wider in proportion to its length, and in having the abdomen, and two posterior sections of the breast, invariably rufous.

VARIETY B. Elytra rufous at the sides and tip.

C. Elytra entirely rufous.

D. Elytra entirely rufous; head and prothorax piceous.

E. Body entirely rufous. [Taken in various parts of Canada.]

[166.] FAMILY TROGOSITIDÆ.

220. *TROGOSITA AMERICANA Kirby*.—Length of body 5 lines. Two specimens taken in the journey between New York and Cumberland-house.

This species is the American representative of *T. caraboides* from which it principally differs in being larger, with the frontal impressions more distinct; the stalk of the antennæ much slenderer, and the knob thicker: the prothorax not so narrow and constricted at the base, and the elytra slightly furrowed. ["The description of this species is so imperfect that it cannot be identified" (Le Conte)].

[167.] FAMILY CERAMBYCIDÆ.

221. MONOCHAMUS RESUTOR Kirby.—Length of body $10\frac{3}{4}$ lines. Frequently taken in Lat. 65° .

[Synonymous with *Monohammus scutellatus* Say—a very abundant species in many parts of Canada. For description of this well-known insect, *vide* Say's Ent. Works, 1. 192.]

[168.] 222. MONOCHAMUS CONFUSOR Kirby.—Length of the body 1 inch and $1\frac{3}{4}$ lines. Taken in Nova Scotia by Dr. Mac Culloch, in Canada by Dr. Bigsby, in Massachusetts by Mr. Drake.

Body linear, elongate, black, covered with white or cinereous decumbent hairs, but so as to let the black appear in confused spots and reticulations. Labrum rather long, fringed anteriorly with ferruginous hairs; maxillary palpi long; rhinarium broad, rufous; antennæ testaceous with the redness obscured by decumbent cinereous hairs, but the scape and pedicel are black; the antennæ of the female are something longer than the body; those of the male are twice its length: the spines of the prothorax are stout, covered thickly with white hairs, and dotted posteriorly with black; in the disk is a central oblong impression: scutellum thickly covered with white decumbent hairs, with a black longitudinal line: the ground colour of the elytra is testaceous which is more or less obscured and clouded by white decumbent hairs, besides there are several black dots and oblong spots produced by erect hairs; at the base of the elytra, especially on the projecting shoulders, are numerous round elevated smooth little spaces, and their whole surface is covered with scattered minute punctures.

N. B.—In the male the black spots and dots of the elytra are fainter, and sometimes nearly obliterated. [The synonyms of this species are so much confused that Kirby's specific name may certainly be considered a most appropriate one, if it is allowed to stand. The insect here described is apparently identical with *Monohammus notatus* Drury, and *M. titillator* Harris; according to the rules of priority, it should, therefore, have the former name. It is a very common species in the pine forests of this country, especially in timber that has been left standing after a fire

has run through the woods. Specimens of this beetle are often found in recently built houses and about lumber-yards.]

[169.] 223. *MONOCHAMUS MARMORATOR* Kirby.—Length of body 11 lines. A single specimen taken in Lat. 54°.

Body black, covered underneath, but so that the black appears in various places, with subcinereous, or somewhat tawny decumbent hairs. Head and prothorax covered in the same way but with redder hairs: spines of the prothorax very robust, rather long, sharpish: scutellum covered with a coat of cinereous hairs, divided by a black longitudinal line: elytra black, marbled variously with cinereous and reddish tawny hairs; the cinereous spots are dotted with black; the surface of the elytra when laid bare appears punctured, and at the base are several confluent smooth elevated spaces; suture and lateral margin testaceous; apex acute.

N. B.—The antennæ in the specimen are broken off. [Unknown to us.]

224. *ACANTHOCINUS (GRAPHISURUS) PUSILLUS* Kirby.—Length of body $4\frac{1}{4}$ lines. A single specimen taken in the journey from New York to Cumberland-house.

[170.] This species is one of the most minute of the Capricorn tribes. Body linear, black but covered with a coat of whitish decumbent hairs, which appears more or less sprinkled with black dots. Head longitudinally channelled; antennæ mutilated in the specimen, but those joints that remain are white at the base: prothorax short, armed on each side, towards the base with a short sharp spine, punctured with scattered punctures; elytra punctured especially towards the base, mottled and speckled with brown, with an oblique brown band a little beyond the middle, apex of the elytra rounded: podex and hypopygium, or last dorsal and ventral segments of the abdomen elongated, so as to defend the base of the ovipositor which is exerted, causing the insect to appear as if it had a tail; the hypopygium is emarginate: thighs much incrassated at the apex. [Not common; taken at Grimsby by Mr. Pettit, and on oak-trees in the neighbourhood of Philadelphia by Mr. Bland.]

225. *CALLIDIUM AGRESTE* Kirby.—Length of body 11 lines. Several specimens taken in the Expedition, and likewise in Nova Scotia by Dr. Mac Culloch and Capt. Hall.

I at first took this for a variety of *C. rusticum*, but on a closer inspection I found it differed in the sculpture as well as colour; and having

received a specimen of that insect from Dr. Harris, in which its characters were all preserved, I am induced to describe *C. agreste* as a distinct species.

It differs from *C. rusticum* in being smaller, of a darker brown, without a tint of red; and in having more gloss. The prothorax has three deep round impressions, while in the insect last named, the impressions are slight, and the two anterior ones oblong: the elevated lines of the elytra are more prominent and become visibly confluent towards the apex, where they form several reticulations: the underside of the body is much more thickly covered with hairs, which are hoary instead of yellowish, those on the breast being longer than those on the abdomen. In other respects these two insects resemble each other. [Included in the genus *Criocephalus* Muls. Taken throughout Ontario and at Lake Superior.]

[171.] 226. *CALLIDIUM STRIATUM* Linn.—Length of body $5\frac{1}{4}$ lines. A single specimen taken in Lat. 65° .

Body linear, black, thickly punctured, underneath with a few hairs, glossy; above without any hairs or gloss. Antennæ a little longer than the prothorax: prothorax suborbicular, covered thickly with minute granules, with an elevated tubercle in its disk: elytra most minutely and thickly granulated, with four longitudinal slight furrows occupying the half adjoining the suture, the alternate interstices being most elevated: tarsi rufo-piceous. [Synonymous with *Asemum mastum* Hald. Taken throughout Ontario.]

227. *CALLIDIUM COLLARE* Kirby.—Length of body 5 lines. A single specimen taken in Lat. 54° .

Body linear, black, hairy with whitish scattered hairs. Head thickly punctured; antennæ shorter than the body, rather hairy, piceous, scape black: prothorax rufous, with a few scattered punctures, glossy, projecting on each side into an angle or short spine: elytra very thickly and confluent punctured: body underneath glossy, slightly punctured: anterior part of antepectus rufous: tarsi piceous, first joint of nearly equal length in all the legs. [North Shore of Lake Superior, Agassiz's Expedition.]

[172.] 228. *CALLIDIUM PROTEUS* Kirby.—Plate v., fig. 5.—Length of body $5-8\frac{1}{2}$ lines. Taken abundantly especially in Lat. 65° .

Body black, minutely punctured, hairy with longish hoary hairs, especially underneath. Nose with a deeply ploughed transverse furrow; front behind the antennæ violet, confluent punctured; palpi black, maxillary rather long, last joint an obtusangular triangle; antennæ longer than the

prothorax; sides of the prothorax very rough with deep confluent punctures: elytra wrinkled, violet, with three longitudinal, subinterrupted, callous, pale lines, of which the intermediate one is the longest, and the external one the shortest: legs piceous, with the incrassated part of the thighs testaceous.

This species varies extremely both in size and colour. The following are the principal varieties:—

VARIETY B. Head and prothorax violet; elytra lurid with only two callous lines. Length $6\frac{1}{4}$ lines.

C. Head, except at the base of the antennæ, black; sides of the prothorax violet, disk bronzed: elytra as in the last. Length 5 lines.

D. Head and prothorax black; elytra lurid; lines faintly marked. Length $5\frac{1}{3}$ —7 lines.

E. Head and prothorax bronzed: elytra lurid bronzed, with two distinct lines. Length 6—7 lines.

F. Head violet; prothorax bronzed: elytra as in the last. Length 6 lines.

G. Like the last, but the callous lines of the elytra are obsolete. Length $5\frac{1}{2}$ — $6\frac{1}{2}$ lines.

H. Head and prothorax black: elytra lurid with three lines. Length $7\frac{1}{2}$ lines.

I. Head and prothorax black-bronzed: elytra bronzed-lurid with two lines.

MEETINGS OF THE LONDON BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

THE Annual Meeting of the London Branch was held on Friday evening, January 5th, at the residence of Mr. W. Saunders. In addition to a goodly attendance of London members, we were favoured with the presence of the esteemed President of the Parent Society, Rev. C. J. S. Bethune, M.A. The following officers were elected for 1872:—

PRESIDENT.....	MR. E. B. REED.
VICE-PRESIDENT.....	MR. J. M. DENTON.
SEC.-TREASURER.....	MR. W. SAUNDERS.
CURATOR.....	MR. JOSEPH WILLIAMS.

The Annual Report of the Secretary-Treasurer was read, showing a

healthy condition of the finances of the Branch, all the current expenses of the year having been met, and a small balance still on hand.

Mr. Reed introduced the subject of local collections, and urged their importance. After some discussion, the following resolution was passed:

"That a local collection of insects shall be made for the Cabinet of the Branch, specimens to be collected within walking distance of the city, and that we, the members, will do all in our power to specially aid and assist in this collection."

FEBRUARY, 1872.

The regular monthly meeting was held on Friday evening, February 2nd, at the residence of Mr. J. M. Denton.

After the routine business was over, a letter was read from Mr. Billings, thanking the members of the London Branch for their kind resolution of sympathy in reference to his father's death, the late B. Billings, of Ottawa.

The excellent microscopes belonging to Messrs. Puddicombe and Denton were then turned to good account by the members, who examined with the aid of high magnifying powers, many objects of great interest.

NOTICE TO MEMBERS.

We regret to state that the Secretary-Treasurer, Mr. E. B. Reed, has been laid up for some little time with an attack of pneumonia, which will probably confine him to his house for a few days longer. He requests us to state that he has received *letters* from C. J. Beale, G. M. Levette, V. T. Chambers, J. W. Byrkitt, R. V. Rogers, J. A. Lintner; and *remittances* from W. V. Andrews, G. Dimmock, H. Y. Hind, H. S. Sprague, J. Bain, O. S. Westcott, Rev. L. Provancher, H. K. Morrison.

The Secretary craves the indulgence of these gentlemen until his health will permit him to reply to their letters.

WILLIAM SAUNDERS,

London, March 15, 1872.

Associate Editor.

MISCELLANEOUS NOTES

APPROPRIATIONS FOR ENTOMOLOGICAL PURPOSES IN THE STATES.—
At the late National Agricultural Convention held in Washington, Mr.

Chas. V. Riley introduced resolutions, which were unanimously passed, asking, in the first place, for an appropriation of \$25,000 to enable the Entomologist of the Department to finish the work on which he has been engaged for so many years; and, in the second place, for an annual appropriation of not less than \$10,000 for experiments in destroying noxious insects.

The last appropriation is to enable such States as may be suffering from the injuries of any insect to an alarming extent, to make the proper investigations and experiments towards abating such injuries. The fund is to be at the disposal of the Commissioner of Agriculture, who upon application from any of the State Boards of the different States, may authorize the expenditure of whatever amount he sees fit, for the purposes mentioned.

ENTOMOLOGICAL REPORT.—The Report of the Entomological Society of Ontario is expected to be issued this month. Great delay has been experienced owing to the pressure of Parliamentary printing required for the Session of the Legislative Assembly, which has just closed.

ADVERTISEMENTS.

NOTICE.—The following scale for advertisements has been decided upon by the Editors:—

Whole page (with cover or fly-sheet	\$5.00 per annum.
Half “ “ “ “	3.00 “ “
Quarter “ “ “ “	1.50 “ “

For body of the Magazine, the rates to be 5 cts. per line for first insertion, and 3 cts. for every subsequent one.

These rates are payable in advance.

COLLECTING TOUR IN LABRADOR.—When I penned the notice of my proposed tour to Labrador, I had no idea that there would be so much demand for Entomological material from this Northern quarter. But since the notice has appeared, letters have been received from Mr. P. S. Sprague, Boston Natural History Society; Mr. Samuel Henshaw, Boston; Mr. Geo. D. Smith, Boston, for *Coleoptera*; and Dr. Theodore L. Mead, New York; Mr. Herman Strecker, Reading, Pa.; Mr. G. M. Levette, Assist. Geolog. Survey, Indianapolis, for *Lepidoptera*; and having neglected to

give my full address, possibly other letters may have gone astray. I want only 12 subscribers for *Lepidoptera*, and the terms are settled by correspondence. I am anxious to put the *Coleoptera* into the hands of one person, or an institution, who could work and determine the material, in order to put the matter in some form for future reference. I will supply notes with every species collected.—WM. COUPER, 38 Bonaventure St., Montreal.

PLATYSAMIA COLUMBIA.—I will give in exchange for a good example of this moth one hundred specimens of *Lepidoptera* of various genera from California, Southern and Atlantic United States, S. America, Europe, East Indian Archipelago, &c., or double the number for two examples; or, if it is preferable, I will pay in money. HERMAN STRECKER, BOX 111, Reading P. O., Berks Co., Pa. U. S.

CORK.—We have a good supply of sheet cork of the ordinary thickness, price 16 cents (gold) per square foot.

PINS.—We have still a supply of Nos. 3, 5 and 6 left. A large quantity have been ordered, and are shortly expected. The prices in future will be slightly raised. The present stock will be sold at 75c. (gold) per packet of 500.

CANADIAN ENTOMOLOGIST, Vols. 1, 2 and 3.—We have a few copies left of Vols. 1 and 2, No. 1, of Vol. 1, being, however, out of print. Price \$1.25 for Vols. 1 and 2; \$1 Vol. 3.

LIST OF CANADIAN COLEOPTERA.—Price 15 cents each, embracing 55 families, 432 genera, and 1231 species. (For labelling cabinets).

PRINTED NUMBERS, in sheets, 1 to 2000, for labelling cabinets. Price 10 cents each set.

These prices are exclusive of cost of transportation, and orders will please state whether the package is to be sent by mail or express.

AGENTS FOR THE ENTOMOLOGIST.

CANADA.—E. B. Reed, London, Ont.; W. Couper, Naturalist, Montreal, P. Q.; G. J. Bowles, Quebec, P. Q.; J. Johnston, Canadian Institute, Toronto, Ont.

UNITED STATES.—The American Naturalist's Book Agency, Salem, Mass.; J. Y. Green, Newport, Vt.; W. V. Andrews, Room 17, No. 137 Broadway, New York.